Document details - Retraction notice to "Applications of internet of things (IOT) to improve the stability of a grid connected power system using interline power flow controller" [Microprocessors and Microsystems 76 (2020) 103038] (Microprocessors and Microsystems (2020) 76, (S0141933119306635), (10.1016/j.micpro.2020.103038))

Microprocessors and Microsystems

Volume 103, November 2023, Article number 104941

Retraction notice to "Applications of internet of things (IOT) to improve the stability of a grid connected power system using interline power flow controller" [Microprocessors and Microsystems 76 (2020) 103038] (Microprocessors and Microsystems (2020) 76, (S0141933119306635), (10.1016/j.micpro.2020.103038))(Erratum)(Open Access)

Radhakrishnan, G., Gopalakrishnan, V.

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Document details - Production of sustainable biodiesel from alkaline pretreated dairy effluent using Yarrowia lipolytica

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Environmental Progress and Sustainable Energy

Volume 42, Issue 6, November/December 2023, Article number e14271

Production of sustainable biodiesel from alkaline pretreated dairy effluent using Yarrowia lipolytica(Article)

Srirajarajeshwari, M., Jeyanthi, J.

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Abstract

Biodiesel (BD) has grown in popularity over the last few years due to the global energy crisis, in addition to the depletion of reserves and the shortage of oil. The current study investigates the utilization of dairy effluent as a substratum for Yarrowia lipolytica, an oily yeast employed in biofuel

Document details - Highly sensitive magnetic field sensor based on uniform core fiber using Mn doped ZnO nanorods as cladding

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Materials Science in Semiconductor Processing

Volume 166, 1 November 2023, Article number 107732

Highly sensitive magnetic field sensor based on uniform core fiber using Mn doped ZnO nanorods as cladding(Article)

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Abstract

To realize the magnetic field sensing, pristine and Mn doped ZnO nanorods coated fiber optic sensor is proposed and experimentally demonstrated. In order to create both pristine and Mn-doped ZnO nanorods (5, 10, 15 and 20 at. %), the hydrothermal approach was used and subjected towards various characterization techniques such as XRD, SEM, EDS and XPS. The XRD data show that ZnO crystallized in wurtzite structure, while samples of ZnO doped with Mn (5, 10, 15 and 20 at. %) contained $ZnMnO_3$ impurity phase. The Mn doped ZnO nanorods served as the sensing component of the sensor structure made up of cladding modification technology. The magneto-refractive effect serves as the sensing principle. The effect of applied magnetic field on Mn doped ZnO nanorods coated cladding modified fiber optic sensor was investigated in detail. According to experimental

Biomass Conversion and Biorefinery

Volume 13, Issue 16, November 2023, Pages 15295-15305

Qualitative improvement of bio-oil derived from hydrothermal liquefaction of liquid fertiliser drained Kappaphycus alvarezii(Article)

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[b]Department of Mechanical Engineering, Government College of Technology, Tamilnadu, Coimbatore, 641013, India

Abstract

The purpose of this investigation was to explore the possibility of utilising post-sap residues for bio-oil production, that are produced after liquid fertiliser extraction from Kappaphucus alverizii, red macroalgae. The sap — a liquid fertiliser — was expelled by crushing the K. alverizii. The residual macroalgae were hydrothermally liquified at varying operating conditions (temperature, biomass to solvent ratio, residence time, catalyst dose), in order to understand its influence over the productdistribution and composition from thehydrothermal liquefaction (HTL) process. The maximal yield for crude bio-oil was 28.4 ± 0.6 wt.%, which was possible only when the HTL reactor was operated in presence of a ZSM-5 catalyst at 300 °C using 20 g of biomass for 30 min duration. Still, the bio-oil derived from the HTL process seems to possess higher oxygen content. Hence, the hydro-deoxygenation (HDO) process was carried out to upgrade the crude bio-oil into oxygenates less oil. The bio-char along with ZSM-5 derived from the previous HTL process was utilised as a catalyst in the HDO process. Catalysed HDO processes were able to improve the HHV of upgraded oil to 36.7 MJ/kg. Overall, this study implies that the crude bio-oil can be effectively produced from the post-sap residue, which can be further upgraded to calorific-rich fuel.

Author keywords

Document details - Optimization of wear properties on LM24 aluminium alloy reinforced with nano alumina and graphite using response surface methodology

Journal of Ceramic Processing Research

Volume 24, Issue 5, October 2023, Pages 899-906

Optimization of wear properties on LM24 aluminium alloy reinforced with nano alumina and graphite using response surface methodology(Article)

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Abstract

The dry sliding wear characteristics of metal matrix composites made of LM24 aluminium alloy reinforced with nano alumina (Al_2O_3) and graphite (Gr) are carried out. The aluminium alloy hybrid composites were prepared by the stir casting technique. In the present study, the wear behaviour of LM24-Al_2O_3-Gr hybrid composites with various weight percentages of Al_2O_3 (1, 3 and 5%) with a constant weight of 1% Gr reinforcement are studied. The parameters taken into account of wear bear behaviour of hybrid composites are applied load (10, 20 and 30 N), sliding distance (500, 1000 and 1500 m), sliding speed (200, 300 and 400 rpm) and Al_2O_3 (1, 3 and 5%) reinforcement. Wear tests are performed using the design of experiments, L27 orthogonal array on pin-on-disc equipment and identified optimising wear parameters in order to minimize the wear rate of LM24-Al_2O_3-Gr hybrid

Document details - Effective utilization of industrial and constructional solid waste materials in foundry mould making to prevent environment pollution and conserve natural silica sand

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Global Nest Journal

Volume 25, Issue 8, October 2023, Pages 35-42

Effective utilization of industrial and constructional solid waste materials in foundry mould making to prevent environment pollution and conserve natural silica sand(Article)(Open Access)

Prabhushankar, N., Balaji, N., Sridhar, N.

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[b]Department of Mechanical Engineering, Sri Krishna College of Engineering and Technology, Tamilnadu, Coimbatore, 641008, India

Abstract

Green sand moulding uses silica sand for metal casting. Silica sand mining and delivery to foundries destroy the ecosystem, making metal casting unsustainable. Due to increased sand-casting output and massive civil buildings in India, the silica sand supply is declining. The depletion and shortage of silica sand necessitate the search for viable replacements. Industrial solid waste from large-scale industrialization pollutes land, air, and water. In order to use industrial waste in large amounts, an attempt is made to use it as a replacement for natural resources. The main objective of

Document details - Incorporating of waste from sugar industry and cement industry in concrete

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Global Nest Journal

Volume 25, Issue 8, October 2023, Pages 81-90

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Incorporating of waste from sugar industry and cement industry in concrete(Article)(Open Access)

Ponnambalam, N., Chinnaraju, K., Chithra, S.

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Abstract

As the production of biomass waste from agroindustry grows across the world, a large amount of agro-based ashes ends up in polluting land The utilization of Sugarcane Bagasse ash (SBA) as Supplementary cementious materials (SCMs) contributes to a fixing of issues related to CO2 emissions from cement industry and land pollution in agro-based industry. Individual performance on the utilization of SBA and limestone in concrete reported by many researcher, research on their combined usage in the concrete is limited. As a result, the current work involves the performance evaluation of ternary blended concrete incorporating SBA and limestone. The blended concrete's workability properties, compressive strength, water absorption, Rapid Chloride Penetration Testing (RCPT), Sorptivity, water permeability and electrical resistivity are examined in this paper. It improves the compressive strength and durability properties of ternary blended concrete It was observed that addition of 10-15 % limestone along with 10 % SBA improves the concrete performance. However, exceeding 15 percent had a detrimental impact on concrete properties. The additional alumina

Document details - Exploratory of novel thermal barrier coating on diesel engine performance

Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering

Volume 237, Issue 5, October 2023, Pages 2083-2092

Exploratory of novel thermal barrier coating on diesel engine performance(Article)

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[b]Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India
[c]Department of Mechanical Engineering, Sri Ramakrishna Institute of Technology, Tamil Nadu, Coimbatore, India

Abstract

This research presents an experimental and theoretical evaluation of the effect of poly-composition thermal barrier coatings on the performance and emission characteristics of the compression ignition engine. This work investigated the thermal and physical behavior of thermal barrier coating. The

Document details - Study on the production, characterization, and application of coconut fiber biochar for effective removal of Co(II) ions from synthetic wastewater

Biomass Conversion and Biorefinery

Volume 13, Issue 15, October 2023, Pages 13677-13693

Study on the production, characterization, and application of coconut fiber biochar for effective removal of Co(II) ions from synthetic wastewater(Article)

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[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, India
[b]Department of Environmental Engineering, Government College of Technology, Coimbatore, 641013, India
[c]Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia

Abstract

Biochar from coconut fibers was produced, analyzed, and evaluated as a potential adsorbent for Co(II) ions in a synthetic solution. FTIR, XRD, and SEM analysis were utilized to study the topological characteristics of adsorbent material. Batch adsorption experiments were employed to study the effects of initial concentrations of Co(II) ions (10–200 mg/L), pH (8.0–14.0), temperature (20–50 °C), contact time (100 min), and coconut fiber biochar dosage (0.02–0.1 g). Various modeling studies were conducted to investigate the adsorption mechanism of Co(II) ions using coconut fiber biochar. The Freundlich isotherm model ($R^2 = 0.99$) and the pseudo-second-order kinetic model ($R^2 = 0.99$) fit the Co(II) ion adsorption well. When the two

Document details - Experimental studies on the effects of reinforcing cowpat ash with aluminium composites

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Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering

Volume 237, Issue 5, October 2023, Pages 1888-1899

Experimental studies on the effects of reinforcing cowpat ash with aluminium composites(Article)

Varun, B., Gopi, S., Manikandan, R.

[a]Department of Mechanical Engineering, Sri Ramakrishna Institute of Technology, Tamil Nadu, Coimbatore, India
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[c]Department of Mechatronics Engineering, Sri Krishna College of Engineering and Technology, Tamil Nadu, Coimbatore, India

Abstract

A brief study is attempted to identify the effects of cowpat ash (CPA) having single reinforcement and also a second reinforcement with titanium diboride (TiB_2) in aluminium 7075 alloys through the liquid metallurgy technique. The microstructural and mechanical properties of the fabricated samples are evaluated and compared with the base material to identify the increase and decrease in properties of the composite materials. In the first stage, single reinforced composites (SRCs) with CPA were varied by 2, 4, 6 and 8 weight percentages. It was found that at 6% of CPA the properties have enhanced in the composite materials. In the second stage of the research, hybrid reinforced composites (HRC) were fabricated with 6% CPA which was kept constant and TiB_2 were varied by 2, 4 and 6 weight percentages. Among the composition, it was found that at 6% CPA and 4% TiB_2 the properties of aluminium 7075 have enhanced. Optical microstructure, SEM with EDAX and XRD for SRC and HRC exhibited uniform distribution

Document details - Extraction of copper from waste printed circuit board by acid leaching and electrowinning

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AIP Conference Proceedings

Volume 2764, Issue 1, 13 September 2023, Article number 050005

2022 International Conference on Advanced Technologies in Chemical, Construction and Mechanical Sciences, iCATCHCOME 2022; Coimbatore; India; 24 March 2022 through 25 March 2022; Code 192741

Extraction of copper from waste printed circuit board by acid leaching and electrowinning(Conference Paper)

Angelaa Dass, M., Ravathi, M.C., Rama, M., Makesh Kumar, S., Rajeshkumar, K.

Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract

With the world moving towards the future rapidly, advancements in technologies are a must to fulfil the requirements that are necessary to both people and the industries that are a major part of the growth. This scenario leads to huge accumulation of electronic waste, which is sabotage to the environment and also causes huge wastage of resources. Proper disposal and recovery of resources is a serious measure to be considered. This study mainly focuses on the extraction of copper from waste printed circuit boards through a combined process of acid leaching and electrowinning. At first, pre-Treatment is done using NaOH for the removal of epoxy coating. Then three different acids such as Con.H2SO4, Con.HNO3 and Aqua regia

Document details - Biocompatibility of additively manufactured materials

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Mechanical Properties and Characterization of Additively Manufactured Materials

13 September 2023, Pages 67-84

Biocompatibility of additively manufactured materials (Book Chapter)

Thanigachalam, M., Subramanian, A.V.M., Sigamani, M., Nagarajan, S., Vadivel, S.

Government College of Technology, Coimbatore, India

Abstract

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Document details - Ferrite-Supported Nanocomposite Polymers for Emerging Organic and Inorganic Pollutants Removal from Wastewater: A Review

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Industrial and Engineering Chemistry Research

Volume 62, Issue 35, 6 September 2023, Pages 13711-13733

Ferrite-Supported Nanocomposite Polymers for Emerging Organic and Inorganic Pollutants Removal from Wastewater: A Review(Review)

Karthik, V., Dhivya Dharshini, G., Senthil Kumar, P., Kiruthika, S., Rangasamy, G., Periyasamy, S., Senthil Rathi, B.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, India
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View additional affiliations

Abstract

In recent years, organic and inorganic contaminants in wastewater (heavy metals, halides, nutrients, dyes, and pathogen-related water pollution) have become a major global problem. There were initially fewer toxins, but as a result of fast industrialization and other human activities, they have rapidly risen. In addition to producing a host of health problems and organ system failure in people, these toxins have had a disastrous effect on the ecological balance of plants, animals, and even microbes. On the basis of nanotechnology, several methods for decontaminating water that use

Document details - Agro-waste residue-based food packaging films

Natural Materials for Food Packaging Application

5 September 2023, Pages 75-87

Agro-waste residue-based food packaging films (Book Chapter)

Nithya, R., Thirunavukkarasu, A.

Government College of Technology, Department of Industrial Biotechnology, Thadagam Main Rd., Coimbatore, 641013, India

Abstract

Petrochemicals-based nonrenewable sources are the preferential choices for the commercial food packaging industries. As these sources are able to negatively impact the health of the ecosystem by producing vast quantity of nonbiodegradable solid wastes, there is a need to develop technologies based on the alternative and renewable forms of sources. Besides the socioeconomic awareness among the consumers also tend to innovate the food packing technologies with the bio-based resources. Among these, agro-waste residues-based biopolymers find attractive among the researchers as it has many advantages include abundance, availability in multiple forms, able to consume, no toxic or associated health outcomes, and biodegradability. Considering these facts, several technological developments have been made in the recent decade in the food packaging sectors. In this chapter, the different forms of the agro-waste-based biopolymers, their utilization as packing material, and their impact on imparting the functional attributes of the food were comprehensively reported. Also, the chapter identified significant research gaps which could be potentially addressed in the near future for the sustainable development in the field of food packaging and technology.

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Document details - Effect of antioxidant addition on stability and emission aspects of novel biodiesel generated from the yeast Yarrowia lipolytica cultivated on dairy effluent

Journal of Renewable and Sustainable Energy

Volume 15, Issue 5, 1 September 2023, Article number 053102

Effect of antioxidant addition on stability and emission aspects of novel biodiesel generated from the yeast Yarrowia lipolytica cultivated on dairy effluent(Article)(Open Access)

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[b]Department of Civil Engineering, Faculty of Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

The continuous utilization of fossil fuel reserves and augmented pollution level leads to inevitable transition toward renewable fuel in transportation sector. Biodiesel is one of the most renowned biofuels across the energy sector in recent decade. Even though biodiesel has many advantages, the stability is a key concern on downside of biodiesel. The presence of oxygenated compounds in biodiesel leads to faster rancidation during prolonged storage period. This research focuses on producing biodiesel from diary waste and assesses the influence of synthetic antioxidant on its stability. The

Document details - Application of machine learning controller in matrix converter based on model predictive control algorithm

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International Journal of Power Electronics and Drive Systems

Volume 14, Issue 3, September 2023, Pages 1489-1496

Application of machine learning controller in matrix converter based on model predictive control algorithm(Article)(Open Access)

Gounder, Y.K., Subramanian, S.

Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India

Abstract

Finite control set model predictive control (FCS-MPC) algorithms are famous in power converter for its easy implementation of constraints with cost function than classical control algortihms. However computation complexity increases when swicthing state is high for converters such as matrix converter, multilevel converters and this impose a serious drawback to compute multi-step prediction horizon MPC algorithm which further increases the computation. To overcome the above said difficulty, machine learning based artificial neural network (ANN) controller for matrix converter is proposed. The training data for ANN controller is derived from MPC algorithm and trained offline with an accuracy of 70.3%. The proposed ANN controller shows a similar and better performance than MPC controller in terms of total harmonic distortion (THD), peak overshoot during dynamic change in reference current and dynamic change in load parameter and less computation with less execution time. Further, ANN

Document details - Mechanical and Materialistic Characterization of Poly Lactic Acid/Zeolite/Hydroxyapatite Composites

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Journal of Inorganic and Organometallic Polymers and Materials

Volume 33, Issue 9, September 2023, Pages 2743-2751

Mechanical and Materialistic Characterization of Poly Lactic Acid/Zeolite/Hydroxyapatite Composites(Article)

Ayyanar, C.B., Marimuthu, K., Sridhar, N., Mugilan, T., Alqarni, S.A., Katowah, D.F., Sanjay, M.R., Siengchin, S.

[a]Department of Mechanical Engineering, Coimbatore Institute of Technology, Tamilnadu, Coimbatore, 641 014, India
[b]Department of Mechanical Engineering, Government College of Technology, Tamilnadu, Coimbatore, 614 013, India
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View additional affiliations

Abstract

The medical sector needs medical devices that are biocompatible or bioabsorbable, and Poly Lactic Acid (PLA) satisfies that need. PLA is a thermoplastic polymer that degrades naturally and has good mechanical strength. In order to create anchors, screws, plates, pins, rods, and mesh for medical implants, polylactic acid, which is harmless, can be broken down into lactic acid. The primary objective of this work is to characterize the mechanical properties and material properties of polymer composite materials reinforced with hydroxyapatite (HAp), zeolite, magnesium, and zinc

Document details - Machining characteristics of aluminium oxide bioinert ceramics and optimization of ECDM process parameters

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AIP Conference Proceedings

Volume 2861, Issue 1, 7 August 2023, Article number 040002

1st International Conference on Minerals, Materials and Manufacturing Methods, ICMMMM 2022; Coimbatore; India; 18 March 2022 through 19 March 2022; Code 192175

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Machining characteristics of aluminium oxide bioinert ceramics and optimization of ECDM process parameters(Conference Paper)

Balaji, M., Balakrishnan, S., Sathishkumar, N.

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Abstract

A novel technique known electrochemical discharge machining (ECDM) uses physical and chemical phenomena to remove material from non-

Document details - Influence of Biodegradable Vertical Drains on Soft Soil

Indian Journal of Environmental Protection

Volume 43, Issue 8, 1 August 2023, Pages 750-756

Influence of Biodegradable Vertical Drains on Soft Soil(Article)

Sathyapriya, S., Gayathridevi, K., Sharvesh, R.

[a]Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India
[b]Hindusthan College of Engineering and Technology, Tamil Nadu, Coimbatore, 641 050, India

Abstract

Consolidation parameters are a crucial component in stability analyses of embankments, footings or columns built on clayey soil. The settlement behaviour of the structures and the pore pressure changes need to be looked upon when structures are built over such soil. Prefabricated vertical drains (PVD) are used to accelerate the process of consolidation by permitting pore water pressures to dissipate easily when subjected to overburden pressures. To avoid detrimental impact on the environment due to the use of polymeric materials in vertical drains, biodegradable vertical drains are employed. This paper reports water absorption capacity tests, consolidation tests, discharge capacity tests and numerical analyses carried out for natural prefabricated vertical drains (NPVD). The natural prefabricated vertical drains are made of jute sheath covering core made-up of bamboo material. The water absorption capacity of fibres used is 8% lesser compared to the other fibres (coir and jute). Consolidation results showed that coefficient of consolidation, coefficient of permeability, coefficient of compressibility, coefficient of volume change and compression index increased with use of a single NPVD in soft clay. Results from discharge capacity test showed a decrease in discharge capacity when compressive stress is increased, at the same hydraulic gradient. The numerical analysis result showed dissipation of pore water pressure while increasing time. © 2023 -

Document details - Adsorption of co(Ii) ions using indigenous tamarind seed biochar: Batch adsorption and modeling studies

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Global Nest Journal

Volume 25, Issue 6, August 2023, Pages 120-129

Adsorption of co(Ii) ions using indigenous tamarind seed biochar: Batch adsorption and modeling studies(Article)(Open Access)

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[b]Department of Industrial Biotechnology, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[c]Department of Chemical Engineering, School of Mechanical, Chemical, and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia

Abstract

With an estimated volume of 162 thousand metric tonnes in 2020, India is the world's largest producer of tamarind. The country is home to a number of tamarind species, and production is spread out across the country. Farmers and agro-industries continue to encounter numerous challenges in the processing and disposal of waste created during tamarind harvesting and processing. However, because this agricultural waste is disposed of fast, it may pollute the ecosystem. As a result, this study focused on agricultural waste reuse for wastewater treatment, with tamarind seeds serving as the principal source for low-cost adsorbent (biochar) manufacture to remove harmful Co (II) ions rendered as an aqueous solution. Biochar is a form of

Document details - Experimental investigation and prediction of ECDM parameters on fiber reinforced SiC composite using hybrid ERNN-based Sparrow Search Optimization

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Materials Today Communications

Volume 36, August 2023, Article number 106777

Experimental investigation and prediction of ECDM parameters on fiber reinforced SiC composite using hybrid ERNN-based Sparrow Search Optimization(Article)

Manoharan, V., Tamilperuvalathan, S.

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[b]Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

The Silicon Carbide (SiC) fiber-reinforced SiC ceramic matrix composites have proved their outstanding performance on high thermal applications such as gas turbine engine parts, turbo-pumps, nozzles, and various other aerospace/aero-propulsion system parts. Regardless of their enhanced strength properties, the SiC fiber-reinforced SiC ceramic composite materials are difficult to process using conventional machining methods. Also, SiC fiber-reinforced SiC ceramic promotes a higher tool wear rate while doing conventional drilling operations. Therefore, this study investigates the

Document details - A review on the Investigation of Hydrocyclone Performance by shape optimization

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Volume 405, 26 July 2023, Article number 04047

2023 International Conference on Sustainable Technologies in Civil and Environmental Engineering, ICSTCE 2023; Dr. D. Y. Patil Institute of TechnologyPune; India; 15 June 2023 through 16 June 2023; Code 191167

A review on the Investigation of Hydrocyclone Performance by shape optimization(Conference Paper)(Open Access)

Vimal, A., Thalaieswaran, S., Kannan, N.H., Ganeshan, P., Venkatesh, S.

[a]Sri Eshwar College of Engineering, Tamil Nadu, Coimbatore, 641202, India
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[c]PSNA College of Engineering and Technology, Tamil Nadu, Dindugul, 642622, India

Abstract

A hydrocyclone is a centrifugal classifier that separates particles by size using centrifugal force. Applications for hydrocyclones are incredibly varied. It is used to separate solids from liquids, liquids from liquids, and gases from liquids. It is easy to install and use, simple, inexpensive, and low maintenance. It serves as the brain of the mineral processing plant and is used to process water in important sectors of the textile, petroleum, chemical, paper, and agricultural industries. It is made up of a cylindrical and a conical portion. Three holes are present-Two outputs and one for the

Document details - Functionalized nanofibers in gas sorption process: a critical review on the challenges and prospective research

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Environmental Monitoring and Assessment

Volume 195, Issue 8, August 2023, Article number 969

Functionalized nanofibers in gas sorption process: a critical review on the challenges and prospective research(Review)

Nithya, R., Thirunavukkarasu, A., Hemavathy, R.V., Sivashankar, R., Kishore, K.A., Sabarish, R.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India
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View additional affiliations

Abstract

Air pollution has become the most important environmental and human health threat as it is accounting for about 7 million deaths across the globe

Document details - Performance analysis of cost-effective hybrid polypropylene-steel engineered cementitious composites and prediction based on artificial neural network

Structural Concrete

Volume 24, Issue 4, August 2023, Pages 4823-4840

Performance analysis of cost-effective hybrid polypropylene-steel engineered cementitious composites and prediction based on artificial neural network(Article)

Soniya, S.M., Chithra, R.

Department of Civil Engineering, Government College of Technology, Coimbatore, India

Abstract

Engineered Cementitious Composites (ECCs) is a high-performance fiber-reinforced cementitious composite renowned for their excellent tensile strain hardening behavior. Among the reinforcing fibers, PolyVinyl Alcohol (PVA) featuring sufficient tensile strength but the fiber's cost is relatively high. Hence, this research has attempted to obtain strain-hardening ECC by locally available fibers. Hybridization of Recron 3s PolyPropylene (PP) fibers and hooked-ended steel fibers (SFs) were chosen to improve the strain hardening behavior. According to the compressive test and direct tensile test results, mixes developed with

Investigations on the Mechanical Characteristics of the Stainless Steel 316L Alloy Fabricated by Directed Energy Deposition for Repairing Application(Article)

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[b]Department of Manufacturing Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[c]Department of Production Engineering, National Institute of Technology, Tamil Nadu, Tiruchirappalli, 620015, India

Abstract

The present work aims to adopt the directed energy deposition (DED) technique for repairing the hot rolled steel (HRS) by depositing stainless steel 316L (SS316L) material over the hot rolled steel. The mechanical and microstructural characteristics of the as-built DED sample, HRS sample, and repaired samples are evaluated in the present work. The mechanical characteristics such as microhardness and tensile strength of the repaired samples are studied. A succinct comparison is made between the HRS samples and the as-built DED samples. The ultimate tensile strength of the repaired sample (hybrid sample), HRS sample, and the as-built DED sample is found to be 541, 590, and 598 Mpa, respectively. The DED sample has an average microhardness of 228HV, while the HRS sample has an average microhardness of 215HV, and the average microhardness of the interface region is 236HV. This work clarified the difference in microstructural characteristics of the interface region, as-built DED samples, and HRS samples. The samples repaired by DED process possess required metallurgical bonding, and hence, DED process can be used to repair HRS components.

Author keywords

additive manufacturing | directed energy deposition | hot rolled steel | repair work | stainless steel 316L

Indexed keywords

Engineering controlled terms: 3D printing | Austenitic stainless steel | Deposition | Hot rolled steel | Hot rolling | Microhardness | Repair

Engineering uncontrolled Directed energy | Directed energy deposition | Energy depositions | Hot rolled steels | Interface regions

Improved data clustering methods and integrated A-FP algorithm for crop yield prediction(Article)

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[b]Department of Computer Science and Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

Big data analysis is the process of gathering, managing and analyzing a large volume of data to determine patterns and other valuable information. Agricultural data can be a significant area of big data applications. The big data analysis for agricultural data can comprise the various data from both internal systems and outside sources like weather data, soil data, and crop data. Though big data analysis has led to advances in different industries, it has not yet been extensively used in agriculture. Several machine learning techniques are developed to cluster the data for the prediction of crop yield. However, it has low accuracy and low quality of the clustering. To improve clustering accuracy with less complexity, a Proximity Likelihood Maximization Data Clustering (PLMDC) technique is developed for both sparse and densely distributed agricultural big data to enhance the accuracy of crop yield prediction for farmers. In this process, unnecessary data is cleansed from the sparse and dense based agricultural data using a logical linear regression model. After that, the presented clustering method is executed depending on the similarity and weight-based Manhattan distance. The genetic algorithm (GA) is applied with a good fitness function to select the features from the clustered data. Finally, the decision support system is computed by the A-FP growth algorithm to predict the crop yields according to their selected features such as weather features and crop features. The results of the proposed PLMDC technique are better in case of clustering accuracy of both spare and densely distributed data with minimum time and space complexity. Based on the results observations, the PLMDC technique is more efficient than the existing methods.

Author keywords

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Topic:

Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering

Volume 237, Issue 3, June 2023, Pages 971-981

Redesigning and numerical simulation of gating system to reduce cold shut defect in submersible pump part castings(Article)

Kumar, J.Y., Gopi, S., Amirthagadeswaran, K.S.

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[b]Department of Production Engineering, Government College of Technology, Coimbatore, India
[c]Department of Mechanical Engineering, United Institute of Technology, Coimbatore, India

Abstract

Gating system design is an essential element in casting that significantly affects the melt's molten metal flow behaviour, heat transfer, and solidification. Improper gating system leads to pouring-related defects like cold shut, misrun, etc. Submersible pump-bearing block castings produced in one of the leading foundries are rejected due to a cold shut defect. It was identified that the improper gating system is the probable cause for rejection. The bearing block and the existing gating system were modelled in 3D modelling software, and the molten metal flow behaviour of casting was simulated with casting simulation software. Based on the simulation results, the existing gating system was redesigned following established empirical relations. The component with the revised gating system was analysed for flow behaviour through simulation with the software. With the revised gating system, elimination of cold shut is observed, and the revised gating design is recommended to the industry for implementation. The effectiveness of the revised gating system is also validated with pump diffuser casing, which has similar geometrical and material characteristics. The simulation results and experimental validation showed a reduction in flow and surface defects. Appropriate design of the gating system and balanced arrangement of cavities in the gating system are noted to reduce the flow and surface-related defects. It is observed that with the revised gating systems, the percentage of rejection is reduced from 28.36% to 2.34% and 23.43% to 2.45% for the bearing block and pump diffuser casing respectively. © IMechE 2022.

Author keywords

casting simulation | Cold shut | finite volume method | gating system | surface defect

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Biomass Conversion and Biorefinery

Volume 13, Issue 8, June 2023, Pages 7349-7373

Performance evaluation and hybrid deep recurrent neural network-based prediction of SS304 turning characteristics using nanoparticles added water emulsified MQL(Article)

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[b]Department of Mechanical Engineering, Government College of Technology, Thadagam Main Rd, Tamil Nadu Agricultural University, Tamil Nadu, Coimbatore, 641013, India

Abstract

Due to the enormous applications in aircraft, architecture, machinery parts etc., the SS304 alloy steel should possess some quality outcome during machining. But, achieving such quality during machining is somewhat difficult for SS304 due to enlarged heat generation caused by tool-surface interaction. The superior aim of this proposed work is to enhance the machinability of SS304 with an optimum minimum quantity lubrication (MQL). In this work, the CNC turning operation is carried out in SS304 with different lubricant conditions such as dry, water-emulsified coconut oil (MQL), single, dual, and tri-hybrid nanoparticle immersed MQLs. Based on the machining performance, the best working environment is selected. The experimentation is planned using Box-Behnken design (BBD) of response surface methodology (RSM). The input machining parameters used for measuring the machining outcomes are spindle speed (S), feed (Fd), depth of cut (DOC), and nanoparticles combination in MQL. Besides, the hybrid deep recurrent neural network-black widow optimizer (DRNN-BWO)-based prediction model is carried out to validate the experimental outcomes. The achieved optimal tool wear and surface roughness is 0.09 mm and 0.11 μm. The observed surface roughness is 6.18 times and 4.18 times better than dry and MQL. Compared to the dry and MQL conditions, the noticed tool wear is 2 times and 1.3 times lesser in the proposed dual hybrid nano-MQL condition. The predicted results of DRNN-BWO are closer to the actual outcomes with a better regression value greater than 0.9. © 2023, The

Document details - A Review on Evolution of Aeroelastic Assisted Wing

International Journal of Aeronautical and Space Sciences

Volume 24, Issue 3, July 2023, Pages 652-688

A Review on Evolution of Aeroelastic Assisted Wing(Article)

Sivanandi, P., Gupta, C., Durai, H.

[a]Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[b]North Eastern Space Applications Centre (NESAC), Department of Space, Government of India, Umiam, Meghalaya, 793103, India

Abstract

Aeroelastic wings have a significant capacity like normal flyers, to improve the aircraft's overall performance and maneuverability. It is a plugin that allows changing the airfoil-level morphing like changing wing airfoil, wing camber and wing-level morphing like changing the wing reference area, aspect ratio, sweep, twist, folding, and the angle of attack (AOA) in the wing's various portions. By dynamically adjusting or enhancing the shape for various flight conditions beyond the current ideas, there are still many new openings. The most prominent forms of morphing mechanisms used mostly for 2D and 3D wing configurations are examined in this research. The technology that is commonly utilized to develop and analyze an aeroelastic wing is thoroughly examined. Adapting morphing technology for practical purposes is highly challenging, and several reasons for this are also considered during the review process.

Author keywords

Document details - Biochar production from Manilkara zapota seeds, activation and characterization for effective removal of Cu²⁺ ions in polluted drinking water

Biomass Conversion and Biorefinery

Volume 13, Issue 11, July 2023, Pages 9381-9395

Biochar production from Manilkara zapota seeds, activation and characterization for effective removal of Cu^{2+} ions in polluted drinking water(Article)

Karthik, V., Karuna, B., Jeyanthi, J., Periyasamy, S.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, India
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[c]Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia

Document details - A Prediction Model Based Energy Efficient Data Collection for Wireless Sensor Networks

1 of 1

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Journal of Machine and Computing

Volume 3, Issue 4, October 2023, Pages 360-378

A Prediction Model Based Energy Efficient Data Collection for Wireless Sensor Networks(Article) (Open Access)

Balakumar, D., Rangaraj, J.

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Abstract

– Many real-time applications make use of advanced wireless sensor networks (WSNs). Because of the limited memory, power limits, narrow communication bandwidth, and low processing units of wireless sensor nodes (SNs), WSNs suffer severe resource constraints. Data prediction algorithms in WSNs have become crucial for reducing redundant data transmission and extending the network's longevity. Redundancy can be

Document details - Ferrite-Supported Nanocomposite Polymers for Emerging Organic and Inorganic Pollutants Removal from Wastewater: A Review

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Industrial and Engineering Chemistry Research

Volume 62, Issue 35, 6 September 2023, Pages 13711-13733

Ferrite-Supported Nanocomposite Polymers for Emerging Organic and Inorganic Pollutants Removal from Wastewater: A Review(Review)

Karthik, V., Dhivya Dharshini, G., Senthil Kumar, P., Kiruthika, S., Rangasamy, G., Periyasamy, S., Senthil Rathi, B.

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[b]Department of Chemical Engineering, Sri Sivasubramaniya Nadar College of Engineering, Tamil Nadu, Kalavakkam, 603 110, India
[c]Centre of Excellence in Water Research (CEWAR), Sri Sivasubramaniya Nadar College of Engineering, Tamil Nadu, Kalavakkam, 603 110, India

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Abstract

Document details - Analysis of seasonal variation and dispersion pattern of ambient air pollutants in an urban environment

Global Nest Journal

Volume 25, Issue 5, May 2023, Pages 66-75

Analysis of seasonal variation and dispersion pattern of ambient air pollutants in an urban environment(Article)(Open Access)

Sadheesh, S., Jeyanthi, J.

[a]Department of Civil Engineering, Sri Krishna College of Engineering and Technology, Coimbatore, India
[b]Department of Civil Engineering, Government College of Technology, Coimbatore, India

Abstract

The level of air pollution increased in urban areas due to local atmospheric conditions and dispersion of various air pollutants. In this study, the air quality index was carried out in four places in the urban zone and investigated the seasonal variation of PM2.5, PM10, SO2, NO2, and O3 over one

Document details - Investigations on the Mechanical Characteristics of the Stainless Steel 316L Alloy Fabricated by Directed Energy Deposition for Repairing Application

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Journal of Materials Engineering and Performance

Volume 32, Issue 9, May 2023, Pages 4138-4150

Investigations on the Mechanical Characteristics of the Stainless Steel 316L Alloy Fabricated by Directed Energy Deposition for Repairing Application(Article)

Vinoth, V., Sekar, T., Kumaran, M.

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[c]Department of Production Engineering, National Institute of Technology, Tamil Nadu, Tiruchirappalli, 620015, India

Abstract

The present work aims to adopt the directed energy deposition (DED) technique for repairing the hot rolled steel (HRS) by depositing stainless steel

Document details - Time Cluster Personalized Ranking Recommender System in Multi-Cloud

Mathematics

Volume 11, Issue 6, March 2023, Article number 1300

Time Cluster Personalized Ranking Recommender System in Multi-Cloud(Article)(Open Access)

Abinaya, S., Indira, K., Karthiga, S., Rajasenbagam, T.

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Abstract

Recommender systems have become a vital tool to identify items for users based on personalized preferences. The personalized ranking or item recommendation generates a ranked list of items for the users. Clustering methods offer better scalability than collaborative filtering (CF) methods since they make predictions within small clusters. The major challenges of recommender systems are accuracy and scalability. Traditionally, recommendation systems are based on a centralized framework that restrains quick scalability for enormous data volumes. The emergence of cloud technology resolves this issue as it handles vast data and supports massive processing. This paper proposes a time cluster personalized ranking recommender system (TCPRRS) in a multi-cloud environment. TCPRRS is a five-stage system that generates recommendations based on temporal information of user consumption and clustering with personalized ranking. Particle swarm optimization (PSO) is utilized for optimizing the solution.

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ARPN Journal of Engineering and Applied Sciences

Volume 18, Issue 6, March 2023, Pages 687-691

GW OPTIMIZATION-BASED MPPT FOR SOLAR PHOTOVOLTAIC SYSTEM(Article)

Kanagaraj, R., Kailasam, Y.

Government College of Technology, Coimbatore, India

Abstract

The most efficient and cleanest form of renewable energy source for effective power generation is the solar photovoltaic (PV) system. In recent years, solar energy generation has become an essential part of electric power applications. The power produced by the solar PV system is unstable, as it depends upon illumination and global climatic change. So as to get the uttermost efficacy the solar PV system must be guided at the maximum point. An efficient MPP tracking method has a vital function to play in upgrading the efficacy of a solar PV system. The operational point of the

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Volume 13, Issue 5, April 2023, Pages 3837-3848

Optimization of process parameters of the growth of Chlorella vulgaris for the production of biodiesel feedstock (microbial lipid) using sago wastewater as substrate(Article)

Vishnu Priya, M., Ramesh, K.

Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India

Abstract

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Volume 12, Issue 2, April 2023, Pages 792-799

Analysis of a Li-ion battery state of charge by artificial neural network(Article)(Open Access)

Arunagirinathan, S., Subramanian, C.

Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India

Abstract

The state of charge (SOC) is a battery residual capacity crucial assessment metric. The need for a precise SOC estimate is very important to ensure the safe functioning of a Li-ion battery and to prevent overload and over-depletion. However, the renewable energy-based standalone application has become a key problem to determine the exact capacity of SOC of the Li-ion battery. To estimate the capacity over time, the battery management system calculates the SOC of a Li-ion battery. This allows for the implementation of intelligent control systems. This paper presents an enhanced radial basis function (RBF) of the SOC battery estimate following the limits and weaknesses of the back propagation (BP) neural network (NN) in estimating battery SOC, such as sluggish convergence speed, poor generalization and can increase the accuracy of the network but it takes time to iterate. Train the enhanced RBF with experimental data in real-time. The trained NN of SOC is compared to actual values and the MATLAB is used to simulate the method to evaluate its accuracy.

Document details - Sustainable use of reclaimed asphalt pavement (RAP) in pavement applications—a review

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Environmental Science and Pollution Research

Volume 30, Issue 16, April 2023, Pages 45587-45606

Sustainable use of reclaimed asphalt pavement (RAP) in pavement applications—a review(Review)

Mariyappan, R., Palammal, J.S., Balu, S.

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Abstract

The purpose of this review is to examine the innovative usage of Reclaimed Asphalt Pavement (RAP) in flexible pavement applications. RAP is elucidated as isolated pavement earthly materials consisting of asphalt and aggregates. When the existing/old asphalt is removed for reconstruction, and resurfacing, these materials are generated. Now, it is highly required to classify the available RAP for further essential use in road construction. RAP addresses the issues regarding the diminishing of Virgin Aggregate (VA) sources, storage of material and disposal of RAP material nearby the site. The utilization of RAP includes social benefits like depletion of manufacturing waste, conservation of non-renewable natural stockpiles and low

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Tan, Y. , Xie, J. , Song, J.

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Environmental Nanotechnology, Monitoring and Management

Volume 19, May 2023, Article number 100779

Fe-TiO_2 and Ag-ZnO mediated visible light photocatalysis for atenolol and acetaminophen removal – A comparative study and modeling(Article)

Ramasamy, B., Jeyanthi, J., Chinnaiyan, P.

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Abstract

Document details - Characteristic investigation and photodetection analysis on Zn_{1-x}Hg_xO nanoflakes for near ultraviolet-visible photodetectors

Journal of Alloys and Compounds

Volume 949, 15 July 2023, Article number 169755

Characteristic investigation and photodetection analysis on $Zn_{1-x}Hg_xO$ nanoflakes for near ultraviolet-visible photodetectors(Article)

Jacob, A.A., Balakrishnan, L.

[a]School of Engineering, Emirates Aviation University, Dubai, 53044, United Arab Emirates
[b]Department of Physics, Government College of Technology, Tamilnadu, Coimbatore, 641 013, India

Abstract

Document details - A Pair-Task Heuristic for Scheduling Tasks in Heterogeneous Multi-cloud Environment

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Wireless Personal Communications

Volume 131, Issue 2, July 2023, Pages 773-804

A Pair-Task Heuristic for Scheduling Tasks in Heterogeneous Multi-cloud Environment(Article) (Open Access)

Krishnasamy, K.G., Periasamy, S., Periasamy, K., Prasanna Moorthy, V., Thangavel, G., Lamba, R., Muthusamy, S.

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Abstract

Document details - Energy Aware Smart Sensing and Implementation in Green Air Pollution Monitoring System

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Volume 2023-May, 2023, Pages 2153-2158

2023 IEEE International Conference on Communications, ICC 2023; Rome; Italy; 28 May 2023 through 1 June 2023; Category numberCFP23ICC-ART; Code 193943

Energy Aware Smart Sensing and Implementation in Green Air Pollution Monitoring System(Conference Paper)

Ghosh, S., Das, P., Murugesh, S., De, S., Chatterjee, S., Portmann, M.

[a]Iit Delhi, UQ-IITD Academy, New Delhi, India
[b]Iit Delhi, Department of EE, New Delhi, India
[c]Government College of Technology, Department of ECE, Coimbatore, India

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Abstract

The field-deployed Internet-of-Things (IoT) sensor nodes are powered by rechargeable batteries. The nodes are equipped with energy harvesters to harvest energy from the environment to replenish the batteries and continue the sensing operations. However, due to the high energy consumption of the power-hungry sensors, the nodes still suffer from energy depletion issues. Towards a green IoT system, an energy aware adaptive sensing

Document details - A Hybrid Technique for Optimal Placement of Fast-Charging Stations of Electric Vehicles for the Reliability of Distribution Network

Energy Technology

2023

A Hybrid Technique for Optimal Placement of Fast-Charging Stations of Electric Vehicles for the Reliability of Distribution Network

(Article in press ?)

Ranjith Kumar, K., Vallimurugan, E.

Department of Electrical and Electronics Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract

Proper planning for electric vehicle (EV) charging stations, as well as the necessary network development, is critical for the continued growth of EVs and conventional loads. This article proposes a hybrid method for the allocation of fast-charging stations (FCSs) and photovoltaic (PV) with battery energy storage (BES) and scheduling. The proposed hybrid technique is the wrapper of golden jackal optimization (GJO) and random forest algorithms (RFA), commonly named the GJO–RFA technique. Using the GJO approach, the allocation and EV assignment problems are resolved. RFA is used to address EV, traffic flow, and PV-related uncertainties. The objective of the proposed approach is to minimize the loss of energy, investments, index of voltage deviation, and operation and maintenance costs of FCS, PV, and BES. The associated important factors are also assessed, including the number of charging ports, FCS capacity, and EV flow caught using a FCS. As a test example, a 33-node radial distribution

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Lipid extraction and analysis of micr strain pectinodesmus PHM3 for bio production

(2023) BMC Biotechnology

Chilakamarry, C.R. , Khilji, I.A. , Sirol

Maximizing the value of biodiesel in waste: Exploring recover, recycle, an reuse for sustainable environment

(2023) Environmental Technology ar

Fuel

Volume 332, 15 January 2023, Article number 126199

Microalgal biofuel production: Potential challenges and prospective research(Article)

Sathya, A.B., Thirunavukkarasu, A., Nithya, R., Nandan, A., Sakthishobana, K., Kola, A.K., Sivashankar, R., Tuan, H.A., Deepanraj, B.

[a]Department of Biotechnology, National Institute of Technology, Warangal, India
[b]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India
[c]Department of Health Safety and Environment & Civil Engineering, University of Petroleum and Energy Studies, Dehradun, India

View additional affiliations

Abstract

Exponential growth in industrialization can be seen as a direct outcome of the urbanization which results in the continuous depletion of natural energy reserves. The existence of carbon dioxide in the ecosystem is primarily due to the fossil fuel combustion from the variety of energy-driven vehicles. Hence, to reduce its levels in the atmosphere and to prevent the depletion of non-renewable resources, scientific researchers have made significant attempts to provide alternate and sustainable ways of producing energy. One such noteworthy effort is the biofuel production from the microalgae that has an excellent potential in lipid accumulation and bioconversion. Despite numerous reports are available on the effective biofuel

Document details - Biodecolorization of Reactive Red 120 in batch and packed bed column using biochar derived from Ulva reticulata

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Biomass Conversion and Biorefinery

Volume 13, Issue 3, February 2023, Pages 1707-1721

Biodecolorization of Reactive Red 120 in batch and packed bed column using biochar derived from Ulva reticulata(Article)

Kumar, M., Gokulan, R., Sujatha, S., Shanmuga Priya, S.P., Praveen, S., Elayaraja, S.

[a]Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[b]Department of Civil Engineering, GMR Institute of Technology, Rajam, Andhra Pradesh, Srikakulam, 532127, India
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View additional affiliations

Abstract

A seaweed Ulva reticulata was used to synthesis biochar, and it was used in the removal of Reactive Red 120 (R120). The optimum thermal pyrolysis temperature was found to be 300 °C, and it was confirmed by proximate and elemental analysis of the biochar. The practical applicability of this biochar was explored by conducting the experiments in batch and continuous mode. An up-flow packed bed reactor was used to study the removal of reactive red 120 in continuous mode. The operating parameters like solution pH, contact time, biochar dosage, temperature, initial concentration

Document details - Improved three phase H-7 transformerless inverter with DPWM to reduce leakage current using CNN based deep learning technique

Artificial Intelligence Review

Volume 56, Issue 2, February 2023, Pages 1319-1347

Improved three phase H-7 transformerless inverter with DPWM to reduce leakage current using CNN based deep learning technique(Article)

Suganthi, R., Pandi, M.

[a]Research Scholar, Government College of Technology, Coimbatore, India
[b]Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India

Abstract

This investigation presents the three-phase Transformerless Inverters (TLI) for a solar photovoltaic (PV) system connected to a high power grid will be implement with better performance and lower cost. Many clamping topologies are developed in the single phase TLI solar PV system and have proven that they are better than the unclamped inverter topologies. In this proposed research, different DC decoupled transformerless inverter topologies with modified discontinuous PWM technique are derived from three phase H-7 transformerless inverter topologies respectively. Further, active switch and diode-based clamped topologies are proposed in addition. This topology certainly minimizes the fluctuations in the common mode voltage of the inverter during zero voltage state. Meanwhile it creates the path for leakage current flow in the off state grid voltage. Evaluations of

Document details - Recent advances in consolidated bioprocessing for conversion of lignocellulosic biomass into bioethanol – A review

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Chemical Engineering Journal

Volume 453, 1 February 2023, Article number 139783

Recent advances in consolidated bioprocessing for conversion of lignocellulosic biomass into bioethanol – A review(Article)

Periyasamy, S., Beula Isabel, J., Kavitha, S., Karthik, V., Mohamed, B.A., Gizaw, D.G., Sivashanmugam, P., Aminabhavi, T.M.

[a]Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia
[b]Department of Energy and Environment, National Institute of Technology, Tiruchirappalli, 620 015, India
[c]Department of Biotechnology, Adhiyamaan College of Engineering, Tamil Nadu, Hosur, India

View additional affiliations

Abstract

As the world's population grows, it will be necessary to make long-term technical advancements to meet energy needs without jeopardizing the planet's scarce resources. There are several benefits to using renewable energy systems, such as stabilizing energy supply and demand, ensuring food security and economic stability, and protecting the environment from pollution. Bioethanol is a possible alternative for a renewable and long-term energy source. However, for long-term survival and economic viability, it is critical to focus on lower-cost ethanol production for this fuel to compete

Document details - Conversion of novel tannery sludge-derived biochar/TiO₂ nanocomposite for efficient removal of Cr (VI) under UV light: photocatalytic performance and mechanism insight

Environmental Science and Pollution Research

Volume 30, Issue 10, February 2023, Pages 28173-28191

Conversion of novel tannery sludge-derived biochar/TiO_2 nanocomposite for efficient removal of Cr (VI) under UV light: photocatalytic performance and mechanism insight(Article)

Velumani, M., Jeyadharmarajan, J.

Department of Civil Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

An investigation on the reduction of Cr (VI) pollutant from tannery effluents using TiO_2, SB/TiO_2, and c-SB/TiO_2 nano photocatalysts was presented in this study. For the preparation of Biochar-based TiO_2 photocatalyst (SB/TiO_2), tannery sludge was utilized as a precursor. Hydrothermal pre-treatment was adopted to prepare chemically activated SB/TiO_2 and SB/TiO_2 nanocomposites. The morphology, crystal structure, optical properties, and elemental composition of the prepared catalysts were analyzed by XRD, FT-IR, SEM–EDX, BET analysis, ZPC, PL, TGA, and Raman spectroscopy. The band gap analysis of Photocatalyst was measured using a DRS instrument, and band gap energy of 3.39 eV was obtained for c-SB/TiO_2

Document details - Recovery of bioethanol from food waste using Saccharomyces cerevisiae

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Global Nest Journal

Volume 25, Issue 3, February 2023, Pages 87-90

Recovery of bioethanol from food waste using Saccharomyces cerevisiae(Article)(Open Access)

Murugan, S., Sujithaadevi, S.

Department of Environmental Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract

Excessive use of fossil fuels results in the rapid depletion of non-renewable fossil energy resources, a rise in fuel cost, and an uncontrolled emission of greenhouse gases which causes a severe threat to the environment. Bio-fuels are being scrutinized as substitutes for current high-pollutant fuels obtained from conventional sources. To meet the global demands, it becomes necessary to find an alternate source of fuel which is bioethanol. In this work, a strategy to promote ethanol production from Leftover Cooked Rice (LCR) by comparing the different types of hydrolysis was proposed. Process integration comprised of mechanical pretreatment of the leftover cooked rice followed by hydrolysis which was then followed by fermentation. The food wastes of weight 50g taken in each of the 3 fermenters were subjected to acid hydrolysis, enzyme hydrolysis, and combined hydrolysis respectively. Commercially available Baker's yeast (Saccharomyces cerevisiae) was used for the fermentation process. The fermented samples were subjected to distillation to separate the bioethanol from them. The amount of bioethanol obtained from combined hydrolysis, acid

Document details - In-silico docking studies of selected phytochemicals against papain like protease of SARS-Cov-2

Vegetos

Volume 36, Issue 1, March 2023, Pages 188-194

In-silico docking studies of selected phytochemicals against papain like protease of SARS-Cov-2(Article)(Open Access)

Saranya, P., Karunya, R., Keerthi Varshini, G., Kowsikan, K., Prathiksha, R.

[a]Department of Industrial Biotechnology, Government College of Technology, Thadagam Road, Coimbatore, 641013, India
[b]Indian Institute of Technology, Gujarat, Gandhinagar, 382055, India

Abstract

The SARS-Cov-2 virus, which is evolving continuously and causing adverse effects throughout the world, needs an effective drug molecule for its treatment. There are several receptors of SARS Cov-2 which are targeted for its inhibition by many lead molecules both in-vitro and in-vivo. Papain like Protease (PLpro) is one of the two SARS-Cov-2 proteases that can be used as a drug target for SARS Cov-2. It is a coronavirus enzyme that plays a role in the cleavage and maturation of viral polyproteins, assembly of the replicase-transcriptase complex and disruption of host responses. PLpro has also been linked to the cleavage of proteinaceous post translational modifications on host proteins as a means of evading antiviral immune responses. Structure-based drug discovery can be one of the effective methods to screen for various molecules against the target receptors. In this

Document details - Coastline change rate estimation on the southern coastal districts of Tamil Nadu, India using the multi temporal google earth images and GIS based statistical approach

Global Nest Journal

Volume 25, Issue 4, March 2023, Pages 95-103

Coastline change rate estimation on the southern coastal districts of Tamil Nadu, India using the multi temporal google earth images and GIS based statistical approach(Article)(Open Access)

Daswin Ebenezer, M., Kumar, M.

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[b]Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract

Coastal erosion is the process of wearing away material from the coastal profile due to an imbalance in the supply and export of material from a particular section of the coast which cause property damage, and the loss of land. This study investigates the rate of erosion and accretion along the southern coast of Tamil Nadu which was exposed to a lot of tourism and development activities. The shorelines were delineated for the years

Document details - Experimental study on geopolymer concrete with partial replacement of bethamcherla waste stone powder

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Global Nest Journal

Volume 25, Issue 4, March 2023, Pages 185-189

Experimental study on geopolymer concrete with partial replacement of bethamcherla waste stone powder(Article)(Open Access)

Paramasivan, S., Rajagopal, T.

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[b]Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract

The process of making portland cement uses up a lot of resources and has a harmful environment effect since it produces a lot of greenhouse emissions. The by-product of the stone cutting and polishing industries is Bethamcharla waste Stone Powder (BWSP). Each industry produces an average of 513900 tonnes of waste each year, which is then simply deposited on the plains of Bethamcharla. The potential approach to using stone waste powder for civil construction projects is presented in this research. The state of Tamil Nadu has enormous industrial polishing potential. There are around 2000 stone polishing machines in this town as a result of the large amount of stone powder produced during the manufacturing of completed goods and the same powder being dumped in and around the companies. In order to convince civil engineers to employ this new

Document details - Fuzzy-Recurrent Network based Distributed Frequency Control of Multi Microgrid system

2023 IEEE IAS Global Conference on Renewable Energy and Hydrogen Technologies, GlobConHT 2023

2023

2023 IEEE IAS Global Conference on Renewable Energy and Hydrogen Technologies, GlobConHT 2023; Male; Maldives; 11 March 2023 through 12 March 2023; Category numberCFP23DP4-ART; Code 187832

Fuzzy-Recurrent Network based Distributed Frequency Control of Multi Microgrid system(Conference Paper)

Kandasamy, J., Ramachandran, R., Veerasamy, V., Irudayaraj, A.X.R.

[a]Government College of Technology, Department of Electrical Engineering, Coimbatore, India
[b]Nanyang Technological University, Department of Electrical and Electronic Engineering, Singapore, Singapore
[c]Universiti Putra Malaysia, Department of Electrical and Electronic Engineering, Selangor, Serdang, Malaysia

Abstract

This paper proposes a distributed control strategy (DCS) for coordinating frequency control of multi microgrid (MMG) system. A leader-follower based consensus control law is derived for controlling each individual MG in the cluster. An adaptive fuzzy tuned recurrent neural network (FRNN) technique is proposed to design the optimal fractional order proportional-integral-derivative (FOPID) controller for distributed generation in the MG. A Lyapunov based objective function is developed to derive the dynamics, for weight updation of the RNN through gradient descent approach. The

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Separation of oil-water emulsion by cellulose acetate ultrafiltration membranes

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Shoba, B., Jeyanthi, J.

Department of Civil Engineering, Government College of Technology, Coimbatore, India

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Abstract

This study reports the separation of oil from water using cellulose acetate (CA) ultrafiltration (UF) membranes. The CA membranes were fabricated by varying bath temperatures such as 5 ± 2°C, 25 ± 2°C and 45 ± 2°C using the phase inversion technique and assess their performance based on the oil removal efficiency. Changing the coagulation bath temperature (CBT) at that stage of membrane formations affects the porosity, pore size, hydraulic resistance, morphological structure and performance of membranes. The obtained results revealed increased porosity and pore size and also decreased hydraulic resistance of the membranes as the CBT increases. Field Emission Scanning Electron Microscopy (FESEM) images indicate that a large number of surface pores are visibly found at the higher bath temperature. Atomic force Microscopy (AFM) images show increased average roughness (R_a) of the membrane as the CBT of the membrane increases. The water flux and permeate flux of all the membranes tend to increase

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1 January 2023, Pages 271-303

Integration of IoT in Energy Management
(Book Chapter)

Angappan, G., Sivaraj, S., Bhuvaneshwaran, P., Thanigachalam, M., Sekar, S., Rathanasamy, R.

[a]Department of Mechanical Engineering, Kongu Engineering College, Perundurai, Tamil Nadu, Erode, India
[b]Department of Robotics and Automation, Easwari Engineering College, Ramapuram, Tamil Nadu, Chennai, India
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Abstract

Digital technologies in recent years have conquered the energy-based industries for achieving better business opportunities through adoption of certain business strategies. The main advantage of Internet of things (IoT) in energy sector was to interconnect the automate and monitor regularly through software interface. So that, the defect or error, which occurred during production process, can be easily located and resolved. Through online condition monitoring, the performance of the machine can be assessed with the application of certain algorithms. In energy industries, IoT made huge revolution in energy management, automation and distribution. IoT facilitates huge profit to investors for improving the workflow with reference to the data based on demand and usage of product. The devices with IoT would communicate each other and perform many tasks without any human intervention. Thus reduces human effort and minimizes the overall cost. Some of the major drawbacks of IoT in energy sectors are

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12 chapters found in Scopus

Document details - Modelling and Analysis of Mixed Mode EM Emission in EV for Electro-Magnetic Compatibility

ICSPC 2023 - 4th International Conference on Signal Processing and Communication

2023, Pages 116-122

4th International Conference on Signal Processing and Communication, ICSPC 2023; Coimbatore; India; 23 March 2023 through 24 March 2023; Category numberCFP23K92-ART; Code 188941

Modelling and Analysis of Mixed Mode EM Emission in EV for Electro-Magnetic Compatibility(Conference Paper)

Arokia Mary Caroline, P., Vasanthanayaki, C.

Govt. College of Technology, Dept. of Ece, Coimbatore, India

Abstract

The emergence of electric vehicles (EVs) has a great impact on energy utilization and controlling pollution in the environment. The EVs are significantly different from conventional vehicles in terms of a control units such as the use of an electric drive system (EDS) instead of the internal combustion engine (ICE) and other aspects that affect the vehicle's performance. One such unique feature of EVs is the use of power line communication (PLC), where main lines from the battery to other devices is used to exchange information. The high switching characteristics of the EDS as well as the implementation of PLC, have a drawback of generating ElectroMagnetic Interference (EMI). The Common-Mode (CM) and

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19th IEEE International Conference on Automation Science and Engineering, CASE 2023; Auckland; New Zealand; 26 August 2023 through 30 August 2023; Category numberCFP23ASE-ART; Code 193105

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Modeling of Rotary Tool Adapted Electrochemical Machining of AISI 202(Conference Paper)

Sekar, T., Natarajan, E., Ang, C.K., Hong, L.W., Rajendran, P.

[a]Government College of Technology, Department of Mechanical Engineering, Tamilnadu, Coimbatore, India
[b]Faculty of Engineering, Technology and Built Environment, Ucsi University, Kuala Lumpur, Malaysia
[c]Psg Institute of Technology and Applied Research, Department of Mechanical Engineering, Coimbatore, India

View additional affiliations

Abstract

Concurrent achievement of better material removal rate (MRR), surface roughness (Ra) and Overcut (OC) are still considered as one of the challenging tasks in Electrochemical Machining (ECM), particularly on the metals having high toughness. The traditional ECM machine was modified with indigenously designed rotary tool adapter to increase the performance of machining. Meanwhile, experimental design was done to conduct the experiments with different machining conditions. The responses of machining for different set of voltage, tool feed rate, electrolyte discharge rate

Document details - Monitoring and Estimation of Phasor Angle of PMU Signals using LabVIEW-DFT Methods

14th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2023

Volume 2023-June, 2023, Pages 2010-2016

14th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2023; Hyderabad; India; 15 June 2023 through 16 June 2023; Code 192282

Monitoring and Estimation of Phasor Angle of PMU Signals using LabVIEW-DFT Methods(Conference Paper)

Marimuthu, C., Chelliah, M., Kumar, N.R., Prakash, R.

[a]EIE, Government College of Technology, Coimbatore, 13, India
[b]EEE, Dhanalakshmi Srinivasan College of Engineering, Coimbatore, 105, India

Abstract

Synchronized Phasor Measurement Unit becomes a part of wide-area measurement system which apply in modern power systems for measurement and control application. Real-time virtual PMU which measures the various signal is designed in LabVIEW and estimates the value of phase of signals by Digital Fourier Transform (DFT) recursive and non-recursive methods. The phasor value collected from polar plot is used to analyse the health condition of the power system and used to compare various sinusoidal and non-sinusoidal signals. © Grenze Scientific Society, 2023.

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Design and Analysis of Transformerless Grid-Tied PV Inverter with Hybrid Switching for a Wide Range of PV Voltage Adaptability

(Article in press ?)

Palanisamy, M., Perumal, M.

[a]Dept. of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India
[b]Dept. of Electrical and Electronics Engineering, Government College of Engineering, Salem, India

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Abstract

An increase in electric vehicles will be going to increase per capita energy consumption, which will encourage domestic consumers to install low-power rooftop photovoltaics (PV) systems. Many single-stage transformerless inverter topologies have been developed to increase the efficiency of PV power generation. Available multilevel transformerless single-stage inverter topologies are designed by considering regulated PV input voltage. However, PV voltage will vary in a wide range. The proposed hybrid switching technique will be able to operate at three different inverter characteristics such as Seven Level Active Neutral Point Converter (7L-ANPC) and Nine level active neutral point converter (9L-ANPC) along with the proposed 11 level voltage boosting inverter (11-LVBI) in a single inverter. This inverter is operated in a wide range of PV voltage variations without

Proceedings of the 4th International Conference on Smart Electronics and Communication, ICOSEC 2023

2023, Pages 289-295

4th International Conference on Smart Electronics and Communication, ICOSEC 2023; Trichy; India; 20 September 2023 through 22 September 2023; Category numberCFP23V90-ART; Code 193543

Implementation of Fuzzy Logic for Controlling the Recharge Rate Electric Vehicles and Minimizing Losses in the Electric Power System(Conference Paper)

Sumithara, A., Chitra, S., Kumar, N.M.G., Ramya, D., Ravikumar, K.

[a]Government College of Technology, Department of Electrical and Electronics Engineering, Coimbatore, India
[b]Government College of Technology, Department of Electrical and Electronics Engineering, Coimbatore, India
[c]Mohan Babu University, Sree Vidyanikethan Engineering College, Department of Electrical and Electronics Engineering, Andhra Pradesh, Tirupathi, India

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Abstract

The concerns about the environment have also grown considerably, raising serious questions about the harmful effects of pollutants emitted by automobiles. Allied to these reasons, there is also an increase in concerns about energy security and fossil energy reserves, which have been promoting a considerable dissemination of the use of plug-in electric vehicles (PEVs) in comparison to combustion-powered ones. The integration of EVs into the power grid introduces various challenges, including Dynamic Charging Demand, Grid Congestion, and Balancing Grid Load. Recent techniques to address these challenges include Machine Learning Approaches. This work develops a system based on fuzzy logic to control the recharge rate of plug-in hybrid electric vehicles (HEVs) in order to minimize losses in the electric power system (EPS). This work investigate the optimization strategy to minimize system losses. Also check the influence of the priority entered by the consumer in recharging a plug-in hybrid EV (PHEV). Also the importance of the optimization strategy in the system operation is investigated. © 2023 IEEE.

Author keywords

Document details - Synthesized activated carbon derived from discarded styrofoam and effectively removal of nickel (II) from aqueous solutions

Revista Materia

Volume 28, Issue 4, 2023, Article number e20230195

Synthesized activated carbon derived from discarded styrofoam and effectively removal of nickel (II) from aqueous solutions(Article)(Open Access)

Dakshinamurthy, R., Natarajan, B., Chelladurai, M.

[a]Karpagam Academy of Higher Education, Faculty of Engineering, Department of Civil Engineering, Tamil Nadu, Coimbatore, India
[b]Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract

Due to the rapid urbanisation and rapid population explosion, there is a vast essential requirement in the dispose of solid waste. Carbonization of Styrofoam is carried out at varying temperature ranges of 300°C to 675°C at an interval of 75°C using KOH as reagent. The Characterisation of power of hydrogen ion, ash and moisture content, fixed carbon, Volatile matter, iodine adsorption value, methyl blue value was conducted. It was found that the acti-vate carbon obtain from the temperature of 525°C has a good carbon characteristic. The batch experiment such has pH, contact time, carbon dosage, agitation speed, potency of Nickel (II) was conducted with the purpose of ascertaining the efficiency of Nickel (II) adsorption. This analysis deals with fixed bed column to remove Nickel (II) from a solution. The results indicated that the sorption-second order kinetic model was the most

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Particle filter-based adaptive super-twisting sliding mode fault-tolerant control for helicopter systems

(Article in press ?)

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Raghappriya, M., Kanthalakshmi, S.

[a]Department of Electronics and Instrumentation Engineering, Government College of Technology, Thadagam Road, Tamil Nadu, Coimbatore, 641013, India
[b]Department of Electrical and Electronics Engineering, PSG College of Technology, Tamil Nadu, Peelamedu, Coimbatore, 641004, India

Abstract

Fault detection and control of nonlinear helicopter systems is crucial in ensuring safety and reliability. The effects of faults on system dynamics become more challenging to control due to the complexity of helicopter dynamics, which exhibit significant nonlinearity and cross-coupling as well as external disturbances like wind, icing, and air turbulence that affect the system. The goal of this work is to provide an active fault diagnosis and control approach for a nonlinear two-degrees-of-freedom helicopter system when it is exposed to different abnormalities, such as sensor, actuator, and component faults. An integrated design of fault diagnostic and fault-tolerant control is designed using adaptive sliding mode control. The fault

Document details - Numerical Study on Load Bearing Capacity of Root-Caisson Foundation

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Volume 2023, 2023, Article number 7774648

Numerical Study on Load Bearing Capacity of Root-Caisson Foundation(Article)(Open Access)

Jayashree, J., Sathyapriya, S., Karthik, V., Periyasamy, S., Sundramurthy, V.P.

[a]Department of Civil Engineering, Sri Ramakrishna Engineering College, Tamil Nadu, Coimbatore, 641 022, India
[b]Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India
[c]Department of Industrial Biotechnology, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

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Abstract

Innovation has been made in the caisson foundation to support a very large structure resting over a soft soil stratum known as the root-caisson foundation. This technique was executed in China-Yangtze River Bridge. The root caisson foundation was first implemented in the Yangtze River bridge and discovered that the root improves soil structure interaction and increases vertical bearing capacity by 100%. In the present research, a numerical study of root-caisson foundation under combined vertical and horizontal loading was performed using ABAQUS software. Analysis was performed by varying the parameters of root caisson such as the inclination of roots (30°, 45°, 60°, and 90°) spacing(S) between the root floors with

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Sustainable agricultural practices using potassium-solubilizing microorganisms (KSMs) in coastal regions: a critical review on the challenges and opportunities

(Article in press ?)

Jini, D., Ganga, Y.S., Greeshma, M.B., Sivashankar, R., Thirunavukkarasu, A.

[a]Department of Biotechnology, Malankara Catholic College, Kaliakkavilai, India
[b]Department of Chemical Engineering, National Institute of Technology, Warangal, India
[c]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India

Abstract

Coastal regions provide excellent ambience for agricultural practices in terms of their weather conditions. However, the presence of salinity in such areas affects crop growth and productivity by restricting the accessibility to vital nutrients. Potassium (K) is one such key nutrient, whose absorption

Document details - Classification of Cotton Weeds in the Cotton Farms Using Deep Transfer Learning Techniques

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Volume 612, 2023, Pages 579-586

Classification of Cotton Weeds in the Cotton Farms Using Deep Transfer Learning Techniques(Book Chapter)

Hari Krishnan, G., Rajasenbagam, T.

Government College of Technology, Coimbatore, 641013, India

Abstract

In current world, the automated weed control systems must important to identifying and locating the weeds from the main plant. The recognition and removal of weeds in the preliminary time is essential for increasing the productivity of the main plant. In recent years, deep learning algorithms give the better performance for the various complex tasks like image processing, audio and video processing, etc. This research paper presents the idea of classifying the various weeds from the main plant using various pre-trained models. The cotton plant was chosen as the main plant with some of its most common weeds was chosen for this work. But one of the major problems in real-world scenario is the soil, dust, etc., present in between of main plant and the weed. So, this paper proposed a methodology to segment the weeds and main plant images from others at very first stage of process. Then, the segmented images fed into the pre-trained CNN models like VGG16, ResNet50, InceptionV3, MobileNet, and InceptionResNetV2

Document details - Novel Polyalthia Longifolia seed fillers loaded and E-glass fiber-reinforced sandwich epoxy composites

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Novel Polyalthia Longifolia seed fillers loaded and E-glass fiber-reinforced sandwich epoxy composites

(Article in press ?)

Balaji Ayyanar, C., Marimuthu, K., Mugilan, T., Gayathri, B., Sanjay, M.R., Khan, A., Siengchin, S.

[a]Department of Mechanical Engineering, Coimbatore Institute of Technology, Tamil Nadu, Coimbatore, India
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[c]Department of Chemistry, Coimbatore Institute of Technology, Tamil Nadu, Coimbatore, India

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Abstract

The research aims to develop new polymer composites using Polyalthia longifolia seeds (PLS) particulates-loaded epoxy composites through open layup molding technique with different wt.% of PLS fillers (PLSF) (10, 20, 30,40, and 50 wt. %). As per ASTM standards, the composite specimens were fabricated and carried out the tensile strength, compressive strength, flexural strength, and Shore D hardness. Among the different weight

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Volume 25, Issue 4, March 2023, Pages 185-189

Experimental study on geopolymer concrete with partial replacement of bethamcherla waste stone powder(Article)(Open Access)

Paramasivan, S., Rajagopal, T.

[a]Department of Civil Engineering, Sri Krishna College of Technology, Tamil Nadu, Coimbatore, 641042, India
[b]Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract

The process of making portland cement uses up a lot of resources and has a harmful environment effect since it produces a lot of greenhouse emissions. The by-product of the stone cutting and polishing industries is Bethamcharla waste Stone Powder (BWSP). Each industry produces an average of 513900 tonnes of waste each year, which is then simply deposited on the plains of Bethamcharla. The potential approach to using stone waste powder for civil construction projects is presented in this research. The state of Tamil Nadu has enormous industrial polishing potential. There are around 2000 stone polishing machines in this town as a result of the large amount of stone powder produced during the manufacturing of completed goods and the same powder being dumped in and around the companies. In order to convince civil engineers to employ this new

AI-based performance optimization of MPTT algorithms for photovoltaic systems(Article) (Open Access)

Nigel, K.G.J., Rajeswari, R.

[a]Department of Robotics Engineering, Karunya Institute of Technology & Sciences, Coimbatore, India
[b]Department of EEE, Government College of Technology Coimbatore, Coimbatore, India

Abstract

Solar models have been drawing much attention in the contemporary electricity environment. Solar energy installations employ various MPPT techniques that generate the most energy. Increasing a solar (PV) device's energy effectiveness has become a key concern for scientists. Multiple MPPT approaches that collect the most power possible using a PV array have been researched. Both primary and intermediate-type procedures will be used in most procedures. The performance and convergence velocity of such a PV device become significant depending on its practical deployment under various conditions. The energy attributes of unit sections collectively serve as the primary energy-extracting elements in specific systems, dependent upon all interior and exterior elements. Considering specific external dynamical circumstances, traditional maximal power point tracing systems will not have the required translation efficacy. For assessing the overall effectiveness of the proposed intelligent maximal power point outlining methodology in partially shaded situations having significant and dynamical variations within ambient parameters, that study contrasts its efficacy using traditional maximal power point tracing techniques.

Author keywords

dynamical partial shadowing | MPPT method | photovoltaics | PV modules

ISSN: 00051144
Source Type: Journal
DOI: 10.1080/00051144.2023.2222251
Document Type: Article

7th International Conference on Information and Communication Technology for Competitive Strategies , ICTCS 2022; Chandigarh; India; 9 December 2022 through 10 December 2022; Code 296069

Power Quality Enhancement Using Shunt Active Power Filter with Vienna Rectifier(Conference Paper)

Sebasthirani, K., Ravi, S., Kumar, C.P., Maruthupandi, P.

[a]Department of Electrical and Electronics Engineering, Sri Ramakrishna Engineering College, Tamilnadu, Coimbatore, India
[b]Department of Electrical and Electronics Engineering, Government College of Technology, Tamilnadu, Coimbatore, India

Abstract

Nowadays, there are a large number of electrical components in domestic, commercial, and industrial applications. The demand for power conversion from one stage to another is necessary for obtaining a proper result in distribution systems. But, it creates power quality problems like voltage spike, voltage dip, swell, harmonics, over voltages, under voltages noise, etc. Harmonics is main representation of power problem in industrial and commercial venues. Conventionally, the passive filters are used to reduce the harmonics content. But, it has some disadvantages like resonance problems and large size, tuning of particular frequency and particular reactive power compensation. To solve the abovementioned problems, active filters are dedicated used to reduce the harmonics content in the power distribution system. In this, the proposed model, three-phase Vienna rectifier is performed to serve as shunt active power filter (SAPF) for reactive power compensation. Fewer switching devices, low circuit losses, and higher power density are the advantages of VIENNA rectifier when compared to PWM rectifier topology. By using MATLAB software, the usefulness and feasibility of the proposed model is tested and certified. Results taken from simulations circuit show that the new proposed model is more effective than other conventional for reducing the harmonic currents filtering action. The three-phase Vienna rectifier-based SAPF can attain and maintain the total harmonic distortion of info source current inside the breaking point recognized by the IEEE-519 Standard.

Author keywords

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1 January 2023, Pages 147-158

Heart Disease Classification Using Multi-Layer Perceptron (MLP) Neural Network (Book Chapter)

Shivappriya, S.N., Harikumar, R., Maheswari, K., Praba, R.D.

[a]Department of ECE, Kumaraguru College of Technology, Coimbatore, India
[b]IEEE, United States
[c]IEI, United States

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Abstract

Ventricular-based arrhythmias are a major cause of heart attacks and sudden cardiac deaths. Accurate detection, classification and

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Document details - Reinforcement Learning Based Autonomous E-Vehicle Speed Control

6th International Conference on Inventive Computation Technologies, ICICT 2023 - Proceedings

2023, Pages 192-198

6th International Conference on Inventive Computation Technologies, ICICT 2023; Lalitpur; Nepal; 26 April 2023 through 28 April 2023; Category numberCFP23F70-ART; Code 189117

Reinforcement Learning Based Autonomous E-Vehicle Speed Control(Conference Paper)

Saranya, E., Sivaramkrishnan, M., Kaliappan, S., Tanguturi, R.C., Arunagirinathan, S., Gunasekaran, K.N., Siva Ramkumar, M.

[a]Department of Information Technology, Mahendra Institute of Technology (Autonomous), Mallasamudharam, Namakkal, India
[b]Department of EEE, Karpagam College of Engineering, Coimbatore, India
[c]Department of Electrical and Electronics Engineering, Coimbatore, India

View additional affiliations

Abstract

Investigation on Tribological Behavior of Heat Treated DIN115CrV3 Steel for Cutting Tool Application by Factorial and Fractional Factorial Design(Article)(Open Access)

Vallavi, M.S.A., Moorthy, A., Mugilan, T.

Department of Mechanical Engineering, Government College of Technology, Tamilnadu, Coimbatore, 641 013, India

Abstract

The manufacturing of machines relies heavily on cutting tools. All of the critical procedures in the machine industry would have to be performed with an unacceptable level of imprecision without the use of effective cutting tools. Selecting an appropriate cutting tool material allows manufacturers to decrease machining times, eliminate unnecessary processes, raise standards of surface smoothness and accuracy, and, ultimately, increase their profits. The heat treated DIN115CrV3 steel is used as a predominant cutting tool material in the industries. Predicting wear rates at various working temperatures were crucial for selecting the cutting tool material. Considering maximum wear resistance was essential in designing the cutting tool. This research attempted to identify the wear rate influence of varying parameters like hardening temperature, tempering temperature, sliding velocity, sliding distance, and load. Each parameter with three levels was selected to design the experiment using Factorial and fractional factorial designs with restrictions. The experiments were conducted as per standard test method to conduct the wear analysis in the pin-on-disc apparatus (ASTM G99) based on the L27 design matrix, and responses such as friction force and wear rate were measured. ANOVA was performed to find out the significance of the measured results. RSM, Excel solver, and Box-Cox approach were used to predict the wear rate and frictional force. The optimized wear rate and friction forces were predicted by a grey relational approach, which was verified by a confirmatory test. The result was that 200 °C tempering temperature offers the minimum dry wear behaviour. The sliding distance contributes significantly to wear and frictional force compared with other parameters. The hardening temperature 800 °C, tempering temperature 200 °C, sliding Velocity 5 m/sec, sliding distance 2000m, and load 25 N are optimal parameter combinations of the dry wear process after the heat treatment obtained by GRA and confirmation. The strength and wear behaviour of cutting tool affects the quality of manufacturing process and also reduces the accuracy industrial products. Hence, the improvements in cutting tool material through optimization is the best way of improve the manufacturing process in industries.

Author keywords

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2023, Pages 1459-1465

7th International Conference on Intelligent Computing and Control Systems, ICICCS 2023; Vaigai College Engineering (VCE)Madurai; India; 17 May 2023 through 19 May 2023; Category numberCFP23K74-ART; Code 189354

Real-Time Implementation of RF-based Mobile Fleet Localization and Collision Avoidance System in Wireless Sensor Network for Drones and Gliders(Conference Paper)

Rithic, C.H., Arulmozhi, N.

[a]Government College of Technology, Department of Electronics and Instrumentation Engineering, Tamil Nadu, Coimbatore, India

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Bioremediation of Oil-contaminated Sand(Article)(Open Access)

Sathyapriya, S., Sharvesh, R., Natarajan, C.

[a]Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India
[b]Hindusthan College of Engineering and Technology, Tamil Nadu, Coimbatore, India
[c]Principal, Hindusthan Institute of Technology, Tamil Nadu, Coimbatore, India

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Abstract

The energy demand is set to grow very rapidly and the potential demand for oil around the world is at its highest level. Apart from indigenous oil sources, crude oil is imported by water transportation to fulfill local demand. The occurrence of oil leakage during drilling and transportation in pipelines is a major concern. As a result of this, soil is getting polluted and its geotechnical properties are altered. In this study, the effect of engine oil and diesel contamination on the geotechnical parameters of sea sand has been studied. Further, to enhance the properties of oil-contaminated sand, the bioremediation method was adopted. Sea sand from Ganagalla Peta beach, Andhra

Document details - A review on the factors influencing the performance of sustainable ternary cement composites

Environment, Development and Sustainability

2023

A review on the factors influencing the performance of sustainable ternary cement composites

(Article in press ?)

Balasubramanian, N.,   Sarangapani, C.

Department of Civil Engineering, Government College of Technology, Coimbatore, India

Abstract

This paper gives an overview of various factors that influences the performance of Limestone Calcined Clay Cement (LC3) concrete. Among the various research related to ternary cements, this paper discusses the influential factors, based on the strength and durability aspects.

Document details - Deep learning based brain tumor detection via fuzzy hexagonal membership function

Journal of Intelligent and Fuzzy Systems

Volume 45, Issue 2, 2023, Pages 2979-2992

Deep learning based brain tumor detection via fuzzy hexagonal membership function(Article)

Kala, R., Deepa, P.

[a]Department of Computer Science and Engineering, Karpagam College of Engineering, Tamil Nadu, Coimbatore, India
[b]Department of Electronics and Communication Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract

Brain tumor is an anomalous growth of brain cells. Segmentation of brain tumors is currently the most important surgical and pharmaceutical procedure. However, manually segmenting the brain tumor is a challenging task due to the complex structure of brain. In recent years, artificial intelligence techniques with the fuzzy logic have shown better results in the field of medicine. In this work, a novel

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Polycyclic Aromatic Compounds

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Synthesis, Structural, Spectroscopic and Quantum Chemical Investigation of a Novel 1,4-Diamino-2,5-dichlorobenzenium Picrate Single Crystal: An Efficient NLO Material

(Article in press ?)

(Open Access)

Arivazhagan, A., Chandrasekaran, S., Vadivel, S., Selvaraj, S.K., Vediyappan, S., Gandhirajan, V.

[a]Department of Chemistry, Government College of Technology, Coimbatore, India

Document details - Study on Osmotic Consolidation and Hydraulic Conductivity Behavior of an Expansive Soil Inundated with Sodium Chloride Solution

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International Journal of Chemical Engineering

Volume 2023, 2023, Article number 6574646

Study on Osmotic Consolidation and Hydraulic Conductivity Behavior of an Expansive Soil Inundated with Sodium Chloride Solution(Article)(Open Access)

Sathyapriya, S., Sharvesh, R., Karthik, V., Periyasamy, S., Sundramurthy, V.P.

[a]Department of Geotechnical Engineering, Government College of Technology, Coimbatore, 641013, India
[b]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, India
[c]Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology

Document details - Automatic image captioning system based on augmentation and ranking mechanism

Signal, Image and Video Processing

2023

Automatic image captioning system based on augmentation and ranking mechanism

(Article in press ?)

Revathi, B.S., Kowshalya, A.M.

Government College of Technology, Coimbatore, India

Abstract

Research on automatically producing syntactically and semantically accurate captions is still an open challenge. This paper proposes an effective pretrained Augmentation–Ranking (A–R) Image Captioning model. The proposed model improves the properties of the images and produces appropriate captions. The employed novel augmentation strategy improves convolution neural network (CNN) operation, while Ranking and Feedback Propagation improve Long Short-Term Memory (LSTM). Our proposed model seeks to address the issues of

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Volume 64, Issue 4, 2023, Pages 1255-1267

Seven levels highly efficient modular multilevel matrix converter (M3C) for low frequency three-phase AC-AC conversion(Article)(Open Access)

Karpagam, V., Narmadhai, N.

[a]Dr. Mahalingam College of Engineering and Technology, Pollachi, India
[b]Department of EEE, Government College of Technology, Coimbatore, India

Abstract

An Innovative Modular multilevel matrix converter (M3C) is proposed with reduced number of switching device owing to the improved efficiency, reduced cost and minimizes the size. Offshore Low-Frequency AC (LFAC) transmissions are economical with greater reliability for short and intermediate distance transmissions. Similar to HVDC, it increases the transmission capacity and also distance can be increased

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Experimental Investigation of the Effects of Fly Ash on Functionally Graded Recycled Coarse Aggregate Concrete Beams Incorporating Fibers(Conference Paper)

Andal, N.M., Kaviya, N.

Government College of Technology, Coimbatore, 13, India

Abstract

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2023 International Conference on Clean Electrical Power, ICCEP 2023; Terrasini; Italy; 27 June 2023 through 29 June 2023; Category numberCFP2336B-ART; Code 192671

Comparative Analysis of Three Phase Hybrid Transformerless Inverters for PV applications(Conference Paper)

Kumar, A., Ramasamy, S., Losito, M., Gatto, G.

[a]University of Cagliari, Department of Electrical and Electronic Engineering, Cagliari, Italy
[b]Government College of Technology, Department of Electrical Engineering, Coimbatore, India

Abstract

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Journal of Heterocyclic Chemistry

Volume 60, Issue 12, December 2023, Pages 2081-2091

Diastereoselective construction of carbazole-based spiropyrrolidines and spiropyrrolizidines via cycloaddition reaction(Article)

Varadharajan, P., Karikalan, S., Kumaresan, P.

[a]Department of Chemistry, PSG College of Arts & Science, Coimbatore, India
[b]Department of Chemistry, Government of College of Technology, Coimbatore, India

Abstract

A series of new spiro heterocyclic compounds having carbazole and pyrrolidine units were successfully synthesized through a one-pot, three component, 1,3-dipolar cycloaddition reaction in good yields with high diastereoselectivity. Simple reaction, easily accessible chemicals, high yield and diastereoselective formation of monospiropyrrolidine and monospiropyrrolizidine carbazole derivatives in one

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2023, Pages 1781-1787

2023 International Conference on Circuit Power and Computing Technologies, ICCPCT 2023; Kollam; India; 10 August 2023 through 11 August 2023; Category numberCFP23IPT-ART; Code 192821

Artificial Intelligence Based Reduced Switch Multilevel Inverter for Grid Connected PV Applications(Conference Paper)

Thangam, T., Rathika, N., Sivasubramanian, M., Kumar, R.T., Manohar, V.J., Kavyalakshmi, A.

[a]International Maritime College of Oman, Department of Process Engineering, National University of Science and Technology, Sohar

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Applied Nanoscience (Switzerland)

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Adsorptive removal of azo dye using magnetic nanoparticles: an insight into equilibrium, kinetics and thermodynamic studies

(Article in press ?)

Raja, S., Kola, A.K., Balakrishnan, D., Arunachalam, T., Rajarathinam, N.

[a]Department of Chemical Engineering, National Institute of Technology, Warangal, India
[b]College of Engineering, Prince Mohammad Bin Fahd University, Al-Khobar, Saudi Arabia
[c]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India

Abstract

Geotechnical Investigation and Microanalysis of Black Cotton Soil Amended with Guar Gum and Polyethylene Terephlate Fibre(Article)(Open Access)

Sathyapriya, S., Abdul Fasith, M.S., Senthil Kumar, P., Karthik, V.

[a]Department of Geotechnical Engineering, Government College of Technology, Coimbatore, 641013, India
[b]Department of Chemical Engineering, Sri Sivasubramaniya Nadar College of Engineering, Tamil Nadu, Kalavakkam, 603110, India
[c]Centre of Excellence in Water Research (CEWAR), Sri SivasubramaniyaNadar College of Engineering, Tamil Nadu, Kalavakkam, 603110, India

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Abstract

Polymer-based soil stabilization has fascinated substantial interest in the field of research intending to gain a better knowledge of the anticipated soil characteristics after polymer treatment. Intricate research on the engineering performance of expansive soil which is highly challenging due to its swell and shrink nature based on variations in water regime, treated with guar gum, a biopolymer made from gum along with polyethylene terephthalate fibre, one of the most generated plastics, resulting in massive waste, is accomplished through this entire experimental investigation. Comprehensive geotechnical tests and microstructural examinations have been performed to optimize the guar gum for enhancement of soil properties and to comprehend the interactive mechanism with the soil. The biopolymer at dosages 0.5%, 1%, 1.5%, and 2% was added to the soil. Polyethylene terephthalate Fibre with an aspect ratio of 28 is used with the soil at an increment of 0.4% up to 1.6%. The optimum dosage of biopolymer was mixed with polyethylene terephthalate fibres, and its effect on geotechnical properties was carried out separately. From the experimental investigations, it is comprehended that there is a reduction of 27% and 40% in plasticity index and swelling, respectively, at an optimum dosage of 0.5% GG when compared to untreated soil. Furthermore, there is a marginal decrease of 24% in dry density, 310% increase in CBR value, and 33% reduction in compressibility of the soil treated with 0.5% GG with 1.6% PET fibre, when compared to virgin soil. The present study was conducted to improve the subgrade soil strength beneath the pavements. The usage of biopolymer and its combination with polyethylene terephthalate fibres shows that there is a considerable improvement in modifying the geotechnical properties, and its coupling effect contributes to higher California bearing ratio values. According to the outcomes of this investigation, it is proven that biopolymer and polyethylene terephthalate fibre is definitely an alternate to conventional materials. The present study was conducted to improve the subgrade soil strength beneath the pavements. ©

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Design of fuzzy controller for MPPT of solar photovoltaic system(Conference Paper)

Arunagirinathan, S., Subramanian, C.

Government College of Technology, Department of Electrical and Electronics Engineering, Coimbatore, India

Abstract

In this work, Fuzzy logic controller (FLC) is proposed for solar photovoltaic (SPV) system. The models consist of PV array, step up converter, load and fuzzy logic controller to manage the duty cycle of step up converter. Maximum Power point tracker (MPPT) technique is applied to get utmost output power in SPV system. The entire model is considered and validated in MATLAB. The conventional tracking method like Perturb and Observe (P&O) is compared with intelligence method such as Artificial Neural Network (ANN), FLC. The obtained result shows that the proposed FLC is performed well to obtain the optimum power in considered system compared to P&O and ANN. The usefulness of the numerous MPPT and the suggested scheme is validated by simulation study. © 2023 IEEE.

Author keywords

ANN | Fuzzy logic controller (FLC) | MPPT | P&O | Solar photovoltaic system (SPV)

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Document details - Effect of sisal/kevlar inter-ply stacking and silane-treatment on mechanical, wear, fracture toughness, drop load impact, and hydrophobicity behavior of cellulose toughened polyester composite

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Effect of sisal/kevlar inter-ply stacking and silane-treatment on mechanical, wear, fracture toughness, drop load impact, and hydrophobicity behavior of cellulose toughened polyester composite

(Article in press ?)

Prabhushankar, N., Balaji, N., Kaliappan, S.

[a]Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India
[b]Department of Mechanical Engineering, Sri Krishna College of Engineering and Technology, Tamil Nadu, Coimbatore, India
[c]Department of Mechanical Engineering, Velammal Institute of Technology, Tamil Nadu, Chennai, India

Abstract

This study examined the inter-ply alternatively stacked kevlar/sisal fiber's mechanical, wear, fracture toughness, drop load impact, and hydrophobicity

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scopus.com/record/display.uri?eid=2-s2.0-85161216511&doi=10.3233%2fJIFS-222840&origin=inward&txGid=8298406fb9fc245d1c6a4df04db516c7

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Journal of Intelligent and Fuzzy Systems

Volume 44, Issue 4, 2023, Pages 6065-6078

Novel neural network architecture using sharpened cosine similarity for robust classification of Covid-19, pneumonia and tuberculosis diseases from X-rays(Article)(Open Access)

Balan, E., Saraniya, O.

[a]Department of Electronics and Communication Engineering, Sri Venkateswara College of Engineering, Tamil Nadu, Chennai, India
[b]Department of Electronics and Communication Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract

COVID-19 is a rapidly proliferating transmissible virus that substantially impacts the world population. Consequently, there is an increasing demand for fast testing, diagnosis, and treatment. However, there is a growing need for quick testing, diagnosis, and treatment. In order to treat infected individuals, stop the spread of the disease, and cure severe pneumonia, early covid-19 detection is crucial. Along with covid-19, various pneumonia etiologies, including tuberculosis, provide additional difficulties for the medical system. In this study, covid-19, pneumonia, tuberculosis, and other

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Volume 14, Issue 2, 2023, Pages 80-85

Crowd management in public transport to ensure social distancing for prevention of spread of COVID-19(Article)

Nigel, K.G.J., Jenisha, J., Rajeswari, R., Pamela, D., Manimegalai, P.

[a]Department of Robotics Engineering, Karunya Institute of Technology and Sciences, Coimbatore, India
[b]EEE Department, Government College of Technology, Coimbatore, India
[c]Department of Biomedical Engineering, Karunya Institute of Technology and Sciences, Coimbatore, India

Abstract

There was global shock from COVID-19 epidemic. Social isolation is becoming more crucial as this delicate condition spreads swiftly. Public transit must be enhanced to stop the spread. This paper proposes an IoT method using LoRa technology that might reduce overcrowding and disease transmission in public buses. In the proposed, buses shall have LoRa transmitters and receivers. It is shown on the bus stop's LCD screen and announced over a speaker if the bus is within range of the receiver. An automatic door mechanism limits the number of people inside the vehicle. In the mobile app, the bus occupancy data is sent to Google Firebase. The app also indicates nearby buses, their occupancy, and their estimated arrival time. In certain cases, authorities may utilise this data to analyse and act. This simple technique would improve bus safety and contain COVID-19.

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Volume 284, 2023, Pages 625-634

3rd International Conference on Structural Engineering and Construction Management, SECON 2022; Angamaly; India; 1 June 2022 through 3 June 2022; Code 285709

Examining the Influence of Various Factors that Affect Construction Professionals Lifestyle – A Case of Tamil Nadu and Kerala(Conference Paper)

Senthamizh Sankar, S., Anandh, K.S., Rama, M.

[a]Department of Civil Engineering, College of Engineering and Technology, SRM Institute of Science and Technology, SRM Nagar, Tamil Nadu, Kattankulathur, 603203, India
[b]Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract

The construction sector has a low quality of lifestyle when compared to other occupations due to a variety of problems associated with their work. The work-life balance is also harmed as a result of the unhealthy lifestyle prevalent among construction professionals. The factors that contribute to the scarcity of construction personnel ready to work in their sector are investigated in this study. This study reveals several common factors affecting construction professionals' lifestyles to improve their quality of life. The first step was to conduct a literature study to identify and summarize

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Volume 25, Issue 1, January 2023, Pages 40-46

Studies on influence of process parameters in upgradation of bio-oil derived from HTL of domestic household waste: Application of response surface methodology(Article)(Open Access)

Sathees Kumar, V., Raja Murugadoss, J., Gokulan, R., Ramkumar, S.

[a]Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India
[b]Department of Civil Engineering, Nadimpalli Satyanarayana Raju Institute of Technology, Andhra Pradesh, Visakhapatnam, 531173, India
[c]Department of Civil Engineering, GMR Institute of Technology, Andhra Pradesh, Rajam, 532 127, India

View additional affiliations

Abstract

This research focuses on hydrothermal gasification (HTG) and hydrothermal liquefaction (HTL) studies to produce bio-hydrogen from domestic mixed waste. HTG and HTL studies were studied at temperatures of 300–450°C and 300–400°C, correspondingly, with a catalyst level of 6 wt %. The

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Mumtha, C., Kabiriyel, J., Mahalingam, P.U.

Enhancing the biological hydrogen production in a novel way of using co-substrates

(2023) Waste Disposal and Sustainable Energy

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Digest Journal of Nanomaterials and Biostructures

Volume 18, Issue 1, January-March 2023, Pages 55-68

Influence of succinic acid species on structural, spectroscopic,optical, Z-scan, frequency doubling, photoconductivity and antibacterial properties of glycine single crystals(Article)(Open Access)

Priya, N.S., Chudar Azhagan, S.A.

[a]Department of Physics, Nehru Institute of Engineering and Technology, Coimbatore, India
[b]Department of Physics, Government College of Technology, Coimbatore, India

Abstract

With succinic acid as an additive, glycine single crystals were grown by conventional solvent slow evaporation route. Effect of succinic acid on the growth, optical and dielectric properties of glycine polymorphs has been investigated. The occurrence of functional groups has been identified by vibrational FTIR spectrophotometer. The low value of dielectric constant and dielectric loss at higher frequency range attested the grown crystal for frequency doubling applications. The laser damage threshold energy of the grown crystal was calculated. Third order nonlinear susceptibility$\chi^{(3)}$(esu) of succinic acid added glycine crystals were evaluated from Z-scan experiment. © 2023, S.C. Virtual Company of Physics S.R.L. All rights reserved.

scopus.com/record/display.uri?eid=2-s2.0-85146639358&doi=10.1016%2fj.matpr.2023.01.089&origin=inward&txGid=d76c859d19de3803d213000357c6cf5e

Document details - Experimental investigation on CNC turning of SS304 using nano particle based minimum quantity lubrication

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Materials Today: Proceedings

2023

Experimental investigation on CNC turning of SS304 using nano particle based minimum quantity lubrication

(Article in press)

P, P., T, S., M, V.

[a]Depatment of Mechanical Engineering, Tagore Institute of Engineering and Technology, Deviyakurichi, Tamil Nadu, Attur, 636 112, India
[b]Depatment of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India

Abstract

Stainless steel 304 has excellent mechanical qualities, good fatigue resistance, and resistance to oxidation. Additionally, the turning of SS304 under MQL needs to be addressed. This work aims to evaluate the machinability study using carbide cutting inserts and nanoparticle-assisted MQL on CNC turning. As a methodology, Response Surface Methodology, Box Behnken Design, and response surface optimization were used. Based on the fitted regression model, a 3D plot was used to analyse the collected machining data. Researchers have been attracted to nano fluids over the last decade due to their improved thermal conductivity and heat extraction capability. The current study creates a new nanofluid by adding HBN nano particles in

Document details - Thermal Behavior of the Time-Dependent Radiative Flow of Water-Based CNTs/Au Nanoparticles Past a Riga Plate with Entropy Optimization and Multiple Slip Conditions

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Entropy

Volume 25, Issue 1, January 2023, Article number 76

Thermal Behavior of the Time-Dependent Radiative Flow of Water-Based CNTs/Au Nanoparticles Past a Riga Plate with Entropy Optimization and Multiple Slip Conditions(Article)(Open Access)

Rajupillai, K., Alessa, N., Eswaramoorthi, S., Loganathan, K.

[a]Department of Mathematics, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[b]Department of Mathematical Sciences, College of Sciences, Princess Nourah bint Abdulrahman University, P.O. Box 84428, Riyadh, 11671, Saudi Arabia
[c]Department of Mathematics, Dr. N.G.P. Arts and Science College, Tamil Nadu, Coimbatore, 641048, India

View additional affiliations

Abstract

This communication deliberates the time-reliant and Darcy–Forchheimer flow of water-based CNTs/gold nanoparticles past a Riga plate. In addition,

Document details - Optimization of DEFORM-3D simulated drilling of UNSS31603-steel by integrated MOORA coupled PCA technique

Materials Today: Proceedings

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Optimization of DEFORM-3D simulated drilling of UNSS31603-steel by integrated MOORA coupled PCA technique

(Article in press ?)

Mugilan, T., Sridhar, N., Santhosh, S., Teddy Jefri, G., Yokesh, K.S.

[a]Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India
[b]Department of Robotics and Automation, SRM Easwari Engineering College, Tamil Nadu, Chennai, 600 089, India
[c]Department of Engineering Design, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India

Abstract

Due to its creep and stress-rapture strengths, superior formability, and high temperature tensile, UNS S31603 alloys are regarded as a good machinability material. As a result of the increased heat and thrust force generated by the cutting process, increased tool wear and damage are an inevitable byproduct of increased cutting speed and feed rate at the cutting edge. Drilling parameters are the only variable that can be changed to affect the temperature, and hence the wear and tear on the drill bit. In this inquiry, a 3D FEM has been proposed to study the drilling process simulation of UNS S31603 to reduce the drilling temperature, thrust force and drilling time. With DEFORM, a computer simulation model has been

Document details - A Numerical Study on Hydrodynamic and Liquefaction Analysis of Coastline Protected with Geotubes

Lecture Notes in Civil Engineering

Volume 300, 2023, Pages 193-206

Indian Geotechnical Conference, IGC 2021; Trichy; India; 16 December 2021 through 18 December 2021; Code 287049

A Numerical Study on Hydrodynamic and Liquefaction Analysis of Coastline Protected with Geotubes(Conference Paper)

Henitha Banumathi, A., Jeyapriya, S.P.

Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract

Protection of shorelines from dynamic wave attacks is a significant problem in Coastal Engineering. Under the action of wave loading, a change in pore water pressure would be generated along the shoreline which is the major factor for the seabed liquefaction and shear failure. Geotubes are the new systems that have been widely utilized as breakwaters to reduce wave impacts and to promote sediment nourishment by reducing sea erosion at the sheltered area. The major failures of the geotubes are due to the instability of the ocean floor and the sliding of geotubes because of high wave attacks. Simulation of these failures and finding the factors responsible for the failure is difficult through field observations and general laboratory tests. Hence, a study was undertaken on these aspects on a coastline named Mandaikadu which is located in Kanyakumari District, Tamil Nadu. This

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Volume 11, 2023, Pages 24420-24430

Optimization Reinforced PID-Sliding Mode Controller for Rotary Inverted Pendulum(Article) (Open Access)

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Abstract

The control of a rotary inverted pendulum (RIP) is challenging because it is an underactuated, highly sensitive, and unsteady system. Sliding mode control (SMC) is a nonlinear control method with high-frequency switching control. Designing a proportional integral derivative (PID) controller for a RIP is challenging due to its nonlinearity and instability in open-loop characteristics. The primacy of the SMC over the PID is the stability of the closed-loop. Hybrid control of a PID-SMC controller can provide better performance because this technique demonstrates less chatter, higher precision, no oscillation, and adequate gain tuning. To achieve gain tuning, the PID and SMC parameters must be optimized. Thus, this paper proposed a congruently tuned control strategy (CTCS) to fine-tune the controller parameters. The proposed strategy uses an improved whale

Document details - Highly Selective and Rapid Detection of Ethanol Using Ni-Functionalized ZnO Nanoflakes Coated Fiber Optic Sensor

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IEEE Sensors Journal

Volume 23, Issue 1, 1 January 2023, Pages 344-352

Highly Selective and Rapid Detection of Ethanol Using Ni-Functionalized ZnO Nanoflakes Coated Fiber Optic Sensor(Article)

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Abstract

Recently, the fabrication of ethanol sensor is of great technological interest toward detection of ethanol in myriad application areas such as fuel and chemical processing, food packaging analysis, breath alcohol analyzers, and clinical applications. Parallelly, the emerging trend of nanotechnology facilitates highly sensitive, miniature, and cut-price sensors with better power consumption. In accordance with this context, the current research work deals with the effect of metal (Ni) functionalization on ZnO nanoflakes for volatile compound (VC) sensing applications. A Co-precipitation method was utilized to synthesize pristine and Ni-functionalized ZnO nanoflakes. Furthermore, various material properties were critically investigated

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Document details - Study on Strength, Permeability and Micro-structure of Pervious Concrete Blended with Metakaolin

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Jordan Journal of Civil Engineering

Volume 17, Issue 1, 2023, Article number 6626, Pages 10-22

Study on Strength, Permeability and Micro-structure of Pervious Concrete Blended with Metakaolin(Article)

Rama, M., Shanthi, V.M.

Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract

Pervious concrete is a developing construction material used for sustainable solutions which helps restore the groundwater level based on its draining ability. The existing research studies address the strength and permeability of pervious-concrete materials and only limited data is available on the microstructural characteristics of pervious concrete. In this study, a characteristic analysis was carried out at micro-and macro-levels to identify the behaviour of pervious concrete using three aggregate gradations. To attain the wide pore network in pervious concrete, fine aggregates were not added in mixes and metakaolin was added at 5% intervals up to 20% of cement. At the macro-level, strength, porosity and permeability were tested and at the micro-level, XRD, FTIR, SEM and EDAX analyses were used for pervious-concrete mixes with metakaolin. The maximum strength of pervious-concrete was achieved in a 4.75-9.5 mm size aggregate mix at 10% addition of metakaolin with cement. Micro-structural studies revealed

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Materials Today: Proceedings

Volume 80, January 2023, Pages 888-895

An integrated approach of FEM analysis using DEFORM 3D and experimental investigation of forces developed in Al-Si7Mg(Article)

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Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India

Abstract

The machining process is a vital role in manufacturing industries. This work takes an alternative method to predict machining parameters and related to the machining process can be fulfilled to introducing process simulation by finite element analysis (FEM). This research article reveals FEM based simulation model of cutting force in turning on Al-Si7Mg. The turning tool insert has been selected as coated carbide. The simulation was carried out with help of Johnson Hook material model for effective computational method to predict the cutting forces during turning. The result indicates an increase in cutting force with rise in the rate of feed. The predicted force generated during cutting were compared with the experiment results, an acceptable error percentage of 9 % has been achieved. The FE simulations give direction to manufacturers to pick out the effective cutting conditions for the precision machining process while not conducting too several expensive experimental runs. In order to effectively fulfil the process analysis, surface roughness (Ra) and material removal rate (MRR) have been investigated and examined. The main interaction effect of machining parameters was examined to show that material removal rate is increase with a decrease in cutting speed, while surface roughness is decreased with increases in

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Nie, H. , Wang, Z. , Xue, X.

Designing sandwich-structured Ag-SnO2 contact materials: Overcoming the trade-off between erosion resistance and mechanical properties

(2024) Ceramics International

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Materials Today: Proceedings

Volume 80, January 2023, Pages 653-658

Static structural investigation of helical compression spring utilizing different materials for an automobile suspension system(Article)

Udhaya, A.R., Rajeswari, B., Mugilan, T.

Department of Mechanical Engineering, Government College of Technology, Coimbatore, India

Abstract

This present work aims to perform the finite element analysis of a helical compression spring used in electric three-wheelers, considering various spring materials. A helical compression spring stores energy in the shock absorber of an automotive suspension unit. The spring material must be elastic and have enough energy to tolerate external mass changes. The elastic characteristics of a spring material and its stability are investigated using static structural analysis in ANSYS. The selected spring materials for this current investigation are Spring Steel (SPS), Stainless Steel (SS), Mild Steel (MS), and Chromium Vanadium steel (CVS). The total deformation and equivalent von-mises stress of selected spring materials are predicted. A comparison has been made between the chosen steels, and the maximum deformation was found as 11.59 mm in both spring steel and chromium-vanadium steel. Hence, the best suitable spring material was selected based on equivalent Von-mises stress. The minimum von-mises stress has been observed at spring steel, and the value is 911.0 MPa. Thus, the spring steel was selected as a suitable material for helical compression springs in road conditions. © 2022

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Cadet, G. , Paredes, M.

A new exhaustive semi-analytical method to calculate stress distribution on the surface of a curved beam with circular cross section, with an application to helical compression springs

(2024) European Journal of Mechanics, A/Solids

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Document details - Analyzing Wear Resistance Characteristics of Al 5052/Al₂O₃/Gr Stir Cast Hybrid Composite

Lecture Notes in Mechanical Engineering

2023, Pages 293-307

3rd Innovative Product Design and Intelligent Manufacturing System, IPDIMS 2021; Rourkela; India; 30 December 2021 through 31 December 2021; Code 284859

Analyzing Wear Resistance Characteristics of Al 5052/Al_2O_3/Gr Stir Cast Hybrid Composite(Conference Paper)

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Abstract

The composite materials are mainly used in engineering sectors due to its reliable mechanical properties. Al5052 alloy generally having high corrosion resistance property, but its wear rate is high, so it will be used in limited applications. The aim of this study is improving mechanical properties of Al5052 reinforced with Al_2O_3 and graphite. Composite materials with different proportions of Al_2O_3 and graphite have been fabricated using stir casting process. The production of aluminum matrix composites in liquid processing technique leads in economical process. Samples were prepared using Al5052 with aluminum oxide Al_2O_3 (2%, 3%, and 4%) and graphite (2%) as reinforcements. The distribution of reinforcement and matrix elements is examined through microstructure analysis such that the mechanical properties were found for improving its strength. The evaluation of mechanical properties revealed that wear resistance increased with increasing reinforcements. © 2023, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

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Document details - Design and Development of Seed Drill Attachment to Tractor-Drawn Cultivator

Lecture Notes in Mechanical Engineering

2023, Pages 111-122

3rd Innovative Product Design and Intelligent Manufacturing System, IPDIMS 2021; Rourkela; India; 30 December 2021 through 31 December 2021; Code 284859

Design and Development of Seed Drill Attachment to Tractor-Drawn Cultivator(Conference Paper)

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Abstract

To overcome the difficulties faced by manual sowing, seed drill attachment for sowing groundnut with a specific mechanism that would not damage seeds while drilling is designed. Since the annual usage of the seed drill is very less it is designed as an attachment to the tractor-drawn cultivator. Hence, the cost of equipment is reduced and it can be stored effectively during an idle period. The mechanism used for indexing and drilling seeds is cup feed type. It is designed to attach it with nine tynes cultivator so it has nine discs with 16 cups on each disc. The row-to-row distance of drilling is 9 inches. The box of seed drill attachments is designed based on the angle of repose of seeds. Based on the design seed drill attachment is manufactured and evaluated by conducting trails on it and readings are tabulated. Analyzing readings it is suggested that, to obtain an optimum seed rate of 86 kg/ha using seed drill, the tractor has to be run at the speed range of 4–6 km/h. © 2023, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author keywords

Cultivator | Kharif crops | Seed drill | Sowing

Indexed keywords

Document details - Nanotechnology- A ray of hope for heavy metals removal

Chemosphere

Volume 311, January 2023, Article number 136989

Nanotechnology- A ray of hope for heavy metals removal(Article)

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View additional affiliations

Abstract

Environmental effects of heavy metal pollution are considered as a widespread problem throughout the world, as it jeopardizes human health and also reduces the sustainability of a cleaner environment. Removal of such noxious pollutants from wastewater is pivotal because it provides a propitious solution for a cleaner environment and water scarcity. Adsorption treatment plays a significant role in water remediation due to its potent treatment and low cost of adsorbents. In the last two decades, researchers have been highly focused on the modification of adsorption treatment by functionalized and surface-modified nanomaterials which has spurred intense research. The characteristics of nano adsorbents attract global scientists as it is also economically viable. This review shines its light on the functionalized nanomaterials application for heavy metals removal from wastewater and also highlights the importance of regeneration of nanomaterials in the view of visualizing the economic aspects along with a cleaner environment. The review also focused on the proper disposal of nanomaterials with crucial issues that persist in the adsorption process and also emphasize future research modification at a large-scale application in industries. © 2022 Elsevier Ltd

Author keywords

Adsorption · Heavy metals · Nanomaterials · Pollutants · Regeneration

Indexed keywords

Document details - Cephalopods Classification Using Fine Tuned Lightweight Transfer Learning Models

Intelligent Automation and Soft Computing

Volume 35, Issue 3, 2023, Pages 3065-3079

Cephalopods Classification Using Fine Tuned Lightweight Transfer Learning Models(Article) (Open Access)

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Abstract

Cephalopods identification is a formidable task that involves hand inspection and close observation by a malacologist. Manual observation and identification take time and are always contingent on the involvement of experts. A system is proposed to alleviate this challenge that uses transfer learning techniques to classify the cephalopods automatically. In the proposed method, only the Lightweight pre-trained networks are chosen to enable IoT in the task of cephalopod recognition. First, the efficiency of the chosen models is determined by evaluating their performance and comparing the findings. Second, the models are fine-tuned by adding dense layers and tweaking hyperparameters to improve the classification of accuracy. The models also employ a well-tuned Rectified Adam optimizer to increase the accuracy rates. Third, Adam with Gradient Centralisation (RAdamGC) is proposed and used in fine-tuned models to reduce the training time. The framework enables an Internet of Things (IoT) or embedded device to perform the classification tasks by embedding a suitable lightweight pre-trained network. The fine-tuned models, MobileNetV2, InceptionV3, and NASNet Mobile have achieved a classification accuracy of 89.74%, 87.12%, and 89.74%, respectively. The findings have indicated that the fine-tuned models can classify different kinds of cephalopods. The results have also demonstrated that there is a significant reduction in the

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Document details - Increasing the wind power generation by modifying the windmill mechanism

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Materials Today: Proceedings

Volume 72, January 2023, Pages 3075-3080

Increasing the wind power generation by modifying the windmill mechanism(Article)

Usha, S., Abishake, M.S., Anbazhil, G., Dhanasekar, S.

Government College of Technology, Coimbatore, 641 013, India

Abstract

The population-consuming resources are expanding by the day; the resources are mostly used in a limited fashion. As a result, a technique for connecting natural resources with growing populations is necessary. Wind turbine technology produces the highest power of any currently available renewable energy source, but it only converts energy into electricity in one direction of wind flow. Power creation is constrained since the current technique is intended to produce energy by receiving input from just one direction. This initiative aims to address this problem. This project's mechanism uses wind energy in both clockwise and counter-clockwise directions as input. Under perfect conditions, this system creates a lot more electricity than the existing traditional windmill system. This output is attained by changing the windmill's gearbox transmission system from a planetary gear system to a simple gear train system along with intermediate gear. As a consequence, if the wind blades allowed the two directional effects, then using this system the wind turbine blade's rotational position is reversed. Therefore, it can obtain an increase in power production by the recommended designed mechanism. These effects are analyzed by ANSYS Fluent software and the results are used to prove this increased output energy than the existing domestic windmills. In terms of electricity and energy conservation, this project shows a successful output. © 2022

Author keywords

(Gear train) (Gear transmission system) (Power generation) (Renewable energy sources) (Spur gear) (Wind energy) (Windmill)

Indexed keywords

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Document details - Multiobjective Economic/Environmental Dispatch Using Harris Hawks Optimization Algorithm

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Intelligent Automation and Soft Computing

Volume 36, Issue 1, 2023, Pages 445-460

Multiobjective Economic/Environmental Dispatch Using Harris Hawks Optimization Algorithm(Article)(Open Access)

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Abstract

The eminence of Economic Dispatch (ED) in power systems is significantly high as it involves in scheduling the available power from various power plants with less cost by compensating equality and inequality constrictions. The emission of toxic gases from power plants leads to environmental imbalance and so it is highly mandatory to rectify this issues for obtaining optimal performance in the power systems. In this present study, the Economic and Emission Dispatch (EED) problems are resolved as multi objective Economic Dispatch problems by using Harris Hawk's Optimization (HHO), which is capable enough to resolve the concerned issue in a wider range. In addition, the clustering approach is employed to maintain the size of the Pareto Optimal (PO) set during each iteration and fuzzy based approach is employed to extricate compromise solution from the Pareto front. To meet the equality constraint effectively, a new demand-based constraint handling mechanism is adopted. This paper also includes Wind energy conversion system (WECS) in EED problem. The conventional thermal generator cost is taken into account while considering the overall cost functions of wind energy like overestimated, underestimated and proportional costs. The quality of the non-dominated solution set is measured using quality metrics such as Set Spacing (SP) and Hyper-Volume (HV) and the solutions are compared with other conventional algorithms to prove its efficiency. The present study is validated with the outcomes of various literature papers. © The Authors

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Volume 64, Issue 1, 2023, Pages 114-126

Controlling the Speed of renewable-sourced DC drives with a series compensated DC to DC converter and sliding mode controller(Article)(Open Access)

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Abstract

A solar-powered drive for the separately excited DC (SEDC) motor drive system has been proposed and validated. The proposed system uses a set of two cascaded series compensated buck boost converters (SCBBCs) and a push pull DC to DC converter. The maximum power point tracking (MPPT) for the solar PV energy harvesting system is based on a sliding mode controller (SMC) and the SCBBC next to the solar PV source is used for this purpose. The armature winding of the SEDC motor receives the required isolated DC voltage from a push pull converter that is powered from a common DC link that carries a battery. The field winding of the SEDC motor is fed by the second SCBBC. The speed of the SEDC motor is regulated by a separate sliding mode controller implemented in the second SCBBC. A detailed state space analysis of the SCBBC and related mathematical modelling of the complete system are presented. The simulations were carried out in the MATLAB SIMULINK environment, and an experimental prototype was developed utilizing a 200 W 110 V SEDC motor. © 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

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Computer Systems Science and Engineering

Volume 45, Issue 1, 2023, Pages 925-938

Multivariate Broadcast Encryption with Group Key Algorithm for Secured IoT(Article)(Open Access)

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[b]Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

The expanding and ubiquitous availability of the Internet of Things (IoT) have changed everyone's life easier and more convenient. Same time it also offers a number of issues, such as effectiveness, security, and excessive power consumption, which constitute a danger to intelligent IoT-based apps. Group managing is primarily used for transmitting and multi-pathing communications that are secured with a general group key and it can only be decrypted by an authorized group member. A centralized trustworthy system, which is in charge of key distribution and upgrades, is used to maintain group keys. To provide longitudinal access controls, Software Defined Network (SDN) based security controllers are employed for group administration services. Cloud service providers provide a variety of security features. There are just a few software security answers available. In the proposed sytem, a hybrid protocols were used in SDN and it embeds edge system to improve the security in the group communication. Tree-based algorithms compared with Group Key Establishment (GKE) and Multivariate public key cryptosystem with Broadcast Encryption in the proposed system. When all factors are considered, Broadcast Encryption (BE) appears to become the most logical solution to the issue. BE enables an initiator to send encrypted messages to a large set of recipients in a efficient and productive way, meanwhile assuring that the data can only be decrypted by defining characteristic. The proposed method improves the security, efficiency of the system and reduces the power consumption and minimizes the cost. © 2023 CRL Publishing. All rights reserved.

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Document details - Sliding mode observer-based fault detection for helicopter system

Journal of Control and Decision
Volume 10, Issue 4, 2023, Pages 465-475

Sliding mode observer-based fault detection for helicopter system(Article)

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Abstract

Fault detection of non-linear systems is of great importance in control systems reliability. Undetected faults could lead to irreparable damage. This paper deals with fault diagnosis of helicopter system in the presence of uncertainties and disturbances. To deal with sensor, actuator and component faults, the observer-based diagnosis scheme which employs sliding mode observer is designed. Faults are modelled as an additive and multiplicative fault which is introduced as an abrupt and intermittent fault into the system. Observer inequality constraints and gain matrices are solved using a Lyapunov-based approach. The results display the effectiveness of the designed observer and the ability to handle faults. © 2022 Northeastern University, China.

Author keywords
actuator and component faults | Fault diagnosis | residual generation | sensor | sliding mode observer

Indexed keywords
Engineering controlled: Actuators | Aircraft detection | Constraint theory | Failure analysis | Flight control systems | Linear systems

Document details - An elite hybrid strategy for solar photovoltaic system based optimized cascade controller under uniform and partial shading conditions

Optimal Control Applications and Methods
Volume 44, Issue 1, January/February 2023, Pages 23-52

An elite hybrid strategy for solar photovoltaic system based optimized cascade controller under uniform and partial shading conditions(Article)

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Abstract

A hybrid technique for maximum power point tracking (MPPT) for a photovoltaic (PV) system is proposed in this paper. The proposed hybrid system is combination of Wing suit Flying Search (WFS) and modified Transient search optimization (MTSO), therefore it is called WFS-MTSO method. The proposed controller has three processes: (i) to identify the operating level of photovoltaic (uniform or in PSC), (ii) to estimate the maximal power point using WFS technique, and (iii) to ensure the photovoltaic system runs on the estimated maximum power point (MPP) by MTSO optimized cascade controller. This method begins with a sense of irradiance and temperature. The proposed photovoltaic system has two components. The first one is WFS maximal power point tracking algorithm attain maximal power point. The second one is MTSO optimized cascade controller to force the photovoltaic system to activate at maximal power point. Here, the proposed hybrid technique is utilized at MPPT to diminish tracking error and oscillation across MPP for optimizing power output. The proposed optimized cascade control improves the system efficiency by averting interruptions previously they propagate to the system. Finally, the performance of proposed hybrid system is executed on MATLAB/Simulink working platform and the performances are compared with various existing approaches. The statistical matrices, like mean, median, and standard deviation is analyzed the tracking efficiency of the proposed WFS-MTSO approach. © 2022 John Wiley & Sons Ltd.

Author keywords

Document details - Angular symmetrical components-based anti-islanding method for solar photovoltaic-integrated microgrid

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Volume 64, Issue 1, 2023, Pages 1-21

Angular symmetrical components-based anti-islanding method for solar photovoltaic-integrated microgrid(Article)(Open Access)

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Abstract

This article examines how an Innovative Angular Symmetrical Components of Voltages be applied to Islanding detection and voltage unbalance factor estimation at a photovoltaic inverter-based distribution unit. Positive and Negative Sequence Components are converted into a polar form such as Line Aggregate RMS (LARMS) Voltage and Tangent Angle of Unbalance (TAU) which are determined from two line voltage signals. Three voltage relays are replaced with a single relay which compares the LARMS voltage and TAU with threshold limits to identify the condition of balance. ASCOV relay does not generate the trip signal in a non-islanding situation such as linear load switching and nonlinear load switching. The Non-Detection Zone (NDZ) of this ASCOV relay is very low compared to other relays. The proposed anti-islanding method is tested in a SPV powered microgrid using MATLAB/SIMULINK and the performance was studied under islanding and non-islanding events. Consequently, the simulation outcome indicates that the proposed technique effectively identifies the islanding condition with less computation time as 1 s and the performance of the proposed relay is compared with existing relays. The voltage unbalance factor determined by the proposed method is very close to the actual value in all types of unbalance conditions. © 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

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Document details - Artificial Intelligence Based Smart Routing in Software Defined Networks

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Computer Systems Science and Engineering

Volume 44, Issue 2, 2023, Pages 1279-1293

Artificial Intelligence Based Smart Routing in Software Defined Networks(Article)(Open Access)

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Abstract

In a non-static information exchange network, routing is an overly complex task to perform, which has to satisfy all the needs of the network. Software Defined Network (SDN) is the latest and widely used technology in the future communication networks, which would provide smart routing that is visible universally. The various features of routing are supported by the Information centric network, which minimizes the congestion in the dataflow in a network and provides the content awareness through its mined mastery. Due to the advantages of the information centric network, the concepts of the information-centric network has been used in the paper to enable an optimal routing in the software-defined networks. Although there are many advantages in the information-centric network, there are some disadvantages due to the non-static communication properties, which affects the routing in SDN. In this regard, artificial intelligence methodology has been used in the proposed approach to solve these difficulties. A detailed analysis has been conducted to map the content awareness with deep learning and deep reinforcement learning with routing. The novel aligned internet investigation technique has been proposed to process the deep reinforcement learning. The performance evaluation of the proposed systems has been conducted among various existing approaches and results in optimal load balancing, usage of the bandwidth, and maximization in the throughput of the network. © 2021 CRL Publishing. All rights reserved.

Author keywords

Document details - An Experimental Investigation on the Impact of Basalt Fibres on Recycled Aggregate Concrete

International Journal of Pavement Research and Technology
Volume 16, Issue 1, January 2023, Pages 176-194

An Experimental Investigation on the Impact of Basalt Fibres on Recycled Aggregate Concrete(Article)

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View additional affiliations

Abstract

In this paper, an attempt is made to understand the effectiveness of the use of basalt fibre in recycled aggregate concrete. For this experimental study, the fresh and hardened properties of concrete samples made of recycled aggregate and incorporated with basalt fibres are investigated. The concrete samples made of recycled aggregate are reinforced with different dosages of basalt fibre varying from 0 to 0.5%, with an increment of 0.1%. From the preliminary analysis, the optimum dosage of basalt fibre which results in maximum efficiency of recycled aggregate concrete is found to be 0.2% by volume. In further investigation, experiments are conducted to evaluate the structural performance of two types of beams, one made of 100% natural aggregate and the other made of 50% recycled aggregate and 50% natural aggregate. The beams are reinforced with 0.2% basalt fibres. It has been observed that the performance of beams made of basalt fibre reinforced recycled aggregate concrete composites are reasonably close to that of conventional concrete. This can be used as an indicator of the fact that basalt fibres can be adequately used as structural material and that existing analytical models and codes for conventional concrete can also be applied to recycled aggregate concrete composites. © 2021, The Author(s), under exclusive licence to Chinese Society of Pavement Engineering.

Document details - DFIG-based Wind Energy Conversion System Using Matrix Converter Under Unbalanced and Harmonic Grid Conditions with Band Pass-FIR Filters

IETE Journal of Research
Volume 69, Issue 7, 2023, Pages 4589-4604

DFIG-based Wind Energy Conversion System Using Matrix Converter Under Unbalanced and Harmonic Grid Conditions with Band Pass-FIR Filters(Article)

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Abstract

This paper presents a modest control strategy of a doubly fed induction generator (DFIG)-based wind electric conversion system (WECS) with matrix converter, under unbalanced and harmonic grid conditions. Tedious sequence decomposition process and complex control reference calculations are avoided in the proposed control methodology. To obtain power grid-friendly operation, Band Pass-finite impulse response (BP-FIR) filters are designed to achieve four different control targets: sinusoidal stator current, sinusoidal rotor current, smooth stator real and reactive power and constant electromagnetic torque. In addition to active power reference from Maximum Power Point Tracking (MPPT) controller and desired reactive power reference, BP-FIR filters are used to synthesize space vectors of direct matrix converter. The effectiveness of the proposed approach is tested for a wide range of wind speeds. © 2023 IETE.

Author keywords

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Document details - Green soap formulation: an insight into the optimization of preparations and antifungal action

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Biomass Conversion and Biorefinery

Volume 13, Issue 1, January 2023, Pages 299-310

Green soap formulation: an insight into the optimization of preparations and antifungal action(Article)

Thirunavukkarasu, A., Nithya, R., Shashankar, R., Sathya, A.B., Rangabhashiyam, S., Pasupathi, S.A., Prakash, M., Nishanth, M.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India
[b]Department of Chemical Engineering, Hindustan Institute of Technology and Science, Chennai, India
[c]Department of Biotechnology, Aarupadai Veedu Institute of Technology, Chennai, India

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Abstract

Ultrasound-assisted extract of Acalypha indica was used to prepare the green soap formulation. Previously, D-optimal mixture design was used to optimize the mixture of oil components including coconut oil (A, 34–56%), soybean oil (B, 19–31%), castor oil (C, 14–23%), sunflower oil (D, 4–6%), and olive oil (E, 5–9%). Linear regression models were proposed to predict the responses, i.e., hardness (Y_1), iodine (Y_2), and iodine number saponification (INS) (Y_3), and validated with a high degree of statistical accuracy ($F_{cal} > F_{tab}$; df = 4, $p < 0.0001$; $R^2 > 0.9950$). Optimization results revealed that the formulation containing 44.57% A, 23.62% B, 17.44% C, 5.37% D, and 9.0% E would yield 41 Y_1, 62 Y_2, and 159 Y_3. The chemical properties of the optimized soap formulation were quite comparable concerning the standard soap specifications (IS13498). Further, this formulation was supplemented with Acalypha indica extract to prepare the green soap, and its antifungal activity was determined using the agar dilution method. [Figure not available: see fulltext.] © 2020, Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

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Pandey, J., Gaire, S., Sharma, K.
Exploring the potentials of Ziziphus mauritiana Lam. seed kernel oil as pharmaceutical oil base: Physicochemical characterization and ketoconazole soap formulation
(2023) Heliyon

Fu, Y., Fu, Q., Yang, L.
Utilizing the above-ground extract of Paris polyphylla as a natural antioxidant and antimicrobial additive in soap formulation
(2023) Biomass Conversion and Biorefinery

Sharma, D., Sharma, S., Mandal, V.
Unveiling the anti-inflammatory potential of Acalypha indica L. and analyzing its research trend: digging deep to learn deep
(2023) Naunyn-Schmiedeberg's Archives of Pharmacology

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Document details - Optimization of nozzle hole number for a diesel engine fueled with kapok methyl ester blend

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Energy Sources, Part A: Recovery, Utilization and Environmental Effects

Volume 45, Issue 3, 2023, Pages 7423-7435

Optimization of nozzle hole number for a diesel engine fueled with kapok methyl ester blend(Article)

Narayanan, S., Ramesh, K., sakthivel, R.

[a]Mechanical Engineering, SNS College of Engineering Coimbatore, Coimbatore, India
[b]Mechanical Engineering, Government College of Technology, Coimbatore, India
[c]Department of Mechanical Engineering, Amrita School of Engineering, Amrita Vishwa Vidyapeetham, Coimbatore, India

Abstract

It is evident from the past investigations that the biodiesel improves the quality of combustion and elevates the thermal efficiency. But the inevitable fact that enhanced combustion quality enhances NOx emissions. This works aims at decreasing NOx emissions by changing the injector hole number (IHN) so that the wall impingement may be reduced which would reduce the NOx emissions. The experiments are conducted for three different nozzle configurations (four holes, five holes, and six holes) for three different kapok methyl ester blends (20%, 30%, and 40%) for three loads. The Performance and emission parameters are optimized using a 3*3*3 matrix (load, biofuel blend, and IHN). As expected results indicate reduction of NOx with increase in IHN. CO, HC, and smoke also see a mild decrement with increase in IHN. Brake-specific fuel consumption (BSFC) decreases with increase in IHN whereas slight increase of BSFC is observed with increase of fuel blend. © 2019 Taylor & Francis Group, LLC.

Author keywords

Diesel engine   NOx   nozzle   optimization   specific fuel consumption

Cited by 2 documents

Dubey, A., Prasad, R.S., Singh, J.K.
Response surface methodology (RSM) based experimental and model analysis of diethyl ether-biodiesel-diesel blends with exhaust gas recirculation (EGR) on stationary diesel engine
(2023) Petroleum Science and Technology

Imthiyas, A., Saravanan, M., Sanjaykumar, B.M.
Influence of nozzle hole geometry of CI engines performance and emission parameters fuelled by diesel and Biodiesel-A review
(2021) Journal of Physics: Conference Series

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Document details - Sustainable organic waste management using vermicomposting: a critical review on the prevailing research gaps and opportunities

Environmental Science: Processes and Impacts
Volume 25, Issue 3, 28 December 2022, Pages 364-381

Sustainable organic waste management using vermicomposting: a critical review on the prevailing research gaps and opportunities(Review)

Thirunavukkarasu, A., Sivashankar, R., Nithya, R., Sathya, A.B., Priyadharshini, V., Kumar, B.P., Muthuveni, M., Krishnamoorthy, S.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India
[b]Department of Chemical Engineering, National Institute of Technology, Warangal, India
[c]Department of Biotechnology, National Institute of Technology, Warangal, India

View additional affiliations

Abstract

Logistic growth of human population, exponential rate in agronomic industries and feeble waste management practices have resulted in the massive generation of organic wastes. Vermicomposting is one of the eco-biotechnological practices to efficiently transform them into stable and nutrient-rich organic manure with the synergetic actions of earthworms and soil microbiota. Vermicompost, a derivative product has the desirable physicochemical traits such as excellent porosity, buffering actions, aeration and water holding capacity. Also the presences of enzymic and microbial secretions contribute to growth and disease resistance of the crops. Owing to the benefits of soil nutrients restoration and effective organic waste management, vermicomposting has gained much attention among the scientific researchers and organic farmers. The present review is intended to provide comprehensive information on the site selection, screening of earthworms, different modes of operation and their desirable micro-environmental conditions. Also, the review has critically identified the prevailing research gaps viz. limited studies on the substrate formulation or optimization designs, poor control on the operational variables, lack of field-level investigations, technological feasibility of scale-up process, economic viability and cost-benefit analysis. Prospective researches can be made on these hotspots to identify the vermicomposting as a successful and profitable business model in the circular economy. © 2023 The Royal Society of Chemistry.

Document details - Examining the surface roughness and kerf quality of micro-slots cut on the surfaces of Ti-B₄C nanocomposites by WEDM: a desirability approach

Materials Research Express
Volume 9, Issue 12, 1 December 2022, Article number 125009

Examining the surface roughness and kerf quality of micro-slots cut on the surfaces of Ti-B_4C nanocomposites by WEDM: a desirability approach(Article)(Open Access)

Ragavan G, V.R., Lakshmanan, P., Mahalingam, M.

[a]Department of Production Engineering, Government college of Technology, Tamil Nadu, Coimbatore, 641013, India
[b]Department of Mechanical Engineering, Sri Sivasubramaniya Nadar College of Engineering, Tamil Nadu, Kalavakkam, Chennai, 603110, India

Abstract

Micro slots and textures are created on Titanium (Ti) composites to improve its surface characteristics. Micro-textured Ti composites are generally recommended for bio implants, automobile, and aerospace components. In the current research, Ti-B_4C nanocomposites were prepared by powder metallurgical route. Micro slots were cut on the Ti-B_4C surfaces by Wire Electrical Discharge Machining (WEDM) Technology by varying the current, pulse-ON time, and pulse-OFF time. Scanning electron microscopy and XRD analysis validates the uniform distribution and inclusion of B_4C nanoparticles in Ti matrix. Response surface methodology was used to plan the experimental runs. Analysis of variance and desirability analysis were employed to identify the most suitable machining factors for obtaining the minimum surface roughness, lower kerf width and higher material removal rate (MRR). Increase in applied current and pulse-ON time, increases the MRR. Increase of pulse-OFF time from 50 μs to 60 μs gradually reduces the MRR and reduce the surface roughness of the cut slots. Contrastingly an increase in pulse-ON time increases the roughness due to an extensive melting and resolidification of Ti nanocomposites. The morphology of the WEDMed surface reveals the recast layer and localized melting zones on the cut surfaces. © 2022 The Author(s). Published by IOP Publishing Ltd.

Author keywords

scopus.com/record/display.uri?eid=2-s2.0-85145617431&doi=10.2478%2fpjct-2022-0024&origin=inward&txGid=dac141f5905fe03c39f828be89647f28

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Document details - Investigation and Prediction of ECMM characteristics of Hardened Die Steel with Nanoparticle Added Electrolytes Using Hybrid Deep Neural Network

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Polish Journal of Chemical Technology

Volume 24, Issue 4, 1 December 2022, Pages 7-22

Investigation and Prediction of ECMM characteristics of Hardened Die Steel with Nanoparticle Added Electrolytes Using Hybrid Deep Neural Network(Article)(Open Access)

Kanniyappan, V., Tamilperuvalathan, S.

[a]Department of Mechanical Engineering, TPEVR Government Polytechnic College, Vellore, 632002, India
[b]Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

In our work, the process efficiency of the ECMM should be improved by using different combinations of nano-particles and added electrolytes. The superior aim of this work is to improve and predict the ECMM machining characteristics of die hardened steel, namely material removal rate (MRR), Tool wear rate (TWR) and Surface Roughness (Ra). The machining conditions are optimized using Response Surface Methodology (RSM) based on Box Behnken Design. The better Nano electrolyte is optimized using Deer Hunting Optimization (DHO) based on the machined outcomes, and the performances are predicted using a hybrid Deep Neural Network (DNN) based DHO. The hybrid DNN-DHO based predicted outcome of MRR is 0.361 mg/min, TWR is 0.272 mg/min and Ra is 2.511 μm. The validation results show that our proposed DNN-DHO model performed well and obtained above 0.99 regression for both training and validation of DNN-DHO, where the root mean square error ranges between 0.018 and 0.024. © 2022 Vijayakumar Kanniyappan et al., published by Sciendo.

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Document details - Attention-Based Multiscale Spatiotemporal Network for Traffic Forecast with Fusion of External Factors

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ISPRS International Journal of Geo-Information

Volume 11, Issue 12, December 2022, Article number 619

Attention-Based Multiscale Spatiotemporal Network for Traffic Forecast with Fusion of External Factors(Article)(Open Access)

Nadarajan, J., Sivaraj, R.

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[b]Department of Computer Science and Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

Periodic traffic prediction and analysis is essential for urbanization and intelligent transportation systems (ITS). However, traffic prediction is challenging due to the nonlinear flow of traffic and its interdependencies on spatiotemporal features. Traffic flow has a long-term dependence on temporal features and a short-term dependence on local and global spatial features. It is strongly influenced by external factors such as weather and points of interest. Existing models consider long-term and short-term predictions in Euclidean space. In this paper, we design an attention-based encoder-decoder with stacked layers of LSTM to analyse multiscale spatiotemporal dependencies in non-Euclidean space to forecast traffic. The attention weights are obtained adaptively and external factors are fused with the output of the decoder to evaluate region-wide traffic predictions. Extensive experiments are conducted to evaluate the performance of the proposed attention-based non-Euclidean spatiotemporal network (ANST) on real-world datasets. The proposed model has improved prediction accuracy over previous methods. The insights obtained from traffic prediction would be beneficial for daily commutation and logistics. © 2022 by the authors.

Author keywords

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STPNet: Quantifying the Uncertainty of Electric Vehicle Charging Demand via Long-Term Spatiotemporal Traffic Flow Prediction Intervals
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Zhang, Q., Zhou, L., Su, Y.
Gated Recurrent Unit Embedded with Dual Spatial Convolution for Long-Term Traffic Flow Prediction
(2023) ISPRS International Journal of Geo-Information

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Document details - Wide Band Gap Devices and Their Application in Power Electronics

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Energies

Volume 15, Issue 23, December 2022, Article number 9172

Wide Band Gap Devices and Their Application in Power Electronics(Review)(Open Access)

Kumar, A., Moradpour, M., Losito, M., Franke, W.-T., Ramasamy, S., Baccoli, R., Gatto, G.

[a]Department of Electrical and Electronic Engineering, University of Cagliari, Via Marengo 2, Cagliari, 09123, Italy
[b]Centre for Industrial Electronics, University of Southern Denmark, Sønderborg, 6400, Denmark
[c]Department of Electrical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

View additional affiliations

Abstract

Power electronic systems have a great impact on modern society. Their applications target a more sustainable future by minimizing the negative impacts of industrialization on the environment, such as global warming effects and greenhouse gas emission. Power devices based on wide band gap (WBG) material have the potential to deliver a paradigm shift in regard to energy efficiency and working with respect to the devices based on mature silicon (Si). Gallium nitride (GaN) and silicon carbide (SiC) have been treated as one of the most promising WBG materials that allow the performance limits of matured Si switching devices to be significantly exceeded. WBG-based power devices enable fast switching with lower power losses at higher switching frequency and hence, allow the development of high power density and high efficiency power converters. This paper reviews popular SiC and GaN power devices, discusses the associated merits and challenges, and finally their applications in power electronics. © 2022 by the authors.

Author keywords

energy storage | gallium nitride | power electronics | silicon carbide | wide bandgap

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Document details - Correction to: Omnidirectional Microstrip MIMO Antenna for Intelligent Vehicle RADAR Communication (Wireless Personal Communications, (2022), 127, 4, (3407-3421), 10.1007/s11277-022-09923-4)

1 of 1

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Wireless Personal Communications

Volume 127, Issue 4, December 2022, Page 3423

Correction to: Omnidirectional Microstrip MIMO Antenna for Intelligent Vehicle RADAR Communication (Wireless Personal Communications, (2022), 127, 4, (3407-3421), 10.1007/s11277-022-09923-4)(Erratum)(Open Access)

Mathivanan, S., Rajeswari, A.

[a]Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, India
[b]Department of Electronics and Communication Engineering, Coimbatore Institute of Technology, Coimbatore, India

Original document
Omnidirectional Microstrip MIMO Antenna for Intelligent Vehicle RADAR Communication
(2022) Wireless Personal Communications

Abstract

In this article the affiliation details for A. Rajeswari were incorrectly given as 'Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, India' but should have been 'Department of Electronics and Communication Engineering, Coimbatore Institute of Technology, Coimbatore, India'. The original article has been corrected. © 2022, The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature.

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Document details - Transdermal drug delivery systems for the effective management of type 2 diabetes mellitus: A review

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Diabetes Research and Clinical Practice

Volume 194, December 2022, Article number 109996

Transdermal drug delivery systems for the effective management of type 2 diabetes mellitus: A review(Review)

Thirunavukkarasu, A., Nithya, R., Jeyanthi, J.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, India
[b]Department of Civil Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

Type 2 Diabetes mellitus (T2DM) is characterized by either insufficient insulin production or the inability to take it up for the glycemic regulation in the human body. According to WHO reports, T2DM will be the seventh-largest syndrome resulting in mortality by 2030. To tackle this chronic metabolic disorder, the person with diabetes population depends on subcutaneous administration (Sub-Q) of insulin and certain oral hypoglycemic drugs. However, these current invasive practices suffered from painful injections, needle phobia, multiple doses, risk of infection and poor-patient compliance. Hence, the search for a non-invasive and patient-friendly insulin administration system was high in the past decades leading to the development of Transdermal Drug Delivery Systems (TDDS). These can offer rapid and sustained release of therapeutic compounds at controlled rates with no pain during the administration. In recent years, the usage of such TDDS has been increasing at an exponential rate in Type 2 diabetes management. In the present review, the scholarly works on the different modes of TDDS were comprehensively reported chronologically to appreciate their developments. Conclusively, this review critically identified prevailing research gaps in the current TDDS research and presented potential research hotspots for the prospect development in T2DM management. © 2022 Elsevier B.V.

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Document details - Design of Full-Order Neural Observer with Nonlinear Filter Techniques for State Estimation of a Three-Tank Process Control System

1 of 1

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Iranian Journal of Science and Technology - Transactions of Electrical Engineering

Volume 46, Issue 4, December 2022, Pages 1057-1087

Design of Full-Order Neural Observer with Nonlinear Filter Techniques for State Estimation of a Three-Tank Process Control System(Article)

Suguna, A., Ranganayaki, V., Deepa, S.N.

[a]Department of Electronics and Instrumentation Engineering, Government College of Technology, Coimbatore, 641 013, India
[b]Department of Electrical and Electronics Engineering, Dr. NGP Institute of Technology, Coimbatore, 641 048, India
[c]Department of Electrical Engineering, National Institute of Technology Arunachal Pradesh, Jote, 791113, India

Abstract

A novel model-based approach to design a full-order state observer for estimating the states of a three-tank process has been attempted in this research study. State estimation has been a methodology that integrates the prediction from exact models pertaining to the system and achieves consistent estimation of the non-measurable variables. This study has attempted to develop a full-order observer for estimation of non-measurable variables of the considered three-tank process control system. Neural observer is designed with the nonlinear state update equation that is structured as the neural network employing radial basis function (RBF) model. Also, nonlinear full-order state observer is designed based on a new recursive likelihood synthesizer (RLS) of the extended Kalman filter (EKF) and classic unscented Kalman filter (UKF) and finally the states are estimated. The likelihood synthesizer determines the covariance and Kalman gains so as to match the real-time process measurements. Three-tank process system (TTPS) is represented by its mathematical model and the developed state estimation techniques are applied for estimating the non-measurable variables. Likelihood synthesizer tends to evaluate the covariance of the initial states and simulation tests confirm the attainment of better results using the new nonlinear filtering techniques. RBF neural observer has resulted in an ARMSE of 4.1629×10^{-3}, 0.3963×10^{-3} and 0.3085×10^{-3} for the measured heights h_1, h_2 and h_3, respectively. The new RLS-EKF observer with its recursive determination of the maximum likelihood has attained ARMSE of 2.1982×10^{-4}, 0.1512×10^{-6} and 0.0261×10^{-7} for the measured heights h_1, h_2 and h_3, respectively. This novel RLS-EKF has proved to be highly robust and has higher precision than the RBF neural observer and UKF technique as applied for the TTPS model. © 2022, The Author(s), under exclusive licence to Shiraz University.

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Document details - Omnidirectional Microstrip MIMO Antenna for Intelligent Vehicle RADAR Communication

Wireless Personal Communications
Volume 127, Issue 4, December 2022, Pages 3407-3421

Omnidirectional Microstrip MIMO Antenna for Intelligent Vehicle RADAR Communication(Article)

Mathivanan, S., Rajeswari, A.
[a]Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, India
[b]Department of Electronics and Communication Engineering, Coimbatore Institute of Technology, Coimbatore, India

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Correction to: Omnidirectional Microstrip MIMO Antenna for Intelligent Vehicle RADAR Communication (Wireless Personal Communications, (2022), 127, 4, (3407-3421), 10.1007/s11277-022-09923-4)
(2022) Wireless Personal Communications, 127 (4), p. 3423.

Abstract

The Multiple Input Multiple Output (MIMO) antenna was developed to enhance many wireless communications with the diverse range of antenna elements. Multiple antennas focus energy into smaller regions of space with improved directional gain and radiation efficiency. Omnidirectional antenna achieves radiation in all directions. This paper has proposed a compact micro-strip circular patch antenna, which operates at 5.8 GHz in C-band for Intelligent Vehicle RADAR (IV RADAR) application. This antenna adopted FR4 as substrate, which has relative permittivity, ε_r = 4.4 and dielectric tangent loss, δ = 0.02. A compact high gain 4 × 4 MIMO circular patch antenna with inset feed has been designed and simulated. Sixteen (4 × 4) circular patch elements have been arranged with 0.5 λ_0 spacing between the consecutive patches in x-y plane. Each circular patch radius is 0.1346 λ_0 and substrate dimension is 2.4800 λ_0 × 2.5133 λ_0 × 0.0309 λ_0. The circular patch array antenna was designed and simulated with a combination of inset and corporate feed. The simulated results provide average return loss of −27.46 dB at 5.8 GHz with realized gain of 11.25 dBi and directivity of 15.80 dB. The Bandwidth of 470 MHz was observed in inset feed method. In order to achieve the omnidirectional radiation pattern, six substrates of dimension 1.546 λ_0 × 1.546 λ_0 × 0.0309 λ_0 were arranged in cuboid shape. Four (2 × 2) circular patches with radius 0.1346 λ_0 each and 0.5 λ_0 spacing between them excited with inset feed have been designed on each substrate. Twenty four microstrip circular patches were arranged in cuboid shape to achieve high omnidirectional gain. In the corporate feed, a quarter wave transformer is employed for impedance matching. Six combinations of inset and corporate feed excite the combination of four (2 × 2) circular patch antennas on each surface of cuboid. The simulated results provide average return loss of about −19.56 dB at 5.83 GHz; realized gain of 8.29 dBi; directivity of 15.86 dB and 197 MHz bandwidth in omni direction. The proposed antenna demonstrably accomplishes antenna miniaturization as well as higher omnidirectional gain with a smaller patch radius. For possible applications in MIMO systems, the proposed configurations remain accordingly compact. Finally, the low cost FR4 material is used for fabrication to reduce the overall system cost. The fabricated antenna had been tested for its radiation characteristics. © 2022, The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature.

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Document details - Experimental investigation of response of HSTC beam encased with Hf-ECC and LWAC

Structural Concrete
Volume 23, Issue 6, December 2022, Pages 3397-3415

Experimental investigation of response of HSTC beam encased with Hf-ECC and LWAC(Article)

Soniya, S.M., Chithra, R.
Department of Civil Engineering, Government College of Technology, Coimbatore, India

Abstract

The present investigation deals with the flexural behavior of a new type of Hybrid steel, polypropylene Engineered Cementitious Composite (Hf-ECC) - Lightweight Aggregate Concrete (LWAC) encased Hybrid Steel Truss Composite (HSTC) beams and detailed parametric study of HSTC beams using Abaqus. Eight simply supported beams fabricated with identical hybrid steel truss, but with varying depths and layer arrangement of Hf-ECC and LWAC were experimentally tested to investigate the effects of Hf-ECC depth of HSTC beam on the ultimate load-carrying capacities and failure modes. Test results show that cracking, yield, ultimate moments, and the ductility of HSTC beams are improved by increasing the depth of Hf-ECC due to the excellent tensile properties of Hf-ECC. In addition to the above enhancement, it is also found that the combined use of Hf- ECC and LWAC could improve the beams' general ductility and considerable energy dissipation capacity due to Hf-ECC's excellent deformation ability besides reducing beams' weight. In addition to experimental work, a finite element model is used to predict the load-deflection behavior of Hf-ECC and LWAC-encased HSTC beams. © 2022 International Federation for Structural Concrete.

Author keywords

ductility · Engineered Cementitious Composite (ECC) · finite element analysis (FE) · flexural behavior

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Soniya, S.M., Chithra, R.
Performance analysis of cost-effective hybrid polypropylene-steel engineered cementitious composites and prediction based on artificial neural network
(2023) Structural Concrete
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Document details - Biosorption of heavy metal ions from the aqueous solutions using groundnut shell activated carbon: batch adsorption, kinetic and thermodynamic studies

Global Nest Journal

Volume 24, Issue 4, November 2022, Pages 729-742

Biosorption of heavy metal ions from the aqueous solutions using groundnut shell activated carbon: batch adsorption, kinetic and thermodynamic studies(Article)(Open Access)

Sathees Kumar, V., Gokulan, R., Geetha, M.B., Zunaithur Rahman, D.

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[b]Department of Civil Engineering, GMR Institute of Technology, Andhra Pradesh, Srikakulam, 532127, India
[c]Department of Chemistry, St. Michael College of Engineering and Technology, Tamil Nadu, Kalayarkoil, 630551, India

View additional affiliations

Abstract

Batch adsorption studies of heavy metals were carried out using activated charcoal groundnut shell powder as an adsorbent material. The groundnut shell was collected and synthesized by chemical synthesis to convert it into charcoal form. The prepared adsorbent's pore size & surface area was analyzed by BET surface analysis using N2 – adsorption & desorption process. XRD techniques analyzed the crystalline structure of charcoal adsorbent, and the functional groups & behaviour of the surface were analyzed through FTIR, SEM, and EDX analysis. The optimum adsorption parameters of pH, temperature, time of contact between adsorbent and adsorbate, groundnut shell dose, and metal ion concentrations were obtained from the batch studies with an optimum concentration of 20 mg/L, and the mass transfer mechanism and rate-controlling step was identified by isotherm and kinetic studies. The adsorbent with the dose of 2.5 g L^{-1} removed 87.12% of Cu ions, 92.78% of Pb ions and 95.62% of Hg ions at the pH of 2.0 with 25 mg L^{-1} concentrated metal ions in the synthetic solution. © 2022 Global NEST Printed in Greece. All rights reserved.

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Document details - Metanil Yellow dye adsorption using green and chemical mediated synthesized manganese ferrite: An insight into equilibrium, kinetics and thermodynamics

Chemosphere

Volume 307, November 2022, Article number 136218

Metanil Yellow dye adsorption using green and chemical mediated synthesized manganese ferrite: An insight into equilibrium, kinetics and thermodynamics(Article)

Sivashankar, R., Sivasubramanian, V., Anand Kishore, K., Sathya, A.B., Thirunavukkarasu, A., Nithya, R., Deepanraj, B.

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Abstract

Green Manganese Ferrite (GMF) and Chemical mediated Manganese Ferrite (CMF) were designed and prepared via in situ co-precipitation method and their adsorption potential was compared using the model dye, Metanil Yellow (MY). Previously, an extract of aquatic macrophyte and metal chloride were employed for the development of ecofriendly GMF. Alternatively, CMF has been synthesized through chemical co-precipitation from metal chloride precursors. Several characterization methods, including PSA, BET, TGA, DSC, FTIR, SEM, VSM, EDX, and XRD, were analyzed to reveal the structural and functional properties of the as-synthesized GMF and CMF. Their MY adsorption performances were tested as the function of the operational conditions such as initial solution pH, temperature, nanocomposite dosage, and dye concentration in a batch mode of operation. The pseudo-second order MY adsorption process fits best in Langmuir model which yielded the maximal monolayer adsorption capacity (q_{max}) of 391.34 mg/g for GMF and 271.89 mg/g for CMF. This outperformance of GMF over CMF was observed due to the augmentation of specified surface functional moieties derived from the phyto-constituents of macrophages. Further, the thermodynamic studies confirmed the chemisorptive and exothermic nature of adsorption processes. Conclusively, with the ease of regeneration and reuse potential, GMF and CMF could be viable contenders for scale up and industrial applications. © 2022

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High photocatalytic activity and stability of MnV2O6 and Mn2V2O7 synthesized by simple low temperature method for bromophenol blue degradation
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Document details - Recycling of Tannery (chrome) sludge into sludge biochar (SB) /TiO₂ nanocomposite via chemical activation through hydrothermal pre-treatment

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Journal of Material Cycles and Waste Management

Volume 24, Issue 6, November 2022, Pages 2255-2269

Recycling of Tannery (chrome) sludge into sludge biochar (SB) /TiO_2 nanocomposite via chemical activation through hydrothermal pre-treatment(Article)

Velumani, M., Jeyadharmarajan, J.

Department of Environmental Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

The preparation of biochar from Tannery (chrome) sludge has gained recent attention among many scientists globally. Hydrothermal pre-treatment method was adopted to load TiO_2 nanoparticles on the surface of sludge biochar to develop a safe, low cost, and novel nanocomposite. Chemical activation of sludge with KOH solution for 48 h was done before pyrolyzing the sludge to produce biochar. This novel c-SB/TiO_2 nanocomposite exhibits a higher surface area of 636.23 m^2/g when compared with the sludge biochar/TiO_2 nanocomposite without chemical activation. The present research work mainly focuses on the synthesis and investigation of structural properties of c-SB/TiO_2 nanocomposite prepared by hydrothermal pre-treatment. The morphological and structural properties of sludge biochar/TiO_2 nanocomposite were identified by Scanning Electron Microscope (SEM) and X-ray Diffraction (XRD). The porosity of the nanocomposite was investigated using a BET surface area analyser. The thermal decomposition and surface functional group was identified using TGA, FT-IR, PL and Raman spectrophotometer, respectively. c-SB/TiO_2 nanocomposite was used to degrade Cr (VI) by varying its initial concentration, catalyst dosage and initial pH. Results indicate that c-SB/TiO_2 nanocomposite showed an enhanced photocatalytic activity under UV light irradiation. Further, it was found that under optimal conditions of 10 mg/L of pollutant concentration, pH of 2 and catalyst dosage of 0.5 g/L, degradation efficiency of 98.65% Cr (VI) has been achieved for a reaction time of 180 min. Additionally, COD measurement shows a 69.8% reduction for a reaction time of 180 min, which is found to be more recalcitrant under photocatalytic activity. © 2022, Springer Japan KK, part of Springer Nature.

Author keywords

(c-SB/TiO_2 nanocomposite) (chemical activation) (Hydrothermal pre-treatment) (Photocatalyst) (Photocatalytic degradation) (sludge biochar)

Indexed keywords

Engineering controlled terms: (Catalysts) (Chemical activation) (Chromium compounds) (Decomposition) (Degradation) (Hydrothermal synthesis) (Irradiation) (Photocatalytic activity) (Potassium hydroxide) (Scanning electron microscopy) (TiO2 nanoparticles) (Titanium dioxide)

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Velumani, M., Jeyadharmarajan, J.

Conversion of novel tannery sludge-derived biochar/TiO2 nanocomposite for efficient removal of Cr (VI) under UV light: photocatalytic performance and mechanistic insight

(2023) Environmental Science and Pollution Research

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Document details - Ensemble classifier based big data classification with hybrid optimal feature selection

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Advances in Engineering Software

Volume 173, November 2022, Article number 103183

Ensemble classifier based big data classification with hybrid optimal feature selection(Article)

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View additional affiliations

Abstract

Big data is turning out to be well-liked and enviable amongst numerous users for storing, analyzing, and handling larger quantities of data. Nevertheless, clustering these larger data has turned into more multifaceted owing to its data size. A number of machine learning (ML) approaches have been developed recently to extract information from Big Data. These existing techniques, on the other hand, do not meet the accuracy criterion. Proposed LDA, PCA, and LSR-based features are first calculated. The optimal features are then chosen using a new SSI-CSA model. These optimal features are then classified via ensemble classifier (EC) that includes SVM, RF, DT and NN and the precise classified outcomes are obtained. This work employs the Shark Smell Integrated Cat Swarm Algorithm (SSI-CSA) model for precise feature selection. In the end, the improvement of deployed scheme is confirmed regarding diverse metrics like FNR, MCC, and accuracy and so on. © 2022

Author keywords

(Big data classification) (Ensemble classifier) (Proposed LDA mode) (SSI-CSA optimization) (SVM)

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Document details - Materialistic characterization, thermal properties, and cytocompatibility investigations on acrylic acid-functionalized nSiO₂-reinforced PEEK polymeric nanocomposite

Colloid and Polymer Science
Volume 300, Issue 10, October 2022, Pages 1155-1168

Materialistic characterization, thermal properties, and cytocompatibility investigations on acrylic acid-functionalized $nSiO_2$-reinforced PEEK polymeric nanocomposite(Article)(Open Access)

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Abstract

Polyether ether ketone (PEEK) is a biocompatible alternative to metallic biomaterials because of its unique properties and biocompatibility. Its bioinert nature may lead to implant failure from inadequate osseointegration. Therefore, this research aims to develop the $nSiO_2$ ceramic particle-reinforced PEEK ($nSiO_2$@PEEK) polymer nanocomposite. The particle size of nanoparticles was measured as 43.6 nm using the particle size analyzer (PSA). The morphology of the fabricated composite was analyzed using FESEM. The structural characteristic of $nSiO_2$@PEEK was investigated using XRD and FTIR. Thermal stability was examined using TGA thermograms and DSC curves. Minimum toxic level (grade: slight, 1–20%) was observed by in vitro cytotoxicity assessment using direct and indirect methods. Excellent cell viability was found as 83.6% through MTT assay. The MG-63 cell adhesion study was conducted subsequently excellent cell growth and cell morphology were monitored using SEM analysis. This investigation found the nanocomposite to be biocompatible. It is a promising biomaterial for medical implants. © 2022, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Document details - Biosensor for heavy metals detection in wastewater: A review

Food and Chemical Toxicology
Volume 168, October 2022, Article number 113307

Biosensor for heavy metals detection in wastewater: A review(Article)

Velusamy, K., Periyasamy, S., Kumar, P.S., Rangasamy, G., Nisha Pauline, J.M., Ramaraju, P., Mohanasundaram, S., Nguyen Vo, D.-V.
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[b]Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia
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Abstract

Pollution due to heavy metals is a global issue in recent years. Initially, there were fewer contaminants, which has increased exponentially owing to rapid industrialization and various anthropogenic activities. Toxicity due to heavy metals causes a lot of health problems and organ system failure in human beings. It also affects other forms of living beings such as plants, animals and even the microbiota. This has been reported by various press reports and research findings. In this review, the production of heavy metals, associated effects on the environment and the technologies employed for detecting these heavy metals are comprehensively discussed. The analytical instruments, including biosensors, have been found to be more beneficial than other techniques. Biosensor exhibits numerous special features, such as reproducibility, reusability, linearity, sensitivity, selectivity, and stability. Over the last three years, biosensors have also had a detection limit of 65.36 ng/mL for heavy metals. The design of biosensors, features and types were also explained in detail. The limit of detection for the heavy metals in wastewater using biosensors was also included with recent references up to the last five years. © 2022 Elsevier Ltd

Author keywords

Document details - Optimization of consolidated bioprocessing by response surface methodology in the conversion of corn stover to bioethanol by thermophilic Geobacillus thermoglucosidasius

Chemosphere

Volume 304, October 2022, Article number 135242

Optimization of consolidated bioprocessing by response surface methodology in the conversion of corn stover to bioethanol by thermophilic Geobacillus thermoglucosidasius(Article)

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View additional affiliations

Abstract

The swift depletion of fossil fuels and their associated environment and economic impact has led the world to explore the sustainable alternate fuels. Amidst the available alternatives lignocellulosic bioethanol provides the edge over the exhausting fossil fuels. In this current study, Response surface methodology, a mathematical and statistical tool was used to optimize the fermentation conditions in consolidated bioprocessing of corn stover by Geobacillus thermoglucosidasius. The impact of inoculum concentration, temperature, pH, agitation speed and time in bioethanol fermentation were screened with Plackett-Burman design and it was farther optimized with central composite design. The analysis by PBD confirmed the significant impact of fermentation time, Inoculum concentration, and temperature of the fermentation process. Further, it was optimized with CCD. This showed that 15% v/v of Inoculum concentration, 50 °C of temperature and fermentation time of 72 h increased the bioethanol concentration to a maximum of 9.04 g/L with 0.45 g/g significant yield and a conversion efficiency of 88%. Thus, the CCD showed a satisfactory result in consolidated bioprocessing of bioethanol from corn stover. Thus, in the future, this approach of optimization will yield a good base for consistent production of bioethanol. © 2022 Elsevier Ltd

Document details - Recent advances in electrochemical sensor developments for detecting emerging pollutant in water environment

Chemosphere

Volume 304, October 2022, Article number 135331

Recent advances in electrochemical sensor developments for detecting emerging pollutant in water environment(Article)

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Abstract

In the latest times, considerable studies have been performed closer to detecting emerging pollutant such as paracetamol in wastewater. Electrochemical sensor developments have recently started to determine in fewer concentrations effectively. The detection of paracetamol using standard protocols corresponding to electroanalytical techniques has a greater impact noticed in directing the detecting process toward biosensors. Non-enzymatic sensors are the peak of all electro analysis approaches. Functionalized materials, such as metal oxide nanoparticles, conducting polymers, and carbon-based materials for electrode surface functionalization have been used to create a fortification for distributing passive enzyme-free biosensors. Synergic effects are possible by enhancing loading capacity and mass transfer of reactants for attaining high analytical sensitivity using a variety of nanomaterials with large surface areas. The main focus of this study is to address the prevailing issues in the identification of paracetamol with the tasks in the non-enzymatic sensors field, followed by the useful methods of electro analysis studies. © 2022 Elsevier Ltd

Document details - Strength optimization of recycled fine aggregate self-curing concrete using Taguchi design

Structural Concrete

Volume 23, Issue 5, October 2022, Pages 3062-3072

Strength optimization of recycled fine aggregate self-curing concrete using Taguchi design(Article)

Ravathi, M.C., Chithra, R.

Department of Civil Engineering, Government College of Technology, Coimbatore, India

Abstract

In the present scenario, sustainable materials which creates less impact on the environment are the need of the hour. Recycled fine aggregate self-curing concrete (RFA-SCRC) can play a significant role in reducing the utilization of natural river sand and also plays a vital role in conserving the water used for curing. This research work deals with the experimental investigations on the compressive strength, flexural strength and split tensile strength of RFA-SCRC for various replacement proportions of RFAs using ordinary portland cement (OPC) and portland pozzolana cement (PPC) as different variants. The replacement proportions of RFAs considered for this study are 0%, 10%, 20%, 30%, 40%, and 50% to the weight of manufactured sand. Strength optimization was carried out by Taguchi optimization method using Minitab software tool. The parameters considered in this study are the replacement proportion of RFA, type of cement and type of curing. The optimization results indicate that, considering compressive and split tensile strength characteristics, RFA concrete produced using 40% RFA, OPC, and self-curing process is found to be optimum whereas 30% RFA, OPC, and self-curing process is found to be optimum with respect to flexural strength characteristics. © 2022 International Federation for Structural Concrete.

Author keywords

recycled fine aggregates, regression equation, self-curing, strength optimization, Taguchi design

Document details - Extraction and characterization of waste plastic pyrolysis oil for diesel engines

Journal of Cleaner Production

Volume 366, 15 September 2022, Article number 132924

Extraction and characterization of waste plastic pyrolysis oil for diesel engines(Article)

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Abstract

In this research work, the fuel extraction process from waste plastics through the thermal cracking method is explored. The pyrolysis process was carried out at a wide range of temperatures in the absence of oxygen. About 78% (w/w) of the liquid yield was extracted between the effective pyrolysis temperatures of 370 °C - 380 °C, resulting in a calorific value of 38.53 MJ/kg. The obtained plastic pyrolysis fuel was then characterized by thermogravimetric study, FTIR and GC-MS analysis. Thermogravimetric analysis indicates that the structures of natural plastic break at 200 °C and fully decompose at 300 °C. The presence of alkanes and aromatic components in the plastic pyrolysis fuel was confirmed through FTIR analysis. Further GC-MS studies on fuel samples have proven that hydrocarbon compounds exist within the C7–C40 range. Plastic pyrolysis fuel obtained from waste plastics is found to have similar fuel properties to diesel. The plastic pyrolysis fuel was tested in a single cylinder four stroke variable compression ratio diesel engine with different blends of plastic pyrolysis fuel and diesel ranging from 0% to 100% at varied engine loads ranging from 25% to 100%. The engine performance and exhaust emissions were studied and compared with conventional diesel fuel operation. The research revealed that the engine can operate on plastic pyrolysis fuel at full load, has a 6% improvement in brake thermal efficiency as well as 4% reduction in UBHC and 2% reduction of CO emissions, albeit NOx emissions were significantly greater. The results confirmed that plastic pyrolysis fuel could be a viable replacement option for diesel. © 2022 Elsevier Ltd

Document details - Coordination complexes of rare earth metals with hydrazine and isomeric acetamidobenzoates as ligands– spectral, thermal and kinetic studies

Arabian Journal of Chemistry

Volume 15, Issue 9, September 2022, Article number 104009

Coordination complexes of rare earth metals with hydrazine and isomeric acetamidobenzoates as ligands– spectral, thermal and kinetic studies(Article)

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Abstract

The isomeric acetamido benzoic acids (abbreviated as acambH) on reaction with hydrazine hydrate and lanthanides, La^{3+}, Ce^{3+}, Pr^{3+}, Nd^{3+}, Sm^{3+} and Gd^{3+} form complexes of formulae, $[Ln\{x-C_6H_4(CH_3CONH)\}_3(N_2H_4)]$ where x = 2 (or) 3 (or) 4, at pH 3–4.5 in (1:1) aqueous ethanolic medium, which are insoluble in water and organic solvents. They are characterized by using elemental analysis, IR, UV, ^{13}C, ^{1}H NMR and mass spectroscopic, XRD, SEM-EDAX, thermal and conductance studies. The difference between IR bands of $\nu_{C-O\,asym}$ (acid) and $\nu_{C-O\,sym}$(acid) range, 122–166 cm^{-1} supports the bidental coordination of carboxylate ions to metal. ν_{N-N} values of 955 to 980 cm^{-1}, substantiate bridging bidentate coordination of hydrazine to metal. $\nu_{C=O}$ of amide group 1632 to1709 cm^{-1} indicates its non-coordination with metal. The thermal studies reveal that complexes undergo dehydrazination between 52 and 180 °C and exothermic degradation into phthalate intermediate between 172 and 496 °C and further degradation to form microsized metal oxide around 600 °C. The magnetic susceptibility measurements indicated that the presence of metals in the same electronic state and electronic spectral assignments suggested that the coordination number is eight for the complexes. The conductance measurement results in DMSO medium indicated that the complexes are neutral. The ^{13}C – NMR, ^{1}H- NMR and the LC-Mass techniques substantiated the composition of the complexes. © 2022

Document details - A hybrid technique based energy management in hybrid electric vehicle system

International Journal of Energy Research

Volume 46, Issue 11, September 2022, Pages 15499-15520

A hybrid technique based energy management in hybrid electric vehicle system(Article)

Prasanna Moorthy, V., Siva Subramanian, S., Tamilselvan, V., Muthubalaji, S., Rajesh, P., Shajin, F.H.

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Abstract

In this article, a novel hybrid method is proposed to optimally manage the energy for a hybrid electric vehicle system. The proposed technique is the joint execution of both the Kernel Wingsuit Flying Search Algorithm and Sea Lion Optimization Algorithm, hence it is called WF2SLOA. The main objective of the WF2SLOA method is integrated in the energy management system to split the torque between the engine and electric machine. During the WF2SLOA-based energy management development, this article performs a parametric investigation on numerous main factors, such as state types and number of states, states and action discretization, exploration and exploitation, and learning experience selection. The proposed method is implemented in MATLAB/Simulink, and the performance is assessed with the existing methods. Consequently, the outcomes illustrate that the selection of the learning experience can diminish the fuel consumption of the vehicle. Furthermore, the states and action discretization study indicates the fuel consume of the vehicle diminishes as action discretization enhances while raising the states discretization is harmful to the fuel consume. The maximizing count of states also raises the economy of fuel. Thus, the simulation outcomes show that the performance of the proposed method is more efficient than the existing methods. The mean, median, and SD of the WF2SLOA method attains 1.5420, 1.5043, and 0.0509. © 2022 John Wiley & Sons Ltd

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Document details - Effects of antioxidant additive and injector hole number on combustion phenomenon of DI diesel engine operating with kapok methyl ester blends

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Environmental Progress and Sustainable Energy

Volume 41, Issue 5, September/October 2022, Article number e13825

Effects of antioxidant additive and injector hole number on combustion phenomenon of DI diesel engine operating with kapok methyl ester blends(Article)

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Abstract

Alternate fuel research is aimed at improving the eminence of combustion behavior. This result focuses on the effects of injector hole number and antioxidant additives on combustion properties of diesel engine fueled with kapok methyl ester blends. Forty percent blend of kapok methyl ester was examined with a single cylinder diesel engine. The parameters of combustion such as peak pressure, net heat release, mean gas temperature were recorded and the influence of nozzle hole number and additives on the above said properties were thoroughly analyzed. From the experimental results it is evident that 6 hole nozzle along with B40 blended with 1000 ppm of tertiary butyl hydro quinone produced highest heat release rate of 102 J/°CA. Propyl gallate exhibited its lowest BSFC of 0.269 kg/kW h with B40 blend at minimum load. © 2022 American Institute of Chemical Engineers.

Author keywords

combustion | diesel engine | NO_x | nozzle | specific fuel consumption

Indexed keywords

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Document details - Performance study of fibre reinforced functionally graded concrete pipes

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Construction and Building Materials

Volume 344, 15 August 2022, Article number 128224

Performance study of fibre reinforced functionally graded concrete pipes(Article)

Yashini, E., Chithra, R.

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Abstract

The focus of the study is to develop Functionally Graded Concrete (FGC) and examine its performance in concrete pipes. FGC is concrete produced with variation in material and structure composition leading to changes in the overall behaviour of structures. In this study, functional gradation is created using micro steel fibre and basalt fibre. The FGC was prepared by varying the fibre content in concrete. The proposed functionally graded concrete consists of two-layer. One layer with fibre reinforced concrete and conventional concrete of M30 on the other side. The study has two major stages. The earlier stage is adopted to study the mechanical performance of the fibre reinforced concrete with 0.25%, 0.5%,0.75% and 1% addition of volumetric fraction to the conventional concrete mix. Compressive strength, split tensile strength, and flexural strength are taken as the mechanical parameters for consideration. FGC with a volumetric fraction of 0.75% with 0.75 h/H, where h/H ratio is the thickness of FGC to overall thickness, proved to be efficient. In the second stage, the optimum FGC is utilised to cast the Functionally graded concrete pipes (FGCP). This stage involves studying the performance of FGCP using three edge bearing tests and post crack studies. In the initial stage, Micro steel fibre reinforced concrete shows higher mechanical performance than basalt fibre, and basalt fibre shows better performance in post crack behaviour. The pipe testing indicates that micro steel fibre has higher strength aspects. Basalt fibre shows higher ductility in post crack behaviour. The micro steel fibre FGCP in strength perspective in both mechanical and post crack strength is higher than conventional concrete and Basalt FGCP. © 2022 Elsevier Ltd

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Document details - Integrated Electro-Coagulation Treatment of Dye Wastewater using Biochar with Aluminium Electrode

Indian Journal of Environmental Protection

Volume 42, Issue 8, August 2022, Pages 1001-1007

Integrated Electro-Coagulation Treatment of Dye Wastewater using Biochar with Aluminium Electrode(Article)

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[b]Government College of Technology, Department of Civil Engineering, Tamil Nadu, Coimbatore, 641 013, India

Abstract

In this study, dye effluent was treated by electro-coagulation method using aluminium (Al) electrodes alongwith biochar (adsorbent) by varying conditions, like pH, current density, operating time and adsorbent dosage. Biochar obtained from wood waste was powered and sieved through 600 ^m sieve. Characterization of biochar was done by scanning electron microscopy, energy dispersive analysis of x-rays, surface area analysis and proximate analysis. Characterization of dye effluent for parameters, like pH, total solids, total suspended solids, dissolved oxygen, biological oxygen demand, chemical oxygen demand, electrical conductivity and total organic carbon. Optical density of dye effluent was found using ELISA microplate reader. It was observed that with an increase in current density and contact time, removal efficiency also increases. Only for Al-Al electrode, higher removal efficiency of 76.71% was obtained at optimum pH 10, current density of 60 A/m^ and at a contact time of 60 min. It was also observed that as the adsorbent dosage increases, removal efficiency also increases. As dosage of 1 g was added alongwith the optimum conditions for Al-Al electrode, removal efficiency increases to 88.27%. Therefore, by adding biochar as adsorbent, efficiency is increased by 15% approximately. © 2022 - Kalpana Corporation.

Author keywords

Document details - Experimental investigation and characterization of titanium diboride reinforced AA6063 in-situ composites

Materials Research Express

Volume 9, Issue 8, 1 August 2022, Article number 086508

Experimental investigation and characterization of titanium diboride reinforced AA6063 in-situ composites(Article)(Open Access)

Nandakumar, N., Balakrishnan, S.

Department of Mechanical Engineering, Government College of Technology, Coimbatore, India

Abstract

Aluminium matrix composites have gained interest recently because they are more efficient, lighter, and less expensive. The purpose of this current study was to examine the effects of various casting operating conditions, including stirring temperature, stirring time, and stirring speed, on the casting process. Determining the optimum processing parameters to achieve significant outcomes could be the most daunting problem while casting a specimen. Box-Behnken design based on response surface methods was used to investigate the effects of stir casting factors on the mechanical properties of AA6063%-4% TiB2 composites. The response's real value, which includes hardness before heat treatment, hardness after heat treatment, and tensile strength, is reflected in the surface plot created by statistical software. F-ratio is often used in an ANOVA table to examine how operational variables affect properties of the material. Dispersion of the reinforcements mixture has been studied and characterized under scanning electron microscope and x-ray diffraction spectrometer. The optimum temperature, time, and rotational speed were 823.662 °C, 15 min, and 300 rpm. Composite materials made from aluminium 6063 are extensively used in the fabrication of lightweight aircraft components like ribs and fuselages. © 2022 The Author(s). Published by IOP Publishing Ltd.

Author keywords

in-situ composites; liquid metallurgy technique; optimization; response surface methodology

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Document details - Influence of cowpat ash particles on micro structure, mechanical and tribological properties of Al 7075 composites

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Journal of Ceramic Processing Research

Volume 23, Issue 4, August 2022, Pages 511-522

Influence of cowpat ash particles on micro structure, mechanical and tribological properties of Al 7075 composites(Article)

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Abstract

In the current study the effects of reinforcing cowpat ash (CPA) in aluminium 7075 alloy are briefly reported. CPA was reinforced in varying the weight percentage by 3, 6 and 9 using double stir casting technique. The effects of CPA particles are analysed and compared with base material through physical and tribological behaviours. Bonding and distribution of CPA particles were examined by optical microscope and scanning electron microscope. Mechanical and tribological properties was carried out in produced samples. The micro structural images disclosed that the CPA particles were uniformly distributed in the aluminium matrix. The fabricated composite materials density was decreasing while increasing CPA particles, but on the other hand the porosity was increasing. The ultimate tensile strength and hardness of samples increased up to 6% of CPA reinforcement and extra addition in particles has reduced their strength. The base alloy exhibited better impact strength than the composite material. Maximum decrease in wear rate was attained at 6% CPA reinforcement. The fracture SEM images exhibited cracks, voids, dimples for tensile and impact specimens and micro cuttings, micro ploughing in the worn-out surface. The corrosion rate decreased with increase in CPA particles.

Cited by 1 document

Vignesh Kumar, D., Arulselvan, S., Arul Marcel Moshi, A.

Mechanical characterization and frictional wear behavior analysis on nano tungsten carbide and molybdenum disulfide particles reinforced aluminium 7075 composites

(2023) Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering

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Document details - Impact Strength of Preplaced Aggregate Concrete Comprising Glass Fibre Mesh and Steel Fibres: Experiments and Modeling

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Materials

Volume 15, Issue 15, August 2022, Article number 5259

Impact Strength of Preplaced Aggregate Concrete Comprising Glass Fibre Mesh and Steel Fibres: Experiments and Modeling(Article)(Open Access)

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View additional affiliations

Abstract

Concrete is the most widely used and most affordable construction material. The structural damage that concrete cracks and fractures may cause can be severe. These concerns have lately been alleviated by new developments in fibre concretes. Recent advancements in fibrous concrete and its evolution have been rapidly drawing researchers' attentions worldwide, which motivates the development of a new type of composite with superior impact resistance. Preplaced aggregate fibrous concrete (PAFC) is a revolutionary composite comprising a higher dosage of fibres. It has outstanding impact resistance that surpasses those of traditional fibrous concrete. The impact behaviour of PAFC in addition to glass fibre mesh (GFM) has not been investigated thoroughly. To fill this research gap, this study investigates the impact performance of three-layered PAFC comprising steel fibres and GFM insertion. Eight different mixtures were prepared and can be divided into two groups. In the first group, specimens were made with 4% fibres and two single, double and triple layers of GFM insertion between the three-layered concrete. The second group of specimens was reinforced with 5, 2 and 5% steel fibres at the top, middle and bottom layers, respectively. However, the GFM insertion scheme for the second group was the same as the first. Rectangular specimens of size 500 × 100 × 100 mm were cast and tested against drop weight impact. The parameters studied were cracking impact numbers, failure impact number, ductility index and failure patterns. In addition, an analytical model was used to evaluate the impact failure energies. Results indicate that the combined action of steel fibre and GFM exhibited an excellent impact resistance. Increasing the number of GFM insertions between the specimen layer led to increased impact strength. The dose of the fibres utilized in the outer layer of the PAFC was increased, resulting in the material having a higher impact resistance. The cracking impact numbers improved from 28 to 40%, and failure impact numbers ranged from 58.8 to 92.2% when the GFM insertion numbers increased from one to three.

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Document details - A hybrid control topology for cascaded multilevel inverter with hybrid renewable energy generation subsystem

Solar Energy
Volume 242, August 2022, Pages 323-334

A hybrid control topology for cascaded multilevel inverter with hybrid renewable energy generation subsystem(Article)

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Abstract

In this paper, a hybrid control topology is proposed for cascaded multilevel inverter (CMLI) with a grid-connected hybrid system involves wind and photovoltaic generation subsystem. The proposed hybrid control technique is the joint execution of Reptile Search Algorithm (RSA) and Gradient Boosting Decision Tree (GBDT) algorithm thus it is called RSA-GBDT approach. The purpose of proposed approach is to achieve load power demand and manage power regulation. Initially, the Cascade Multilevel Inverter (CMLI) is designed to obtain optimal control signal through proposed controller. The proposed control technique is utilized in two phases of the proposed system. In the first phase, RSA is used to evaluate the optimal gain parameters considering the range of source currents is also utilized to generate the optimal offline control signal data set. According to data set, in the second phase, the GBDT works and forecasts the most optimal control signals from the online CMLI. Finally, the resulting control signal is used to control CMLI's Insulated Gate Bipolar Transistor (IGBT). The proposed RSA-GBDT technique develops the operation mode for solar and wind generation system discovers the switching states of converter. The proposed control system minimizes the variation of system parameters and external disturbances. Also, the load demand is achieved and the proposed RSA-GBDT control approach is executed on MATLAB/Simulink platform and performance is analyzed. © 2022

Document details - Mechanical performances, in-vitro antibacterial study and bone stress prediction of ceramic particulates filled polyether ether ketone nanocomposites for medical applications

Journal of Polymer Research
Volume 29, Issue 8, August 2022, Article number 318

Mechanical performances, in-vitro antibacterial study and bone stress prediction of ceramic particulates filled polyether ether ketone nanocomposites for medical applications(Article)

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Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India

Abstract

Polyether ether ketone (PEEK) and PEEK composites are viable candidates for dental and ortho implants due to their superior properties. This research aims to develop the functionalized ceramic nanoparticles such as TiO_2 (T-NPs) and SiO_2 (S-NPs) reinforced biopolymer nanocompoites by injection moulding. The morphologies of fabricated composite group were analysed by FE-SEM. The effect of T-NPs, S-NPs, and combined effect of TS-NPs of different wt.% reinforcements (4, 8, 12, 16, and 20 wt.%) with PEEK matrix on mechanical properties such as tensile, flexural, compressive, and shore D hardness had been investigated. The excellent mechanical strengths were obtained in 16 wt.% T/PEEK, 12 wt.% S/PEEK, and 16 wt.% TS/PEEK group. Then, the in-vitro antibacterial property of these selected composite group was investigated and found improved antibacterial activity compared to neat PEEK. Four different thread profiles were selected and analysed using 3D-FEM to reduce the stress distribution at bone-implant contact region. The minimum stress distribution range was achieved in the cortical bone model as 0.11–1.74 MPa due to trapezium profile threaded implants. Thus, the developed composites were found to be promising material for medical implant applications. © 2022, The Polymer Society, Taipei.

Document details - Design, fabrication, and characterization of natural fillers loaded HDPE composites for domestic applications

Polymer Composites

Volume 43, Issue 8, August 2022, Pages 5168-5178

Design, fabrication, and characterization of natural fillers loaded HDPE composites for domestic applications(Article)

Ayyanar, C.B., Dharshini, M.D., Marimuthu, K., Akhil, S., Mugilan, T., Bharathiraj, C., Mavinkere Rangappa, S., Khan, A., Siengchin, S.

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Abstract

This work aims to incorporate lignocellulosic coconut coir (CC) fillers into the HDPE matrix for domestic cloth clip product development where the strength is less significant. The structural, mechanical, and thermal properties of HDPE composites with varying weight fractions of CC fillers (10, 20 wt%) were investigated. The die for product development was designed through Pro-E software and manufactured with relevant machining processes. The composites were fabricated through the injection molding technique as per ASTM standards. Using scanning electron microscopy (SEM) and energy dispersive X-ray (EDX) analysis, the microstructure and various proportions of elements present in the composites were investigated. The presence of different functional groups and their vibrations were identified through the Fourier-transform infrared spectroscopy (FTIR) technique. The experimental mechanical results reveal the positive effect of CC fillers in the HDPE matrix, and the results were a maximum of 20 wt% CC filler incorporation. The filler reinforcement has little effect on the thermal degradation behavior since the step of deterioration is not changed appreciably. Nevertheless, the initial degradation temperature was affected by the presence of CC fillers. Depolymerization and dehydration of diverse ingredients correspond to different endothermic peaks in the DSC curve. Based on the characterization results, the 20 wt% CC filled-loaded partial eco-composite was selected for cloth clip product development. © 2022 Society of Plastics Engineers.

Document details - Exploring the Biosynthesized Metal Nanoparticles for their Catalytic Degradation of Toxic Water Wastes and Antimicrobial Potential

Journal of Inorganic and Organometallic Polymers and Materials

Volume 32, Issue 8, August 2022, Pages 3153-3169

Exploring the Biosynthesized Metal Nanoparticles for their Catalytic Degradation of Toxic Water Wastes and Antimicrobial Potential(Article)

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[c]College of Pharmacy, Al Kitab University, Kirkuk, Iraq

Abstract

In recent decades, the analysis of nanoparticles is of greater importance for their applications in various fields. This present work also focuses the novel biological green material to synthesize the copper and cobalt oxide (Co_3O_4) nanoparticles. The copper oxide (CuO) and Co_3O_4 nanoparticles (nps) have been synthesized by biological strategy utilizing (Araucaria heterophylla) AH gum extract. The characterization techniques, i.e. UV, GC-MS, FT-IR, XRD, SEM, HR-TEM provide concrete information about the morphology, crystalline nature and structure of the synthesized nanoparticles. The high resolution TEM and SAED images confirm the formation of spherical shaped (Co_3O_4) and oval shaped (CuO) isolated nanoparticles. The catalytic adequacy of the developed catalyst, CuO and Co_3O_4 nanoparticles was analyzed for the degradation of dyes: Methylene Blue, Congo Red, Acid Violet.The kinetic investigations for the reduction of synthetic dyes by the nanoparticles were assessed and the reduction contemplates are very much fitted with the pseudo second order kinetic model with less time. The antibacterial and antifungal activity of the prepared nanoparticles have been evaluated against Escherichia coli, Staphylococcus aureus, Bacillus subtilis, Aspergillus niger and Candida albicans. Graphical Abstract: [Figure not available: see fulltext.] © 2022, The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature.

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Document details - A laboratory-scale study of residential greywater treatment with sugarcane in a constructed wetland

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Environmental Science and Pollution Research

Volume 29, Issue 40, August 2022, Pages 61176-61186

A laboratory-scale study of residential greywater treatment with sugarcane in a constructed wetland(Article)(Open Access)

Boopathi, N., Kaliaraj, R.

[a]Department of Civil Engineering, Annapoorana Engineering College, Tamil Nadu, Salem, India
[b]Department of Environmental Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract

Due to India's population expansion, water recycling is critical to reducing water scarcity. The purpose of this study is to discuss the recycling and reuse of domestic greywater. The horizontal subsurface flow constructed wetland (HSSF-CW) was employed to treat greywater, with bioenergy crops replacing decorative plants. CO 86032 and CO 15027 sugarcane varieties were employed for phytoremediation. In a laboratory-scale HSSF-CW system with dimensions of 0.92 m, 0.61 m, and 0.45 m, coarse aggregate (20 mm), brick jelly (20 mm), and red soil mixed with coir pith (1/3 of coir pith volume-based) were employed as filter materials. During a hydraulic retention time (HRT) of 2 to 48 h, the maximum removal efficiency of biochemical oxygen demand (BOD), chemical oxygen demand (COD), total suspended solids (TSS), and total nitrogen (TN) was 77.78–90%, 69.92–81.20%, 67–91.06%, and 75.83–84.02%, respectively. © 2022, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Bioenergy crops | BOD | COD | Coir pith | Phytoremediation | Sugarcane

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Document details - Optimization of binary acids pretreatment of corncob biomass for enhanced recovery of cellulose to produce bioethanol

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Fuel

Volume 321, 1 August 2022, Article number 124060

Optimization of binary acids pretreatment of corncob biomass for enhanced recovery of cellulose to produce bioethanol(Article)

Selvakumar, P., Adane, A.A., Zelalem, T., Hunegnaw, B.M., Karthik, V., Kavitha, S., Jayakumar, M., Karmegam, N., Govarthanan, M., Kim, W.

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Abstract

Lignocellulosic agricultural wastes are the most widely utilized resource for bioethanol production due to several advantages. Removal of hemicellulose and lignin is a prerequired step during bioethanol production from lignocellulosic biomass to upgrade cellulose recovery and the substrate porosity for saccharification. Chemical pretreatment of corncob was performed in the current research applying binary acids (H_2SO_4 + CH_3COOH) in different ratios. The attained maximum removal of lignin and hemicellulose were 81.41 ± 2.3% and 85.6 ± 1.8%, respectively, with enhanced cellulose recovery of 93.5 ± 1.3% at the optimum conditions of binary acids concentration (3%, v/v), biomass loading ratio (0.1 g/mL), pretreatment temperature (120 °C) and time (60 min). The SEM, FTIR and XRD results revealed the removal of hemicelluloses and lignin from the corncob biomass by binary acids pretreatment and confirmed a change in the crystallinity index of corncob biomass. Ethanol fermentation was accomplished at 30 °C at 200 rpm for 4 days with the hydrolysates using Saccharomyces cerevisiae and obtained a maximum bioethanol concentration of 24.6 mg/mL. This study demonstrates that binary acids pretreatment is an alternative approach for the pretreatment of lignocellulosic biomass. The optimized process conditions could also increase cellulose recovery and bioethanol yield. © 2022 Elsevier Ltd

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Salazar-Bravo, P., Torres-Huerta, A.M., Dominguez-Crespo, M.A.
Development of film nanocomposite membranes from nanocrystalline cellulose combined with reduced graphene oxide or graphene oxide: Evaluation of potential applications in proton exchange membranes
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Zheng, Q.-X., Yan, C.-Y., Zhu, M.-W.
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(2023) Journal of Industrial and Engineering Chemistry

Jayakumar, M., Hamda, A.S., Abo, L.D.
Comprehensive review on lignocellulosic biomass derived biochar production, characterization, utilization and applications
(2023) Chemosphere

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Document details - Adsorption of Cationic Dye onto ZSM-5 Zeolite-Based Bio Membrane: Characterizations, Kinetics and Adsorption Isotherm

Journal of Polymers and the Environment

Volume 30, Issue 8, August 2022, Pages 3279-3292

Adsorption of Cationic Dye onto ZSM-5 Zeolite-Based Bio Membrane: Characterizations, Kinetics and Adsorption Isotherm(Article)

Radoor, S., Karayil, J., Jayakumar, A., Nandi, D., Parameswaranpillai, J., Lee, J., Shivanna, J.M., Nithya, R., Siengchin, S.

[a]Materials and Production Engineering, The Sirindhorn International Thai-German Graduate School of Engineering (TGGS), King Mongkut's University of Technology North Bangkok, Bangkok, 10800, Thailand
[b]Government Women's Polytechnic College, Kerala, Calicut, India
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Abstract

In this study, we report polyvinyl alcohol/carboxymethyl cellulose/gelatin/ZSM-5 zeolite (PVA/CMC/GEL/ZSM-5) membrane for cationic dye (rhodamine B, Rh B) removal from aqueous solution. The prepared membrane was characterized using different techniques such as Fourier transform infrared spectroscopy (FT-IR), X-ray diffraction (XRD), scanning electron microscopy (SEM), optical microscopy (OM), universal testing machine (UTM) and water contact angle respectively. XRD, FT-IR and SEM analysis indicates successful incorporation of zeolite into PVA/CMC/GEL membrane. The improved hydrophobicity of the zeolite loaded membrane was confirmed by contact angle analysis. The Rh B removal efficiency of zeolite loaded PVA/CMC/GEL membrane was investigated through batch adsorption technique. The effect of different parameters such as initial dye concentration, zeolite dosage, contact time, temperature and pH on the adsorption was examined. Rh B dye adsorption onto the membrane followed Freundlich isotherm model. The kinetic studies revealed that Rh B dye adsorption on the membrane could be explained using pseudo-second-order model. Finally, the recyclability test revealed that the membrane exhibits good recycle efficiency and is stable after six recycle. © 2022, The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature.

Document details - Synergistic effect on the performance of ash-based bricks with glass wastes and granite tailings along with strength prediction by adopting machine learning approach

Environmental Science and Pollution Research

Volume 29, Issue 36, August 2022, Pages 54193-54218

Synergistic effect on the performance of ash-based bricks with glass wastes and granite tailings along with strength prediction by adopting machine learning approach(Article)

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[b]Department of Civil Engineering, Government College of Technology, Coimbatore, India

Abstract

The study proposes a novel and sustainable method to appropriately utilize wastes from granite as well as glass industries in brick manufacturing. An ecofriendly and low-cost manufacturing process of ash-based bricks pertaining to the Indian standard codal provisions that can be adopted on the commercial scale is deliberated. The research also recommends the method for predicting the strength of the ash-based bricks using machine learning algorithms like random forests and decision trees. For positive synergy in the performance, both the granite tailings and glass waste must be used together. Using the granite tailings and glass waste together led to a significant reduction of 75% in the fly ash requirement without compromising the brick's performance. The addition of the granite tailings and glass waste in the mix could increase the strength of the brick by 90.5% and 37.7%, respectively. Beyond 30% dosage of granite, tailings are not recommended as they may lead to the poor gradation of particles and weak bonding in the microstructure. The glass waste in the mixture should not be more than 15% as it causes the dilution of pozzolanic reactions thereby forming fewer hydrated compounds. Brick's durability is known after exposing the specimens for 1 year to sewers and biogenic corrosion environment, marine environment, and saline soil environment, respectively. The inclusion of the industrial wastes significantly reduced the specimen damage in the extreme environmental conditions along with the least absorption rates. The dosage of ash, granite tailings, and glass waste has to be maintained around 15%, 30%, and 15%, respectively for attaining the optimum performance. Out of the generated machine learning algorithms, only random forests could be able to predict the values accurately with R^2 values at 0.90 and with comparatively lesser errors. © 2022, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Document details - Numerical Investigation on the Cold Flow Field of a Typical Cavity-based Scramjet Combustor with Double Ramp Entry

International Journal of Turbo and Jet Engines

Volume 39, Issue 3, 1 August 2022, Pages 439-449

Numerical Investigation on the Cold Flow Field of a Typical Cavity-based Scramjet Combustor with Double Ramp Entry(Article)

Periyasamy, S., Ragul, S., Sundararaj, K., Premkumar, P.S.

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[b]Aeronautical Engineering, Kumaraguru College of Technology, Chinnavedampatti Tamil Nadu, Coimbatore, 641049, India

Abstract

The effects of back pressure and cavity L/D ratio on the shock wave structure in the cold flow field of a typical cavity-based scramjet combustor with combined inlet and isolator is investigated numerically in the selected scramjet models. The scramjet with a throat ratio of TR 0.0 and cavity L/D 6.04 was analyzed. To perform such analysis, steady, 2-D RANS was used with SST k-ω. From the analysis, the value of static pressure along the cowl surface, contours of Mach number and pressure were obtained. The scramjet was modeled with different TR 0.1, 0.2, 0.25 and 0.3 with the same cavity L/D 6.04 and different cavity L/D 4.04, 9.04 and 12.04 with the same TR 0.25. All the models were analyzed with the same inlet conditions and the results were obtained. From the analysis, it was observed that the increase in back pressure moves the shock train towards the inlet of the isolator which leads to 'engine unstart' after the throat ratio of TR 0.1. Also, it is observed that there is an optimal L/D ratio of the cavity L/D 9.04 which restricts the propagation of high-pressure waves obtained in the combustor. © 2020 Walter de Gruyter GmbH, Berlin/Boston.

Author keywords

back pressure | cavity flame holder | scramjet engine | shock wave train | unstart

Indexed keywords

Document details - Investigation on mechanical and tribological properties of magnesite reinforced aluminium 6061 composites

Materials Research Express

Volume 9, Issue 7, 1 July 2022, Article number 075502

Investigation on mechanical and tribological properties of magnesite reinforced aluminium 6061 composites(Article)(Open Access)

Ayyappan, S., Saminathan, M., Selvarasan, R.

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[b]Department of Mechanical Engineering, Annapoorana Engineering College, Tamil Nadu, Salem, 636308, India
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Abstract

During the sintering process in the shaft kiln of refractory factories, a considerable quantity of materials is separated and dumped as Waste Magnesite (WM). The other superior grades, Lightly-Calcined Magnesite (LCM) and Dead-Burned Magnesite (DBM), are separated at different temperatures from the shaft kiln. The WM materials still have 8% of magnesium with some sand and dust particles in huge ranges. These materials are primarily used in the applications of medicine and fertilizers and animal feed processing and additives. This work investigates the potential of WM particles as reinforcement materials in the Al 6061 alloy matrix. In order to compare the characteristics of WM-based composite, LCM and DBM powders were also considered as reinforcement particles. The WM, LCM, and DBM particles were mixed with a 15% weight ratio to Al 6061 alloy, and composites were fabricated using the Stir Casting method. The surface morphology investigations through Scanning Electron Microscopy (SEM) revealed that these particles were well distributed and dispersed within the alloy matrix and with good interfacial adhesion. It is noted that Al 6061/15% wt. LCM composite possesses a better tensile strength than Al 6061/15% wt. WM and Al 6061/15% wt.DBM composites. The Impact value produced by the WM-based composite is better than the LCM and DBM composites. The Wear Rate and Coefficient of Friction (COF) were examined through a Pin-on-Disc apparatus. Al 6061/15% wt. WM composite tested a low wear rate (9.74 x 10-6 mm3 m)-1. The results show that Al 6061/15% wt. LCM composite achieved the least COF value of 0.681 at an applied load of 0.5 Kg and a sliding distance of 2826 m. The results prove that the wastage magnesite is good enough and the most robust reinforcement material for Aluminum 6061 alloy-based composite. © 2022 The Author(s). Published by IOP Publishing Ltd.

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Document details - Assessment of Optimum Mechanical Properties for Friction Stir Welding of Pure Copper and Aluminium Bronze

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Chiang Mai Journal of Science

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Authors Keywords

Assessment of Optimum Mechanical Properties for Friction Stir Welding of Pure Copper and Aluminium Bronze(Article)(Open Access)

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[b]Department of Mechanical Engineering, Dr.N.G.P Institute of Technology, Tamilnadu, Coimbatore, 641048, India

Abstract

Joining Aluminium Bronze and copper alloys has more comprehensive applications like power distribution, marine and automotive sectors and conventional fusion welding techniques impairs the weld quality owing to the high temperatures required. Friction stir welding is a preferred technique for fusing these alloys. This process eliminates many common problems associated with fusion welding like oxidization of aluminium, porosity, hot cracking. In recent years, there has been a lot of research into employing friction stir welding to fuse incompatible metals and alloys. Mechanical parameters such as hardness, yield strength elongation and ultimate tensile strength in friction stir welded joints of pure copper and aluminium bronze are investigated in this study. Each of the parameters, such as axial force, tool rotational speed and traverse speed was varied three levels each. A mathematical model based on a face-centered central composite design was used to study the effect of welding parameters on output responses. The selected friction stir welding parameters have a considerable impact on the output responses that are measured. The optimum process parameters for increasing the mechanical characteristics of welded joints were determined to be 1000 rpm tool rotation speed, 30 mm/min traverse speed, and 4.5 kN axial force.

Author keywords

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scopus.com/record/display.uri?eid=2-s2.0-85134378190&doi=10.12982%2fCMJS.2022.066&origin=inward&txGid=a943ff4f36b07ec95657dc428216b131

Document details - Microstructure, Tensile, and Fractography Analysis of Al2016 and Al2618 Age Hardened Aluminium Alloys

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Microstructure, Tensile, and Fractography Analysis of Al2016 and Al2618 Age Hardened Aluminium Alloys(Article)(Open Access)

Ravanan, A., Palanivel, I., Kalendran, B.

[a]Department of Mechanical Engineering, Government College of Technology, Tamilnadu, Coimbatore, 641013, India
[b]Department of Mechanical Engineering, KIT-KalaignarKarunanidhi Institute of Technology, Tamilnadu, 641402, India
[c]Department of Mechanical Engineering, Government College of Engineering, Tamilnadu, Erode, 638316, India

Abstract

This experimental project is dealt with two high-strength aluminium alloys, termed Al2016, Al2618. Objective of this research is to contribute to a good clarification on microstructural and tensile properties of distinct grades of Al2016 and Al2618 alloys to be used in the aerospace field as skin materials. These two different grades of twin-rolled aerospace metallic materials were received for investigation after those were subjected to two different conditions of heat treatment processes namely artificially aging and overaging. Those four specially processed alloys are specified as Al2016-T6510, Al2016-T7510, Al2618-T6510, and Al2618-T7510 based on the treatment. This article discusses the physical characteristics and tensile behavior of those alloys through the outcome of light microscopy test and tensile tests. Particle size variations and origination of grains play a major role in mechanical behavior. When comparing the various tensile properties of radial longitudinal and transversely oriented specimens of all specified graded alloys possess almost a similar tensile behavior between each grade. Broken specimens of tensile tests were employed for investigating the fractographic conditions through scanning electron microscopy. As result, ductile ruptures were commonly registered in all the grades of materials whereas the evidence for intergranular fracture was found in Al2016-T6; and a transgranular fracture was noticed in Al2016-T6. Amongst all the grades, a greater number of intergranular compounds were found in the Al2618-T6 alloy. T6 and T7 conditioned alloys of both grades revealed that the denseness of precipitation increases due to overaging, which in turn ends in declination of ductility. In general, other attributes of such T7 conditioned aluminium alloys have contributed well to elevated temperature applications especially, in stress corrosion cracking resistance.

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Document details - Erratum to "A novel investigation in the performance, combustion and emission characteristic of variable compression ratio engine using bio-diesel blends" (Journal of Mechanical Science and Technology, (2022), 36, 4, (1729-1738), 10.1007/s12206-022-0309-1)

Journal of Mechanical Science and Technology
Volume 36, Issue 7, July 2022, Page 3775

Erratum to "A novel investigation in the performance, combustion and emission characteristic of variable compression ratio engine using bio-diesel blends" (Journal of Mechanical Science and Technology, (2022), 36, 4, (1729-1738), 10.1007/s12206-022-0309-1)(Erratum)(Open Access)

Tamilselvan, R., Periyasamy, S.
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Original document
A novel investigation in the performance, combustion and emission characteristics of variable compression ratio engine using bio-diesel blends
(2022) Journal of Mechanical Science and Technology, 36 (4), pp. 1729-1738

Abstract

Due to an unfortunate oversight, the affiliation of the 2nd author has been given erroneously. The affiliation should be corrected as follows:
[a]Department of Mechanical Engineering, Government College of Technology, Tamilnadu 641013, India. © 2022, The Korean Society of Mechanical Engineers and Springer-Verlag GmbH Germany, part of Springer Nature.

Document details - A hybrid approach for optimal energy management system of internet of things enabled residential buildings in smart grid

International Journal of Energy Research
Volume 46, Issue 9, July 2022, Pages 12530-12548

A hybrid approach for optimal energy management system of internet of things enabled residential buildings in smart grid(Article)(Open Access)

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[b]Department of Electrical and Electronics Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract

Nowadays, a large number of smart devices in residential buildings is integrated with the evolution of internet of things (IoT), where it is necessary to effectively manage energy to meet the increase in demand. Therefore, in this paper, an optimal energy management strategy using the hybrid Gradient Boosting Decision Tree -Artificial Transgender Longicorn Algorithm (GBDT-ALTA) is proposed for IoT-enabled residential buildings. The main objective of the proposed approach is to minimize the electricity bill of customer, thereby Peak-to-Average Ratio (PAR) is reduced. Due to the scheduling process of residential electric devices, the proposed approach utilizes the waiting time threshold. Here, three types of appliances, such as shiftable electrical devices, thermostatically controlled electrical devices, and generally operated electrical devices are considered. Related to real-time price signals (RTPS) in utilities, scheduling the shiftable electrical devices is processed. The cost minimization with less acceptable time of waiting is achieved by GBDT-ATLA method, which considers the trade-off between the electricity cost and waiting time. Moreover, the proposed approach maintains the stability of the grid, because the stability of grid depends on the PAR. The proposed method is carried out in MATLAB/Simulink site and the simulated results prove that the better performance of GBDT-ATLA approach compared to the existing approaches, like Slime Mould Optimization (SMO), Chaos Game Optimization Algorithm (CGO), and Side-Blotched Lizard Optimization Algorithm (SBLO). The efficiency of the proposed approach under 100, 200, 500, and 1000 trails are 99.7300%, 99.6513%, 99.8363%, and 99.7916% respectively. © 2022 John Wiley & Sons Ltd.

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Document details - Development of lab-on-chip biosensor for the detection of toxic heavy metals: A review

Chemosphere

Volume 299, July 2022, Article number 134427

Development of lab-on-chip biosensor for the detection of toxic heavy metals: A review(Article)

Karthik, V., Karuna, B., Kumar, P.S., Saravanan, A., Hemavathy, R.V.

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View additional affiliations

Abstract

Recently, a decrease in water availability and quality has been raised due to rapid industrialization, unsustainable agricultural activities and anthropogenic activities. Heavy metals are considered significant pollutants in the water environment, cause environmental hazards and health effects to humans. For monitoring water contaminants utilized different conventional techniques. Still, they have some drawbacks, such as cost expensive, ecological issues, and processing time, requiring technicians and researchers to operate them effectively. Biosensors have become reasonable devices for screening and identifying environmental contaminants because of their different benefits contrasted with other detecting techniques. This review summarizes the toxic effect of heavy metal and their source, occurrence. A detailed discussion is provided on the heavy metal recognition materials for detecting heavy metals in wastewater. Lab on chip (LOC) is an emerging micro-electrical mechanical system (MEMS) device that intakes liquid and makes it move through the micro-channels, to accomplish fast, cost-effective and profoundly sensitive analysis with significant yield. LOC also provided a discussion on numerous laboratory functions on a single platform. This article attempts to discuss the detection of heavy metals using lab on a chip by suitable recognition materials. Further, the design and fabrication mechanism and their recognition abilities of LOC were also reviewed. The review mainly focuses on the application of LOC biosensors, pros, and cons, and suggests a roadmap towards future development to enhance the practical use in pollutant monitoring. © 2022 Elsevier Ltd

Document details - Information Gain Based Feature Selection for Improved Textual Sentiment Analysis

Wireless Personal Communications

Volume 125, Issue 2, July 2022, Pages 1203-1219

Information Gain Based Feature Selection for Improved Textual Sentiment Analysis(Article) (Open Access)

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[b]Government College of Technology, Coimbatore, India

Abstract

Sentiment analysis or opinion mining is the process of mining the emotion from a given text. It is a text mining technique that effectively measures the inclination of public opinions and aids in analysing the subjective information from the given context. Sentiment analysis evaluates the opinion of a sentiment as either positive or negative or neutral. Sentiments are very specific and with respect to the underlying content, it plays a very crucial role in depicting the real-world scenario. Sentiment analysis can be performed at three levels namely document level, sentence level and feature level. This paper proposes a novel Information Gain based Feature Selection algorithm that selects highly correlated features by removing inappropriate content. Using this algorithm, extensive sentimental analysis is performed at the document level, sentence level and feature level. Datasets from Cornell and Kaggle are exploited for experimental purposes. Compared to other baseline classifiers experimental results show that the proposed Information Gain based classifier resulted in an accuracy of 95, 96.3 and 97.4% for document, sentence and feature levels respectively. The proposed method is also tested with higher dimensional datasets namely Movielens 1M, 10M and 25M datasets. Experimental results proved that the proposed method works better even for high dimensional datasets. © 2022, The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature.

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Document details - Karanja oil transesterification using green synthesized bimetallic oxide catalyst, gCaO-CeO₂: Comparative investigations with the monometallic oxide catalysts on the catalytic efficacy and stability

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Fuel

Volume 319, 1 July 2022, Article number 123711

Karanja oil transesterification using green synthesized bimetallic oxide catalyst, gCaO-CeO_2: Comparative investigations with the monometallic oxide catalysts on the catalytic efficacy and stability(Article)

Sivashankar, R., Thirunavukkarasu, A., Nithya, R., Madhubala, V., Deepanraj, B.

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[c]Department of Mechanical Engineering, Jyothi Engineering College, Thrissur, India

View additional affiliations

Abstract

In the present study, a novel plant-mediated approach was reported to synthesize a bimetallic oxide (BMO, gCaO-CeO2) catalyst from waste egg shells. Previously, an equi-molar mixture of cerium nitrate and shell recovered calcium nitrate was considered as precursor for Prosopis juliflora mediated green synthesis. The prepared gCaO-CeO2 was characterized by means of FT-IR, TG/DTA, XRD and surface area analyzer. X-ray diffraction results showed that the gCaO-CeO2 is thermally stable even after the calcination process at 800 °C as the peaks for the cubic fluorite of cerium oxide (CEO) and cubic nature of calcium oxide (CO) were observed intact. Batch transesterification of karanja oil showed an improved catalytic activity for gCaO-CeO2 than monometallic oxides due to the increased basicity of the catalysts with the reduced temperature maxima. The highest fatty acid ethyl ester (FAEE) content of 96.37 % was attained for 6:1 mol ratio of ethanol-karanja oil over 4% (weight basis) of gCaO-CeO2 catalyst at 65 °C in 5 h. Further, the physico-chemical parameters of the transesterified products were found consistent with ASTM D6751 biodiesel standards. The study also reported the potential reuse of gCaO-CeO2 catalyst upto 6 operations with no appreciable loss in catalytic activity during transesterification.

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Document details - Investigation on the Properties of Sustainable Steel Fiber Reinforced Reactive Powder Concrete by Utilization of Coir Pith Aggregates and Pyrogenic Silica

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Silicon

Volume 14, Issue 10, July 2022, Pages 5545-5562

Investigation on the Properties of Sustainable Steel Fiber Reinforced Reactive Powder Concrete by Utilization of Coir Pith Aggregates and Pyrogenic Silica(Article)

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[b]Department of Civil Engineering, Government College of Technology, Tamilnadu, Coimbatore, 641013, India

Abstract

The present study investigates the properties of RPC (Reactive Powder Concrete) developed using low-cost eco-friendly materials such as pyrogenic silica (PS) and coir pith (CP) fine aggregates. This study investigates the effects of PS as silica fume (SF) replacement which is the main constituent for the production of reactive powder concrete which contained coir pith as a fine aggregate replacement instead of quartz sand (QS) up to 25%. The use of silica fume increases the particle packing density of RPC but increases the shrinkage phenomenon in RPC due to the minimum w/b ratio adopted. Therefore, in this research PS is used as a partial substitute for SF up to 30% and its effect on the mechanical and durability properties of coir pith containing RPC is studied. The test results showed that the mechanical strength values decreased with an increase in the addition of CP aggregate beyond 5% whereas the decrement in compressive strength was partially reduced when PS is used as silica fume replacement up to a maximum of 30%. The chloride penetration resistance was also improved with increasing PS substitution in RPC containing CP aggregates. The autogenous shrinkage and drying shrinkage were also significantly reduced due to the internal curing ability of the CP aggregates in combination with PS. The development of dense CSH (Calcium Silicate Hydrate) gels from hydration is also evident from the low CaO/ SiO2 ratio obtained from the EDS (Energy-dispersive X-ray Spectroscopy) analysis. Hence the combination of PS with CP aggregates can reduce the shrinkage characteristics of RPC thereby providing eco-friendly sustainable concrete at low cost.

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Asian Journal of Control

Volume 24, Issue 4, July 2022, Pages 1954-1964

State estimation and frequency stabilization of multi-area power systems via fault-alarm approach(Article)

Harshavarthini, S., Sakthivel, R., Poornesh Kumar, K.S., Kong, F.

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[b]Department of Power Electronics and Drives, Government College of Technology, Coimbatore, India
[c]School of Mathematics and Statistics, Anhui Normal University, Wuhu, China

Abstract

This work is mainly focused on designing hybrid memory state feedback load frequency control law for a class of multi-area power systems against transmission delays, parameter uncertainties, actuator faults, and load disturbances via fault-alarm approach. More specifically, the load disturbances are prompted by the incorporation of abundance amount of renewable energy resources, namely, photo voltaic and wind power. Additionally, the power system takes the effect of actuator faults into account, which is unavoidable and exists at any instant of time. Thus, to stabilize the addressed system, the fault-alarm approach is exploited to develop the hybrid control law. Particularly, the state dynamics are well estimated by the aid of residual observer to detect the faulty condition of actuators. Also, by following the algorithm of fault detection, the spontaneous alert from the alarm is accomplished. Further, in consideration of appropriate Lyapunov–Krasovskii functional, the stability conditions having linear matrix inequality form are derived and which affirms the asymptotic stability of the power systems. Precisely, the controller gain matrices are obtained by solving the developed sufficient conditions. Eventually, the simulation results of two-area interconnected power systems are presented to examine the applicability and advantage of the proposed theoretical result. © 2021 Chinese Automatic Control Society and John Wiley & Sons Australia, Ltd.

Author keywords

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Yang, Y. , Wang, X. , Qi, C.
A distributed event-triggered dynamic average consensus scheme with a time-varying threshold and its application in DC microgrid

(2023) Asian Journal of Control

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Handbook of Research on Aspects and Applications of Incompressible and Compressible Aerodynamics

24 June 2022, Pages 142-156

Aerodynamic Force Measurements Using Blower Balance Tunnel at Low Reynolds Number (Book Chapter)

Chinnasamy, S., Venugopal, P., Kasimani, R.

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Abstract

This chapter describes the basic concepts of aerodynamics, evolution of lift and drag, types of drag, reduction of wing tip vortices, non-planar wing concepts for increased aerodynamic efficiency, various methods for determination of aerodynamic forces of an airplane, classification of wind tunnels, blower balance tunnels, and a case study report on aerodynamic force measurement of the non-planar wing systems. To increase the aerodynamic efficiency of the monoplane configuration, the 'C-wing' configuration is presented in this chapter. The aim is to prove, at all angles of attack, C-wing produces a higher (L/D) ratio than straight wing for the same wetted surface area. The aerodynamic characteristics of three different wing models with NACA-64215 aerofoil such as straight wing, C-wing, and inverted C-wing at different angles of attack and low Reynolds number are shown. The inverted C-wing created more lift but produced more vibration, which may lead to lesser structural integrity. © 2022, IGI Global. All rights reserved.

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Document details - Prediction on enhanced electrochemical discharge machining behaviors of zirconia-silicon nitride using hybrid DNN based spotted hyena optimization

International Journal of Energy Research
Volume 46, Issue 7, 10 June 2022, Pages 9221-9241

Prediction on enhanced electrochemical discharge machining behaviors of zirconia-silicon nitride using hybrid DNN based spotted hyena optimization(Article)

Manoharan, V., Tamilperuvalathan, S.
Department of Mechanical Engineering, Government College of Technology, Coimbatore, India

Abstract

In this work, zirconia composite is machined by the unconventional Electrochemical Discharge Machining (ECDM). Normally, the machining of zirconia is an inconvenient process due to its increased hardness and maximum machining time. The ECDM of zirconia-silicon nitride is done by varying the input parameters such as electrolytic concentration, voltage, and duty cycle. The measured output machined parameters are material removal rate (MRR), Overcut (OC), and Tool wear rate (TWR). In Response Surface Methodology (RSM), the Box Behnken method is used to plan the experimental design of this work. The parameter optimization is conducted using RSM. Besides, the experimented machining performances are validated using hybrid Deep Neural Network-based Spotted Hyena optimization (DNN-SHO) done in MATLAB platform version 2020 a. From the findings, the voltage and electrolytic concentration are identified as signified parameters for improving the ECDM performances from the RSM analysis. The obtained favorable machining performances are 0.371 mg/min of MRR, 162.2 μm of OC, and 0.26 mg/min of TWR. The predicted results from the proposed DNN-SHO for the MRR are 0.402 mg/min, OC is 152.98 μm, and TWR is 0.21 mg/min. The proposed DNN-SHO outcomes are in perfect agreement with the experimented values and are more superior to the RSM, DNN, and DNN-PSO based prediction approaches. © 2022 John Wiley & Sons Ltd.

Document details - Performance analysis of solar evaporation for treating coconut husk retting water

Desalination and Water Treatment
Volume 261, June 2022, Pages 24-32

Performance analysis of solar evaporation for treating coconut husk retting water(Article)

Sandhiya, M., Kumar, M.
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Abstract

Water is the foundation of all forms of life. It is the most abundant physical substance on earth. The study area – Kallipatti village is located 14 km away from Pollachi, Coimbatore district, with a total geographical area of 492.05 hectares and is mostly covered with coconut farms, coir pith industries, etc., Residents from that village pointed out that since the year 2018, water has become their biggest concern. They have been seeing an increasing incidence of skin diseases, eye aller-gies, throat and lung infections. The present study focused particularly on the treatment of coconut husk retting water. During retting, fibers are degraded and loosened. Environmental pollution and water contamination are associated with conventional retting. The high values of 5-day biochemical oxygen demand associated with the extending flora and fauna were the remarkable feature of the retting zones. In this study, pollution sources were identified, retting water samples were collected, the physico-chemical parameters of the coconut husk retting water samples were tested and compared to Indian standards, and appropriate treatment techniques were obtained based on various literatures. A solar evaporation system is adopted to treat retting water. The main aim of this study is to observe the daily rate of evaporation under various conditions such as daily rate of evaporation and meteorological parameters, rate of evaporation vs. the type of evaporation (single and stack), rate of evaporation vs. plain evaporation, and pan evaporation with algal growth. The evaporated water is condensed and tested for the physico-chemical parameters and compared with the results obtained before treatment. The sludge formed after the evaporation of the coconut husk retting water is collected, dewatered, and made into briquettes that can be used as biomass. The recommendations are given to the small-scale industries to treat the coconut husk retting water based on the cost analysis and rate of evaporation. © 2022, Desalination Publications. All rights reserved.

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Document details - Effect of Steel Fiber on the Strength and Flexural Characteristics of Coconut Shell Concrete Partially Blended with Fly Ash

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Materials

Volume 15, Issue 12, June-2 2022, Article number 4272

Effect of Steel Fiber on the Strength and Flexural Characteristics of Coconut Shell Concrete Partially Blended with Fly Ash(Article)(Open Access)

Prakash, R., Divyah, N., Srividhya, S., Avudaiappan, S., Amran, M., Naidu Raman, S., Guindos, P., Vatin, N.I., Fediuk, R.

[a]Department of Civil Engineering, Alagappa Chettiar Government College of Engineering and Technology, Karaikudi, 630001, India
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Abstract

The construction industry relies heavily on concrete as a building material. The coarse aggregate makes up a substantial portion of the volume of concrete. However, the continued exploitation of granite rock for coarse aggregate results in an increase in the future generations' demand for natural resources. In this investigation, coconut shell was used in the place of conventional aggregate to produce coconut shell lightweight concrete. Class F fly ash was used as a partial substitute for cement to reduce the high cement content of lightweight concrete. The impact of steel fiber addition on the compressive strength and flexural features of sustainable concrete was investigated. A 10% weight replacement of class F fly ash was used in the place of cement. Steel fiber was added at 0.25, 0.5, 0.75, and 1.0% of the concrete volume. The results revealed that the addition of steel fibers enhanced the compressive strength by up to 39%. The addition of steel fiber to reinforced coconut shell concrete beams increased the ultimate moment capacity by 5–14%. Flexural toughness was increased by up to 45%. The span/deflection ratio of all fiber-reinforced coconut shell concrete beams met the IS456 and BS 8110 requirements. Branson's and the finite element models developed in this study agreed well with the experimental results. As a result, coconut shell concrete with steel fiber could be considered as a viable and environmentally-friendly construction material. © 2022 by the authors. Licensee MDPI, Basel, Switzerland.

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Shrinkage mitigation in alkali-activated composites: A comprehensive insight into the potential applications for sustainable construction
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Cyclic compressive behavior of hook-end steel and macro-polypropylene hybrid fiber reinforced recycled aggregate concrete
(2023) Case Studies in Construction Materials

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Document details - A business canvas model on vermicomposting process: Key insights onto technological and economical aspects

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Bioresource Technology Reports

Volume 18, June 2022, Article number 101119

A business canvas model on vermicomposting process: Key insights onto technological and economical aspects(Article)

Thirunavukkarasu, A., Nithya, R., Kumar, S.M., Priyadharshini, V., Kumar, B.P., Premnath, P., Shashankar, R., Sathya, A.B.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India
[b]Department of Civil Engineering, Government College of Technology, Coimbatore, India
[c]Department of Chemical Engineering, National Institute of Technology, Warangal, 506004, India

View additional affiliations

Abstract

In the present study, a pilot-scaled size (0.5 tons) of the vermicomposting process was adopted using the vegetable waste as substrate for the earthworm, Eisenia fetida. The harvested vermicompost was technically assessed for its stability, maturity and other physicochemical parameters. Further, the study has provided a comprehensive examination of the cost economics of the vermicomposting along with the SWOT analysis. Key insights on the cost-benefit breakdown and economic analysis were discussed and a net profit ratio of 139.5 % and 134.6 % was figured for the 2nd and 3rd harvesting years respectively. With 15 % of the discounting rate, the Net Present Worth (NPW) of cost and benefit were computed as Rs.7.63 lakh and Rs.11.94 lakh respectively and hence the Benefit-Cost Ratio (BCR) was observed as 1.56. With this superior BCR, the present study is presenting a technologically feasible and economically successful business model on vermicomposting for the young entrepreneurs and start-up aspirants. © 2022 Elsevier Ltd

Author keywords

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Yang, Z.-Y., Wang, X.-J., Cao, Y.
Vermicomposting of Pleurotus eryngii spent mushroom substrates and the possible mechanisms of vermicompost suppressing nematode disease caused by Meloidogyne incognita
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Document details - Retraction Note to: QOS distributed routing protocol for mobile ad-hoc wireless networks using intelligent packet carrying systems (Des Autom Embed Syst, (2018), 22, (201–213), 10.1007/s10617-018-9204-5)

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Design Automation for Embedded Systems

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Retraction Note to: QOS distributed routing protocol for mobile ad-hoc wireless networks using intelligent packet carrying systems (Des Autom Embed Syst, (2018), 22, (201–213), 10.1007/s10617-018-9204-5)(Erratum)(Open Access)

Murugeswari, T., Rathi, S.

[a]Department of EEE, Hindustan College of Engineering and Technology, Tamilnadu, Coimbatore, India
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Original document

QOS distributed routing protocol for mobile ad-hoc wireless networks using intelligent packet carrying systems
(2018) Design Automation for Embedded Systems, 22 (3), pp. 201-213.

Abstract

The Editor-in-Chief and the publisher have retracted this article. The article was submitted to be part of a guest-edited issue. An investigation by the publisher found a number of articles, including this one, with a number of concerns, including but not limited to compromised editorial handling and peer review process, inappropriate or irrelevant references or not being in scope of the journal or guest-edited issue. Based on the investigation's findings the Editor-in-Chief therefore no longer has confidence in the results and conclusions of this article. The authors have not responded to correspondence regarding this retraction. © 2022, Springer Science+Business Media, LLC, part of Springer Nature.

scopus.com/record/display.uri?eid=2-s2.0-85119362705&doi=10.1007%2fs40996-021-00783-9&origin=inward&txGid=fb325918bc1a279aaa6b194e8cdf4bf6

Document details - Experimental Study on Hardened Mechanical and Durability Properties of Industrial Ash Bricks

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Iranian Journal of Science and Technology - Transactions of Civil Engineering

Volume 46, Issue 3, June 2022, Pages 1929-1936

Experimental Study on Hardened Mechanical and Durability Properties of Industrial Ash Bricks(Article)

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Abstract

Bricks are one of the popular construction materials since olden days and are used for a variety of applications such as load bearing and non-load bearing walls, piers, bridges, bunkers and so on. Vast tracts of fertile soil are turned into wastelands due to mining of clay for the manufacture of clay bricks and fuel wood required for brick kilns becomes depleted, scarce and costlier. Coal-based thermal power plants contribute to about 50% of the total electricity produced in India. In doing so, they generate large volume of coal ash (pond ash and fly ash). The safe disposal of coal ash requires vast land area. To overcome the environmental hazards created by the production of clay bricks and coal ash from thermal power plants, effective utilization of coal ash replacing natural clay in brick making is studied. In this present paper study, an attempt has been made to find out the optimum proportion of pond ash in brick manufacturing. The research work covers a wide range starting from studying the properties and influence of pond ash at the microstructure level to the behaviour of industrial bricks (I-ash) units. The I-ash bricks made with incorporation of pond ash were studied for specific brick properties. Durability tests studies were also conducted to study the feasibility of using I-ash bricks in construction. © 2021, Shiraz University.

Author keywords

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Document details - Functionalization of MXene-based nanomaterials for the treatment of micropollutants in aquatic system: A review

1 of 1

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Environmental Pollution

Volume 301, 15 May 2022, Article number 119034

Functionalization of MXene-based nanomaterials for the treatment of micropollutants in aquatic system: A review(Article)

Velusamy, K., Chellam, P., Kumar, P.S., Venkatachalam, J., Periyasamy, S., Saravanan, R.

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[b]Department of Biotechnology, National Institute of Technology, Andhra Pradesh, India
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View additional affiliations

Abstract

The increased industrialization and urbanization generate a larger quantity of effluent that is discharged into the environment regularly. Based on the effluent composition produced from various industries, the number of hazardous substances such as heavy metals, hydrocarbons, volatile organic compounds, organic chemicals, microorganisms introduced into the aquatic systems vary. The conventional wastewater treatment systems do not meet the effluent standards before discharge and require a different treatment system before reuse. Adsorption is an eco-friendly technique that uses selective adsorbents to remove hazardous pollutants even at microscale levels. MXene, a 2-Dimensional nanomaterial with resplendent properties like conductivity, hydrophilicity, stability, and functionalized surface characteristics, is found as a potential candidate for pollutant removal systems. This review discusses the fabrication, characterization, and application of MXene based nanoparticles to remove many pollutants in water treatment systems. The improvement in surface properties and adsorption capacity of MXene based NPs, when modified using different modification agents, has also been discussed. Their feasibility in terms of economic and environmental aspects has been evaluated to understand their scope for practical application in large-scale industries. The challenges towards the synthesis and toxicity's importance have been discussed, with the appropriate recommendations. © 2022 Elsevier Ltd

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Document details - Load Balancing Based on Closed Loop Control Theory (LBBCLCT): A Software Defined Networking (SDN) powered server load balancing system based on closed loop control theory

1 of 1

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Concurrency and Computation: Practice and Experience

Volume 34, Issue 11, 15 May 2022, Article number e6854

Load Balancing Based on Closed Loop Control Theory (LBBCLCT): A Software Defined Networking (SDN) powered server load balancing system based on closed loop control theory(Article)

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[b]Department of Computer science and Engineering, Dr. Mahalingam College of Engineering and Technology, Tamil Nadu, Pollachi, India

Abstract

This article comprises work concerned with proposing a scheme for intercepting network traffic and directs that traffic to servers in Software defined network model. Several studies have explored the effects of average response time of user requests with different load balancing algorithms. Server load balancing is a well-recognized issue which necessitates a better approach by doing deeper understanding of the network parameters. The implications of the mean response time of client requests are investigated in this article by having a closer look on changing the important network parameter namely probing time (time to investigate the server farm in order to gain access to server data) using the concept of closed loop control theory. Our LBBCLCT proves to be effectively distributes the user requests to the most appropriate server by timely changing the server even when the traffic exhibits inconsistency. The results reveal that LBBCLCT outperforms other methods such as round robin, LBBSRT, and SD-WLB in terms of processing the client requests with a reduced mean server response time. LBBCLCT showed the improvement of average response time by 46.7%, 25.6%, and 43.59% over round robin, LBBSRT, and SDWLB respectively. © 2022 John Wiley & Sons, Ltd.

Author keywords

closed loop control theory · optimal probing · SDN · server load balancing

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Document details - Experimental Evaluation on Suitability of Alternate Fluids with the Influence of Additives for Power System Transformer Applications

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Journal of Electrical Engineering and Technology

Volume 17, Issue 3, May 2022, Pages 1883-1906

Experimental Evaluation on Suitability of Alternate Fluids with the Influence of Additives for Power System Transformer Applications(Article)

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[a]Department of Electrical and Electronics Engineering, Sri Ramakrishna Engineering College, Tamil Nadu, Coimbatore, 641 022, India
[b]Department of Electrical and Electronics Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India

Abstract

Transformers are most vibrant equipment of power system network and petroleum base mineral oil is used as dielectric insulating medium and cooling medium. At present more research works are focused towards natural esters based fluids as prospectivedisplace to traditional mineral oil, due to similar properties of transformer oil, high availability of resources, high biodegradability and environmental friendly nature. This work emphasizes on enhancement of properties of natural ester using antioxidants. Natural esters such as mustard oil, rice bran oil, punna oil and castor oil are chosen for investigation along with antioxidants such as gallic acid, citric acid, propyl gallate and tertiary butylated hydroxy quinone. Natural esters are mixed with 1 g, 2 g, 3 g and 5 g of antioxidants for the investigations. The critical properties like breakdown voltage, flash point, fire point, viscosity, interfacial tension, water content and acidity of natural esters are analyzed based on IEC/ASTM standards before and after addition of antioxidants. From this study, it is noted that antioxidants improve the characteristics of natural esters after addition of it and properties are superior to the traditional mineral oil.By the suitable proportion of fluids the 80–90% of characteristics betterment are achieved with the influence of fatty acid based additives. © 2022, The Author(s) under exclusive licence to The Korean Institute of Electrical Engineers.

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(2023) Electrical Engineering

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Management System of Electric Firefighting Equipment Based on GeoMap
(2023) Lecture Notes in Mechanical Engineering

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Document details - Enhancement of battery life in microgrid energy management using mixed integer linear programming and hybrid knapsack

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International Journal of Energy Research

Volume 46, Issue 6, May 2022, Pages 8158-8174

Enhancement of battery life in microgrid energy management using mixed integer linear programming and hybrid knapsack(Article)(Open Access)

Kallasa Gounder, Y., Subramanian, S.

Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India

Abstract

Microgrid with distributed energy resources and energy storage system provides sustainability and resiliency. In this research, residential community microgrid is examined with responsive loads that create flexible generation-demand model. An optimization algorithm using mixed integer linear programming (MILP) has been formulated to minimize the operating cost and emission of dispatchable power generation, with the help of demand response. Usually, in renewable energy-based grid-connected microgrid, the batteries are managed under partial state of charge (SoC) conditions due to the limit of power imported from grid. The proposed MILP model ensures full SoC operation and safe charging or discharging dynamics of the battery in order to enhance its lifespan. Moreover, the day-ahead scheduling of household appliances is carried out using a novel hybrid knapsack method, which combines binary and fractional knapsack algorithms. An electric vehicle battery is considered as a flexible power load, which offers an unique way of approach in scheduling of appliances. The results confirm that the power demanded by the appliances is fulfilled at the user-specified hour for maximum comfort along with minimum operating cost of microgrid. Generic algebraic modeling system (GAMS) tool is used to run the proposed algorithms. © 2022 John Wiley & Sons Ltd.

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Wang, J., Ramli, N., Aziz, N.H.A.
Modelling and adaptive control strategy of hybrid microgrid based on virtual synchronous generator
(2023) Advanced Control for Applications: Engineering and Industrial Systems

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Document details - Versatile application of cobalt ferrite nanoparticles for the removal of heavy metals and dyes from aqueous solution

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Environmental Nanotechnology, Monitoring and Management

Volume 17, May 2022, Article number 100659

Versatile application of cobalt ferrite nanoparticles for the removal of heavy metals and dyes from aqueous solution(Article)

Jayalakshmi, R., Jeyanthi, J., Aswin Sidhaarth, K.R.

[a]Department of Civil Engineering, Government College of Technology, Coimbatore, India

[b]Department of Civil Engineering, Veltech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai, India

Abstract

The present communication is an endeavor to explore the versatile adsorption potential of Cobalt ferrite nanoparticles to abate heavy metals and dyes from an aqueous solution. Cobalt ferrite nanoparticle (CFN) is a magnetic material synthesized using the co-precipitation method. Characterization was made through XRD, FTIR, SEM, EDAX, TEM, AFM, BET and VSM studies. The CFN exhibited a higher specific surface area of 131.3 m^2/g and magnetic saturation of 82.028 emu/g. Batch adsorption studies for removing Lead, Zinc, Congo red and Malachite green using CFN resulted in monolayer adsorption capacity of 275, 390, 833 and 161 mg/g, respectively. An increase in CFN mass prolonged the breakthrough time and enhanced the overall adsorption of the column. The dynamic behavior of the CFN adsorption column was testified with Yoon-Nelson, Thomas and BDST model. The breakthrough performances indicated the suitability of CFN to be applied in fixed bed column. The results from the study showed the simple, cost-effective, efficient and versatile behavior of the CFN for the removal of heavy metals and dyes. © 2022 Elsevier B.V.

Author keywords

Adsorption BDST Cost-effective Dye Ferrite Heavy metal

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Document details - Magnetic Nano-catalyzed Synthesis of Biodiesel from Tannery Sludge: Characterization, Optimization and Kinetic Studies

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Arabian Journal for Science and Engineering

Volume 47, Issue 5, May 2022, Pages 6341-6353

Magnetic Nano-catalyzed Synthesis of Biodiesel from Tannery Sludge: Characterization, Optimization and Kinetic Studies(Article)

Boopathy, V.K., Kasimani, R., Pandian, S., Subramanian, D.

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[c]School of Petroleum Technology, Pandit Deendayal Energy University, Gandhinagar, 382426, India

View additional affiliations

Abstract

The fat extracted from tannery sludge was utilized for producing biodiesel by transesterification reaction using a short chain alcohol and a nano-catalyst (Fe_3O_4/BaO). This catalyst was synthesized through co-precipitation method and various characterization techniques were followed using analytical instruments. The synthesized catalyst was examined through transesterification reaction using tannery sludge fat for observing the activity performance. The effect of various process parameters was investigated to obtain an optimum yield of 97.6%. The optimum reaction conditions were 18:1 molar ratio of methanol/oil, 8 wt% of catalyst loading with 65 °C of reaction temperature, 300 min of reaction time and a rate of stirring of 450 rpm. Furthermore, the ASTM standard test methods were followed for examining the fuel property of biodiesel and were found to be within the range of ASTM D6751 standard. Moreover, the rate of reaction (k) was determined by conducting the kinetic studies. The obtained values of 46.64 kJ mol^{-1} and 21.3 × 10^3 min^{-1}, respectively, denote activation energy and frequency factor. © 2021, King Fahd University of Petroleum & Minerals.

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Document details - New Mg(II) and Ca(II) Mixed Strontium Squarates: Structural Characterization, DNA/BSA Interaction, Antioxidant and Anticancer Activities

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Journal of Cluster Science

Volume 33, Issue 3, May 2022, Pages 867-885

New Mg(II) and Ca(II) Mixed Strontium Squarates: Structural Characterization, DNA/BSA Interaction, Antioxidant and Anticancer Activities(Article)

Priya Vadhana, K.T., Valram, S., Ushadevi, B., Parveen, S.

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[b]Department of Chemistry, K.P.R. Institute of Engineering and Technology, Tamil Nadu, Coimbatore, 641407, India
[c]Department of Science and Humanities, Dr. Mahalingam College of Engineering and Technology, Pollachi, Tamil Nadu, Coimbatore, 642003, India

Abstract

New mixed alkaline earth metal squarates, viz $[Sr_{0.865}Mg_{0.135}(C_4O_4)(H_2O)_2]\cdot H_2O$—(1) and $[Sr_{0.88}Ca_{0.12}(C_4O_4)(H_2O)_3]$—(2) have been synthesized and characterized by single-crystal X-ray diffraction, thermal analysis, and biological studies, EB-CTDNA binding, BSA binding, antioxidant and cytotoxicity activity. The complexes 1 and 2 crystallized in triclinic and monoclinic space groups with eight and nine coordination number, respectively, from the reaction mixture of squaric acid and the respective metal nitrates in aqueous medium at pH 7. The complexes on thermal analysis show that they yield mixed metal carbonates at 544 °C as residue. Their interaction with EB-CTDNA evaluated by emission method substantiates the intercalative mode of binding. The protein binding (BSA) study by the fluorescence quenching method reveals that the complexes bind strongly with BSA. Antioxidant property analysis shows that they exhibit a strong radical scavenging ability against ABTS, DPPH and NO radicals. The in vitro cytotoxicity of the complexes examined for human breast cancer (MCF-7) and lung cancer (A549) cell lines exhibit substantial cytotoxic property. AO/EB and DAPI staining methods support that they induce apoptosis and nuclear fragmentations in MCF-7 and A549 cell lines. © 2021, The Author(s), under exclusive licence to Springer Science+Business Media, LLC part of Springer Nature.

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Khaksar, S., Panjehpour, A., Ghadermazi, E.

Study on crystallographic structure and antiproliferative effect of mixed-ligand strontium(II) complex and N, N'-bis(2-hydroxy-5-methylphenyl) pyridine-2,6-dicarboxamide ligand

(2023) Journal of Molecular Structure

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Document details - A comprehensive analysis of numerical techniques for estimation of solar PV parameters under dynamic environmental condition

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Smart Grids and Microgrids: Technology Evolution

20 April 2022, Pages 1-26

A comprehensive analysis of numerical techniques for estimation of solar PV parameters under dynamic environmental condition (Book Chapter)

Balasubramonian, M., Ramachandran, R., Veerasamy, V., Albert, P.A.C.P., Wahab, N.I.A.

[a]Department of Electrical Engineering, Alagappa Chettiar Government College of Engineering and Technology, Karaikudi, India
[b]Department of Electrical Engineering, Government College of Technology, Coimbatore, India
[c]Advanced Lightning, Power and Energy Research (ALPER), Department of Electrical and Electronics Engineering, Faculty of Engineering, Universiti Putra Malaysia (UPM), Selangor, Malaysia

Abstract

The ampleness and non-polluting nature of power generation from solar photovoltaic (SPV) is used worldwide to meet the ever-increasing load demand. In order to operate SPV efficiently, an accurate modeling and control is required prior to the installation. Therefore, this chapter presents the Single Diode Model(SDM) of SPV module through which five parameters such as series resistance (R_{se}), shunt resistance (R_{sh}), diode ideality factor (A), light generated current (I_{LG}), diode reverse saturation current (I_{sat}) are determined for extracting the maximum power from PV panel. Initially, this work describes the mathematical model of SPV in terms of the above specified unknown parameters. Using these modeling equations, the parameters are determined under standard test condition (STC). The manipulated form of SPV modeling equations under dynamic environmental condition are portrayed which are used for determining the parameters of SDM. From these parameters, the voltage and current at maximum power point (MPP) are deduced under varying environmental conditions. This study presents the numerical iterative techniques like Gauss-Seidel (GS) and Newton Raphson (NR) approach to solve the non-linear transcendental equations describing the behavior of SPV. The effectiveness of the presented method is tested with various SPV modules such as KD245GX, US-80, and Shell SP70. The comparative analysis of results obtained reveal that among the presented numerical techniques, the NR method is simple to use, reduces the computational cost and robust. Further, the accuracy of the presented NR method is validated with the results obtained from the experimental data under dynamic environmental conditions. The comparison of I-V and P-V characteristics of HST60FXXXP PV panel from experimental results and numerical analysis shows unnoticeable deviation between them. The predicted values of MPP voltage and current estimated from numerical techniques under dynamic environmental conditions are in good

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Document details - Design of single- and multi-loop self-adaptive PID controller using heuristic based recurrent neural network for ALFC of hybrid power system

Expert Systems with Applications
Volume 192, 15 April 2022, Article number 116402

Design of single- and multi-loop self-adaptive PID controller using heuristic based recurrent neural network for ALFC of hybrid power system(Article)

Veerasamy, V., Abdul Wahab, N.I., Ramachandran, R., Othman, M.L., Hizam, H., Satheesh Kumar, J., Irudayaraj, A.X.R.
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[c]Department of Electrical Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

This paper presents a novel heuristic based recurrent Hopfield neural network (HNN) designed self-adaptive proportional-integral-derivative (PID) controller for automatic load frequency control of interconnected hybrid power system (HPS). The control problem is conceptualized as an optimization problem and solved using a heuristic optimization technique with the aim of minimizing the Lyapunov function. Initially, the energy function is formulated and the differential equations governing the dynamics of HNN are derived. Then, these dynamics are solved using hybrid particle swarm optimization-gravitational search algorithm (PSO-GSA) to obtain the initial solution. The effectiveness of the controller is tested for two-area system considering the system non-linearities and integration of plug-in-electric vehicle (PEV). Further, to improve the speed of response of the system, the cascade control scheme is proposed using the presented approach of heuristic based HNN (h-HNN). The efficacy of the method is examined in single- and multi-loop PID control of three-area HPS. The performance of propounded control schemes is compared with PSO-GSA and generalized HNN based PID controller. The results obtained show that the response of proposed controller is superior in terms of transient and steady state performance indices measured. In addition, the control effort of suggested cascade controller is much reduced compared with other controllers presented. Furthermore, the self-adaptive property of the controller is analyzed for random change in load demand and their corresponding change in gain parameters are recorded. This reveals that the proposed controller is more suitable for stable operation of modern power network with green energy technologies and PEV efficiently. © 2021 Elsevier Ltd

Document details - Groundwater potential mapping and natural remediation through artificial recharge structures in Vellore District, Tamil Nadu, India using geospatial techniques

Desalination and Water Treatment
Volume 254, April 2022, Pages 229-237

Groundwater potential mapping and natural remediation through artificial recharge structures in Vellore District, Tamil Nadu, India using geospatial techniques(Article)

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[c]Department of Electrical & Electronics Engineering, Saveetha Engineering College, Tamil Nadu, Chennai, 602 105, India
View additional affiliations

Abstract

The main objective of the present study is groundwater potential mapping and natural remediation through artificial recharge structures in Vellore District, Tamil Nadu, India using geospatial tech-niques. Water is an important essential renewal resource, without which life cannot exist on the earth. Water scarcity problems are increasing day by day throughout the Vellore District due to the increasing needs for various applications like domestic, agriculture and industries. Unpredictable variation in the occurrence of precipitation with respect to space and time creates droughts and floods in many places. In the Vellore District delineating groundwater potential zones with the aid of geo-spatial techniques and suggestion of suitable sites and structures for artificial recharge of ground-water is much important. According to research, the area of groundwater occurrence in good water is 382 km^2, moderate water is 736.3 km^2, and 38 villages have 'poor' occurrences of 586.7 km^2, which require immediate attention to improve the scenario through artificial recharge. Because rainfall recharge dilutes ion concentrations in groundwater during the NE and SW monsoon seasons, the study recommends implementing artificial recharge techniques such as constructing a percolation tank across a Palar River stream, constructing a check dam across a Palar River channel, and introduc-ing injection wells to place fluid underground into porous geologic formations in this region. © 2022 Desalination Publications. All rights reserved.

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Document details - Experimental and Analytical Evaluation of the Mechanical Properties of High-Strength Self-Curing Concrete with Recycled Fine Aggregates

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Journal of Materials in Civil Engineering

Volume 34, Issue 4, 1 April 2022, Article number 04022017

Experimental and Analytical Evaluation of the Mechanical Properties of High-Strength Self-Curing Concrete with Recycled Fine Aggregates(Article)

Revathi, M.C., Chithra, R., Saranya, E.

[a]Dept. of Civil Engineering, Government College of Technology, Coimbatore, Thadagam Rd., Tamilnadu, Coimbatore, 641013, India
[b]Dept. of Structural Engineering, Government College of Technology, Coimbatore, Thadagam Rd., Tamilnadu, Coimbatore, 641013, India

Abstract

Increasing demand for high-rise buildings and massive structures has led to the production and use of high-strength concrete in large quantities, which in turn has led to higher environmental impacts. Self-curing concrete produced using polyethylene glycol and recycled fine aggregates (RFA) along with superplasticizers is found to be the most promising solution for attaining high-strength concrete with significantly lower environmental impacts. This work deals with the experimental and analytical evaluation of the mechanical properties of high-strength self-curing (HSSC) concrete using RFA. The replacement proportion of RFA considered are 0%, 10%, 20%, 30%, 40%, and 50% with respect to the weight of natural fine aggregates. Experimental investigations indicate that the optimum replacement proportion of RFA in this HSSC concrete is 30% when considering the strength characteristics. An empirical model based on regression analysis using Minitab software is developed for compressive strength, split tensile strength, and flexural strength to evaluate its correlation with the existing analytical models of international codes. Analytical evaluation indicates that the compressive strength and flexural strength of HSSC concrete correlates highly with American Concrete Institute (ACI) code. The split tensile strength of HSSC concrete is found to have a better correlation with Eurocode. RFA self-curing concrete can be effectively used to produce high-strength concrete. © 2022 American Society of Civil Engineers.

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Document details - Chemical, physical and biological methods to convert lignocellulosic waste into value-added products. A review

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Environmental Chemistry Letters

Volume 20, Issue 2, April 2022, Pages 1129-1152

Chemical, physical and biological methods to convert lignocellulosic waste into value-added products. A review(Review)

Periyasamy, S., Karthik, V., Senthil Kumar, P., Isabel, J.B., Temesgen, T., Hunegnaw, B.M., Melese, B.B., Mohamed, B.A., Vo, D.-V.N.

[a]Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia
[b]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, India
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Abstract

Actual agricultural practices produce about 998 million tonnes of agricultural waste per year. Therefore, converting lignocellulosic wastes into energy, chemicals, and other products is a major goal for the future circular economy. The major challenge of lignocellulosic biorefineries is to transform individual components of lignocellulosic biomass into valuable products. Here we review lignocellulosic biomasses such as coffee husk, wheat straw, rice straw, corn cob, and banana pseudostem. We present pretreatment technologies such as milling, microwave irradiation, acidic, alkaline, ionic liquid, organosolv, ozonolysis, steam explosion, ammonia fiber explosion, and CO_2 explosion methods. These methods convert biomass into monomers and polymers. For that, the concoction pretreatment methods appear promising. © 2022, The Author(s), under exclusive licence to Springer Nature Switzerland AG.

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Document details - Bioethanol from hydrolysate of ultrasonic processed robust microalgal biomass cultivated in dairy wastewater under optimal strategy

Energy
Volume 244, 1 April 2022, Article number 122604

Bioethanol from hydrolysate of ultrasonic processed robust microalgal biomass cultivated in dairy wastewater under optimal strategy(Article)

Dhandayuthapani, K., Kumar, P.S., Chia, W.Y., Chew, K.W., Karthik, V., Selvarangaraj, H., Selvakumar, P., Shanmugam, P., Show, P.L.

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Abstract

Microalgal biomass produced from the inexpensive nutrient medium is a potential raw source for manufacturing different essential products covering a broad spectrum of applications. In this study, six separate microalgal strains were isolated from lake freshwater and screened based on their growth and biomass productivity in 10% raw dairy wastewater (DWW). Statistically optimized growth parameters of microalga using CCD-RSM were light intensity 65 μE $m^{-2}s^{-1}$, pH 7, temperature 35 °C and agitation 150 rpm with maximum dry biomass yield 16.35 ± 0.34 g/L in ultrasonic pre-treated DWW (UPDWW) (75%, v/v). The physicochemical properties of 75% UPDWW were observed pre- and post-algal cultivation and found 94.8% COD removal, indicating the strain's potential phycoremediation. At optimal conditions, hydrolysate of C. sorokiniana NITTS3 biomass yielded 13.67 g/L of bioethanol using selected yeast. The findings of this investigation suggest that C. sorokiniana NITTS3 isolated from freshwater could effectively be used for phycoremediation of DWW with concomitant biomass production as an appropriate feedstock for bioethanol production. © 2021 Elsevier Ltd

Document details - Identification of Power Leakage and Protection of Over Voltage in Residential Buildings

International Journal of Electrical and Electronics Research
Volume 10, Issue 1, 30 March 2022, Article number IJEER220129, Pages 51-56

Identification of Power Leakage and Protection of Over Voltage in Residential Buildings(Article) (Open Access)

Chitra, S., Jayakumar, J., Venkateshkumar, P., Chacko, S., Sivabalan

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Abstract

In many residential buildings the electrical wires of individual houses are laid in the same conduit pipe and some mistakes could be made in identifying similar coloured wires when they are laid in same conduit pipe. Most of the faults are caused by the neutral interconnection in the wiring system. Usually neutral wires are connected to neutral bus within the panel board or switchboard, and are "bonded" to earth ground. In our secondary distribution, tree system of supply is mostly utilized. The voltage of each phase to neutral will be maintained at rated value even during the unbalanced load conditions. If neutral wire connection is poor the voltage at each phase will be different from one another, such an isolated neutral point is called floating neutral and the voltage of the point is always changing. This is the reason for over voltage causing damage to appliance's which should be protected. In this paper, a smart system that identifies power leakage and provides over voltage protection to the residential building is proposed. © 2022 by the Chitra S, Jayakumar J, Venkateshkumar P, Shanty Chacko, Sivabalan.

Author keywords

Faults · Load · low power devices · Neutral Leakage · Operational Amplifier · Voltage Protection

Document details - Meta-Heuristic Technique-Based Parametric Optimization for Electrochemical Machining of Monel 400 Alloys to Investigate the Material Removal Rate and the Sludge

Applied Sciences (Switzerland)
Volume 12, Issue 6, March-2 2022, Article number 2793

Meta-Heuristic Technique-Based Parametric Optimization for Electrochemical Machining of Monel 400 Alloys to Investigate the Material Removal Rate and the Sludge(Article)(Open Access)

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Abstract

Electrochemical machining (ECM) is a preferred advanced machining process for machining Monel 400 alloys. During the machining, the toxic nickel hydroxides in the sludge are formed. Therefore, it becomes necessary to determine the optimum ECM process parameters that minimize the nickel presence (NP) emission in the sludge while maximizing the material removal rate (MRR). In this investigation, the predominant ECM process parameters, such as the applied voltage, flow rate, and electrolyte concentration, were controlled to study their effect on the performance measures (i.e., MRR and NP). A meta-heuristic algorithm, the grey wolf optimizer (GWO), was used for the multi-objective optimization of the process parameters for ECM, and its results were compared with the moth-flame optimization (MFO) and particle swarm optimization (PSO) algorithms. It was observed from the surface, main, and interaction plots of this experimentation that all the process variables influenced the objectives significantly. The TOPSIS algorithm was employed to convert multiple objectives into a single objective used in meta-heuristic algorithms. In the convergence plot for the MRR model, the PSO algorithm converged very quickly in 10 iterations, while GWO and MFO took 34 and 64 iterations, respectively. In the case of the NP model, the PSO tool took only 6 iterations to converge, whereas MFO and GWO took 48 and 88 iterations, respectively. However, both MFO and GWO obtained the same solutions of EC = 132.014 g/L, V = 2406 V, and FR = 2.8455 L/min with the best

Document details - Fabrication, Characterization and In Vitro Assessment of Laevistrombus canarium-Derived Hydroxyapatite Particulate-Filled Polymer Composite for Implant Applications

Polymers
Volume 14, Issue 5, March-1 2022, Article number 872

Fabrication, Characterization and In Vitro Assessment of Laevistrombus canarium-Derived Hydroxyapatite Particulate-Filled Polymer Composite for Implant Applications(Article)(Open Access)

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Abstract

This paper presents the formulation, characterization, and in vitro studies of polymer composite material impregnated with naturally derived hydroxyapatite (HA) particulates for biomedical implant applications. Laevistrombus canarium (LC) seashells (SS) were collected, washed and cleaned, sun-dried for 24 h, and ground into powder particulates. The SS particulates of different weight percentages (0, 10, 20, 30, 40, 50 wt%)-loaded high-density polyethylene (HDPE) composites were fabricated by compression molding for comparative in vitro assessment. A temperature-controlled compression molding technique was used with the operating pressure of 2 to 3 bars for particulate retention in the HDPE matrix during molding. The HDPE/LC composite was fabricated and characterized using X-ray diffraction (XRD), field-emission scanning electron microscopy (FESEM), energy-dispersive X-ray (EDX), differential scanning calorimetry (DSC), and TGA. Mechanical properties such as tensile, compression, flexural, hardness, and also surface roughness were tested as per ASTM standards. Mass degradation and thermal stability of the HDPE/LC composite were evaluated at different temperatures ranging from 10 to 700°C using thermogravimetric analysis (TGA). The maximum tensile strength was found to be 27 ± 0.5 MPa for 30 wt% HDPE/LC composite. The thermal energy absorbed during endothermic processes was recorded as 71.24 J/g and the peak

Document details - Effect of doping nickel/cobalt ions on the structural and photocatalytic efficiency of magnesium manganese oxide materials for the environmental applications

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Journal of Materials Science: Materials in Electronics

Volume 33, Issue 9, March 2022, Pages 7134-7153

Effect of doping nickel/cobalt ions on the structural and photocatalytic efficiency of magnesium manganese oxide materials for the environmental applications(Article)

Banu, A., Jones, B.F., Muthuraj, V., Govindan, K., Senthil kumar, P., Sasikumar, M., Thamilselvan, M., Vidhya, B., Rajesh, S., Sakunthala, A.

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Abstract

The excessive use of the antibiotics like norfloxacin and their residue is a serious threat to the environment. Although photocatalysis method of removing antibiotics is considered as an efficient method, again the materials used for the above purpose should be environmentally benign and earth abundant in nature. Hence exploration of new materials and enhancing the efficiency of materials for photocatalytic degradation of the above antibiotic become an important topic of investigation. Inducing oxygen vacancies in an environment-benign compound like $MgMn_2O_4$ through low concentration of transition metal ion doping and their advantageous changes in optical properties are favorable for the photocatalytic application. In this regard, the changes in the structural and optical properties of the $MgMn_2O_4$ compound, by doping with Ni/Co ions is explored. It is found that the nickel doping shows a high photocatalytic degradation of norfloxacin as 90–95% within 90 min under the irradiation of UV–Vis light, which is higher than the bare and cobalt ion-doped compound. This is due to the more number of oxygen vacancies as analyzed from XPS, high light absorption, and more charge separation retention characteristics, as per UV–VIS and PL studies, respectively. The $MgNi_{0.5}Mn_{1.5}O_4$ compound shows a high rate constant value of 9.25×10^{-4} M^{-1} s^{-1} and high reusability up to four cycles and could be utilized as the efficient photocatalytic materials for wastewater remediation.

Document details - Performance Analysis of Rubber Seed Shell Activated Carbon Incorporated Polymeric Membrane for the Separation of Oil-in-Water Emulsion

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Journal of Polymers and the Environment

Volume 30, Issue 3, March 2022, Pages 1055-1071

Performance Analysis of Rubber Seed Shell Activated Carbon Incorporated Polymeric Membrane for the Separation of Oil-in-Water Emulsion(Article)

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Abstract

In this study, pure cellulose acetate (CA) and rubber (Hevea brasiliensis) seed shell activated carbon (RSSAC) blended CA membranes were fabricated by the phase-inversion technique. Results indicate that the composite membranes exhibit increased water content, porosity and pore size. Field emission scanning electron microscopy (FESEM) images reveal that no pores visibly found at the surface of membrane. The atomic force microscopic images (AFM) indicate an decreased squared average roughness (R_q) of membrane upto 1 wt% of RSSAC additives. Filtration experiments were conducted to evaluate the performance of membranes for the chemical oxygen demand (COD) and waste engine oil removal efficiency. The results evince that the COD and waste engine oil removal efficiency of composite membrane increased than the pure CA membrane, which is due to the attraction of hydrocarbon towards the composite membrane. Further, in comparison with pure CA, the antifouling properties of the composite membranes were found to be significantly improved.

Author keywords

Document details - Green synthesis of copper nanoparticles using Sesbania aculeata to enhance the plant growth and antimicrobial activities

International Journal of Environmental Science and Technology
Volume 19, Issue 3, March 2022, Pages 1313-1322

Green synthesis of copper nanoparticles using Sesbania aculeata to enhance the plant growth and antimicrobial activities(Article)

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Abstract

Green synthesis of copper oxide nanoparticles (CuONPs) was performed using Sesbania aculeata leaf extract. The characteristics of CuONPs were studied using the selected area electron diffraction analysis. The effect of nanoparticles on the plant growth including germination efficiency was studied in Brassica nigra at different concentrations (25, 30, 100 mg/100 ml) using plant tissue culture technique. The uptake of copper and potential metal-binding compounds (citrate, phytochelatins, nicotinamide) in xylem and phloem saps of B. nigra was examined. Copper uptake in xylem and phloem sap was found to be higher at 100 mg/100 ml concentration (2.2 ± 0.23 and 5.70 ± 0.9 μM, respectively) when compared to the control (1.0 ± 0.15 and 4.90 ± 0.7 μM) which could be toxic and inhibit the plant's growth. 25 and 30 mg/100 ml were found to be safer. The root uptake of CuONPs in xylem was observed through the transmission electron microscopy analysis. Since the nanoparticles at higher dose inhibit plant's growth, potassium leakage rate was analyzed and found to be higher with copper sulfate treatment (0.8 μg/g FW min^{-1}) than with the CuONPs treatment (0.5 μg/g FW min^{-1}) at 100 mg/100 ml concentration. Additionally, we evaluated the antimicrobial activity of CuONPs and the maximum zone of inhibition was found with Phoma destructiva (23 mm), Curvularia lunata (22 mm) at 40 μl concentration. This study shows that CuONPs synthesized using greener technology enhanced the plant growth of B. nigra at a lower dose (25 and 30 mg/100 ml) and act as a strong antimicrobial agent which can act as biofertilizer for both the crop protection and production. © 2021, Islamic Azad University (IAU).

Document details - A comprehensive review on the application of response surface methodology for optimization of biodiesel production using different oil sources

Journal of King Saud University - Engineering Sciences
Volume 34, Issue 3, March 2022, Pages 198-208

A comprehensive review on the application of response surface methodology for optimization of biodiesel production using different oil sources(Review)(Open Access)

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Abstract

The renewable and sustainable energy resources gained greater importance in the current scenario to minimize the environmental pollution load and to compensate the energy demand worldwide. Biodiesel is one of the renewable biofuels which can be produced from vegetable oils and animal fats. The optimization of process variables and conditions for biodiesel production is one of the crucial steps in the process to achieve maximum yield with cost effective manner. Conventional optimization (one-factor at a time) method is well studied and, it possesses some disadvantages like more experimental runs, time and not illuminates the synergistic effect of the process variables. Use of response surface methodology (RSM) in optimization studies is increasing and, it provides the details of the interaction effect of chosen variables with fewer experiments. In this review, the application of RSM for biodiesel production using different oil sources was reported. © 2020 King Saud University

Author keywords

Document details - Day-ahead solar irradiance forecast using sequence-to-sequence model with attention mechanism

Indonesian Journal of Electrical Engineering and Computer Science

Volume 25, Issue 2, February 2022, Pages 900-909

Day-ahead solar irradiance forecast using sequence-to-sequence model with attention mechanism(Article)(Open Access)

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Abstract

The increasing integration of distributed energy resources (DERs) into power grid makes it significant to forecast solar irradiance for power system planning. With the advent of deep learning techniques, it is possible to forecast solar irradiance accurately for a longer time. In this paper, day-ahead solar irradiance is forecasted using encoder-decoder sequence-to-sequence models with attention mechanism. This study formulates the problem as structured multivariate forecasting and comprehensive experiments are made with the data collected from National Solar Radiation Database (NSRDB). Two error metrics are adopted to measure the errors of encoder-decoder sequence-to-sequence model and compared with smart persistence (SP), back propagation neural network (BPNN), recurrent neural network (RNN), long short term memory (LSTM) and encoder-decoder sequence-to-sequence LSTM with attention mechanism (Enc-Dec-LSTM). Compared with SP, BPNN and RNN, Enc-Dec-LSTM is more accurate and has reduced forecast error of 31.1%, 19.3% and 8.5% respectively for day-ahead solar irradiance forecast with 31.07% as forecast skill.

Author keywords

Document details - Role of Purged Air in the Synthesis of the Mesoporous NiO/C Composite and Its Application in Wastewater Treatment

Water, Air, and Soil Pollution

Volume 233, Issue 2, February 2022, Article number 53

Role of Purged Air in the Synthesis of the Mesoporous NiO/C Composite and Its Application in Wastewater Treatment(Article)(Open Access)

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Abstract

In this study, two methods were used to synthesize the NiO/C composite from agricultural waste. The mesoporous composite was successfully synthesized via a novel precipitation method in the presence of dissolved gases. The morphology of the composites was differentiated by using characterization techniques such as X-ray diffraction, the point of zero charge (pH_{pzc}), field-emission scanning electron microscopy (FESEM), Fourier transform infrared spectroscopy, energy-dispersive X-ray analysis (EDAX), and vibrating sample magnetometry (VSM). Then, the mechanism of synthesis was elucidated using the above experimental characterization data. Results of FESEM and EDAX analyses of $Ni(OH)_2$–carbon composite clearly showed the role of dissolved gases in the synthesis. Both the composites were subjected as the adsorbent to remove the toxic Pb(II) ions from the wastewater. Batch adsorption experiments were carried out to compare the Pb(II) ion removal capability of both the composite materials. The parameters such as the effect of pH, the dosage of the adsorbents, and initial concentration were studied. At the optimized conditions, isotherm studies for each of the adsorbent were also carried out. The isotherm results revealed that the maximum removal capacity q_e (mg/g) was 30.78 for PJNC and 43.48 for PJGNC. The VSM analysis confirmed that both the adsorbents were soft magnetic materials. Hence, they could be competently separated from salted/treated water using a magnetic field.

Author keywords

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Document details - Transformation of aqueous methyl orange to green metabolites using bacterial strains isolated from textile industry effluent

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Environmental Technology and Innovation

Volume 25, February 2022, Article number 102126

Transformation of aqueous methyl orange to green metabolites using bacterial strains isolated from textile industry effluent(Article)(Open Access)

Velusamy, K., Periyasamy, S., Kumar, P.S., C., F.C., Jayaraj, T., Gokulakrishnan, M., Keerthana, P.

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Abstract

The present report is based on the degradation of methyl orange, which is categorized as an acute toxic compound and mutagenic substance. Since it is highly solubilized in the environment, it is very challenging to remove. This study is focusedon biological treatment which has the ability to breakdown methyl orange. Three bacterial strains were initially isolated from the textile wastewater. Out of those strains, Aeromonas hydrophila showed maximum degradation of about 85%. The optimized conditions for the degradation process were found to be 20 ppm concentration, pH 7, and temperature 35 °C. The carbon source such as 1% sucrose is found to be appropriate carbon source for the degradation. While nitrogen source suited well was found to be 1% peptone over 1% meat extract. The metabolite obtained after degradation was analyzed using FT-IR and GC–MS. N, N-dimethyl p-phenylenediamine and 4-amino sulfonic acid were identified as the end products. © 2021

Author keywords

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(2023) Food and Chemical Toxicology

Sennaj, R., Dari, K., Timinouni, M.
Evaluation of Bioremediation Potentiality of Bacillus mojavensis Isolated from Wastewater for the Elimination of Reactive Yellow 145 and Methyl Orange
(2023) Current Microbiology

Liu, S., Yang, B., Zuo, A.
Characterization of a Ti/SnO2-Sb/Fe-PVP-PbO2 Electrode Deposited from Methanesulfonate Bath and Application in Electrocatalytic Degradation of MO
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Document details - Inherent characteristics of ultra-photosensitive Al/Cu-CeO₂/p-Si metal oxide semiconductor diodes

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Journal of Materials Chemistry C

Volume 10, Issue 4, 28 January 2022, Pages 1445-1457

Inherent characteristics of ultra-photosensitive Al/Cu-CeO_2/p-Si metal oxide semiconductor diodes(Article)(Open Access)

Manikandan, V., Mamadu, R., Chandrasekaran, J., Vigneselvan, S., Mane, R.S., Banks, C.E., Mirzaei, A.

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Abstract

An ultrahigh photosensitive diode was developed using a Cu-doped CeO2 thin film through spray pyrolysis processing, which has made a unique contribution in the field of optoelectronic device fabrication process. Phase identification revealed a good arrangement of atoms in the as-prepared nanostructured thin films via structural analysis. The formation of wire-shaped nanorods was confirmed. Elemental distribution and their valence states were systematically monitored using X-ray photoelectron spectroscopy analysis, where the presence of Ce3+ was evidenced. Good mechanical properties were obtained owing to the Cu-doping in the cerium host matrix, which was investigated by nano-indentation. Bandgap energy fluctuation was the root cause for electrical conductivity. The present work revealed a decrease in the band gap energy upon Cu-doping alters the electrical conductivity. An as-fabricated photodiode demonstrated superior detectability upon Cu-doping. In the depletion region, on account of a high surface-to-volume ratio, the generation of electron-hole pairs increased along with photoresponsivity with increases in the quantum efficiency and current gain. © 2022 The Royal Society of Chemistry.

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Issac Nelson, P., Mohan, A., Rathes Kannan, R.
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Document details - Facile green synthesis of nano-sized ZnO using leaf extract of Morinda tinctoria: MCF-7 cell cycle arrest, antiproliferation, and apoptosis studies

Journal of Industrial and Engineering Chemistry
Volume 105, 25 January 2022, Pages 520-529

Facile green synthesis of nano-sized ZnO using leaf extract of Morinda tinctoria: MCF-7 cell cycle arrest, antiproliferation, and apoptosis studies(Article)

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View additional affiliations

Abstract

Zinc oxide nanoparticles (ZnO NPs) were prepared by a facile, one-pot, greener approach using aqueous leaf extract of the medicinal plant Nuna (Morinda tinctoria) and were analyzed by ultraviolet-visible (UV-Vis) and Fourier-transform infrared (FT-IR) spectroscopy, powder X-ray diffraction (PXRD), field emission scanning electron microscopy (FESEM), and transmission electron microscopy (TEM) techniques. The TEM images confirmed that the as-prepared greener Nuna (Nu)-mediated ZnO NPs (Nu-ZnO NPs) were spherical in shape, with an average diameter of 8–10 nm. Further, the single phase and crystallinity of the Nu-ZnO NPs were observed by PXRD pattern. In addition, the biogenic Nu-ZnO NPs showed high cytotoxicity in human breast adenocarcinoma (MCF-7) cells in vitro. These tiny spherical bodies produced profound toxicity according to the MTT assay, with IC_{50} of 46 µg/mL. Apoptosis and morphological changes were studied using acridine orange/ethidium bromide and 4′,6-diamidino-2-phenylindole fluorescence staining and MTT assays. Finally, the anticancer efficacy of biosynthesized Nu-ZnO NPs was imparted by dysregulation of cell division through arrest of growth-promoting and inhibiting signals in the S phase, with further reduction in the G2/M phase of the cell cycle. In conclusion, Nu-ZnO NPs conferred MCF-7 cell toxicity by modulating proliferation and inducing apoptosis. © 2021 The Korean Society of Industrial and Engineering Chemistry

Document details - Green synthesis and characterization studies of biogenic zirconium oxide (ZrO₂) nanoparticles for adsorptive removal of methylene blue dye

Journal of Molecular Structure
Volume 1247, 5 January 2022, Article number 131275

Green synthesis and characterization studies of biogenic zirconium oxide (ZrO_2) nanoparticles for adsorptive removal of methylene blue dye(Article)

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View additional affiliations

Abstract

In this current study, Zirconium oxide nanoparticles were prepared using the pericarp extract of Sapindus mukorossi as a powerful capping and reducing agent. The prepared nanoparticles were characterized using UV-Visible spectrophotometer, FTIR, XRD, SEM-EDX and HR-TEM. The absorption spectra at 275 nm confirmed the presence of Zirconium oxide nanoparticle with an optical band gap value of 5.535 eV. The prepared nano zirconia was tetragonal, crystalline in nature with 5 nm average size. The adsorptive capacities of synthesized nanoparticles were studied for Methylene blue (MB) dye as a function of pH, dosage, initial adsorbate concentration and time in batch trials. 94% removal efficiency was registered with an adsorptive capacity of 23.26 mg/g which fitted well with non linear Langmuir isotherm model. The experimental data finds highest suitability with Pseudo-second-order kinetics followed by Elovich model in its non linear form which was evidenced from higher R^2 and reduced error values. Thermodynamic analysis described the endothermic and spontaneous nature of adsorption. Intra particle diffusion acts as the rate limiting step in the mobility of adsorbate molecules across the boundary. With 0.1 M HCl as an eluent, the prepared nano zirconia exhibited good regenerative capacity which makes it a suitable adsorbent for methylene blue removal. © 2021

Document details - Various Non-Isolated Three Phase grid-integrated PV Inverter Topologies for Leakage Current Reduction-A simulation-based study

2022 IEEE International Power and Renewable Energy Conference, IPRECON 2022

2022

3rd IEEE International Power and Renewable Energy Conference, IPRECON 2022; Kollam; India; 16 December 2022 through 18 December 2022; Category numberCFP22W75-ART; Code 187296

Various Non-Isolated Three Phase grid-integrated PV Inverter Topologies for Leakage Current Reduction-A simulation-based study(Conference Paper)

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Abstract

Non-isolated grid-integrated inverter configurations are vastly preferred due to their high efficiency, low cost and compatibility with the system. The main downside of the system is galvanic isolation, leakage current (LC) minimisation, and reactive power compensation. Galvanic isolation and leakage current reduction in non-isolated inverter configuration mainly depends on inverter structure and modulation techniques. Based on these issues, several single-phase grid-integrated inverter configurations are developed and reviewed. Compared to single-phase inverter topologies, there are very few studies on three-phase inverter topologies. Hence, in this paper, several three-phase inverter topologies are reviewed based on AC and DC clamping isolation, hybrid isolation with modified discontinuous pulse width modulation technique on LC reduction, current THD, and the strengths and weaknesses of the structure. Finally, simulations are carried out in MATLAB/Simulink for different inverter topologies. © 2022 IEEE.

Author keywords

Document details - Application of Biochar for Wastewater Treatment

Biochar and its Application in Bioremediation

1 January 2022, Pages 363-380

Application of Biochar for Wastewater Treatment (Book Chapter) (Open Access)

Karthik, V., Periyasamy, S., Beula Isabel, J., Kalaivani, S., Temesgen, T.

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Abstract

The issues of wastewater containing different contaminants are insurmountable, as they cause major threats to aquatic ecosystems. The stages of treatment technologies may consist of or a combination of chemical, biological, or physical processes, depending on the wastewater characteristics, the climate, and the resources available. Among all, due to its simple operation in high volume with high performance, easy to functional sorbent preparation and reuse, the removal of contaminants by adsorption gains more interest. Biochar, a durable, low-cost carbon-rich material, is a promising agent for evacuating various organic and inorganic pollutants in wastewater due to its high adsorption properties. Functionally modified surface biochar is currently being developed to improve its ability to remove contaminants in wastewater and other bioremediation applications. This chapter offers clear information about the wastewater treatment process using biochar and knowledge gaps in biochar-based remediation of wastewater. © The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2021, corrected publication 2022.

Document details - An Extensive Review of Machine Learning Techniques for EEG Signal Processing

International Conference on Automation, Computing and Renewable Systems, ICACRS 2022 - Proceedings

2022, Pages 669-673

1st IEEE International Conference on Automation, Computing and Renewable Systems, ICACRS 2022; Mount Zion College of Engineering and Technology (MZCET)Pudukkottai; India; 13 December 2022 through 15 December 2022; Category numberCFP22CB5-ART; Code 186576

An Extensive Review of Machine Learning Techniques for EEG Signal Processing(Conference Paper)

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Abstract

Electrical brain activity is detected by signals in an Electroencephalogram (EEG). Based on their frequencies, EEG signals are usually put into one of five groups: delta, theta, alpha, beta, and gamma. These signals help find a pattern that can be used to predict when a person will have a seizure. Classifying a seizure is a very important job for a doctor, as it helps them figure out what kind of seizure it is and if there will be any other problems. The goal of seizure classification is to learn as much as possible about the EEG signals. Literature shows that there are a lot of EEG signal preprocessing techniques, selection methods, feature extraction from EEG signals, and classification algorithms that can be used to find out if someone is having a seizure. The most important thing about preprocessing EEG signals is that is improves the quality of raw experimental data, which leads to better datasets, better classifications, and better accuracy. This study gives an overview of recent EEG pre-processing methods, datasets that can be used for experiments, and EEG classification techniques that will help a beginner researcher build on and use the right techniques. ©

Document details - A Compact Integrated Converter for Plug-In Electric Vehicles

2022 1st International Conference on Sustainable Technology for Power and Energy Systems, STPES 2022

2022

1st International Conference on Sustainable Technology for Power and Energy Systems, STPES 2022; Srinagar; India; 4 July 2022 through 6 July 2022; Category numberCFP22BT3-ART; Code 186061

A Compact Integrated Converter for Plug-In Electric Vehicles(Conference Paper)

Puvendran, H.L., Narmadhai, N.

[a]Government College of Technology, Electrical and Electronics Engineering, Coimbatore, India
[b]Government College of Technology, Faculty of Electrical and Electronics Engineering, Coimbatore, India

Abstract

Plug-in electric vehicles have gained interest in recent years, to make pollution free environment in future. A key attribute of plug-in electric vehicles is their ability to be recharged from electrical outlets. In a conventional system, onboard converters are used for charging purposes in plug in mode of operation (Static mode) has been mounted in the vehicle. However, for propulsion and regenerative braking mode of operation (Running modes), a bidirectional DC-DC converter is used, and it is integrated with the vehicle's power train components. In order to overcome the conventional methods, a compact integrated converter for plug-in electric vehicles has been proposed in this work. The compact integrated converter which operates in three modes namely plug-in charging mode, propulsion mode, regenerative braking mode, has been placed along with the power train components of the vehicle. The Proposed work focused on simulating the integrated buck-boost converter on plug-in charging mode with two-loop control strategy using MATLAB software. The battery charging of 8 kWh using a single-phase supply on the proposed configuration was observed in the simulation. © 2022 IEEE.

Author keywords

Integrated buck-boost converter · Plug-In electric vehicles · single-phase supply · two-loop strategy

Indexed keywords

scopus.com/record/display.uri?eid=2-s2.0-85146728773&doi=10.1080%2f13682199.2022.2161996&origin=inward&txGid=ad2151aa623c0d835d38...

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Document details - Blind image deblurring using GLCM and negans obtuse mono proximate distance

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Blind image deblurring using GLCM and negans obtuse mono proximate distance(Article)

Jothi Lakshmi, S., Deepa, P.

[a]Department of CSE, Akshaya College of Engineering and Technology, Coimbatore, India
[b]Department of ECE, Government College of Technology, Coimbatore, India

Abstract

Image deblurring is a challenging problem in computer vision, which aims to recover the sharp image from a blurred observation. This paper proposes the Image deblurring algorithm based on Gray-Level Co-occurrence Matrix (GLCM) and Negans obtuse mono proximate distance to extract informative regions for better deblurring process without user guidance. The high-frequency layer is extracted from blurred image using 2D Haar wavelet, sparse approximation to estimate the sharper and more detailed high-frequency layer. From the high-frequency layer, rich edge region is extracted using GLCM along sliding window concepts after the canny edge detection. Finally, the extracted regions are applied for negans obtuse mono proximate distance. The proposed method avoids over-fitting data and reduces blurring. The proposed deblurring algorithm deblurs the blurred image by restoring image textures and details. The experiments performed are compared with existing deblurring algorithms to demonstrate the effectiveness of the proposed deblurring algorithm. © 2023 The Royal Photographic Society.

Author keywords

Blur kernel estimation | Canny edge | GLCM | Image restoration | Negans obtuse mono proximate distance | Rich edge region | Sparse approximation | Wavelet transforms

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Document details - Detection of Cyber Attack in Electric Vehicles using ALSTM based Machine Learning

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4th International Conference on Inventive Research in Computing Applications, ICIRCA 2022 - Proceedings

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4th International Conference on Inventive Research in Computing Applications, ICIRCA 2022; Coimbatore; India; 21 September 2022 through 23 September 2022; Category numberCFP22N67-ART; Code 185672

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Detection of Cyber Attack in Electric Vehicles using ALSTM based Machine Learning(Conference Paper)

Kandasamy, J., Arunagirinathan, S., Sivaraj, P., Pamela, M., Subham, G.T., Nagarajan, R.

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[c]Gems Polytechnic College, Department of Electrical and Electronics Engineering, Bihar, India

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Abstract

The importance of the cyber-physical protection of power electronic devices systems is steadily growing as a result of intellectualization and system integration. Specifically, power train systems comprised of one or more drive systems. In recent days, hybrid cars are becoming more susceptible to cyber threats as a result of the smart transportation system's link to external networks. In this study, a Advanced Long Short Term Memory (ALSTM) based machine learning system is implemented to identify cyber-attacks on electric vehicles (EVs) based on various driving circumstances. To portray EVs' rapid physical features, both device-and vehicle-level signals are acquired. Then, designers offer novel data characteristics pertaining to the crucial system stability and mechanical behavior of the vehicle, utilizing data-driven technique with particularly high powered devices and automotive designs. On the basis of data characteristics, an advanced machine-learning-based classifier with excellent accuracy under diverse driving circumstances is constructed. © 2022 IEEE.

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Document details - Effects of air pollution due to vehicular emission in coimbatore and reduction strategies: A review

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Volume 1125, Issue 1, 2022, Article number 012004

2nd International Conference on Sustainable Infrastructure with Smart Technology for Energy and Environmental Management, SIC-SISTEEM 2022; Virtual, Online; ; 24 March 2022 through 26 March 2022; Code 185792

Effects of air pollution due to vehicular emission in coimbatore and reduction strategies: A review(Conference Paper)(Open Access)

Sadheesh, S., Jeyanthi, J., Mohan, L.R., Reshmi, N., Sashwath, Y.G.

[a]Department of Civil Engineering, Sri Krishna College of Engineering and Technology, Tamil Nadu, Coimbatore, India
[b]Department of Civil engineering, Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract

Air pollution is a Worldwide challenge that is a reason for premature death. It affects both developing nations and developed nations. In particular, the air is so much polluted so that cities are fighting to fulfill air quality range and protect humans from harmful substances. One of the greatest global challenges of 2050 is the reduction of greenhouse gas emissions. Besides greenhouse gas emissions, air pollution is the major problems in many urban areas this situation is due to the sudden increase in the count of vehicles. According to the studies, Nitric oxide and particulate matter contribute more toair pollution. Due to urban transportation improvements vehicle traffic volume is on the rise over the past few years. Air pollution is majorly contributed by vehicular congestion and traffic. This paper analyzes traffic data at Coimbatore. From the review, comparing various locations, two-wheelers are the highest in count among all of the rest of the vehicles. Air pollution is a crisis that causes damage to the human who are living in areas where air pollutants are high in level. The type and amount of air pollutant decides the risk of illness. This indicates that carbon monoxide and particulate matter emitted from a vehicle of two passengers is higher than a single passenger vehicle. Although the centralization of poisons close by avenue are not always connected to transportation sector, this marker can be used as an indication of increase in residents. It also acts as an indication of how much surrounding areas are being polluted by metropolitan toxic wastes. This paper examines the vehicular emissions in Coimbatore, India. The study looks at reviewing data from various sources to formulate solutions for improving air quality in the city.

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Document details - Analysis of Equivalent Skin Model with Battery-Less Cardiac Pacemaker using Improved MPPT Controller

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6th International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud), I-SMAC 2022 - Proceedings

2022, Pages 331-339

6th International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud), I-SMAC 2022; Dharan; Nepal; 10 November 2022 through 12 November 2022; Category numberCFP22OSV-ART; Code 185437

Analysis of Equivalent Skin Model with Battery-Less Cardiac Pacemaker using Improved MPPT Controller(Conference Paper)

Suganya, T., Rajendran, V., Mangalyarkarasi, P.

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Abstract

Medical electronic implants can basically work on the well-being and personal satisfaction of individuals. These plugs are usually fueled by batteries, which as a rule have a limited lifespan and as a result need to be replaced occasionally using surgery. In the latter, subcutaneous sun-based cells, which can generate energy by retaining the light transmitted by the skin, can be developed as an economic force to control medical electronic insertions in the body. This paper is to develop an Improved Maximum Power Point Tracking (IMPPT) controller aimed at an equivalent skin model with battery-less cardiac pacemaker. In the proposed methodology, the equivalent skin model with battery-less cardiac pacemaker is designed and analyzed. The Photovoltaic cellis utilized to power the cardiac pacemaker for design a battery-less cardiac pacemaker. After that, the PV is connected with the equivalent circuit model. The PV may be affected due to environmental conditions which will be solved by the MPPT controller. Artificial Intelligence (AI) technique is developed to maintain the stability operation by avoiding environmental conditions. Here, the Arithmetic Optimization Algorithm (AOA) can be utilized towards manage the MPPT controller. The proposed battery-less cardiac pacemaker is designed and executed in MATLAB/Simulink, and its performance is evaluated in terms of maximum power, maximum voltage, maximum current, irradiance, input power of pacemaker, and output power of pacemaker.

Author keywords

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Document details - Pitch and yaw motion control of 2 DoF helicopter subjected to faults using sliding-mode control

Archives of Control Sciences

Volume 32, Issue 2, 2022, Pages 359-381

Pitch and yaw motion control of 2 DoF helicopter subjected to faults using sliding-mode control(Article)(Open Access)

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[a]Department of Electronics and Instrumentation Engineering, Government College of Technology, Coimbatore, India
[b]Department of Electrical and Electronics Engineering, PSG College of Technology, Coimbatore, India

Abstract

This paper presents a fault-tolerant control scheme for a 2 DOF helicopter. The 2 DOF helicopter is a higher-order multi-input multi-output system featuring non-linearity, cross-coupling, and unstable behaviour. The impact of sensor, actuator, and component faults on such highly complex systems is enormous. This work employs sliding mode control, which is based on reaching and super-twisting laws, to handle the problem of fault control. Simulation tests are carried out to show the effectiveness of the algorithms. Various performance metrics are analyzed and the results show SMC based on super-twisting law provides better control with less chattering. The stability of the closed-loop system is mathematically assured, in the presence of faults, which is a key contribution of this research.

Author keywords

Document details - Processing on Curcuma longa waste oil-diesel blends for using as better alternative to diesel fuel

Science and Technology for Energy Transition (STET)

Volume 77, Issue 3, 2022, Article number 18

Processing on Curcuma longa waste oil-diesel blends for using as better alternative to diesel fuel(Article)(Open Access)

Karunanidhi, S., Deepa, A.M.M.A.J., Kasimani, R.

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[c]Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

Technology advancements are growing in an exponential rate. Automobile sector is getting developed day by day where modern innovations are viewed with different features for the human society. Inspite of having various renewable energy sources, the demand for the fossil fuels still exists for meeting out the requirements of the growing application sides. In the present work, different blends of Curcuma longa waste neat oil samples have been prepared and mixed with diesel at different volume fractions. Nano metal oxide particles such as cerium oxide and Nano Egg Shell Powder (NESP) have been added with the prepared fuel samples in order to achieve better evaporation, atomization, better air-fuel mixing, considerable reduction in ignition delay and best flame sustainability nature. The prepared waste oil samples have been tested under four different loading conditions such as 30, 60, 90 and 120 N. The performance characteristics such as Brake Thermal Efficiency (BTE), Brake Specific Fuel Consumption (BSFC), Exhaust Gas Temperature (EGT), % of carbon monoxide emission, % of carbon dioxide emission, % of hydrocarbon emission and % of NOX emission have been measured for the tested blends. From the results, the optimal sample which exhibits improved desirable characteristics has been suggested. Grey Relational Analysis (GRA) has also been used as a multi objective optimization tool in order to find out the best composition of the Curcuma longa waste oil a diesel blend in order to achieve better desirable properties. ANOVA technique has been used to identify the most influencing input factor in achieving better characteristics for the oil blends.

Document details - Modeling and Tuning of PID Controller for Continuous Stirred Tank Reactor

Lecture Notes in Electrical Engineering

Volume 758, 2022, Pages 817-823

1st International Conference on Artificial Intelligence for Smart Community, AISC 2020; Virtual, Online; ; 17 December 2020 through 18 December 2020; Code 286319

Modeling and Tuning of PID Controller for Continuous Stirred Tank Reactor(Conference Paper)

Suguna, A., Deepa, S.N., Rajasingam, N.

[a]Government College of Technology, Coimbatore, India
[b]Anna University Regional Campus, Coimbatore, India
[c]Dr. N. G. P. Institute of Technology, Coimbatore, India

Abstract

Continuous Stirred tank reactor is a chemical reactor system which exhibits complex non-linear dynamic characteristics. The quality of final product is based on the design of the controller. The mathematical modeling of CSTR is designed based on first principle method. Conventional PID controllers Ziegler-Nichols, Tyreus-Luyben, Cohen-Coon and IMC based PID have been implemented and the performance analysis of different PID tuning methods is done. The performance of the PID controller is analyzed in MATLAB simulation. © 2022, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author keywords

CSTR PID controller Tuning

Indexed keywords

Document details - Finite Element Analysis and simulation of missile impact on Nuclear Reactor Containment Structure

Electronic Journal of Structural Engineering

Volume 22, Issue 2, 2022, Pages 27-32

Finite Element Analysis and simulation of missile impact on Nuclear Reactor Containment Structure(Article)(Open Access)

Khan, K.A., Rama, M.

Government College of Technology Coimbatore, Tamil Nadu, India

Abstract

Nuclear Powerplants are planned and designed to withstand high internal, external pressures and impact loads. International Atomic Energy Agency recommends Design Extension Condition (Impact of Missile or Aircraft) that is a mandatory condition to be fulfilled by Containment structure. In this Finite Ele-ment Analytical study, wall joint section of containment structure is modelled and analysed for Missile body impact, and it is observed that, the surface induced pressure in wall section is dynamic in nature, as it varies with respect to time and load. By obtained 3D simulation and contour pattern on PCC panel, it is found that the Induced stress is bending pressure. © 2022 Department of Civil and Environmental Engineering. All rights reserved.

Indexed keywords

Engineering controlled terms: Finite element method Nuclear reactors

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Communications in Computer and Information Science

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5th International Conference on Computational Intelligence, Cyber Security and Computational Models, ICC3 2021; Virtual, Online; ; 16 December 2021 through 18 December 2021; Code 284589

Up-Link/Down-Link Availability Calculation in Cloud Using Ford Fulkerson Algorithm(Conference Paper)

Devi, R., Gopalakrishnan, V.

Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract

In recent days Cloud plays a vital role in Information technology. Many customers and organization are moving towards the cloud computing environment for effective utilization of the resources. Availability of Internet is the main need for accessing the cloud. Once the customer registered for a cloud service, they can access the service from anywhere and at any time using the Internet. Normally, shortest distance between the user interface and the information server in the Internet is identified using RIP (Routing Information Protocol) or OSPF (Open Shortest Path First Protocol). Ford Fulkerson algorithm is applied to shortest path graph to identify the uplink/downlink bandwidth. Hence this algorithm helps to identify the current availability percentage of cloud services. This algorith m is efficient when compared to the existing measurement methodologies like Trouble Ticketing, Device reach-ability and SNMP (Simple Network Maintenance Protocol). © 2022, The Author(s), under exclusive license to Springer Nature Switzerland AG.

Author keywords

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Materials Today: Proceedings

Volume 56, January 2022, Pages 1495-1500

Importance of radon assessment in indoor Environment-a review(Article)

Gopalakrishnan, P., Jeyanthi, J.

[a]Department of Civil Engineering, Sri Krishna College of Engineering and Technology, Coimbatore, India
[b]Department of Civil Engineering, Government College of Technology, Coimbatore, India

Abstract

Radon is odourless, colourless indoor air pollutant from the radiation source of uranium. The source of radon in indoor are walls, floor and ceiling. Importance of radon detection at buildings are rare as it cannot be suspected until faced with an health issues. Concentration of radon in indoor environment depends on various factors. Lund disorders are the most commonly reported issue with radon exposure. This paper concentrates on the sources, factors influencing the radon dispersion and the health issues rise up with high radon exposure. © 2022

Author keywords

Infertility | Lung disorders | Radon | Radon daughters

Indexed keywords

Engineering controlled terms: Indoor air pollution

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Volume 52, Issue 3, 2022, Pages 311-317

PREDICTION OF COMPRESSIVE STRENGTH OF SINTERED FLY ASH AGGREGATE CONCRETE USING ARTIFICIAL NEURAL NETWORKING(Article)

Babu, B.R., Thenmozhi, R.

[a]PSNA College of Engineering &Technology, Tamil Nadu, Dindigul, India
[b]Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract

In this study, a high strength-lightweight concrete of 50 MPa compressive strength was developed using an artificial neural network through MatLab programming. For the structural application of lighweight concrete, density and strength are more crucial. According to IS 456-2000, the concrete used for structural elements such as beams, columns, and slabs must have a minimum compressive strength of 20 MPa. Historically, additional materials like silica fume and fly ash were utilized to partially substitute cement. Nowadays, fly ash is processed systematically into pelletized aggregates and heated to temperatures up to 1500 degrees Celsius and is used as aggregates in lightweight concrete adding to sustainability. A high-strength lightweight concrete was modeled using neural networks, and its compressive strength was validated using laboratory measurements. A total of 57 data sets were used to construct this mix, which was based on earlier research. © 2022, Fundatia Serban Solacolu. All rights reserved.

Author keywords

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Journal of the Serbian Chemical Society

Volume 87, Issue 9, 2022, Pages 997-1010

Statistical optimization of lipase production from oil mill effluent by Acinetobacter sp. KSPE71(Article)(Open Access)

[СТАТИСТИЧКА ОПТИМИЗАЦИЈА ПРОИЗВОДЊЕ ЛИПАЗЕ ИЗ ОТПАДА УЉАРЕ ПРИМЕНОМ Acinetobacter SP. KSPE71]

Kumaraswamy, S., Singaram, J.

[a]Department of Industrial Biotechnology, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[b]Department of Civil Engineering, Government College of Engineering, Tamil Nadu, Bodinayakannur, 625582, India

Abstract

The present study investigated the valorisation of oil-rich residues of coconut oil mill effluent (COME) as a potential growth medium for the microbial production of extracellular lipase. The bacterial species isolated from oil mill effluent, Acinetobacter sp. KSPE71 was tested for its efficiency to grow and produce lipase in undiluted COME and 0.2 % yeast extract and 0.2 % NH_4Cl supplemented COME. In this connection, the process parameters such as pH, temperature, agitation speed, and inoculum size were optimized to maximize the production using a central composite design in the Response surface methodology. At the optimized state of pH 7.5, 35 °C, 150 rpm with 0.6 % inoculum size, a maximum of 3.95 U mL^{-1} activity was obtained, four-fold higher than the basal condition. At this stage, 73 % of the lipid content was degraded. The present work results imply that the oil mill effluent can be used as a cheaper production medium for lipase and the new isolate Acinetobacter sp. KSPE71 as a potential lipase producer. The degradation of oil waste along with the production of the valuable product has multiple advantages of cost reduction of lipase and environmental concern. © 2022 Serbian Chemical Society. All rights reserved.

Author keywords

enzyme for fat hydrolysis industrial waste oil degradation recycle of lipid waste submerged fermentation waste valorisation

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3rd International Conference on Electronics and Sustainable Communication Systems, ICESC 2022 - Proceedings

2022, Pages 58-63

3rd International Conference on Electronics and Sustainable Communication Systems, ICESC 2022; Coimbatore; India; 17 August 2022 through 19 August 2022; Category numberCFP22V66-ART; Code 182897

Design and Development of Temperature Controlled Intelligent Portable Reefer Container for Delivery Optimisation in Logistics and Supply Chain Management(Conference Paper)

Rithic, C.H., Srinivasan, N., Anbu, S.

Government College of Technology, Department of Electronics and Instrumentation, Coimbatore, India

Abstract

The statistics reflect the fact that a considerable quantity of perishable goods is wasted due to poorly designed supply chain management systems. This throws up the challenge in improvising or innovating a novel modus operandi in every stage of supply chain management. This article discusses a novel way of providing micro-management of goods by designing an intelligent temperature-controlled portable reefer container which can be transported effortlessly. The reefer container consists of a Peltier plate arrangement integrated with an automatic temperature control system (ATC) used to regulate the temperature precisely inside the container. The Global Positioning System (GPS) fitted on the container delivers precise location coordinates to the stakeholders in real-time. The multipurpose reefer container holds the feature of a seamless remote temperature setpoint change based on the type of perishable items loaded into the container. The supply chain management manager can remotely adjust the settings using Over The Air updates (OTA). The reefer container is equipped with an access control system to offer accurate delivery of products to the customer with the help of a quick response system with a credible user interface. © 2022 IEEE.

Author keywords

Embedded C | ESP32 microcontroller | Firebase | Heroku database | Over The Air (OTA) updates | Python | Temperature Control

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3rd International Conference on Electronics and Sustainable Communication Systems, ICESC 2022; Coimbatore; India; 17 August 2022 through 19 August 2022; Category numberCFP22V66-ART; Code 182897

Solar Aware Routing with Super Capacitors to Balance Energy in Unequal Clusters for WSN(Conference Paper)

Dilip Charaan, R.M., Therasa, P.R., Lavanya Joya, B.

[a]Anna University, A.C Tech, India
[b]Government College of Technology, Coimbatore, India

Abstract

WSN is one among the predominant innovations that uprises in the recent decades. LEACH protocol is utilized for routing in order to form the clusters in an efficient manner. In case if the network is split into unequal clusters, then the system may become unbalanced in packet delivery. Formation of small clusters collapses that particular cluster after few rounds due to lack of energy, making a part of the network completely drained out and blacked out. In order to balance the network, a novel protocol is proposed which makes the system more efficient by making an additional energy source available to the existing system. Replacing a battery by super capacitor increases the lifetime of the power source. This technique makes the nodes to operate in energy rich state for longer duration, thus increasing the performance of the network. In addition usage of Super Capacitors reduces the number of batteries used. These e-wastes obtained from the energy sources are a big threat to the Mother Nature, flora and fauna. This paper proposes a technique to overcome these issues by employing a Super Capacitor thus producing a load balanced energy rich resultant bunch of nodes. © 2022 IEEE.

Document details - Optimization of torsion and wear characteristics on reinforced steel wire rope

Mechanics Based Design of Structures and Machines

2022

Optimization of torsion and wear characteristics on reinforced steel wire rope

(Article in press)

Palanisamy, S.K., Krishnaswamy, M.

[a]Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India
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Abstract

This work develops the optimization of torsional, wear, and fatigue life behaviors based on the hybrid emperor penguin social ski-driver for reinforced steel wire. Using granite and rutile particles reinforcement, steel wires are strengthened. Normal steel wire rope and reinforced wire rope are prepared with 7 strands and 15 wires. Using hybrid emperor penguin optimization-based social ski driver Optimization (Hybrid EPSSD), the failure tests such as wear analysis, fatigue life, and torsional behavior are optimized. Besides, the performances of the experimented wire rope are predicted by using hybrid Elman recurrent Neural Network-based EPO (Hybrid ERNN-EPO). Using the Matlab 2018a platform, the optimization and prediction processes are performed. In this, reinforced wire ropes deliver enhanced performances for both experimented and optimization behaviors. From the results, the reinforced wire rope has the best performance which possesses less wear rate, more fatigue life, and torsion behavior are obtained. The experimental outcome of wear depth for reinforced wire rope is 0.18 mm and the optimized wear depth outcome from the Hybrid EPSSD approach is 0.16 mm. For reinforced wire rope, the optimized fatigue life is 4.50×10^{4} times at 500 KN and the maximum fatigue life experimentally is 4.20×10^{4} times. At a particular hoisting time, the optimization value for the location of maximum torsion angle is 243 to 18 mm is obtained and the experimental values are 240 to 15 m. The reinforced wire rope has a better performance compared to the steel wire rope.

Document details - Enhanced Biodegradation of Battery-Contaminated Soil Using Bacillus sp. (MZ959824) and Its Phytotoxicity Study

Advances in Materials Science and Engineering

Volume 2022, 2022, Article number 5697465

Enhanced Biodegradation of Battery-Contaminated Soil Using Bacillus sp. (MZ959824) and Its Phytotoxicity Study(Article)(Open Access)

Raag Harshavardhan, P., Subbaiyan, A., Vasavi, U., Thirumoorthy, P., Periyasamy, M., Jesteena Johney, J., Ragunathan, R., Pichaipillai, S., Velusamy, S., Balamoorthy, D.

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View additional affiliations

Abstract

Batteries that have been used and thrown away are potential threats to the environment. The aim of the present study is to explore the bacterial bioremediation of the battery-contaminated soil. The battery contaminated soil sample was collected from the municipal compost yard, Vellalore, Coimbatore, Tamil Nadu, India. The Bacillus sp was isolated by the serial dilution method. The Bacillus strain was identified based on the colony morphology as well as the 16s ribosomal ribonucleic acid partial gene sequence and was designated the name HVRCBNR. It was deposited in the GenBank under the accession number Bacillus sp MZ959824. The bacterial growth was evaluated by measuring the optical density of the media (OD600), while the degradation was determined by FTIR analysis. The phytotoxic analysis was performed using Trigonella foenum-graecum to assess the toxicity of the battery waste before and after bacterial treatment. The spectroscopic study showed that the strain HVRCBNR achieved 83.6% degradation. The growth indexes of Trigonella foenum-graecum showed that the biodegraded soil was nonphytotoxic in comparison with the control. This study supports the degradability of the strain HVRCBNR, and this could pave a way for sustainable solution to battery contaminated soil treatment.

scopus.com/record/display.uri?eid=2-s2.0-85137716444&doi=10.4316%2fAECE.2022.03008&origin=inward&txGid=553572c64bf348e24048b9f0cf2db501

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Document details - Power Optimization in Hybrid Renewable Energy Standalone System using SMC-ANFIS

1 of 1

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Advances in Electrical and Computer Engineering

Volume 22, Issue 3, 2022, Pages 69-78

Power Optimization in Hybrid Renewable Energy Standalone System using SMC-ANFIS(Article)(Open Access)

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[b]Department of Electrical and Electronics Engineering, Government College of Technology, Tamilnadu, Coimbatore, 641013, India

Abstract

The integration of renewable energy sources is challenging now-a-days because of intermittent nature of solar radiation. Particularly in hybrid renewable energy system, it is required to incorporate an intelligent control algorithm to optimize the time duration at transient condition and also ensures the stable operation. This paper is aimed at integrating hybrid renewable energy system includes partial shaded solar photovoltaic system and Proton Exchange Membrane Fuel Cell (PEMFC) at constant temperature to supply the stand-alone DC load. Due to the dynamic DC source, an Energy Management System (EMS) is used to get the stable output. The system includes Interleaving soft switching boost converters (SSBC's) is controlled by combined Slide Mode Controller with trained Artificial Neuro Fuzzy System (SMCANFIS). The proposed Hybrid system is modeled and simulated using MATLAB Simulink platform. The tested parameters are obtained in terms of voltage, current, power, speed, and torque. The simulated result of proposed system with SMC-ANFIS-EMS is compared with conventional SMCEMS and SMC-ANN-EMS to obtain optimal output. From the performance analysis, the SMC-ANFIS-EMS provides better output and control © 2022 AECE

Author keywords

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Document details - Behaviour of sintered fly ash aggregates and steel fibers on rein-forced concrete slabs subjected to punching

1 of 1

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Revista de la Construccion

Volume 21, Issue 2, 2022, Pages 228-247

Behaviour of sintered fly ash aggregates and steel fibers on rein-forced concrete slabs subjected to punching(Article)(Open Access)

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Abstract

In this study the optimum replacement percentage of sintered fly ash aggregates in M30 grade of concrete was identified based on 28 days cubical compressive strength value. The optimum replacement of Sintered Fly ash Aggregates (SFA) is 40 %. Before identifying the optimum replacement percentage, the SFAs were tested for suitability test such as crushing strength test, impact test and water absorption test. Further, the optimum 40 % SFAs in concrete is tested for punching shear on the Reinforced Concrete (RC) slabs for a dimension of 1000 mm x 1000 mm x 100 mm. In addition to know the effect of steel fibers in RC slabs subjected to punching. A hook ended steel fibers having an aspect ratio of 55, 80 and 100 is selected and varied by volume of concrete for the punching shear values on RC slabs. The RC slabs concrete contains aspect ratio of steel fibers 55 is varied for 0.25 %, 0.5 %, 0.75 % and 1 % for volume of concrete. In addition to that a constant volume of steel fiber 0.5 % is selected for the aspect ratios of 80 and 100 for the punching shear tests. The punching shear values for the RC slabs shows that partial replacement of SFAs and steel fibors in concrete enhances the punching shear strength. These experimental tested results are compared with finite element programming (ABAQUS) and international codes such as IS 456 and ACI 2011. The experimental punching shear results were higher when compared to international codes.

ENG 10:42 PM 28-12-2023

Document details - Restoration of Contaminated Agricultural Soils

Biochar and its Application in Bioremediation

1 January 2022, Pages 381-401

Restoration of Contaminated Agricultural Soils (Book Chapter)

Karthik, V., Periyasamy, S., Beula Isabel, J., Tamesgen, T.

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Abstract

Industrialization, urbanization, and mining activities are the primary sources of soil contamination. Human-made and rare natural activities are disseminating potentially toxic elements and organic pollutants in the environment. Restoration of ecology also blends several related disciplines, including hydrology, geomorphology, and oceanography. The primary role of the restoration of ecology is to conserve or improve the soil ecosystem services and implement efficient environment-friendly techniques for the characterization of pollutants, risk assessment in problematic zones, and reclamation of polluted agricultural sites. Physical and chemical methods are widely in practice to restore the contaminated agricultural soil efficiently. There are also eco-friendly better techniques that comprehend the mobilization and immobilization of enzymes/microbes to reawaken the polluted soil. Restoration of agricultural soil is an important concept needed in the present and future to make the upcoming generation healthier and make the ecosystem stable. © The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2021, corrected publication 2022.

Author keywords

Chapters in this book

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22 chapters found in Scopus

Document details - Mechanical characterization of polymer composite reinforced with Bio-fillers

Materials Today: Proceedings

Volume 69, January 2022, Pages 695-699

Mechanical characterization of polymer composite reinforced with Bio-fillers(Article)

SN CH Dattu, V., Lokesh, M., Kumar, A., Rajkumar, M., Aezhisai Vallavi, M.S., Sagai Francis Britto, A.

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View additional affiliations

Abstract

In order to attain environmental protection, organic composite materials are increasingly replacing plastics. The goal of this study was to create composites by using discarded tamarind seed powder (TP) as a bio-filler reinforcement material into an epoxy-based polymer matrix. The epoxy-based polymer composites were fabricated by altering the filler proportions from 10 to 20% by the weight of epoxy matrix. A computerized universal testing machine (CUTM) had been used to assess the impact of reinforced TP content on the mechanical characteristics (tensile, flexural and impact strength) of the polymer composites. The mechanical characteristics of the polymer composite was considerably climbed-up as the bio-filler content increased from 10% to 40% and unexpectedly dropped at the weight fraction of 50% TP in composite, according to the experiments. The extreme tensile, flexural and impact strength of the TP bio-filler reinforced polymer composite was reported at the weight fraction of 40% TP in epoxy, and the attained values were 15 MPa, 20 MPa and 25 MPa, respectively. © 2022

Author keywords

Document details - Experimental and examination of Recron 3S fibre on reinforced concrete

Materials Today: Proceedings

Volume 69, January 2022, Pages 645-649

Experimental and examination of Recron 3S fibre on reinforced concrete(Article)

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Abstract

Concrete is a key element which solidifies and hardens after mixing the water with cement, fine aggregate and coarse aggregate due to the process of chemical reaction called hydration. The new habit forming of Recron 3S (polypropylene) fibre is a state of art reinforcing material in many appliances; especially it was found to be adequate in concrete. Our exploratory and examination consists of M40 grade design concrete mix. We provide a constant water cement ratio as 0.4 while adding the fibre in certain proportions. We carried out the test of slump cone, compaction factor, compressive strength, split tensile strength and flexural strength test. We take the strength test at the period of 7, 14 and 28 days. Inclusion of Recron 3S FIBRE in concrete were analysed and compared with conventional concrete. © 2023

Author keywords

Compacting Factor; Compressive Strength; Fibre Reinforced Concrete; Flexural Strength; Recron 3S Fibre; Slump; Split Tensile Strength

Indexed keywords

Document details - Optimization of process parameters for mechanical properties of Al- Al₂O₃- graphite hybrid composite fabricated using stir casting process

Materials Today: Proceedings

Volume 65, January 2022, Pages 3937-3945

Optimization of process parameters for mechanical properties of Al- Al_2O_3- graphite hybrid composite fabricated using stir casting process(Article)

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[c]Department of Mechanical Engineering, Indian Institute of Technology, Palakkad, India

Abstract

Due to their high strength-to-weight ratio and other mechanical qualities, composite materials are widely employed in the automotive, aerospace, and defence industries. While Al 5052 alloy has good corrosion resistance, its hardness restricts its applicability. At melting temperatures of 700 °C, 750 °C, and 800 °C, and reinforcement pre-heat temperatures of 250 °C, 300 °C, and 350 °C, samples were made using Al 5052 reinforced with Aluminium oxide Al_2O_3 (2%, 4%, and 6% by volume) and graphite (0.5 %). The Taguchi L9 orthogonal design of experiments was used to perform the studies. The distribution of reinforcement and the microstructure of composites were investigated using an inverted microscope. Microhardness and wear tests were done, respectively, utilizing microhardness testing equipment and pin-on-disc apparatus. Tensile testing equipment was used to determine the tensile strength of the composite materials. The results indicate that Al_2O_3 MMC having 0.5% graphite, and 6% Al_2O_3 fabricated at 750 °C with reinforcement preheated at 300 °C shows a hardness, wear resistance and tensile strength of 87 Hv, 220.9 MPa and 81 μm respectively, whilst the presence of graphite increases the material's wear resistance. © 2022

Document details - High content cellulosic Abelmoschus esculentus fibre and tamarind kernel powder–reinforced epoxy composite

Biomass Conversion and Biorefinery
2022

High content cellulosic Abelmoschus esculentus fibre and tamarind kernel powder–reinforced epoxy composite

(Article in press ?)

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[a]Department of Mechanical Engineering, Government College of Technology, Tamilnadu, India
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View additional affiliations

Abstract

This research investigates the mechanical, thermal stability, and water absorption behaviour of silane-treated high content cellulose Abelmoschus esculentus (okra fibre) and macromolecule tamarind kernel powder (MTP)–toughened epoxy composites. The primary objective of this study was to examine the effects of adding surface-modified high content cellulose okra fibre (CCO) and the contribution of tamarind kernel macromolecule powder to various properties of epoxy resin composite. The fibre and particle were surface-treated by an amino silane (3-Aminopropyl)trimethoxysilane (APTMS). The composites were fabricated by the hand lay-up process and post cured at 120 °C. The outcomes of the load impact tests indicated that the combination of surface-treated okra fibre and tamarind kernel powder increased the resistance to damage. Similarly, the tensile, flexural, and thermal tests reported improvements in load-bearing and high thermal stability. The hardness test and SEM images revealed enhanced adhesion and distribution of kernel particles in the resin, resulting in a maximum attainable hardness of 93 shore-D. Moreover, the contact angle of the silane-treated composites was higher, indicating a retained hydrophobicity. Such mechanical, thermal, and impact toughness, as well as hardness improved composites with higher hydrophobic nature, would be highly preferable for structural and industrial applications like automobile body parts, armour guards in defence, sports goods, and domestic appliances manufacturing.

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Divakaran, D., Suyambulingam, I., Sanjay, M.R.
Isolation and characterization of microcrystalline cellulose from an agro-waste tamarind (Tamarindus indica) seeds and its suitability investigation for biofilm formulation
(2024) International Journal of Biological Macromolecules

Senthamaraikannan, P., Saravanakumar, S.S.
Effect of Cocos nucifera shell powder on mechanical and thermal properties of Mucuna atropurpurea stem fibre-reinforced polyester composites
(2023) Biomass Conversion and Biorefinery

J, N.
Revalorisation of tamarind seed waste for improved PLA wear and hydrophilic behaviour in 3D printing applications
(2023) Biomass Conversion and Biorefinery

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Document details - Gorilla Troops Optimizer Combined with ANFIS for Wire Cut EDM of Aluminum Alloy

Advances in Materials Science and Engineering
Volume 2022, 2022, Article number 3072663

Gorilla Troops Optimizer Combined with ANFIS for Wire Cut EDM of Aluminum Alloy(Article) (Open Access)

Natarajan, E., Kaviarasan, V., Lim, W.H., Ramesh, S., Palanikumar, K., Sekar, T., Mok, V.H.
[a]Faculty of Engineering, Technology and Built Environment, UCSI University, Kuala Lumpur, Malaysia
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[c]Department of Mechanical Engineering, Jerusalem College of Engineering, Chennai, India
View additional affiliations

Abstract

Wire cut EDM is a quite regularly used machining process in mechanical and electronic industries. This research has attempted to machine aluminum alloy for which experimental design was prepared using Box-Behnken design. Different combinational options of pulse-on time (P1), pulse-off time (P2), servo wire feed (WF), and current (I) were investigated and surface roughness after machining was observed. Collected 27 datasets were further used in Adaptive Neuro Fuzzy Inference System (ANFIS) to produce about 500 datasets. These 500 datasets are approximated data derived from experimental datasets, known as synthetic data. Data model was further developed and used in Gorilla Troops Optimizer (GTO) to locate the optimum machining parameters. With the excellent three search operators: move towards other gorillas, migrate towards unknown places, and migrate towards known places, GTO has produced the lowest surface roughness value of 0.500953 μm when the machining parameters of pulse-on time, pulse-off time, wire feed, and current values were set as 121 μs, 52 μs, 3 m/min, and 166A, respectively. To ensure the accuracy of the synthetic data-based model and optimality, verification and validation were conducted. Wilcoxon signed rank test was conducted for the pairwise comparison of GTO with each of its competing algorithms at the significance level of $\alpha = 0.05$. Friedman test was conducted to calculate the average ranking of each algorithm and to detect the global differences between all compared algorithms. Outperforming performance by GTO algorithm in machining of the selected material is found.

Cited by 3 documents

Appadurai, S., Ganesan, S.K., Rangasamy, V.
OPTIMIZATION AND EFFECT OF DIELECTRIC FLUID WITH Zr AND NI ON ELECTRICAL DISCHARGE MACHINING OF DIE STEEL MATERIAL | OPTIMIZACIJA I EFEKAT DIELEKTRIČNE TEČNOSTI SA Zr I NI NA MAŠINSKU OBRADU ČELIČNOG MATERIJALA ELEKTRIČNIM PRAŽNJENJEM
(2023) Chemical Industry and Chemical Engineering Quarterly

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Adaptive Neuro-Fuzzy Inference System for Prediction of Surface Roughness Under Biodegradable Nano-lubricant
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Achite, M., Farzin, S., Elshaboury, N.
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Document details - DSTATCOM BASED ADDITIVE AND SUBTRACTIVE TOPOLOGY MULTILEVEL INVERTER FOR IMPROVING POWER QUALITY

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International Journal on Technical and Physical Problems of Engineering

Volume 14, Issue 2, 2022, Pages 36-45

DSTATCOM BASED ADDITIVE AND SUBTRACTIVE TOPOLOGY MULTILEVEL INVERTER FOR IMPROVING POWER QUALITY(Article)

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[a]Nehru College of Engineering and Research Centre, Kerala, Thrissur, India
[b]Department of Electrical and Electronics Engineering, Periyar Maniammai Institute of Science and Technology, Thanjavur, India
[c]Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India

Abstract

This research proposes a DSTATCOM-based innovative multilevel inverter that uses additive and subtractive topologies to achieve larger output levels. In comparison to previous topologies, this strategy the active switches are dramatically decreased. The current multilevel inverter can only generate five voltage levels. The multilevel inverter can be converted to a nine-level inverter using the proposed architecture. Furthermore, the new multilevel inverter can employ a modified hybrid multicarrier Pulse Width Modulation (PWM) approach to provide continuous switch utilization and lower THD. An appropriate modulation technique is proposed, and the proposed concept is tested with simulation studies and a hardware model. The results show that the proposed DSTATCOM based multilevel inverter has successfully improved the power quality.

Author keywords

Additive and Subtractive Topologies | DSTATCOM | Multicarrier PWM Scheme | PWM Scheme | THD Reduction

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Document details - I-optimal mixture design and artificial neural network for the sustainable production of vermicompost

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Biomass Conversion and Biorefinery

2022

I-optimal mixture design and artificial neural network for the sustainable production of vermicompost

(Article in press ?)

Muthuveni, M., Deebika, S., Boopathy, T., Nithya, R., Thirunavukkarasu, A.

Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India

Abstract

In the present study, fortified cow dung substrates in different proportions were employed to convert them into stable and mature vermicompost using the earthworm, Eisenia fetida. With the use of the I-optimal matrix of the mixture design, 94.46% of cow dung fortified with 5.54% of Calotropis gigantea was found to be optimal. The vermicompost derived from this optimal substrate mixture showed a carbon–nitrogen ratio (C/N) of 13.76, carbon dioxide evolution (CO_2) of 0.49% with a high germination index (G.I) of 97.38%. Further, the process of composting was modeled with the use of the back propagation algorithm of artificial neural network (ANN) and the developed model was found to be statistically significant with a high correlation coefficient ($R > 0.99$) and minimum mean square error ($MSE < 0.5$). Graphical abstract: [Figure not available: see fulltext.]

Author keywords

Calotropis gigantean | Cow dung | Eisenia fetida | I-optimal mixture design | Vermicompost

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Jinl, D., Ganga, V.S., Greeshma, M.B.

Sustainable agricultural practices using potassium-solubilizing microorganisms (KSMs) in coastal regions: a critical review on the challenges and opportunities

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Thirunavukkarasu, A., Sivashankar, R., Nithya, R.

Sustainable organic waste management using vermicomposting: a critical review on the prevailing research gaps and opportunities

(2022) Environmental Science: Processes and Impacts

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Document details - Stimulus on strength and durability of granite powder in the waste-based masonry units with copper slag and crumb rubber as partial substitute of fine aggregate

International Journal of Masonry Research and Innovation

Volume 7, Issue 4, 2022, Pages 366-394

Stimulus on strength and durability of granite powder in the waste-based masonry units with copper slag and crumb rubber as partial substitute of fine aggregate(Article)

Praburanganathan, S., Chithra, S.

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[b] Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract

In this research, an extensive experiment was made to utilise industrial waste rejects for the production of bricks via a pressing technique in a factory-controlled environment. A total of 650 bricks were cast and each brick's recipe consists of a fixed percentage of primary raw materials akin to lime and gypsum. Along with granite powder as partly substituted for fly ash composed with copper slag and crumb rubber as a partial replacement with stone dust were used in different percentages. A range of mechanical, durability, morphology, FTIR and UPV studies are presented. The investigations reveal that the bricks of a prototype mix design using granite waste and copper slag using an optimum percentage of fly ash and lime-gypsum binder provide better strength and durability. The advantage of the proposed bricks is twofold: having utilised sustainable wastes make an eco-friendly product; the developed product can be used for load-bearing structural elements. Copyright © 2022 Inderscience Enterprises Ltd.

Author keywords

Document details - Experimental investigation on machining characteristics of EN24 alloy steel using desirability approach

Materials Today: Proceedings

Volume 65, January 2022, Pages 3581-3589

Experimental investigation on machining characteristics of EN24 alloy steel using desirability approach(Article)

Chinnachamy, M., Balakrishnan, R.

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[b] Government College of Technology, Coimbatore, Tamilnadu, India

Abstract

The metal cutting process has been signed an improved surface finishing of components to minimize the assembling difficulties. The machining was performed in EN24 alloy steel using carbide inserts. The Central Composite Design (CCD) of Response Surface Methodology (RSM) was followed to determine the number of cutting trials. Twenty cutting trials were carried out by varying cutting speed, feed rate and depth of cut. The experiment results were analyzed in Design Expert -11 software and the developed regression models verified the competence of each input variable on responses. This research identifies the optimized level of cutting parameters to obtain better results on the surface roughness (SR), cutting tool temperature (CTT) and metal remove rate (MRR). The multi responses were enhanced with aid of a single solution by using the desirability approach. Optimal cutting parameters were found at 1000 rpm, 0.1 mm and 0.75 mm speed, feed rate and depth of cut respectively. The input factor of speed reveals the most significant contribution on surface finish and cutting tool temperature, however, depth of cut implies a better contribution to metal removal rate. The validation trial results are agreed with the predicted values. © 2022

Author keywords

Document details - Improvement of Micro-Electrochemical Discharge Machining of Austenitic Stainless Steel 316L using NaOH electrolyte containing N₂

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International Journal of Electrochemical Science

Volume 17, 2022, Article number 220747

Improvement of Micro-Electrochemical Discharge Machining of Austenitic Stainless Steel 316L using NaOH electrolyte containing N_2(Article)(Open Access)

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[b]Department of Mechanical Engineering, Government College of Technology, Coimbatore, India

Abstract

Micro-Electrochemical discharge machining (µECDM) is a subjective choice in delicate micro machining operations, particularly in Micro-Electromechanical Systems (MEMS) industries for fabricating the microscale devices. Dielectric characteristic of electrolyte is a predominant parameter determining the performance of µECDM. Prevention of surface cracks, heat-affected zone, and surface irregularities on the machined specimen are research challenges that striving to find innovative experimental designs. This research adopts a new experimental setup where Nitrogen gas is introduced in the gap between the tool electrode and workpiece. The experiments were conducted using plain aqueous NaOH and Nitrogen gas assisted aqueous NaOH electrolytes in µECDM of Austenitic stainless steel 316L (SS 316L). Voltage, duty cycle, electrolyte concentration, and Nitrogen gas flow rate were varied to investigate the responses of the machining process namely Material removal rate (MRR) and Tool wear rate (TWR). The dielectric characteristic of the generated gas film has improved the current density across the gap and consequently enhanced the heat transformation from the spark through the discharge and hydrodynamic regimes to the workpiece effectively. Nitrogen gas assisted µECDM has produced MRR of 2.6 mg/min and TWR of 0.8 mg/min at 105V, 70 duty cycle, 15.708 wt% of NaOH electrolyte and 3 lit/min of Nitrogen gas flow. SEM and EDX results have evidenced the minimum surface irregularities which indicates the uniform metal removal on the machined components. The results of the confirmatory experiment reveal that there is about 10% of increase in MRR and 21% of decrease in TWR are achieved from Nitrogen gas assisted machining, compared to plain NaOH electrolyte machining.

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Process characteristics of electrochemical discharge machining and hybrid methods: a review
(2023) International Journal of Advanced Manufacturing Technology

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(2023) Micromachines

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Mechanical behavior of LM26/SiC/TiO2/Ni-Gr reinforced hybrid metal matrix composites - An experimental investigation
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International Journal of Electrical and Electronics Research

Volume 10, Issue 2, January - March 2022, Pages 93-99

Enhanced Visual Analytics Technique for Content-Based Medical Image Retrieval(Article)(Open Access)

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Abstract

Content-based image retrieval (CBIR) is a method for searching that finds related images in a medical database. Furthermore, a clinical adaptation of CBIR is hampered in part by a contextual gap that is the disparity among the person characterization of the picture and the framework characterization of the image. This technique makes it tough for the user to validate the fetched images that are similar to the query image in addition to that it only fetches the images of top-ranked and ignores the low-ranking ones. Visual Analytics for Medical Image Retrieval is a novel procedure for medicinal CBIR proposed in this research (VAMIR). By integrating human and machine analysis, Visual Analytics provides the potential to address the above-mentioned significant challenges. The texture properties are retrieved using the shape features extraction and Gray Level Co-occurrence Matrix (GLCM) is performed by contour-based shape descriptor. Using the Euclidean distance correlation metric, related medical pictures will be fetched by distinguishing the query image's attribute vector with the database images' respective attribute vectors. A vector of multiple features outperforms a vector of a single feature in terms of quality. The VAMIR implementation demonstrates that the search outcome for the user is acquired with 90% of recall and precision.

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A Diagnostic Study of Content-Based Image Retrieval Technique for Studying the CT Images of Lung Nodules and Prediction of Lung Cancer as a Biometric Tool
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Document details - Adsorption isotherm and kinetic studies for the decolorization of sunset yellow FCF dye using economically feasible low-cost adsorbent

Global Nest Journal
Volume 24, Issue 2, 2022, Pages 276-285

Adsorption isotherm and kinetic studies for the decolorization of sunset yellow FCF dye using economically feasible low-cost adsorbent(Article)(Open Access)

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Abstract

The present communication attempts to explore the adsorption potential of Mixed Fruit Peel Waste (MFPW) to remove Sunset Yellow FCF dye from an aqueous solution. The MFPW is a low-cost adsorbent prepared from the peels orange, watermelon and banana. The characterization of MFPW was made through FTIR, SEM and BET studies. The FTIR studies revealed the presence of functional groups such as nitro, carboxyl, ester, ether, phenol and alkyne that are solely responsible for adsorption. The surface morphology exposed the clear and well-developed pores of MFPW. Batch adsorption studies resulted in a maximum adsorption capacity (qmax) of 200 mg/g at optimum pH 3.0, contact time of 100 minutes, and adsorbent dose of 2.0 g/L with an initial dye concentration of 40 ppm. Sunset Yellow FCF dye removal was discovered to be spontaneous and endothermic in nature, with the Langmuir isotherm and pseudo-second-order-kinetics providing the best fit. In summary, mixed fruit peel waste adsorbent can be used as a low-cost, environmentally friendly and sustainable adsorbent to decolorize sunset yellow FCF dye. Copyright© 2022 Global NEST.

Document details - Eco-friendly filtration of Nickel from the sludge during electrochemical machining of Monel 400 alloys

Global Nest Journal
Volume 24, Issue 2, 2022, Pages 203-211

Eco-friendly filtration of Nickel from the sludge during electrochemical machining of Monel 400 alloys(Article)(Open Access)

Vengatajalapathi, N., Ayyappan, S., Rajasekar, V.
Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract

Electrochemical Machining played a vital role in the aircraft, atomic, and healthcare industries via electrochemical machining (ECM). Even with difficult-to-machine materials. ECM has generally preferred to machine Nickel-based alloys compared to other non-conventional and conventional machining tools. During machining with ECM, the Nickel-based alloys discharge toxic nickel hydroxides in sludge, which is very harmful to the environment. Therefore, in this work, investigations have been made to analyze the amount of nickel content discharges into the electrolyte and develop an eco-friendly filtering mechanism for nickel discharges to attain sustainable manufacturing. Bio-degradable coconut shell powder and wood dust powder were used in the filtration set up to filter the sludge. Thus, Eco-Friendly Electrochemical Machining (EECM) was developed and investigated the machining on Monel 400 alloys. Measurements including applied voltage (V), flow rate (U), and electrolyte concentration were commonly used to compare the amount of material removal rate (MRR) and the amount of nickel in the electrolyte before and after filtering. The contour plots were designed to show the impact of cycle boundaries on nickel particle releases and their collaboration. Researchers found that natural environmental debris, including coconut shell powder, wood dust powder, and bagasse, were excellent at filtering out nickel levels from the electrolyte. © 2022 Global NEST.

Document details - Multi response hybrid optimization of sustainable high-speed end milling on 89.7Ti-6Al-4V

Materials Today: Proceedings

Volume 65, January 2022, Pages 3170-3176

Multi response hybrid optimization of sustainable high-speed end milling on 89.7Ti-6Al-4V(Article)

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Abstract

This research investigates machining parameters involving the high-speed CNC end milling to improve the material removal rate, to reduce the surface roughness and cutting force. A large amount of cutting forces is generated while machining the high strength and high hardness materials. In order to reduce the cutting force generation during the machining of difficult to machine materials with large diameter cutting tools, improve the material removal rate and reduce the surface roughness, the present study has been framed. For these objectives, sixteen experimental combinations based on the design of the experiment (L16 Orthogonal array) constructed in Minitab were performed by varying the parameters. The multi-response optimization, Taguchi-based grey relation analysis, was used to perform the various responses based on suitable weightage. It shows optimal machining parameters such as spindle speed of 800 rpm, depth cut of 0.5 mm, and 0.4 mm/rev of feed rate for enhancing the quality, productivity, and machinability. The contribution of each parameter toward response variables was found by using an analysis of variance. © 2022

Author keywords

ANOVA | Grey relation analysis | High speed CNC end milling | Ti-6Al-4V

Document details - Design of a Multiloop Controller for a Nonlinear Process

International Journal of Advanced Computer Science and Applications

Volume 13, Issue 4, 2022, Pages 290-299

Design of a Multiloop Controller for a Nonlinear Process(Article)(Open Access)

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[b]Deputation from Annamalai University, Department of Electronics and Instrumentation Engineering, Faculty of Engineering & Technology, Annamalai Nagar, Chidambaram, Tamil Nadu, 608 002, India
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View additional affiliations

Abstract

Among the category of nonlinear processes, the Continuous Stirred Tank Reactor (CSTR) is one popular unit that finds application in various verticals of chemical process industries. The process variables within the CSTR are highly interactive; hence developing control strategies become a laborious task as it can be viewed as a Multi Input Multi Output (MIMO) system. Often the CSTR is assumed as a Single Input Single Output (SISO) system and during the development of control strategies or algorithm, the main objective is on maintaining only a single process variable closer to its set point, even though many measured variables form part of it. On the contrary, when compared to a SISO system, the MIMO control includes sustaining different controlled variables at their appropriate set points concurrently; thereby achieving an improved efficiency. The components' concentration and the temperature inside the CSTR are highly interactive in nature and exhibit reasonably high non-linear steady state behaviour. Both the interaction and non-linear behaviours pose challenges to the overall system stability. A stabilizing Proportional + Integral (PI) controller employing Stability Boundary Locus (SBL) concept is designed for a CSTR which eventually encapsulates both the stability and closed loop performance in its design procedure and analysed through simulation in MATLAB with the results presented. © 2022. All Rights Reserved.

Document details - Value-added waste substitution using slag and rubber aggregates in the sustainable and eco-friendly compressed brick production

Revista de la Construccion

Volume 21, Issue 1, 2022, Pages 5-20

Value-added waste substitution using slag and rubber aggregates in the sustainable and eco-friendly compressed brick production(Article)(Open Access)

Praburanganathan, S., Chithra, S., Divyah, N., Sudharsan, N., Reddy, Y.B.S., Vigneshwaran

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[b]Department of Civil Engineering, Government College of Technology, Coimbatore, India
[c]Department of Civil Engineering, Vidya Jyothi Institute of Technology, Hyderabad, India

Abstract

The current study aimed to analyze the viability of incorporating the post cryogenic discarded rubber and the air-cooled slag as an aggregate in partial replacement of stone dust in fly ash bricks production. A range of mechanical, non-destructive, and microstructural tests was performed on bricks thus produced by incorporating rubber and slag aggre-gates in various dosages (i.e., 5, 10, 15, 20 and 25% by stone dust weight). The result revealed that the compressive strength dropped from 71 to 43 % in the case of rubber aggregate replacement. Morphology study confirms that the rubber aggre-gates resulted in the porous microstructure of the bricks and thus leads to lesser unit weight and lighter structure. The rubber may be used as a lightweight aggregate in the brick possibly as it reduces the density of the final product. However, the use of rubber in bricks needs to be cautiously designed to get hold of productive solutions at the end. The findings demonstrate that the copper slag substitution of up to 15%, found to be enhanced the strength properties and it will be a better choice for low-cost construction as a promising alternative construction material.

Document details - Assessment of Sentiment Analysis Using Information Gain Based Feature Selection Approach

Computer Systems Science and Engineering

Volume 43, Issue 2, 2022, Pages 849-860

Assessment of Sentiment Analysis Using Information Gain Based Feature Selection Approach(Article)(Open Access)

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[b]Government College of Technology, Coimbatore, India

Abstract

Sentiment analysis is the process of determining the intention or emotion behind an article. The subjective information from the context is analyzed by the sentimental analysis of the people's opinion. The data that is analyzed quantifies the reactions or sentiments and reveals the information's contextual polarity. In social behavior, sentiment can be thought of as a latent variable. Measuring and comprehending this behavior could help us to better understand the social issues. Because sentiments are domain specific, sentimental analysis in a specific context is critical in any real-world scenario. Textual sentiment analysis is done in sentence, document level and feature levels. This work introduces a new Information Gain based Feature Selection (IGbFS) algorithm for selecting highly correlated features eliminating irrelevant and redundant ones. Extensive textual sentiment analysis on sentence, document and feature levels are performed by exploiting the proposed Information Gain based Feature Selection algorithm. The analysis is done based on the datasets from Cornell and Kaggle repositories. When compared to existing baseline classifiers, the suggested Information Gain based classifier resulted in an increased accuracy of 96% for document, 97.4% for sentence and 98.5% for feature levels respectively. Also, the proposed method is tested with IMDB, Yelp 2013 and Yelp 2014 datasets. Experimental results for these high dimensional datasets give increased accuracy of 95%, 96% and 98% for the proposed Information Gain based classifier for document, sentence and feature levels respectively compared to existing baseline classifiers.

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Document details - Binary mixture of lithium chloride and methyl orange dye on adipic acid crystallization from methanol solvent and their characterization studies

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Molecular Crystals and Liquid Crystals

Volume 744, Issue 1, 2022, Pages 109-123

Binary mixture of lithium chloride and methyl orange dye on adipic acid crystallization from methanol solvent and their characterization studies(Article)

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[b]Department of Physics, Sri Krishna College of Technology, Coimbatore, India

Abstract

The binary mixture of lithium chloride and methyl orange dye in crystallizing the adipic acid in methanol solvent has been examined for the first attempt. The red colored superior quality single crystals were grown by slow solvent evaporation route at ambient temperature. SXRD, PXRD, EDAX-SEM, FTIR, UV-Vis-NIR, TG-DTA, NLO characterization and anti bacterial studies were performed on the grown crystals. The SHG efficiency value was lowered due to binary dopant. The grown doped ADLM crystals proved to be better antibacterial activity against E. coli and S. aureus can be devoted for pharamaceutical applications to employ an effective antibiotic drug.

Author keywords

Adipic acid | crystal growth | crystal structure | FTIR | powder XRD | recrystallization

Indexed keywords

Engineering controlled: Azo dyes | Binary mixtures | Citrus fruits | Crystal growth | Escherichia coli | Harmonic generation

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Document details - Kalman Filter and H_∞Filter Based Linear Quadratic Regulator for Furuta Pendulum

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Computer Systems Science and Engineering

Volume 43, Issue 2, 2022, Pages 605-623

Kalman Filter and H_∞Filter Based Linear Quadratic Regulator for Furuta Pendulum(Article) (Open Access)

Arulmozhi, N., Albert Victoire, T.A.

[a]Department of Electronics and Instrumentation Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India
[b]Department of Electrical and Electronics Engineering, Anna University, Regional Campus, Tamil Nadu, Coimbatore, India

Abstract

This paper deals with Furuta Pendulum (FP) or Rotary Inverted Pendulum (RIP), which is an under-actuated non-minimum unstable non-linear process. The process considered along with uncertainties which are unmodelled and analyses the performance of Linear Quadratic Regulator (LQR) with Kalman filter and H_∞filter as two filter configurations. The LQR is a technique for developing practical feedback, in addition the desired x shows the vector of desirable states and is used as the external input to the closed-loop system. The effectiveness of the two filters in FP or RIP are measured and contrasted with rise time, peak time, settling time and maximum peak overshoot for time domain performance. The filters are also tested with gain margin, phase margin, disk stability margins for frequency domain performance and worst case stability margins for performance due to uncertainties. The H-infinity filter reduces the estimate error to a minimum, making it resilient in the worst case than the standard Kalman filter. Further, when the β restriction value lowers, the H_∞Filter becomes more robust. The worst case gain performance is also focused for the two filter configurations and tested where H_∞filter is found to outperform towards robust stability and performance. Also the switchover between the two filters is dependent upon a user-specified co-efficient that gives the flexibility in the design of non-linear systems. The non-linear process is tested for set point tracking, disturbance rejection, un-modelled noise dynamics and uncertainties, which records robust performance towards stability.

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Document details - Utilization of PCM in inclined and single basin solar stills to improve the daily productivity

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Materials Today: Proceedings

Volume 62, January 2022, Pages 967-972

Utilization of PCM in inclined and single basin solar stills to improve the daily productivity(Article)

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View additional affiliations

Abstract

In this work, the inclined and conventional solar still is combined to enhance the overall daily distillation yield. Further the paraffin wax is used in both stills for latent heat thermal energy storage. The PCM stores the thermal energy in sunshine hours and release the heat on demand. The latent heat thermal energy storage gives the solar still distillate productivity yield on night hours. The external attachments such as flat, stepped and fin shaped absorbers are integrated with the solar still for distillation enhancement. The experimentation is done in the outdoor setup and the daily productivity was measured. Based on this study, fin shaped absorber was found to be more productive, and it was coupled with PCM to give a maximum distillate output of 5.62 L/day. It was found that the inclined still with fin formed absorber was extra productive with, 71.5% enhancement, when it is combined with basin still and 87.96% productivity enhancement, when it is coupled with PCM and basin still. © 2022

Author keywords

Daily yield | Paraffin wax | Phase change material | Solar still with inclined cover | Still with fin

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Document details - Automatic Load Frequency Control for Interconnected Micro-Grid System

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Proceedings of the International Conference on Electronics and Renewable Systems, ICEARS 2022

2022, Pages 222-227

2022 International Conference on Electronics and Renewable Systems, ICEARS 2022; St. Mother Theresa Engineering CollegeTuticorin; India; 16 March 2022 through 18 March 2022; Category numberCFP22AV8-ART; Code 178760

Automatic Load Frequency Control for Interconnected Micro-Grid System(Conference Paper)

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[b]Nanyang Technological University, School of Electrical and Electronics Engineering, Singapore, Singapore

Abstract

In this paper, automatic load frequency controllers (ALFC) are considered for an interconnected micro-grid system to enhance the transient performance of frequency deviation. The widespread use of renewable energy in an interconnected micro-grid would cause frequency instability. Frequency stability is a significant concern for the operation of interconnected micro-grids. The modeling of interconnected micro-grids comprising of a wind power generation, a diesel engine generator and Energy Storage system. A conventional Proportional Integral Derivative (PID) controller tuned by Ziegler-Nichols method (ZN) is designed for the sample interconnected micro-grid system for improving the frequency stability. The efficacy of ALFC for interconnected micro-grids is demonstrated using MATLAB/Simulink under abrupt change in load demand and uncertainties in system parameters. The results obtained through simulation are validated in HIL simulation environment using Real Time Simulator. © 2022 IEEE.

Author keywords

ALFC | Frequency instability | Interconnected microgrid system | Ziegler-Nichols method (ZN) - PID controller

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Document details - Biodiesel production from non-edible crops using waste tyre heterogeneous acid catalyst

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Energy Sources, Part A: Recovery, Utilization and Environmental Effects

Volume 44, Issue 2, 2022, Pages 3223-3238

Biodiesel production from non-edible crops using waste tyre heterogeneous acid catalyst(Article)

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[b]Department of Mechanical Engineering, Government College of Technology, Coimbatore, India
[c]Department of Chemical Engineering, Kongu Engineering College, Erode, India

Abstract

The present study aims at the ways and means of decreasing environmental pollution using spent tyre waste as an acid-based catalyst intended for the synthesis of biodiesel from Pongamia pinnata, a year-round crop that costs roughly 1300 \$/tonne, whereas coal costs around 50 \$/tonne. Heterogeneous catalysts were developed as a successful replacement for homogeneous catalysts because they have unique benefits over homogeneous catalysts, especially the ability to separate and reuse the solid catalyst used. The characteristics of the produced waste tyre acid-catalyst were studied using instrumental analysis such as EDX, scanning electron microscope and Fourier-transform infrared spectroscopy. Operating parameters studied for the catalyst were methanol-to-oil molar ratio (12:1 to 24:1), catalyst loading (1–5 weight %), reaction temperature (30–70°C), and reaction duration (1–4 h) were tuned upon the steady stirring rate of 400 rpm. At optimal conditions, the spent tyre waste activated by pyrolysis gives maximum conversion of biodiesel (82.1%). The pseudo-first-order model with a rate constant of 0.0269 min^{-1} (at 60°C) and activation energy of 21.53 kJ/mol was found to be the best match for demonstrating the methanolysis kinetics of Pongamia pinnata oil. When compared to other solid base catalysts reported in the literature, the catalytic activity of the waste tyre acid-catalyst provided a high yield of biodiesel under relatively mild reaction conditions. © 2022 Taylor & Francis Group, LLC.

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Document details - Extraction and characterization of pectin derived from underutilized papaya seeds as a value-added product

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Journal of Applied and Natural Science

Volume 14, Issue 1, 2022, Pages 127-132

Extraction and characterization of pectin derived from underutilized papaya seeds as a value-added product(Article)(Open Access)

Madhuvanthi, S., Selvapriya, K., Nirmala, R.A., Agalya, A., Jeya, N.

Department of Industrial Biotechnology, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract

Food processing industries generate a massive amount of biowastes, which causes major environmental issues. High-level marketable bioproducts can be extracted from these biowastes as value-added products. One such value-added product is pectin. Papaya fruit is one of the tropical fruits that is utilized the most to produce a greater number of processed foods in the food processing industries. Papaya seeds are one of the underutilized parts of papaya and have potential commercial value-added products. The present study aims to extract pectin from papaya seed waste using the hot water extraction technique. Furthermore, one factor at a time (OFAT) was used to find the optimum process conditions for the high extraction of pectin. The parameters considered were liquid–solid ratio (5-50 ml/g), sample weight (5-25 g), extraction time (15-90 min), temperature (50-100°C) and pH (1-3). A high yield of pectin (8.655%) was obtained at a liquid–solid ratio of 25 ml/g, sample weight of 20 g, extraction time of 60 min at 80°C, pH of 1.5 and precipitation with ethanol. Proximate analysis was performed for the papaya seeds that had moisture (82.10%), ash (1.76%), protein (1.52%), fat (1.42%) and carbohydrate (13.20%), and the pectin extracted from papaya seeds were found to have moisture (7.8%), ash (7.6%), protein (2.2%), fat (2.1%) and carbohydrate (80.3%). Pectin was characterized with gas chromatography for its methoxy content, which was found to be 9.216%. The current investigation found that pectin obtained from papaya seeds had low methoxy pectin, which has commercial applications in the jam and jelly industries. © 2022, Applied and Natural Science Foundation. All rights reserved.

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Document details - REMOVAL OF Ni(II) IONS FROM AQUEOUS SOLUTIONS USING MANGANESE OXIDE NANOPARTICLES FROM BUFFELGRASS, CENCHRUS CILIARIS L., AS GREEN ADSORBENT. KINETICS AND THERMODYNAMICS STUDIES

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Environment Protection Engineering

Volume 48, Issue 1, 2022, Pages 135-149

REMOVAL OF Ni(II) IONS FROM AQUEOUS SOLUTIONS USING MANGANESE OXIDE NANOPARTICLES FROM BUFFELGRASS, CENCHRUS CILIARIS L., AS GREEN ADSORBENT. KINETICS AND THERMODYNAMICS STUDIES(Article)

Kirubo, D.A., Muthukumaran, K., Thamarai, P.

[a]Department of Industrial Biotechnology, Government College of Technology, Tamilnadu, Coimbatore, 641013, India
[b]Hindusthan College of Engineering and Technology, Tamilnadu, Coimbatore, 641032, India
[c]Government College of Technology, Tamilnadu, Coimbatore, 641013, India

Abstract

Manganese oxide nanoparticles (MnONPs) synthesized from buffelgrass, Cenchrus ciliaris (L.), an invasive weed posing threats to ecosystems, are used in this study to remove nickel(II) ions from aqueous solutions. As a biosorbent, the synthesized MnONPs were put to the test. MnONPs were studied for their surface morphology and functional properties. A variety of adsorbent dosages and contact times were tested in batch experiments to see how they affected adsorption rates. At pH 6.0 and room temperature, MnONPs had an 87.196 removal efficiency for Ni(II) ions. Pseudo-second order correlations had a higher R^2 value (0.988). In the Langmuir plot, a maximum adsorption capacity of 4.78 mg/g was observed. However, the experimental data fitted well with both Langmuir and Freundlich isotherm models (R^2 – 0.99). Spontaneous and exothermic was the nature of the adsorption process. To remove heavy metal ions contaminants from aqueous solutions, these results suggested that MnONPs synthesized from buffelgrass extract could be used.

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Document details - Design and optimization of solar parabolic trough collector with evacuated absorber by grey relational analysis

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Current Science

Volume 122, Issue 4, January 2022, Pages 410-418

Design and optimization of solar parabolic trough collector with evacuated absorber by grey relational analysis(Article)(Open Access)

Arunkumar, S., Ramesh, K.

Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641 013, India

Abstract

Solar energy that contains bright heat and light from the sun is often controlled using modern technology such as photovoltaic, solar heating, artificial photosynthesis, solar architecture and solar thermal electricity. This study concerned with an experimental analysis of solar parabolic trough collector. The sunlight is reflected from the parabolic trough surface and focused on the evacuated absorber tube. The trough is usually aligned to the N–S axis and can be rotated normally according to the sun position from east to west. We have studied the potential of a solar thermal system for hot-water generation. The parabolic trough concentrator was made of galvanized sheet metal on which solar reflective films were pasted. The heat transfer fluid, viz. water runs through the absorber tube and absorbs concentrated heat energy. It has been designed with principal focus 0.1 m from the vertex so that the receiver heat loss is minimized. Data were collected on water inlet temperature, outlet temperature of the heat transfer fluid, solar radiation and water flow rate (days) during March to May 2019 at Coimbatore, Tamil Nadu, India. Also, the processing parameters were optimized because they are the key factors affecting the performance of the solar collector. Grey relational analysis was used to solve the optimization. Through confirmatory experiments, the input variables such as time, angle of tracking and solar radiation, as well as output variables such as inlet temperature, outlet temperature and efficiency were obtained, and the optimal conditions were verified. A suitable choice of input parameters such as tracking angle of 120° provides a high efficiency rate at 2 pm for March, April and May.

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Document details - Removal of methylene blue from aqueous solution using a mixture of dried rice husk, sugarcane bagasse and wheat bran powder as a low-cost biosorbent

Desalination and Water Treatment
Volume 245, January 2022, Pages 286-296

Removal of methylene blue from aqueous solution using a mixture of dried rice husk, sugarcane bagasse and wheat bran powder as a low-cost biosorbent(Article)

Malarvizhi, T., Muthukumaran, K., Thamaraj, P.
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[b]Department of Chemistry, Government College of Technology, Coimbatore, India
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Abstract

Dye removal from textile industrial wastewater through conventional methods is a critical task over the last few decades. This article focuses on an efficient and economic biosorption technique used to study the elimination of methylene blue (MB) from wastewater. A mixture of dried rice husk, sugarcane bagasse and wheat bran powder (DRSWP) in equal amounts was used to prepare a biosorbent to remove the methylene blue (MB) dye. This work discusses the impacts of different variables such as pH, contact time, initial dye concentration and biosorbent dose during the dye molecule elimination process and the optimal experimental conditions were also determined. As a result, the removal percentage of MB dye was found to be 96%. The equilibrium data were studied by Langmuir, Freundlich and Temkin isotherm models. The examined data suited well with the Langmuir model having a maximum biosorption capacity of 39.002 mg/g of DRSWP-biosorbent for MB. The pseudo-first-order kinetic equation effectively explained the kinetics of biosorption of MB using DRSWP. From the reported data, it could be proved that the biosorption of MB dye by DRSWP-biosorbent was not only cost effective but also eco-friendly. In this attempt, the concoction of dried rice husk, sugarcane bagasse and wheat bran powder has been utilized as a biosorbent.

Author keywords

Document details - Comparative profile of green and chemically synthesized nanomaterials from bio-hydrometallurgical leachate of e-waste on crystal violet adsorption kinetics, thermodynamics, and mass transfer and statistical models

Biomass Conversion and Biorefinery
Volume 13, Issue 18, December 2023, Pages 17197-17221

Comparative profile of green and chemically synthesized nanomaterials from bio-hydrometallurgical leachate of e-waste on crystal violet adsorption kinetics, thermodynamics, and mass transfer and statistical models(Article)

Nithya, R., Thirunavukkarasu, A., Sivasankari, C.
[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India
[b]Department of Chemistry, Government College of Technology, Coimbatore, India

Abstract

In the present research, nano-sized copper oxide particles (CuO) were synthesized from the bio-hydrometallurgical leachate of electronic waste (e-waste) using chemical and green mediated approaches. Glycine nitrate precursor (GNP) method was adopted to synthesize cCuO and Eichhornia crassipes leaves extract was used to prepare gCuO. Further, to ensure their nano-sized forms, the optical and structural properties were examined. Then, a set of batch trials were planned to compare their removal efficiencies of the cationic dye, crystal violet (CV). The maximum percent removal of 93.8% and 91.3% were observed for gCuO and cCuO, respectively, at pH_0 of 8.0 with the initial concentration of 10 mg/L. The acquired batch trial data revealed the maximum adsorptive capacity for gCuO (200.00 mg/g) than cCuO (142.86 mg/g). This enhanced removal can be attributed due to the augmentation of surface functional moieties derived from the various phyto-constituents of E. crassipes. Also, the present study developed regression models predicting the CV adsorption process with high degree of statistical accuracy using artificial neural network (5-5-1 model; <0.5 MSE, R^2 >0.99) and response surface methodology (3-3 BBD model, p<0.05, C.I>95%). Conclusively, the desorption results showed that the nano-adsorbents can be efficiently regenerated for the minimum of three successive adsorption-desorption cycles. Graphical abstract: [Figure not available: see fulltext.]

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Document details - Experimental Investigation on Performance and Emission Characteristics of Low Heat Rejection Engine Operating on Biodiesel

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2022, Pages 955-968

1st International Conference on Energy, Material Sciences and Mechanical Engineering, EMSME 2020; New Delhi; India; 30 October 2020 through 1 November 2020; Code 270569

Experimental Investigation on Performance and Emission Characteristics of Low Heat Rejection Engine Operating on Biodiesel(Conference Paper)

Vadivel, A., Periyasamy, S., Mithun Kumar, V.V., Praveen, M.

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[b]Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract

The aim of this experimental work is to explore the effect of a thermal barrier coating (TBC) on an Annona biodiesel-fueled diesel engine, where NiCrAl was a bond coat in which the cylinder head, piston crown, and valves were coated with a plasma spray process consisting of two layers. Furthermore, the mixing of Al_2O_3 and TiO_2 was selected as a second layer. The conversion of Annona squamosa seed oil to Annona methyl ester was achieved through the transesterification process. For testing, a Kirloskar TV1 model was used with a highly precise eddy current dynamometer for a direct injection single-cylinder diesel engine. In terms of performance characteristics, the brake thermal efficiency is raised by 5.59%, and the specific fuel consumption of the Annona biodiesel-coated engine was reduced by 10.81% compared to the diesel-coated engine. As the carbon test concerned CO, HC, and CO_2 were reduced in the Annona biodiesel-coated engine, the NO_x emission improved in biodiesel in comparison to diesel fuel. © 2022, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

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Document details - Emission Analysis of Compression Ignition Engine with Induced Chemical Reaction Between Engine Exhaust and Slaked Calcium Hydroxide Solution

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Lecture Notes in Mechanical Engineering

2022, Pages 587-598

1st International Conference on Energy, Material Sciences and Mechanical Engineering, EMSME 2020; New Delhi; India; 30 October 2020 through 1 November 2020; Code 270569

Emission Analysis of Compression Ignition Engine with Induced Chemical Reaction Between Engine Exhaust and Slaked Calcium Hydroxide Solution(Conference Paper)

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[a]Department of Mechanical Engineering, Sri Ramakrishna Engineering College, Tamil Nadu, Coimbatore, 641022, India
[b]Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[c]Department of Mechanical Engineering, National Institute of Technology Puducherry, Karaikal, U.T. of Puducherry, India

Abstract

In the current scenario, one of the primary challenges is global warming and the primitive task is to curtail the emission of CO_2 which is a mainspring for global warming. Climate change as a consequence of global warming is the additional worriment. The human being and all other living organisms are seriously affecting by global warming in straight or diffusely. This paper analyzes the emission level parameters of a four-stroke diesel engine with the induced chemical reaction between slaked calcium hydroxide solution and exhaust emission have been studied experimentally. The calcium hydroxide solution setup was fabricated and exercised on a single-cylinder, four-stroke compression ignition engine with variable loads of zero, 2, 4, 6, and 8 kg. This setup was placed in between the engine exhaust manifold and exhaust gas line. Using the AVL gas analyzer, the emissions like as HC, CO, CO_2, and NO_x were measured outwardly. The test results demonstrated that the emissions of contaminants decreased significantly after the calcium hydroxide solution has been used. The installation of the slaked calcium hydroxide solution setup results in reducing unburned HC, CO_2, and CO by 13, 11.3, and 35%, respectively. The slight increase of the NO_x emissions appears as a negative factor. There was no fuel penalty by using the calcium hydroxide solution setup. © 2022, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

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Energy Conversion and Management: X

Volume 13, January 2022, Article number 100167

Biodiesel production from lignocellulosic biomass using Yarrowia lipolytica(Article)(Open Access)

Vasaki, M., Sithan, M., Ravindran, G., Paramasivan, B., Ekambaram, G., Karri, R.R.

[a]Department of Environmental Engineering, Government College of Technology Coimbatore, India
[b]Department of Civil Engineering, S R Engineering College Warangal, Telangana, India
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View additional affiliations

Abstract

Depletion of hydrocarbons is forcing to find alternative resources to meet the energy demand of the growing population. Microbial biodiesel as a fuel can act as a cheaper and eco-friendly alternative to fossil fuel. Single-cell oil (SCO) consisting of carbon, hydrogen and oxygen grown over the lignocellulosic biomass using oleaginous microorganisms are triacylglycerols which can be converted to biodiesel, with physicochemical properties similar to conventional diesel. However, several cost-effective pretreatment methods are required to utilize lignocellulosic biomasses. The current research study investigates the SCO yield (and biodiesel characteristics) obtained from sugarcane bagasse hydrolysate through various pretreatment techniques. The pretreatment with 4% v/v H_2SO_4 at 25 min of ultra-sonication provided the best depolymerization results (based on the glucose concentration). Yarrowia lipolytica was inoculated into the hydrolysates, allowed to grow at 25 °C, pH of 6.5 and rapid mixing for six days yielded biomass of 16.39 g/l. Biodiesel was extracted from the biomass via in-situ and ex-situ transesterification. In-situ transesterification carried out with the catalyst K_2CO_3 yields 80% biodiesel. In comparison, 63% were achieved with ex-situ transesterification, where lipid extraction was carried out as a first step and transesterified further in the presence of catalyst KOH to obtain biodiesel. The obtained fatty acid methyl esters (FAME) was subjected to FTIR analysis, and the observed physicochemical properties were within the international standards. © 2021 The Authors

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Document details - Evaluation of PEEK-TiO₂- SiO₂ nanocomposite as biomedical implants with regard to in-vitro biocompatibility and material characterization

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Journal of Biomaterials Science, Polymer Edition

Volume 33, Issue 6, 2022, Pages 727-746

Evaluation of PEEK-TiO_2- SiO_2 nanocomposite as biomedical implants with regard to in-vitro biocompatibility and material characterization(Article)

Thanigachalam, M., Muthusamy Subramanian, A.V.

Department of Mechanical Engineering, Government College of Technology, Coimbatore, India

Abstract

Polyether Ether Ketone (PEEK) exhibits superior mechanical and biological safety characteristics, and its biological inertness significantly restricts its applicability in biomedical applications. Recent researches included active ceramic particles to enhance biological activity and broaden the application range of bioactive composites in medical implants. During the current investigation, acrylic acid-functionalized ceramic TiO_2 and SiO_2 nanoparticles (NP) were used to reinforce the PEEK matrix. The PEEK/TiO_2/SiO_2 (PTS) nanocomposite was fabricated using plastic injection moulding process. Different functional groups and crystal plane orientations of the composite were found through FTIR and XRD. The morphological and elemental analysis were carried out using FESEM and the EDAX mapping technique. The thermal stability of the composite was investigated through TGA and DSC analysis. The mean diameter of the inhibition zone of PTS polymer composite is 18.125 mm and 16.375 mm against E. coli and B. subtilis, respectively, which is higher than that of the mean diameter of the inhibition zone of PEEK. In-vitro direct and indirect cytotoxicity studies were carried using the MG-63 cell line and found the cell viability as 94.30% and cytotoxicity as 5.70% on PTS nanocomposite. Cell adhesion study was carried out using MG-63 cell line on the composite surface. That demonstrated the good cell adherence and cell proliferation those were observed through SEM morphologies. Thus, the newly developed composite serves as a potential candidate in biomedical applications. © 2021 Informa UK Limited, trading as Taylor & Francis Group.

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Document details - In-vitro cytotoxicity assessment and cell adhesion study of functionalized nTiO₂ reinforced PEEK biocompatible polymer composite

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Polymer-Plastics Technology and Materials

Volume 61, Issue 5, 2022, Pages 566-576

In-vitro cytotoxicity assessment and cell adhesion study of functionalized $nTiO_2$ reinforced PEEK biocompatible polymer composite(Article)

Thanigachalam, M., Muthusamy Subramanian, A.V.

Department of Mechanical Engineering, Government College of Technology, Coimbatore, India

Abstract

This research aims to develop a nontoxic PEEK-based acrylic acid-functionalized $nTiO_2$ reinforced polymer nanocomposite fabricated by injection molding. Functional groups in PEEK, synthesized $nTiO_2$, and PEEK-$nTiO_2$ composite have been identified through FTIR analysis. Effect of acrylic acid-functionalized $nTiO_2$ particles on the thermal degradation was investigated using DSC, TGA analysis, and biocompatibility of PEEK-$nTiO_2$ using In-vitro studies. The cytotoxicity level as 2.7% (grade 1, slight toxic level) and cell viability as 97.3% were identified in the direct method of cytotoxicity assessment. The indirect cytotoxicity method revealed slight toxic level. Excellent cell growth was identified through cell adhesion study using SEM analysis. © 2021 Taylor & Francis.

Author keywords

(biocompatibility) (cell viability) (In-vitro) (MTT assay) (polyether ether ketone) (Polymer nanocomposite)

Document details - Effect of cerium oxide nanoadditive on Annona Methyl Ester in a thermally coated direct injection diesel engine

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International Journal of Ambient Energy

Volume 43, Issue 1, 2022, Pages 5992-6006

Effect of cerium oxide nanoadditive on Annona Methyl Ester in a thermally coated direct injection diesel engine(Article)

Ayyakkannu, V., Sivanandi, P.

[a]Department of Mechanical Engineering, Sri Ramakrishna Engineering College, Coimbatore, India
[b]Department of Mechanical Engineering, Government College of Technology, Coimbatore, India

Abstract

The utilisation of biodiesel in compression ignition (CI) engines results in a reduction of exhaust emissions; Meanwhile, most of the studies assert that the usage of biodiesel in engines emits more NOx emission, which interruption the use of biodiesel. In this experimental work, an investigation of the impact of cerium oxide nanoadditive added in the fuel as a fuel modification technique on NOx reduction in an Annona biodiesel-operated thermal barrier coated (TBC) CI engine has been conducted. Experimental results show that the fuel modification technique increases the brake thermal efficiency by 13.30% and decreases the brake specific fuel consumption by 9.37% in the combined biodiesel–nanoadditive operated TBC engine as compared to the conventional engine. Emission parameters such as CO, HC, NOx, and smoke were also significantly reduced as compared to the conventional engine due to the high combustion temperature and oxygen denoting catalyst of cerium oxide nanoadditive. © 2021 Informa UK Limited, trading as Taylor & Francis Group.

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(Annona seed oil methyl ester) (cerium oxide nanoadditive) (diesel engine) (NO_x emission reduction) (Thermal barrier coating)

Document details - Lightweight and secure mutual authentication scheme for IoT devices using CoAP protocol

Computer Systems Science and Engineering

Volume 41, Issue 2, 2022, Pages 767-780

Lightweight and secure mutual authentication scheme for IoT devices using CoAP protocol(Article) (Open Access)

Oliver, S.G., Purusothaman, T.

[a]Department of Information Technology, Government College of Technology, Coimbatore, 641013, India
[b]Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

Internet of things enables every real world objects to be seamlessly integrated with traditional internet. Heterogeneous objects of real world are enhanced with capability to communicate, computing capabilities and standards to interoperate with existing network and these entities are resource constrained and vulnerable to various security attacks. Huge number of research works are being carried out to analyze various possible attacks and to propose standards for securing communication between devices in internet of things (IoT). In this article, a robust and lightweight authentication scheme for mutual authentication between client and server using constrained application protocol is proposed. Internet of things enables devices with different characteristics and capabilities to be integrated with internet. These heterogeneous devices should interoperate with each other to accumulate, process and transmit data for facilitating smart services. The growth of IoT applications leads to the rapid growth of IoT devices incorporated to the global network and network traffic over the traditional network. This scheme greatly reduces the authentication overhead between the devices by reducing the packet size of messages, number of messages transmitted and processing overhead on communicating devices. Efficiency of this authentication scheme against attacks such as DoS (denial of service), replay attacks and attacks to exhaust the resources are also examined. Message transmission time reduced upto 50% of using proposed techniques.

Author keywords

Document details - Recycling of industrial waste material of fly ash cenosphere for the treatment of car wash water effluent

Journal of Material Cycles and Waste Management

Volume 24, Issue 1, January 2022, Pages 321-332

Recycling of industrial waste material of fly ash cenosphere for the treatment of car wash water effluent(Article)

Priya, M., Jeyanthi, J., Thiruvenkatamani, G.

Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract

This study presents the investigation on the preparation, characterisation and utilisation of the modified industrial waste material of Fly Ash Cenosphere (FAC). Recently, the recycling of FAC is practiced to reduce the accumulation of waste in the environment. The surface of the cenosphere is enhanced by modification. FAC was modified by chitosan and prepared Fly-ash Cenosphere-Chitosan (FCC) composite. The surface and morphological features of the samples were carried out by using the SEM, EDAX, Surface area analyser, XRD and FT-IR analyser. The performance of the modified cenosphere was monitored by the jar test. The operating parameters such as dosage (2–12 g/L), Contact time (10–60 min), sedimentation time (10–60 min), pH (3–8) and mixing speed (30–150 rpm) of the jar test was varied and observed. The contaminant removal was measured by the removal of total solids and Chemical Oxygen Demand (COD) from the car wash water effluent. Before and after the treatment the FT-IR analysis was carried out. At an optimised condition, 63.6% of COD and 90% of solids were removed by FCC. FT-IR peaks also confirmed the contaminant removal efficiency of FCC. Based on the results, FCC composite could be recycled for the pretreatment of the car wash water effluent.

Author keywords

Document details - Experimental Investigation on Electrochemical Discharge Machining of Zirconia

Lecture Notes in Mechanical Engineering

2022, Pages 27-34

1st International Conference on Future Technologies in Manufacturing, Automation, Design and Energy, ICoFT 2020; Karaikal; India; 28 December 2020 through 30 December 2020; Code 266989

Experimental Investigation on Electrochemical Discharge Machining of Zirconia(Conference Paper)

Manoharan, V., Tamilperuvalathan, S., Natarajan, E., Ponnusamy, P.

[a]Department of Mechanical Engineering, Government College of Technology, Coimbatore, Tamil Nadu, India
[b]Department of Mechanical and Mechatronic Engineering, UCSI University, UCSI Heights, Jalan Menara Gading, Kuala Lumpur, Malaysia
[c]Department of Mechanical Engineering, Tagore Institute of Engineering and Technology, Attur, Salem, Tamil Nadu, India

Abstract

In the present industrial development, an essential usage of hard materials such as ceramics immensely increased. Zirconia (ZrO_2) is one among to produce medical and dental instruments, atomic reactors due to its high strength and corrosion resistance. However, the machining of the zirconia is challenging without any thermal reactions. This research work focuses on machining the zirconia using one of the unconventional machining processes of electrochemical discharge machining (ECDM) with NaOH as electrolyte and stainless steel as a tool material. In this work, NaOH was used as an electrolyte at various levels such as 15, 20, and 25% concentration with distilled water. The other parameters such as voltage 80, 90, and 100v and duty cycle 30, 40, and 50% are used to machining the material. Response surface methodology is used to determine the optimum parameters to conduct the design of experiments in Box–Behnken design. © 2022, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

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OPTIMIZATION AND EFFECT OF DIELECTRIC FLUID WITH Zr AND Ni ON ELECTRICAL DISCHARGE MACHINING OF DIE STEEL MATERIAL | OPTIMIZACIJA I EFEKAT DIELEKTRIČNE TEČNOSTI SA Zr I Ni NA MAŠINSKU OBRADU ČELIČNOG MATERIJALA ELEKTRIČNIM PRAŽNJENJEM
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Document details - Exergy Analysis of R1234yf and R1234ze as an Alternative to R134a in a Domestic Refrigeration System

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2022, Pages 975-982

1st International Conference on Future Technologies in Manufacturing, Automation, Design and Energy, ICoFT 2020; Karaikal; India; 28 December 2020 through 30 December 2020; Code 266989

Exergy Analysis of R1234yf and R1234ze as an Alternative to R134a in a Domestic Refrigeration System(Conference Paper)

Muthuvalravan, G., Soma Sundaram, S., Palani, P.K.

[a]National Institute of Technology Puducherry, Karaikal, India
[b]Government College of Technology, Coimbatore, India

Abstract

A computational model based on the exergy destruction using Engineering Equation Solver (EES) is developed to analyze the exergy losses in the evaporator, condenser, compressor, and the expansion valve of the system for the refrigerant R134a and its alternatives: R600a, R290, R1234yf, and R1234ze. Coefficient of performance, refrigeration effect, total exergy destruction, and exergy efficiency for the various operating ranges of condensing and evaporator temperatures are evaluated for a particular alternate refrigerant. The results inferred that R600a, R290, R1234yf, and R1234ze refrigerants in comparison with R134a perform well for domestic residential applications within evaporator temperature (263–293 K) and condenser temperature (303–323 K). Although the performance parameters for R1234yf and R1234ze fall short than that of R134a as per the first law of thermodynamics, its eco-friendly properties, low exergy loss for lower capacity refrigeration system such as domestic refrigeration system, and lower work input requirement offset the gap and make it a suitable alternative for R134a. © 2022, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

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Muthuvalravan, G., Kumar Natarajan, S.
Experimental study on drying kinetics and thermal modeling of drying Kohlrabi under different solar drying methods
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Document details - Experimental Studies on Material Removal Rate of Die Steel in Electrochemical Micromachining Process Using Taguchi Method

Lecture Notes in Mechanical Engineering

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Experimental Studies on Material Removal Rate of Die Steel in Electrochemical Micromachining Process Using Taguchi Method(Conference Paper)

Vijayakumar, K., Sekar, T., Vijay, M.

[a]Department of Mechanical Engineering, TPEVR Government Polytechnic College, Vellore, Tamil Nadu, India
[b]Department of Mechanical Engineering, Government College of Technology, Coimbatore, Tamil Nadu, India

Abstract

Electrochemical micromachining is one of a commonly used unconventional machining processes used to machine the not easy to process materials and to make complicated and irregular shapes of a product. This study aims to optimize process parameters and to maximize the material removal rate (MRR). Taguchi approach is used to do the design of experiments. In this work, an experimental study is given for machining of D2 Die steel. Voltage, electrolyte concentration, and duty cycle are selected as processing parameters of the electrochemical micromachining (ECCM) process. The analysis of variance (ANOVA) and the signal-to-noise ratio (SN) are statistical methods used to study the influence of process parameters over the results. As the results, the maximum MRR is 0.1483 mm3/min achieved at the voltage of 20 V, electrolyte concentration at 150 g/l, and duty cycle at 60% in this work voltage is the most influencing parameter on the material removal rate.

Author keywords

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Experimental Studies on Material Removal Rate of Die Steel in Electrochemical Micromachining Process Using Taguchi Method(Conference Paper)

Vijayakumar, K., Sekar, T., Vijay, M.

[a]Department of Mechanical Engineering, TPEVR Government Polytechnic College, Vellore, Tamil Nadu, India
[b]Department of Mechanical Engineering, Government College of Technology, Coimbatore, Tamil Nadu, India

Abstract

Electrochemical micromachining is one of a commonly used unconventional machining processes used to machine the not easy to process materials and to make complicated and irregular shapes of a product. This study aims to optimize process parameters and to maximize the material removal rate (MRR). Taguchi approach is used to do the design of experiments. In this work, an experimental study is given for machining of D2 Die steel. Voltage, electrolyte concentration, and duty cycle are selected as processing parameters of the electrochemical micromachining (ECCM) process. The analysis of variance (ANOVA) and the signal-to-noise ratio (SN) are statistical methods used to study the influence of process parameters over the results. As the results, the maximum MRR is 0.1483 mm3/min achieved at the voltage of 20 V, electrolyte concentration at 150 g/l, and duty cycle at 60% in this work voltage is the most influencing parameter on the material removal rate. © 2022, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

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Document details - Proteomic perspectives on thermotolerant microbes: an updated review

Molecular Biology Reports

Volume 49, Issue 1, January 2022, Pages 629-646

Proteomic perspectives on thermotolerant microbes: an updated review(Review)

Yamini, C., Sharmila, G., Muthukumaran, C., Pavithran, K., Manojkumar, N.

[a]Department of Genetic Engineering, School of Bioengineering, SRM Institute of Science and Technology, Kattankulathur, Tamilnadu, Chennai, 603203, India
[b]Department of Industrial Biotechnology, Government College of Technology, Tamilnadu, Coimbatore, 641013, India

Abstract

Introduction: Thermotolerant microbes are a group of microorganisms that survive in elevated temperatures. The thermotolerant microbes, which are found in geothermal heat zones, grow at temperatures of or above 45°C. The proteins present in such microbes are optimally active at these elevated temperatures. Hence, therefore, serves as an advantage in various biotechnological applications. In the last few years, scientists have tried to understand the molecular mechanisms behind the maintenance of the structural integrity of the cell and to study the stability of various thermotolerant proteins at extreme temperatures. Proteomic analysis is the solution for this search. Applying novel proteomic tools determines the proteins involved in the thermostability of microbes at elevated temperatures. Methods: Advanced proteomic techniques like Mass spectrometry, nano-LC-MS, protein microarray, ICAT, ITRAQ, and SILAC could enable the screening and identification of novel thermostable proteins. Results: This review provides up-to-date details on the protein signature of various thermotolerant microbes analyzed through advanced proteomic tools concerning relevant research articles. The protein complex composition from various thermotolerant microbes cultured at different temperatures, their structural arrangement, and functional efficiency of the protein was reviewed and reported. Conclusion: This review provides an overview of thermotolerant microbes, their enzymes, and the proteomic tools implemented to characterize them. This article also reviewed a comprehensive view of the current proteomic approaches for protein profiling in thermotolerant microbes. © 2021, The Author(s), under exclusive licence to Springer Nature B.V.

Document details - Predicting the ultimate tensile strength and wear rate of aluminium hybrid surface composites fabricated via friction stir processing using computational methods

Journal of Adhesion Science and Technology

Volume 36, Issue 16, 2022, Pages 1707-1726

Predicting the ultimate tensile strength and wear rate of aluminium hybrid surface composites fabricated via friction stir processing using computational methods(Article)

C J, A., Gopi, S., Mohan, D.G., ShashiKumar, S.

[a]Department of Mechanical Engineering, CIT Sandwich Polytechnic College, Coimbatore, India
[b]Department of Production Engineering, Government College of Technology, Coimbatore, India
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View additional affiliations

Abstract

In the present study, aluminium hybrid surface composites were prepared by incorporating boron carbide (B_4C) and Aluminium oxide (Al_2O_3) ceramic particles via the Friction Stir Processing (FSP) route. Tool rotational speed, Tool traverse speed, Axial force, and Reinforcement ratio were the chosen process parameters. Response Surface Method (RSM) based Central Composite Design (CCD) was used to conduct the experimental trials. A second-order regression equation was developed for the responses, ultimate tensile strength (UTS), and wear rate (WR). Statistical tests were performed to check the adequacy of the regression models. The effect of process parameters on the responses was studied. It was found that tool traverse speed was the most dominant process parameter, followed by tool rotational speed, axial force, and reinforcement ratio. The optimal process parameters for the responses were found using a genetic algorithm, where the regression equations from RSM were used as the objective function. © 2021 Informa UK Limited, trading as Taylor & Francis Group.

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Document details - Optimal Design of PID Controller for the analysis of Two TANK System Using Metaheuristic Optimization Algorithm

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Journal of Electrical Engineering and Technology

Volume 17, Issue 1, January 2022, Pages 627-640

Optimal Design of PID Controller for the analysis of Two TANK System Using Metaheuristic Optimization Algorithm(Article)

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Abstract

Two surge interactive and non-interactive tank systems are taken as examples of multi-level tank system. Due to the dynamic level changes of the two-tank system, various control techniques are intended to regulate the level by controlling the liquid inflow quantity. In addition to that, disturbance effect is considered to get better step response for the tuning of Proportional Integral Derivative (PID) controller by using meta-heuristic algorithm. In this paper, Proportional Integral Derivative (PID) controller design analysis is carried out by using Feed Forward (FF) control, Genetic Algorithm (GA), Particle Swarm Optimization (PSO) and Bubble Net Whale Optimization Algorithms (BNWOA). BNWOA is used to tune the PID controller to reduce constrains of two tank system and obtain the optimal control is proposed. The transfer function of the two-tank system with step input for various control algorithms such as GA, PSO and BNWOA are observed using MATLAB Simulink and M-script. From the analysis, better performance such as reduced constrains and optimal control can be obtained from BNWOA. Then steady state analysis is made and the simulation results are presented at the end. © 2021, The Korean Institute of Electrical Engineers.

Author keywords

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Document details - Influence of Eco-Sand Drains on the Performance of Consolidation Characteristics Founded on Soft Clay Deposits

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Lecture Notes in Civil Engineering

Volume 152, 2022, Pages 185-192

Indian Geotechnical Conference, IGC 2020; Virtual, Online; ; 17 December 2020 through 19 December 2020; Code 263919

Influence of Eco-Sand Drains on the Performance of Consolidation Characteristics Founded on Soft Clay Deposits(Conference Paper)

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Abstract

Soft clay deposits are highly vulnerable to severe damages due to its low bearing capacity and poor drainage characteristics. Proper ground improvement techniques are mandated to enhance the performance of these problematic soils. In this regard, the paper aims to study the potential of eco-sand drains in enhancing the properties of the soil deposit, in addition, it also aims to promote sustainability. The Eco-sand material is sponsored by ACC Cement Plant, Coimbatore, which was found to be waste material from a limestone quarry. Three gang consolidometer was used to conduct the experiments. The eco-sand was used instead of natural river sand in sand drains. The eco-sand drains were used with area replacement ratios from 0 to 10%. The eco-sand drains were installed in the prepared soft clay sample using a specially designed mandrel. From the detailed experimental study, five different consolidation characteristics such as Coefficient of consolidation, Coefficient of compressibility, Coefficient of volume change, Coefficient of vertical consolidation and Permeability are determined for varying area replacement ratio and results are compared with the untreated soft clay deposits. The performance of the 6% area replacement ratio of eco-sand drains was found optimum in enhancing the consolidation characteristics and improves the load-carrying capacity of the soft clay deposits. From the obtained results, it is strongly recommended that usage of waste materials such as eco-sand will enhance the geotechnical properties of the soft clay deposits and in promoting sustainability. © 2022, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

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Document details - Isolation, mass cultivation, and biodiesel production potential of marine microalgae identified from Bay of Bengal

Environmental Science and Pollution Research
Volume 29, Issue 5, January 2022, Pages 6646-6655

Isolation, mass cultivation, and biodiesel production potential of marine microalgae identified from Bay of Bengal(Article)

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[b]Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India
[c]School of Petroleum Technology, Pandit Deendayal Energy University, Gandhinagar, 382426, India

Abstract

In this study, marine microalgae were isolated from the Bay of Bengal, and their biodiesel production potential was investigated. Five different strains of microalgae were identified, viz. Nannochloropsis salina (N. salina), Dunaliella salina (D. salina), Chaetoceros calcitrans (C. calcitrans), Tetraselmis chuii (T. chuii), and Euglena sanguinea (E. sanguinea). Further, these stains were mass cultivated in a 250-L bioreactor to assess their biomass production ability. At the end of the exponential phase, algal biomass was harvested for lipid extraction. The fatty acid profile and physico-chemical properties of the lipids were analyzed. It was observed that a maximum of 27.67wt% of lipid was obtained for N. salina followed by D. salina (22.58 wt%), E. sanguinea (21.88 wt%), T. chuii (20.15 wt%), and C. calcitrans (16.25 wt%). Subsequently, the extracted lipids were subjected to single-step esterification and transesterification process to produce biodiesel by using an acid catalyst. The different parameters influencing the reaction such as catalyst concentration, temperature, methanol to lipid molar ratio, and time were investigated. A maximum biodiesel yield of 97, 94, 96, 92, and 92 wt% were obtained for N. salina, D. salina, C. calcitrans, T. chuii, and E. sanguinea, respectively, at the favorable reaction conditions. The fuel properties of biodiesel were analyzed as per the standard protocol and compared with ASTM D6751 standard. © 2021, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Document details - Floor Plan Designer Application by Predicting Spatial Configuration Using Machine Learning

Lecture Notes in Networks and Systems
Volume 191, 2022, Pages 665-673

Floor Plan Designer Application by Predicting Spatial Configuration Using Machine Learning(Book Chapter)

Rajasenbagam, T., Jeyanthi, S., Uma Maheswari, N.
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[b]Department of Computer Science and Engineering, PSNA College of Engineering and Technology, Dindigul, Tamil Nadu, India

Abstract

In the field of architecture, floor plan design is the way to generate various floor plans for houses. Designing of floor plan is one of the most essentials for all kinds of infrastructures. In spite of this, there are many computerized and manual ways are available today. Nowadays, the burden of manual work has been greatly reduced. Even though the manual works have been greatly reduced, still there are some manual works like dragging and dropping, aligning the rooms, placing in desired locations, etc. We cannot determine the exact lengths of rooms, hall, kitchen, etc. Floor plan designing is one of the highly iterative processes and it demands extensive human labour; however, they are limited to fully automate the creative process. This proposed work faces so many real challenges because of the many implicit and explicit rules in order to create viable floor plans. In this work, a floor plan designer is suggested for an automated floor plan generating application that can generate floor plans automatically when the total area of the land and choice of BHK (B = Bedroom. H = Hall. K = Kitchen) is provided by the customers. In this research work, deep convolutional neural network (DCNN) methods are proposed to handle floor plan parsing and spatial recognition methods. Spatial recognition [1] among objects plays a fundamental role in the human perception and understanding of design. The various spatial recognition methods are used to edit the generated floor plans based on their willingness and acceptance. © 2022, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

scopus.com/record/display.uri?eid=2-s2.0-85111865238&doi=10.1080%2f00207179.2021.1959067&origin=inward&txGid=b4e74c95842a322767760...

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International Journal of Control

Volume 95, Issue 11, 2022, Pages 3148-3165

Active fault diagnosis of 2 DoF helicopter using particle filter-based log-likelihood ratio(Article)

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Abstract

This paper deals with fault detection and diagnosis scheme for stochastic non-linear systems using particle filter. To address the problem of fault detection of helicopters in the presence of sensor, actuator, and component faults, the algorithm uses a bank of particle filters running in parallel. The filter monitors the system states and identifies the occurrence of faults. Using the monitored system states, a log-likelihood ratio-based hypothesis testing is performed to detect and isolate faults in the system. Comparing log-likelihood ratio with threshold generated from deviation function of normal model induces the fault decision signal. The algorithm is applied to a 2 Degrees of Freedom helicopter system which is a highly complex, non-linear, and unstable system. The results are presented for sensor, actuator, and component faults represented as additive and multiplicative models. The results show the effectiveness of the algorithm compared with residual generation methods used in fault diagnosis. © 2021 Informa UK Limited, trading as Taylor & Francis Group.

Author keywords

actuator and component faults | Fault diagnosis | likelihood ratio | non-linear filtering | particle filter | sensor

Cited by 1 document

Kenyeres, E. , Abonyi, J.
Goal-Oriented Tuning of Particle Filters for the Fault Diagnostics of Process Systems
(2023) Processes

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Document details - An Automated Crop and Plant Disease Identification Scheme Using Cognitive Fuzzy C-Means Algorithm

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IETE Journal of Research

Volume 68, Issue 5, 2022, Pages 3786-3797

An Automated Crop and Plant Disease Identification Scheme Using Cognitive Fuzzy C-Means Algorithm(Article)

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Abstract

The cultivation of crops, conservation of plants, restoration of landscape, and management of soil are the phases incorporated in agriculture and horticulture. During the cultivation and conservation stages, the plants and the crops are affected by various diseases such as Bacterial scourge, Bacterial Leaf Blight, Brown spot, Seedling blight, Leaf streak, Powdery Mildew, Fire Blight, Black Rot and Apple Scab. These diseases in plants will lead to losses such as manufacturing and financial loss in farming industry worldwide. To maintain the sustainability in horticulture, the detection of crop disease and maintaining the condition of the plants are important. The Computer Aided Detection (CAD) in the agriculture and horticulture is the emerging trend; based on the digital imaging that provides the detailed analysis about the disease by applying the image mining process. In this work, the Cross Central Filter (CCF) technique is proposed to perform the noise removal process in the image and the identification of objects in the image is applied by using the Cognitive Fuzzy C-Means (CFCM) algorithm to differentiate the suspicious region from the normal region. The evaluation is conducted against the diseases affected in the rice crop and apple trees. The performance evaluation proves that the proposed design achieves the best performance results compared to the other filters and the segmentation techniques. © 2022 IETE.

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Kanthik, R. , Hussain, S. , George, T.T.
A dual track deep fusion network for citrus disease classification using group shuffle depthwise feature pyramid and Swin transformer
(2023) Ecological Informatics

Sunil, C.K. , Jaidhar, C.D. , Patil, N.
Systematic study on deep learning-based plant disease detection or classification
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Madanan, M. , Muthukumaran, N. , Tiwari, S.
RSA based improved YOLOv3 network for segmentation and detection of wood species
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Document details - Biodiesel Production from Tannery Waste using a Nano Catalyst (Ferric-Manganese Doped Sulphated Zirconia)

Energy Sources, Part A: Recovery, Utilization and Environmental Effects
Volume 44, Issue 1, 2022, Pages 1092-1104

Biodiesel Production from Tannery Waste using a Nano Catalyst (Ferric-Manganese Doped Sulphated Zirconia)(Article)

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[a]Department of Petrochemical Engineering, RVS College of Engineering and Technology, Coimbatore, India
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Abstract

In this study, biodiesel was prepared using fat from tannery waste in the presence of a nanocatalyst, Ferric-Manganese Doped Sulfated Zirconia (Fe-Mn-SO_4/ZrO_2). After its preparationthe catalyst was characterized by modified wetness impregnation method. The effect of the various parameters influencing the biodiesel process was studied and optimized. A maximum biodiesel yield of 96.6 wt% was obtained when the optimized conditions were 12:1 methanol to fat, catalytic loading of 6 wt% at 65°C with a stirring rate of 450 rpm for 300 min. Furthermore, a catalyst reusability study was conducted to check the performance during recycling. It was observed that the catalyst can be recycled upto five times giving an yield above 90 wt%. Finally, the biodiesel properties were analyzed and compared with ASTM standards. © 2022 Taylor & Francis Group, LLC.

Author keywords
ASTM D6751 biodiesel Impregnation nano catalyst reusability

Document details - Enhanced texture classification through feature compaction using dihybrid bio-inspired computation techniques

Concurrency and Computation: Practice and Experience
Volume 33, Issue 24, 25 December 2021, Article number e6453

Enhanced texture classification through feature compaction using dihybrid bio-inspired computation techniques(Article)

Bagavathi, C., Saraniya, O.
Department of ECE, Government College of Technology, Coimbatore, 641013, India

Abstract

Synchronous data processing is often preferred considering the volume of data available and the requirement of processed data. Data volume increase from current technical advancements should be balanced and suitably dealt with efficient feature processing techniques. Feature selection can efficiently improve the concurrency in data processing on a completely uncorrelated and separately processable feature set. Texture analysis is a significant application of image processing that analyses specific patterns in an image. As the volume of image data available for producing better classification models progressively moves to be out of the human-manageable range, it is the automation methods that aid the researchers to manage the data. When the number of samples in the data and the dimensionality of the problem is too high, the purpose of data analysis is often compromised. Feature engineering can be utilized to improve the efficiency of the model with a smaller subset of features. This work proposes dihybrid bio-inspired computation based feature compaction, that is a combination of improvised genetic algorithm and selective tabu search for texture classification problem. Machine learning techniques are employed to evaluate and minimize the validation error from the applied computational methods. © 2021 John Wiley & Sons, Ltd.

Author keywords

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Fuel

Volume 306, 15 December 2021, Article number 121632

A review on nano-catalysts and biochar-based catalysts for biofuel production(Article)

Velusamy, K., Devanand, J., Senthil Kumar, P., Soundarajan, K., Sivasubramanian, V., Sindhu, J., Vo, D.-V.N.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, India
[b]Department of Mechanical Engineering, Government Polytechnic College, Coimbatore, 641014, India
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Abstract

Necessity and exploitation of fossil fuels is unstoppable in meeting humanity's needs despite being a small and scarce resource. The use of different renewable feedstock materials are vital in the satisfaction of large-scale demand for renewable energy sources without creating environmental problems in order to satisfy energy demand. In this context we covered the production of biofuels from a variety of feedstocks using pyrolysis, direct blending, micro-emulsion, trans-esterification (biodiesel production techniques) and hydrolysis, acidogenesis, acetogenesis, methanogenesis (biogas production techniques) and pyrolysis, thermochemical liquefaction (bio-oil production techniques) along with the focus on increasing biofuel production using nanocatalysts and biochar-based catalysts and the techniques for creating those catalysts. Torrefaction, pyrolysis, hydrothermal carbonization, hydrothermal liquefaction, and gasification are the key methods used to make biochar. Slow pyrolysis and hydrothermal carbonization are the best methods to produce high-yield biochar. Biochar's catalytic activity is influenced by pyrolysis temperature, pyrolysis time, transition metals, and biomass to water mass ratio. However, there are some noteworthy challenges associated with biofuel development. The cost of feedstock and the option of convenient technology for efficient fuel production, the availability of commercially viable nanoparticles, a biological understanding of the nanomaterial and protein system, and microorganism compatibility levels involving enzymes and nanomaterials are all discussed repeatedly. © 2021 Elsevier Ltd

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Document details - Bioethanol production from pineapple peels waste by heat treatment and enzyme hydrolysis: An eco-friendly and economical method

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Research Journal of Biotechnology

Volume 16, Issue 12, December 2021, Pages 64-71

Bioethanol production from pineapple peels waste by heat treatment and enzyme hydrolysis: An eco-friendly and economical method(Article)

Jambulingam, K., Sathya, A., Sharvika, T.

Government college of Technology, Coimbatore-13, Tamilnadu, India

Abstract

Bioethanol is a renewable energy source with reduced CO2 emission and a better alternate for fossil fuels. The production of bioethanol using low cost agricultural wastes such as fruits waste always remains a better solution for the present environmental and energy problems. The present study focusses on the production of bioethanol from pineapple peel wastes by simultaneous scarification and fermentation process in a completely eco-friendly manner and economical manner. The fruit wastes are rich sources of sugars and can be utilized for the production of second generation fuel. Initially, cellulase producing potent bacterial isolate was isolated from soil sample collected from fruit market (Uzhavar Santhai), R.S. Puram, Coimbatore district, Tamilnadu, India. Further, the bacterial isolate was identified by 16S rDNA sequencing and the sequence was submitted in GenBank with the accession number MW227436. The phylogenetic tree was constructed and the bacterial isolate was identified as Bacillus cereus strain JK79. Pineapple peel waste was processed, heat pretreated and was utilized for enzymatic saccharification with crude cellulase enzyme to hydrolyze cellulose into simple sugars. The enzyme hydrolyzed content was allowed to undergo fermentation simultaneously (Simultaneous saccharification and fermentation) utilizing Saccharomyces cerevisiae to produce bioethanol. The yield of bioethanol was determined by potassium dichromate method. About 10.07 g/l of bioethanol was obtained by fermenting the enzymatically hydrolyzed pineapple peel waste using Saccharomyces cerevisiae. The production of bioethanol was confirmed by GC-MS. © 2021 World Research Association. All rights reserved.

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Document details - Mechanical, metallurgical and tribological properties of friction stir processed aluminium alloy 6061 hybrid surface composites

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Surface Topography: Metrology and Properties

Volume 9, Issue 4, December 2021, Article number 045019

Mechanical, metallurgical and tribological properties of friction stir processed aluminium alloy 6061 hybrid surface composites(Article)

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[b]Department of Production Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
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Abstract

Friction stir processing (FSP) was applied in the fabrication of aluminium hybrid surface composites by embedding reinforcement particles namely, aluminium oxide (Al_2O_3), boron nitride (BN) and Graphite (Gr) with Boron carbide (B_4C) in an equal volume basis. Three FSPed plates were fabricated at constant tool rotational speed of 1000 rpm, welding speed of 30 mm min^{-1} and axial force of 6 kN. The microstructure showed the homogeneous dispersion of reinforcement particles and good interfacial bonding between the reinforcement particles and the base material was observed in the processed zone. In terms of strength and hardness, surface composites with B_4C and Al_2O_3 combinations yielded better mechanical properties over other the combinations. The results of wear studies reveal that the FSPed surfaces exhibited better resistance to wear when compared to the base material in a dry sliding condition. The dominance of abrasive wear was observed in all cases of the surface composites inspite of few micro cracks and delamination found on the worn surface. XRD analysis suggests that no secondary phases or intermetallic was formed anywhere in the processed zone. © 2021 IOP Publishing Ltd

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Samuel Ratna Kumar, P.S., Vaira Vignesh, R., Mashinini, P.M.

Tribological behavior of friction stir process surface hybrid composite AA5083/MWCNT/Al2SiO5 using multi-quadratic RBF algorithm

(2023) Carbon Letters

Alam, M.A., Ya, H.H., Qistina, N.A.

Investigating the Microhardness Behavior of Al6061/TiC Surface Composites Produced by Friction Stir Processing

(2023) International Journal of Computational Methods and Experimental Measurements

Abdelhady, S.S., Elbadawi, R.E., Zoalfakar, S.H.

Investigation of the microstructure, mechanical and wear performance of friction stir-processed AA6061-T6 plate reinforced with B4C particles surface composite

(2023) Journal of Composite Materials

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Document details - Continuous fixed-bed biosorption process: A review

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Chemical Engineering Journal Advances

Volume 8, 15 November 2021, Article number 100188

Continuous fixed-bed biosorption process: A review(Review)(Open Access)

Thirunavukkarasu, A., Nithya, R., Sivashankar, R.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, India
[b]Department of Chemical Engineering, Hindustan Institute of Technology and Science, Chennai, 603103, India

Abstract

Biosorption is one of the solute enrichment techniques driven by the concentration difference of biosorbate molecules among the bulk liquid phase and solid biosorbent. The presence of the surface functional groups of the biosorbents facilitates the formation of physical/chemical interactions with the biosorbates at the solid-liquid interface. Biosorption is proved as an alternative, effective and sustainable approach to traditional water treatment technologies. Abundance, biodegradable, versatile surface functionalities, and ease of tailor-made modifications of biosorbents have fascinated many researchers to exploit their potential in the removal of a wide range of pollutants in batch/continuous mode of operation. However, the reports on continuous biosorption are significantly lesser and hence, the present review is focused only on the fixed-bed biosorption and comprehensively discussed the vital shortcomings of the current biosorption research. Conclusively, this review recommends potential research hotspots for the scientific community to address the prevailing research gaps. © 2021 The Author(s)

Author keywords

Biosorbents Biosorption Continuous fixed-bed biosorption Wastewater treatment

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stability assessment and improvement with distributed energy sources

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Applied Energy

Volume 302, 15 November 2021, Article number 117524

Recurrent network based power flow solution for voltage stability assessment and improvement with distributed energy sources(Article)

Veerasamy, V., Abdul Wahab, N.I., Ramachandran, R., Othman, M.L., Hizam, H., Devendran, V.S., Irudayaraj, A.X.R., Vinayagam, A.

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[c]Department of Electrical and Electronics Engineering, New Horizon College of Engineering, Bangalore, India

Abstract

The increasing penetration of alternative energy sources into the Integrated energy systems often influences the voltage stability (VS) of the entire system. However, developing a technique that comprehensively analyze the energy flow in this environment is a major challenge. This paper presents a novel heuristic-based recurrent type Hopfield Neural Network (h-HNN) planning tool for VS assessment of power system, towards reducing the computational cost of conventional power flow (PF) method. The proposed approach is a Jacobian-less, energy function-based approach, which was formulated using power residuals of the system. The dynamics of neural networks were governed by the differential equations of energy function, which would be minimized by the heuristic particle swarm optimization-gravitational search algorithm to deduce the unknown parameters of voltage magnitude and phase angle. The proposed technique was coded in MATLAB and its effectiveness was tested on IEEE 14-, 30-, and 57- buses, as well as a 1354-bus test system. The obtained results were compared with well-known PF techniques, and the robustness was demonstrated for ill-conditioned network. A composite severity index was proposed to rank the critical contingency of the energy network. Then, the VS assessment was performed in IEEE 14-bus system under severe contingency conditions and improvement of VS is observed under the penetration of distributed energy sources (DES). During the case of DES placement, (i) the voltage profile of the system is maintained within the acceptable range of 0.95 to 1.05 pu and (ii) the VS of the system evaluated using stability indices are enhanced by an amount of 16.54 % to 88.16 %. The application results indicate that the proposed method is useful for electric energy utilities to assess the state of the system under monitoring process. © 2021 Elsevier Ltd

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Materials

Volume 14, Issue 21, November-1 2021, Article number 6560

Study on dry sliding wear and friction behaviour of al7068/si_3n_4/bn hybrid composites(Article)(Open Access)

Subramanian, K., Murugesan, S., Mohan, D.G., Tomków, J.

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[b]Department of Mechanical Engineering, Anna University Regional Campus Coimbatore, Coimbatore, 641047, India
[c]Institute of Materials Joining, Shandong University, Jinan, 250061, China

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Abstract

Hybrid aluminium metal matrix composites have the potential to replace single reinforced aluminium metal matrix composites due to improved properties. Moreover, tribological performance is critical for these composites, as they have extensive application areas, such as the automotive, aerospace, marine and defence industries. The present work aims to establish the tribological characteristics of Al7068/Si_3N_4/BN hybrid metal matrix composites prepared by stir casting route and studied using a pin-on-disc apparatus under dry sliding conditions. The hybrid composite samples were prepared at various weight percentages (0, 5, 10) of Si_3N_4 and BN particles. To investigate the tribological performance of the prepared composites, the wear experiments were conducted by varying the load (20, 40 and 60 N), sliding velocity (1.5, 2.5 and 3.5 m/s) and sliding distance (500, 1000 and 1500 m). Wear experimental runs were carried out based on the plan of experiments proposed by Taguchi. The minimum wear rate was found with the composite material reinforced with 10 wt. % of Si_3N_4 and 5 wt. % of BN. Analysis of Variance (ANOVA) was employed to analyse the effect of process parameters on wear rate and coefficient of friction (COF). The ANOVA test revealed that the weight fraction of Si_3N_4 has more of a contribution percentage (36.60%) on wear rate, and load has more of a contribution percentage (29.73%) on COF. The worn-out surface of the wear

Document details - CNN-based deep learning technique for improved H7 TLI with grid-connected photovoltaic systems

International Journal of Energy Research

Volume 45, Issue 14, November 2021, Pages 19851-19868

CNN-based deep learning technique for improved H7 TLI with grid-connected photovoltaic systems(Article)(Open Access)

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Abstract

In this article, a three-phase transformerless inverter (TLI) for a solar photovoltaic (PV) system connected to a high-power grid are proposed, which has advantages of better performance and lower cost. The primary concern about the TLI is fluctuations in the common-mode voltage, which impacts switching frequency leakage current and grid interface system. An improved H7 common-mode voltage (CMV) damped TLI with discontinuous pulse width modulation (DPWM) is designed using a conventional neural network (CNN)-based deep learning approach. In this, a completely minimized leakage current is obtained to avoid CMV transients. The proposed PV-connected improved H7-TLI provides low-loss DC-side decoupling, which further reduces leakage current and isolation of the PV system during off-grid. In addition, the effects of several factors on CNN deep learning performance are explored, including training data size, image resolution, and network configuration. The proposed technique has the potential to be used in a test instrument for intelligent signal analysis or used in an artificial intelligence system. Switching loss is analyzed using proposed and existing H7 inverters under different load conditions. To verify the theoretical explanation, existing H7 inverters is analyzed by MATLAB/Simulink, and the outcomes are tested experimentally. The total harmonic distortion (THD) analysis of proposed and existing topology is analyzed and compared. The THD values of the existing and proposed topology are 3.74% and 3.23%, respectively. © 2021 John Wiley & Sons Ltd.

Document details - Surface improved agro-based material for the effective separation of toxic Ni(II) ions from aquatic environment

Chemosphere

Volume 283, November 2021, Article number 131215

Surface improved agro-based material for the effective separation of toxic Ni(II) ions from aquatic environment(Article)

Saravanan, A., Kumar, P.S., Nguyen Vo, D.-V., Jayasree, R., Venkatakrishnan Hemavathy, R.R., Karthik, V., Karishma, S., Jeevanantham, S., Manivasagan, V., George, C.S.

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Abstract

In this present study, a novel and low cost surface improved material was prepared from the farm waste material (Borassus flabellifer male inflorescence) and its surface was enhanced by the sulphuric acid treatment to intensify the Ni(II) ions adsorption. The adsorption individualities such as availability of functional groups, essential elements and the exterior side and structural properties of the material were assessed by the FT-IR, EDX, SEM and XRD investigation. The impact of varied adsorption influencing parameters on Ni(II) ions adsorption was studied and optimized as pH - 6.0, biosorbent dosage - 1.5 g/L, contact time - 60 min and temperature - 303 K via batch adsorption examination. Modeling examinations were carried with varied adsorption isotherm (Langmuir, Freundlich, Fritz-Schlunder and Temkin) and kinetic models (Pseudo-first order, Pseudo-second order and Elovich kinetics). Thermodynamic studies were carried out at varied Ni(II) ions concentrations (25 mg/L – 150 mg/L) and temperatures (303 K–333 K) to explain the nature of Ni(II) ions adsorption on Borassus flabellifer male inflorescence. The prepared material has shown the most suitable Ni(II) ions adsorption results for the Langmuir isotherm (R^2 = 0.9808) and Pseudo-first order kinetic models (R^2 = 0.9735 for 25 mg/L). Thereby, the

Document details - Analysis on the removal of emerging contaminant from aqueous solution using biochar derived from soap nut seeds

Environmental Pollution

Volume 287, 15 October 2021, Article number 117632

Analysis on the removal of emerging contaminant from aqueous solution using biochar derived from soap nut seeds(Article)

Velusamy, K., Periyasamy, S., Kumar, P.S., Jayaraj, T., Krishnasamy, R., Sindhu, J., Sneka, D., Subhashini, B., Vo, D.-V.N.

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Abstract

For clearing pollutants and emerging contaminants like ciprofloxacin-500mg from wastewaters generated from pharmaceutical industries, soapnut seeds biochar was synthesized and used as an adsorbent for the effective removal process. Tubular furnace operated under nitrogen gas environment was used to synthesize biochar. The batch analysis were carried out successfully to study the removal mechanism and the removal efficiency of the chosen pollutant. The soapnut seeds biochar showed excellent adsorption of ciprofloxacin at pH 6 and temperature 303 K when the dosage was 0.07 g. The Langmuir removal capacity of 33.44 mg/g was received and the Freundlich model provided the best-fits. The ciprofloxacin-500mg adsorption process correlated well with the pseudo-second-order kinetics equation, and the intraparticle diffusion mechanism mainly controlled the process. The characterization of biochar concluded that O–H groups, C[dbnd]O groups, COO⁻groups and C–F groups, and π-π interactions, pore-filling effect, and cation exchange interactions played a role in the adsorption process. Therefore, the findings of the present work revealed that soapnut seeds biochar would be an excellent low-cost adsorbent for the removal of ciprofloxacin-500mg from wastewater. © 2021 Elsevier Ltd

Document details - Clad-modified fiber optic sensor utilizing CdS nanoflower as cladding for the detection of ethanol

Journal of Materials Science: Materials in Electronics
Volume 32, Issue 19, October 2021, Pages 23900-23910

Clad-modified fiber optic sensor utilizing CdS nanoflower as cladding for the detection of ethanol(Article)

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Abstract

Nowadays, sensing and detection of ethanol is paramount one for numerous applications including production of ethanol, fuel processing, chemical processing in industry, traffic management, food package testing for safety and medical applications. On the other hand, the rapid growth of nanotechnology paves the way to develop highly sensitive, portable and low-cost sensors with less power consumption. In line with this fact, a cladding modified fiber optic ethanol sensor using CdS nanoflower has been reported in the present study. CdS nanoflower was prepared by one step hydrothermal synthesis and subjected for various characterization techniques to investigate the material properties. The sensor probe was developed via cladding modification technology followed by dip coating of CdS nanoflower over an unclad section of an optical fiber. The potency of CdS nanoflower has been probed for 0–300 ppm of acetone, ethanol, methanol and isopropanol at ambient environment. The sensing results demonstrates that the sensor coated with CdS nanoflower manifested better sensing performances towards ethanol (~4.6% at 300 ppm) with response/recovery of 90 s and 100 s than other gases. The unique sensing feature compiled that CdS nanoflower is desirable candidate in effective quantification of ethanol.

Document details - Graphene-based materials for environmental applications: a review

Environmental Chemistry Letters
Volume 19, Issue 5, October 2021, Pages 3631-3644

Graphene-based materials for environmental applications: a review(Review)

Karthik, V., Selvakumar, P., Senthil Kumar, P., Vo, D.-V.N., Gokulakrishnan, M., Keerthana, P., Tamil Elakkiya, V., Rajeswari, R.
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View additional affiliations

Abstract

The recent discovery and synthesis of graphene materials have led to many applications in various fields such as medicine, energy and environment. Here, we review the synthesis, functionalization, properties and applications of graphene materials with focus on environmental applications such as detection and adsorption of pollutants, and photocatalysis. For instance, hybrid systems can detect pollutants at levels of 0.1 nM Pb^{2+}, 5 nM Hg^{2+} and 0.3 μmol Cu^{2+} per L with a faster response time. Graphene-based materials have adsorption capacities ranging from 21 to 1125 mg/g for metal ions, and from 1 to 827 mg/g for organic pollutants. Graphene oxide-based photocatalytic devices allow more than 95% of dye degradation.

Author keywords

Analysis · Functionalization · Graphene · Remediation · Synthesis · Toxic pollutant

Document details - Tribological performance of aluminium hybrid self-lubricating composites reinforced with green synthesized graphene

Materials Research Express

Volume 8, Issue 9, September 2021, Article number 096530

Tribological performance of aluminium hybrid self-lubricating composites reinforced with green synthesized graphene(Article)(Open Access)

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Abstract

In this contemporary research work, graphene nanosheets were synthesized by the green method using agricultural waste and characterized by FESEM, XRD and Raman spectroscopy. Vortex liquid metallurgy technique is used to fabricate AA7075 hybrid composites reinforced with graphene and hard ceramic. The samples were evaluated for tensile strength, hardness and tribological behaviour. The influencing wear parameters percentage of graphene reinforcement, load, sliding speed and sliding distance were varied three levels each. An empirical relationship was formulated using face-centred central composite design considering wear weight loss and coefficient of friction as output responses. The influencing parameters on the output responses were determined by employing analysis of variance and the objective is to find the optimal process parameters. Graphene enriched the mechanical and wear behaviour. The composite having a 0.5 reinforcement percentage of graphene exhibited higher hardness and higher tensile strength. The optimal combination of tribological parameters for minimum wear loss and friction coefficient was found for 0.5% of graphene reinforcement, 30 N load, 2.5 m s-1 sliding speed, 3000 m sliding distance. The worn surface was also analyzed using FESEM and inverted microscope images. © 2021 The Author(s). Published by IOP Publishing Ltd.

Author keywords

Document details - Influence of tool pin profiles on the filler added friction stir spot welded dissimilar aluminium alloy joints

Materials Research Express

Volume 8, Issue 9, September 2021, Article number 096531

Influence of tool pin profiles on the filler added friction stir spot welded dissimilar aluminium alloy joints(Article)(Open Access)

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Abstract

Dissimilar metals are pretty challenging to attain enhanced mechanical properties in the conventional friction stir spot welding (FSSW) process. In this research, a new filler added friction stir spot welding (FAFSSW) process is adopted for welding dissimilar aluminium alloys of AA5052 with AA6061 by using five different tapered tool pins to enhance the mechanical and metallurgical properties of the joints. Magnesium (Mg) powder with 4.5 mg in volume fraction is considered filler material to fabricate the joints. Mechanical properties of the spot weldments like tensile shear strength test, microhardness test, and metallurgical characterizations like microstructure analysis were carried out for FAFSSW joints. The results show that a tool pin profile with 5 mm upper diameter, 2 mm lower diameter and a pin length of 1.2 mm produce a sound joint with 202.85 MPa tensile shear strength and 119.9 HV microhardness. The FAFSSW joint shows 34% higher strength than the normal FSSW joints. The microstructure analysis indicates that the Mg filler mixes well in the weld zone, and a fine grain structure is gained without any defects. © 2021 The Author(s). Published by IOP Publishing Ltd.

Author keywords

Document details - Power flow solution using a novel generalized linear Hopfield network based on Moore–Penrose pseudoinverse

Neural Computing and Applications

Volume 33, Issue 18, September 2021, Pages 11673-11689

Power flow solution using a novel generalized linear Hopfield network based on Moore–Penrose pseudoinverse(Article)

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Abstract

This paper proposes a novel generalized linear Hopfield neural network-based power flow analysis technique using Moore–Penrose Inverse (MPI) to solve the nonlinear power flow equations (PFEs). The Hopfield neural network (HNN) with linear activation function augmented by a feed forward layer is used to compute the MPI. In this work, the inverse of Jacobian matrix in solving the PFEs is determined by including feed forward network along with feedback network. The developed power flow technique is coded in MATLAB, and its effectiveness is tested on well-conditioned IEEE bus systems (9-bus, 14-bus, 30-bus, and 118-bus), naturally ill-conditioned systems (11-bus and 13-bus), and real-time Malaysian 87-bus system. The results of voltage magnitude and phase angle obtained are compared with standard Newton–Raphson method in case of well-conditioned system. Further, the sensitivity analysis of this approach is carried out against change in initial conditions, line outage, and increase in power generation to validate its robustness. The computational cost of convergence time is compared with well-known power flow techniques of Modified HNN, fourth-order Runge–Kutta (RK4), Iwamoto, and Euler method. The convergence of solution obtained from proposed technique is ensured by Lyapunov notion of stability. © 2021, The Author(s), under exclusive licence to Springer-Verlag London Ltd., part of Springer Nature.

Document details - Spectroscopic investigation of carbon nanotube as nano-filler entrapped in chitosan hydrogel beads

Journal of Molecular Structure

Volume 1232, 5 August 2021, Article number 130386

Spectroscopic investigation of carbon nanotube as nano-filler entrapped in chitosan hydrogel beads(Article)

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Abstract

The present work primarily contemplates the entrapment of carbon nanotubes (CNT) as nano-filler into chitosan hydrogel beads using the phase inversion method in order to improve thermal stability and chemical resistance. The structural, functional and thermal properties of carbon nanotube entrapped chitosan hydrogel beads (CNTCB) are explored. The XRD pattern and Raman measurements confirm the graphitic nature of the CNT and its structural changes in the case of CNTCB. The SEM, TEM and AFM measurements reveal the successful entrapment of CNT in chitosan hydrogel beads. The FTIR studies and TGA/DTA analysis further support its improved chemical resistance and enhanced thermal stability after the entrapment. © 2021 Elsevier B.V.

Author keywords

AFM | Chitosan | CNT | Entrapment | Polymer | Raman spectra

Indexed keywords

Engineering controlled: Chemical analysis | Chemical stability | Chitosan | Fourier transform infrared spectroscopy | Hydrogels

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micro-electrical discharge machining to improve process parameters and flushing properties (Bulletin of the Polish Academy of Sciences Technical Sciences (2020) 68:3 (565-573) DOI: 10.24425/bpasts.2020.133366)

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Bulletin of the Polish Academy of Sciences: Technical Sciences

Volume 69, Issue 4, August 2021, Article number e00ret1

Retraction: Machining of microholes in Ti-6Al-4V by hybrid micro-electrical discharge machining to improve process parameters and flushing properties (Bulletin of the Polish Academy of Sciences Technical Sciences (2020) 68:3 (565-573) DOI: 10.24425/bpasts.2020.133366)(Erratum)

Muglian, T., Aezhical Valbel, M.S., Santhosh, S., Sugumar, D., Ezhil Singh, S.C.

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Original document

Machining of microholes in Ti-6Al-4V by hybrid micro electrical discharge machining to improve process parameters and flushing properties

(2020) Bulletin of the Polish Academy of Sciences: Technical Sciences, 68 (3), pp. 565-573.

Abstract

Note: The authors request the retraction of the publication "Machining of microholes in Ti-6Al-4V by hybrid micro-electrical discharge machining to improve process parameters and flushing properties" because of an ethical conflict with other performers of research results described in the article. This article has been retracted by the publisher. Reasonable effort should be made to remove all past references to this paper. © 2021 The Author(s).

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Document details - Advanced techniques to remove phosphates and nitrates from waters: a review

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Environmental Chemistry Letters

Volume 19, Issue 4, August 2021, Pages 3165-3180

Advanced techniques to remove phosphates and nitrates from waters: a review(Review)

Velusamy, K., Periyasamy, S., Kumar, P.S., Vo, D.-V.N., Sindhu, J., Sneka, D., Subhashini, B.

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Abstract

At high levels, phosphates and nitrates from mineral fertilizers and wastewaters are contaminating natural waters, leading, for example, to eutrophication and death of many living species. This requires remediation techniques such as physical, chemical, biological methods, and nano-techniques. For instance, microbes such as Bacillus subtilis, Pseudomonas, Achromobacter, Spirulina platensis and Chlorella vulgaris allow denitrification and can remove 55% of phosphates. Removal can be done also using adsorbents produced from wastes and bio-sorbents. Here we compare the methods to remove phosphates and nitrates in waters. © 2021, The Author(s), under exclusive licence to Springer Nature Switzerland AG.

Author keywords

Environmental pollutants | Nitrates removal | Phosphates removal | Water system

Cited by 44 documents

Xu, Z., Guo, H., Gan, J.
Simultaneous removal of phosphate and tetracycline using LaFeO3 functionalised magnetic biochar by obtained ultrasound-assisted sol-gel pyrolysis: Mechanisms and characterization
(2023) Environmental Research

Abdulwahid, A.S., Mohammed, F., Hadi, M.
Investigating the Nitrate Absorption Capacities of Sargassum Polycystum Biomass
(2023) Journal of Chemical Health Risks

Aryee, A.A., Han, R., Qu, L.
Preparation of zirconium functionalized magnetic peanut husk crosslinked with polyethyleneimine and its application for the adsorption of phosphates in aqueous solution
(2023) Journal of Environmental Chemical Engineering

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Document details - Visible light assisted degradation of Atenolol by Fe-TiO₂: Synthesis, characterization, optimization and mechanism

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Volume 239, August 2021, Article number 166658

Visible light assisted degradation of Atenolol by Fe-TiO_2: Synthesis, characterization, optimization and mechanism(Article)

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Abstract

Photo stimulation of Fe doped TiO_2 (Fe-TiO_2) under visible light irradiation (i.e. 300 W Halogen lamp) was employed for atenolol (ATL) removal from domestic wastewater effluent. As a first step, Fe nanoparticles (NPs) were synthesized using Acacia Catechu pods, doped with TiO_2, characterized using UV–vis spectrometry, SEM, TEM, FT-IR, XRD and XPS, and subsequently, used for photo degradation experiments. The experimental variables, viz., initial contaminant concentration (10–50 mg/L), pH (6–12), photocatalyst concentration (500–2000 mg/L) and reaction time (30–180 min.) were optimized using response surface methodology (RSM). A positive correlation between catalyst dosage and ATL degradation was observed in RSM up to a catalyst dose of 1.25 g/L when pH was between 7 and 9. After 105 min, a maximum of 85 % ATL removal was achieved at pH 9, 1.25 g/L of Fe-TiO_2 dosage at an initial ATL concentration of 10 mg/L. The obtained RSM model demonstrated a high correlation between experimental and predicted values of ATL removal (R^2 ~0.95). Cleavage of ether bond, hydroxylation of aromatic ring and oxidation of amine moieties were responsible for the degradation of ATL by visible light activated Fe-TiO_2. The electrical energy consumed per order (EE/O) was evaluated to ascertain the efficiency of irradiation intensity and EE/O values were found to increase with increase in the initial ATL concentration. Overall, the green synthesized Fe-TiO_2 could be an useful alternative for commercial photocatalysts. © 2021 Elsevier GmbH

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Document details - Novel organic assisted Ag-ZnO photocatalyst for atenolol and acetaminophen photocatalytic degradation under visible radiation: performance and reaction mechanism

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Environmental Science and Pollution Research

Volume 28, Issue 29, August 2021, Pages 39632-39647

Novel organic assisted Ag-ZnO photocatalyst for atenolol and acetaminophen photocatalytic degradation under visible radiation: performance and reaction mechanism(Article)(Open Access)

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Abstract

This study is on photocatalytic degradation of pharmaceutical residues of atenolol (ATL) and acetaminophen (ACT) present in secondary effluent under visible light irradiation stimulated by Ag doped ZnO (Ag-ZnO) photocatalyst. Lawsonia inermis leaf extract was used for reduction of Zinc sulphate to ZnO nanoparticles (NPs). Further, ZnO NPs were doped with Ag and characterized by XRD, FT-IR, SEM-EDX, surface area analyzer, UV-Vis, and photoluminescence spectrometry to analyze the structure, morphology, chemical composition, and optical property. FT-IR analysis revealed major functional groups such as OH, C=O, and SEM analysis depicted the polyhedron shape of the NPs with size range of 100 nm. Ag-ZnO NPs were used in the photocatalytic degradation of ATL and ACT, and its removal was evaluated by varying initial contaminant concentration, catalyst dosage, and initial pH. Findings indicate that Ag-ZnO NPs demonstrated relative narrow bandgap and efficient charge separation that resulted in enhanced photocatalytic activity under visible light illumination. The photocatalytic degradation of ATL and ACT fitted well with pseudo-first-order kinetic model. Further, it was found that under optimal conditions of 5 mg/L of contaminants, pH of 6.5, and catalyst dose of 1 g/L, degradation efficiency of 78.2% (ATL) and 98.8% (ACT) was achieved for a reaction time of 120 min. More than 60% reduction in TOC was observed for both contaminants and OH• pathway was found to be the major removal process. Ag-ZnO photocatalyst showed good recycling performance, and these findings indicate that it could be cost effectively employed for removing emerging contaminants under visible light radiation. © 2021, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Lawsonia inermis (Henna) · Organic synthesis · Pharmaceutical contaminants · Photocatalysis · Wastewater treatment

Indexed keywords

GEOBASE Subject Index: catalysis · catalyst · degradation · effluent · performance assessment · photodegradation · plant extract · reaction kinetics · visible spectrum

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Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering
Volume 235, Issue 4, August 2021, Pages 1073-1081

Optimization of squeeze casting parameters of hybrid aluminium matrix composite using Taguchi approach(Article)

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Abstract

Squeeze casting is one of the simplest processes of manufacturing of composite materials and it attains higher advantages of low material processing cost, easy handling of material, size, design and good stability of matrix structure. LM24 aluminium alloy reinforced with silicon carbide (SiC) and coconut shell ash (CSA) were used to prepare the composite. LM24 alloy had wide engineering applications, wherein the addition of SiC enhances the wear resistance and CSA particles offer significant technical and economic benefits. In the present study, the composite samples were prepared based on Taguchi experimental conditions L_{16} (4-levels and 5- parameters) through squeeze casting method. From the experimental results, percentage of reinforcement and squeeze pressure were most influential parameters on impact strength. The optimum casting condition was obtained by using Taguchi optimization. From microstructural study, applying high level of squeeze pressure improved the uniform dispersion, good bonding between the matrix and reinforcement. Also, 25% of impact strength was improved the composite using Taguchi optimum conditions compared than conventional alloys. Higher squeeze pressure seen to have refined dendritic structure with uniform distribution of reinforcement materials in the aluminium matrix. © IMechE 2021.

Author keywords

coconut shell ash | LM24 aluminium alloy | squeeze casting | Taguchi method

Indexed keywords

Engineering controlled terms: Casting | Composite structures | Impact strength | Materials handling | Silicon alloys | Silicon carbide | Squeeze casting | Taguchi methods | Wear resistance

Engineering uncontrolled: Aluminium matrix composites | Engineering applications | Experimental conditions | Percentage of reinforcements

Document details - Cleaner production of self-compacting concrete with selected industrial rejects-an overview

Silicon
Volume 13, Issue 8, August 2021, Pages 2809-2820

Cleaner production of self-compacting concrete with selected industrial rejects-an overview(Article)

Kumar, K.R., Shyamala, G., Awoyera, P.O., Vedhasakthi, K., Olalusi, O.B.
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View additional affiliations

Abstract

Sustainability issues have been a major concern in the construction field, owing to the overexploration of natural raw material sources. The high demand of natural materials is traceble to increasing urbanization and industrialization. Various landmark research achievement has been made in the production of self-compacting concrete in recent years. The focus has been on the use of wastes emanating from agricultural, construction, and industrial activities. However, finding a workable framework for the use of the alternative materials is still an issue. This study presented procedures for cleaner production of self-compacting concrete with selected industrial rejects. The use of waste materials (supplementary cementitious materials (S.C.M.) and recycled materials) were explored. The materials, according to research trend, were either utilized as a partial or total replacement of conventional materials. From the available data, the study found that industrial by-products demonstrated potential to serve as an alternative material in production of self-compacting concrete. It is shown from the study that greener, and sustainable S.C.C. with enhanced properties could be achieved by using industry rejects. The presented procedures will serve as a guide for industrial application of the materials, and also foster economic benefits to the construction sector. © 2020, Springer Nature B.V.

Document details - Fresh and mechanical characteristics of roselle fibre reinforced self-compacting concrete incorporating fly ash and metakaolin

Construction and Building Materials

Volume 290, 5 July 2021, Article number 123209

Fresh and mechanical characteristics of roselle fibre reinforced self-compacting concrete incorporating fly ash and metakaolin(Article)

Prakash, R., Raman, S.N., Divyah, N., Subramanian, C., Vijayaprabha, C., Praveenkumar, S.

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Abstract

This study covered the fresh and mechanical characteristics of self-compacting concrete incorporating various fractions of (natural) roselle fibre (1 to 4% with 1% increment by weight of powder content). The fresh state behaviour of the composite was assessed by measuring the slump flow diameter, V-funnel flow time, L-box blocking ratio and J-ring step height. Meanwhile, the mechanical characteristics of the composite were determined by measuring the compressive strength, splitting tensile strength, modulus of rupture, modulus of elasticity and impact strength. Data collected from the experiments of the fresh and mechanical characteristics of the roselle fibre reinforced self-compacting concrete mix were correlated and subjected to regression analysis. The findings indicated that the incorporation of the roselle fibre reduced the workability behaviour of the self-compacting concrete. By contrast, the mechanical characteristics, such as compressive strength, splitting tensile strength, modulus of rupture and modulus of elasticity were enhanced with increasing fibre content. However, 4% fibre addition resulted in a marginally decreased compressive strength and modulus of elasticity of the self-compacting concrete. Empirical equations were developed to correlate the splitting tensile strength, flexural strength and modulus of elasticity to the compressive strength with high values of coefficient of determination. Experimental findings were found to be in

Document details - Experimental investigation on EDM of Si₃N₄–TiN using grey relational analysis coupled with teaching-learning-based optimization algorithm

Ceramics International

Volume 47, Issue 13, 1 July 2021, Pages 19153-19168

Experimental investigation on EDM of Si_3N_4–TiN using grey relational analysis coupled with teaching-learning-based optimization algorithm(Article)

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[b]Government College of Technology, Coimbatore, Tamil Nadu, India

Abstract

Electric discharge machining of silicon nitride–titanium nitride (Si_3N_4–TiN) ceramic composites was conceded for making square and circular profiles. Five imperative machining parameters namely current, pulse-on time, pulse-off time, dielectric pressure and spark gap voltage have been contemplated to resolve the response characteristics like material removal rate, electrode wear rate, surface roughness and geometrical tolerances. Multi Criteria Decision Making techniques like GRA and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) are used to discover the optimal set of machining parameter combinations to accomplish maximum efficiency of all the responses. Also, Metaheuristic or nature inspired algorithm namely GRA coupled with TLBO algorithm is engaged for obtaining global optimum parameters. The parameters like the current, pulse-on time and spark gap voltage have the indicative impact on the responses like MRR, EWR and geometrical tolerances. It is acknowledged that the current and pulse-on time are most significant parameters among others. The optimal EDM parameters based on GRA and TOPSIS methods for obtaining better responses are current - 10 amps; pulse-on time - 8 μsec; pulse-off time - 4 μsec; dielectric pressure - 20 kg/cm² and spark gap

Document details - Compactible Level Measurement and Forewarning in Petrol Station

1 of 1

Journal of Physics: Conference Series

Volume 1917, Issue 1, 14 June 2021, Article number 012003

National Virtual Conference on Advanced Informatics, Electronics and Vision 2021, NCAIEV 2021; Pollachi; India; 23 April 2021 through ; Code 169633

Compactible Level Measurement and Forewarning in Petrol Station(Conference Paper) (Open Access)

Moorthy, V.P., Subramanian, S., Balaji, O.S.P.

Department of Electronics and Instrumentation Engineering, Government College of Technology, Coimbatore, India

Abstract

It is known that India is the third-largest country in fossil fuel consumption, and the economy of India dramatically depends on the transportation of goods and services which require fuel. Petrol stations should ensure the correct fuel stock and restore the fuel on time once it gets exhausted. Thus, the customer's needs get satisfied. Generally, the level measurement in fuel storage tanks is carried out by physical methods which involve dipsticks or using some level sensors, float switch, and load cell. Dipsticks are more often used in level measurement. The usage of dipsticks involves a human operator removing and read the dipstick scale. The measured data is communicated to the refill manager through phone calls, and the petrol station gets refilled. The refilling of petrol station may get late due to improper communication and late transportation of fuel vehicles when stuck in traffic. This work aims to overcome the material problem and improve efficiency and accuracy in the level measurement of fuel by introducing automation in measurement and communication. The depth of the fuel tank is estimated by a level sensor accompanied by a Wi-Fi module to bring out automation. The measured data can be accessed directly by the user through a telegram app. The level of the fuel tank is automatically indicated. The dynamically changing data of the fuel tank can also be acquired by using the telegram app. The refill manager will be aware of the fuel level, and fuel can be restored on time. This product will be very useful in remote areas. This product has vast potential and will play a significant role in fuel measurement for key oil companies. © Published under licence by IOP Publishing Ltd.

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Document details - Effect of welding speed on mechanical properties and corrosion resistance rates of filler induced friction stir welded AA6082 and AA5052 joints

1 of 1

Materials Research Express

Volume 8, Issue 6, June 2021, Article number 066531

Effect of welding speed on mechanical properties and corrosion resistance rates of filler induced friction stir welded AA6082 and AA5052 Joints(Article)(Open Access)

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[b]Institute of Materials Joining, Shandong University, Jinan, China

Abstract

Friction Stir Welding (FSW) was carried out to examine the influence of filler materials and varying process parameters on the microhardness and the joints corrosion resistance properties. Aluminium alloys 6082 and 5052, having 8 mm thickness was joined by varying parameters. The primary process parameters are rotational speed, tool travel speed, plunge depth, filler holes centre distance and filler ratio. The hardness at the weld nugget zone and corrosion rate evaluations were analyzed. The best results were obtained for the parameter combinations of 1150 rpm tool rotation, 130 mm min-1 tool travel, 0.2 mm tool plunge, the filler holes centre distance 2 mm and a powder filler made of 95% magnesium and 5% chromium. © 2021 The Author(s). Published by IOP Publishing Ltd.

Author keywords

(Aluminium alloys) (Corrosion) (Filler) (Friction stir welding) (Microstructure)

Indexed keywords

scopus.com/record/display.uri?eid=2-s2.0-85106550430&doi=10.1088%2f2631-8695%2fabfe1d&origin=inward&txGid=16c52baa7f676bfc99c2f72dfdefcd14

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Document details - Influence of In-situ induction heated friction stir welding on tensile, microhardness, corrosion resistance and microstructural properties of martensitic steel

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Engineering Research Express

Volume 3, Issue 2, June 2021, Article number 025023

Influence of In-situ induction heated friction stir welding on tensile, microhardness, corrosion resistance and microstructural properties of martensitic steel(Article)

Mohan, D.G., Gopi, S.

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[b]Government College of Technology, Coimbatore, Tamilnadu, India

Abstract

Induction Heated Friction Stir Welding (IH-FSW) was conducted using two varying parameters and two fixed parameters. The microstructure evaluation shows that the nugget zone's grain size is smaller while comparing with the parent metal. Due to dynamic recrystallization during the induction heated friction stir welding, well-equiaxed grains were found in the nugget zone. The microhardness test reveals that the welded region have improved hardness than the parent metal; the high hardness was attained in the heat-affected zone. The 3 h and 24 h of weight-loss corrosion test methods were conducted using the coefficient of 0.5 M H_2SO_4, showing that the stir zone's corrosion resistance is better than the parent material. The given parameter combinations obtain the best results, tool rotation of 1250 rpm, welding speed of 45 mm min^{-1}, shoulder penetration of 0.50 mm and induction heat input of 441.8 °C at 50 W. © 2021 IOP Publishing Ltd.

Author keywords

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Document details - Rational design of Shewanella sp. L-arabinose isomerase for D-galactose isomerase activity under mesophilic conditions

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Enzyme and Microbial Technology

Volume 147, June 2021, Article number 109796

Rational design of Shewanella sp. L-arabinose isomerase for D-galactose isomerase activity under mesophilic conditions(Article)

Jayaraman, A.B., Kandasamy, T., Venkataraman, D., S., M.

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Abstract

D-Tagatose, a potential low calorific substitute for sucrose, can be produced by bioconversion of D-galactose catalysed by L-arabinose isomerase. L-Arabinose isomerase from Shewanella sp. ANA-3 is unique for its ability to catalyse bioconversion reactions under mesophilic conditions. However, D-galactose not being a natural substrate for L-arabinose isomerase is catalysed at a slower rate. We attempted to increase the biocatalytic efficiency of Shewanella sp. L-arabinose isomerase by rational design to enhance galactose isomerisation activity. In silico molecular docking, analysis has revealed that F279 is sterically hindering the binding of D-galactose at the C6 position. Substitution of bulky Phe residue with smaller hydrophilic residues such as Asn and Thr increased the galactose isomerase activity by 86 % and 12 % respectively. At mesophilic conditions, F279N mutant catalysed the bioconversion of D-galactose more efficiently than L-arabinose, indicating a shift in substrate preference. © 2021 Elsevier Inc.

Author keywords

D-Galactose isomerase; D-Tagatose; L-Arabinose isomerase; Mesophilic; Molecular docking; Shewanella sp.; Site-directed mutagenesis

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Document details - Effect of self-compacting concrete infill on the flexural behavior of hollow channel sections: Experimental and numerical studies

Structural Concrete
Volume 22, Issue 3, June 2021, Pages 1720-1740

Effect of self-compacting concrete infill on the flexural behavior of hollow channel sections: Experimental and numerical studies(Article)

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Abstract

Use of hollow cold-formed steel (CFS) sections has gained popularity in the construction of light industrial and commercial structures. However, their overall load carrying capacity under flexure can be severely affected due to the possible buckling failure modes. Addition of concrete as an infill material for hollow CFS sections can significantly improve their overall performance by resisting their inward local buckling. In this paper, the effectiveness of self-compacting concrete (SCC) as an infill material for hollow channel sections (HCS) is investigated under flexure. In total, nine full-scale hollow channel sections with and without SCC infill are tested to understand the effect of different parameters namely (i) width to depth ratio, (ii) section thickness, and (iii) developed length. In addition, a detailed nonlinear finite element (FE) modeling was performed using the software ABAQUS. Moreover, an analytical investigation was performed to determine the ultimate moment capacity of SCC infilled sections using the strain compatibility procedure. Test results revealed that the addition of SCC infill helped in increasing the ultimate moment resistance by more than 100% when compared to the specimens with no infill. Moreover, the local buckling resistance of HCS is significantly improved due to the addition of SCC infill. The validated analytical and finite element models were used for performing an extensive parametric investigation. © 2021 fib. International Federation for Structural Concrete.

Author keywords

Document details - Enzyme-loaded nanoparticles for the degradation of wastewater contaminants: a review

Environmental Chemistry Letters
Volume 19, Issue 3, June 2021, Pages 2331-2350

Enzyme-loaded nanoparticles for the degradation of wastewater contaminants: a review(Review)

Karthik, V., Senthil Kumar, P., Vo, D.-V.N., Selvakumar, P., Gokulakrishnan, M., Keerthana, P., Audilakshmi, V., Jeyanthi, J.

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View additional affiliations

Abstract

Preventing water pollution and conserving water are major issues in the context of population growth and worldwide pollution, calling for advanced remediation techniques. Classical remediation techniques of water cleaning such as membrane adsorption are able to separate pollutants from water, yet the separated pollutants require additional treatment or disposal. Therefore, techniques that degrade the pollutant appear promising, provided that pollutants are organic and degradable. Here, we review the enzymatic degradation of organic pollutants with focus on methods to immobilize enzymes and nanoparticles as support materials. We discuss the degradation of pesticides, dyes, phenolic compounds and antibiotics. © 2021, The Author(s), under exclusive licence to Springer Nature Switzerland AG part of Springer Nature.

Author keywords

Enzyme | Immobilization | Nanoparticles | Removal | Toxic pollutants | Wastewater

Document details - Mechanical characterisation of sustainable fibre-reinforced lightweight concrete incorporating waste coconut shell as coarse aggregate and sisal fibre

International Journal of Environmental Science and Technology
Volume 18, Issue 6, June 2021, Pages 1579-1590

Mechanical characterisation of sustainable fibre-reinforced lightweight concrete incorporating waste coconut shell as coarse aggregate and sisal fibre(Article)

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Abstract

The construction industry is largely dependent on concrete as a construction material. The aggregate occupies a major volume of concrete. However, the continuous extraction of granite rock for coarse aggregate leads to the increase in demand of natural resources of future generations. In this study, coconut shell, an agricultural waste, is used to replace conventional aggregate in concrete for producing coconut shell lightweight concrete. To enhance the weak mechanical characteristics of lightweight concrete, various contents of sisal fibre at 1%, 2%, 3% and 4% have been added on the basis of the binder's weight. Mechanical properties, such as compressive strength, split tensile strength, flexural strength, elastic modulus and impact resistance, were examined. Results showed that the compressive strength increased by up to 6% when 3% fibre was added. An improvement in split tensile strength of 14%, flexural strength of 11% and modulus of elasticity of 6% was observed when a maximum of 3% fibre was added. Impact

Document details - Geotechnical Investigation and Numerical Analysis of Slope Failure: A Case Study of Landslide Vulnerability Zone in Kolli Hills, Tamil Nadu

Journal of the Geological Society of India
Volume 97, Issue 5, May 2021, Pages 513-519

Geotechnical Investigation and Numerical Analysis of Slope Failure: A Case Study of Landslide Vulnerability Zone in Kolli Hills, Tamil Nadu(Article)

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Abstract

Landslides are the downward movement of materials under the influence of gravity when shear stress exceeds the shear strength of the material. It includes various movements resulting in complex type of slope failures which commonly occurred on cut slopes of Ghat roads in mountaneous region. The study area chosen for the geotechnical investigation is Kolli hills situated in the tail end of the Eastern Ghats in Namakkal district of Tamil Nadu, India. The ghat road section of 20 km stretch along with 70 hairpin bends, connects the foothills at Karavallikkombai to Sholaikkadu at the top is selected for the present study. The hill is situated at a fault zone which is extended from Mettur dam, Salem district, Tamil Nadu. In this study, undisturbed soil samples were collected from 10 landslide locations and tested for its index and engineering properties. Based on the test results,

Document details - A hybrid MFO-GHNN tuned self-adaptive FOPID controller for ALFC of renewable energy integrated hybrid power system

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IET Renewable Power Generation

Volume 15, Issue 7, 18 May 2021, Pages 1582-1595

A hybrid MFO-GHNN tuned self-adaptive FOPID controller for ALFC of renewable energy integrated hybrid power system(Article)(Open Access)

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Abstract

This paper proposes a hybrid moth flame optimization–generalized Hopfield neural network (MFO-GHNN) optimized self-adaptive fractional order proportional integral derivative (FOPID) controller for automatic load frequency control of multi-area hybrid power system (HPS). The control problem is formulated with an objective function of area control error associated with unknown parameters such as K_p, K_i, K_d, λ and μ of FOPID controller. The fractional order of differentiator and integrator terms, and the initial values of K_p, K_i and K_d, are drawn from MFO algorithm. Then, the K_p, K_i and K_d are fine-tuned by solving the dynamic equations governing the behaviour of GHNN under system uncertainties. To test the

Document details - Predictive capability evaluation and optimization of sustainable biodiesel production from oleaginous biomass grown on pulp and paper industrial wastewater

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Renewable Energy

Volume 168, May 2021, Pages 204-215

Predictive capability evaluation and optimization of sustainable biodiesel production from oleaginous biomass grown on pulp and paper industrial wastewater(Article)

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[c]Department of Civil Engineering, S R Engineering College Warangal, Telangana, India

View additional affiliations

Abstract

Biodiesel, as a green fuel, acts as a potential candidate to supplement conventional fossil fuels. This research study targets green environment (using biodiesel) and clean environment (reduce wastewater) by producing biodiesel through oleaginous biomasses (Yarrowia lipolytica, Metschnikowia

Document details - Emission profiling of a common rail direct injection diesel engine fueled with hydrocarbon fuel extracted from waste high density polyethylene as a partial replacement for diesel with some modifications

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Energy and Environment

Volume 32, Issue 3, May 2021, Pages 481-505

Emission profiling of a common rail direct injection diesel engine fueled with hydrocarbon fuel extracted from waste high density polyethylene as a partial replacement for diesel with some modifications(Article)

Duraisamy, K., Ismailgani, R., Paramasivam, S.A., Kaliyaperumal, G., Dillikannan, D.

[a]Department of Mechanical Engineering, Government College of Technology, Anna University, Coimbatore, India
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View additional affiliations

Abstract

A hydrocarbon fuel extracted from waste high-density polyethylene (WHDPE) by catalytic pyrolysis in a batch scale reactor is blended with diesel by 30% vol. (called as D70H30) is tested in a variable compression ratio engine equipped with a common rail system. Experiments were conducted at three compression ratios (16:1, 17.5:1, and 19:1) and exhaust gas re-circulation (EGR) rates (0%, 10%, and 20%) at the engine's rated power to evaluate its combustion, performance and emission characteristics. The results revealed that, increasing the compression ratio resulted in higher peak cylinder pressure (PCP) and heat release rates (HRR). Introduction of EGR diminished both PCP and HRR peaks. The brake thermal efficiency of D70H30 blend was 4% lower than diesel at same operating conditions which got better at higher compression ratio without EGR. NOx emission was highest when injected at compression ratio 19:1 and at 0% EGR rate which was 6% and 3% higher than diesel and D70H30 blend operated at engine stock settings. In comparison with baseline diesel smoke opacity remained lower at all operating conditions, where lowest smoke emission was recorded at CR19 and at 0% EGR rate. UHC and CO emission followed the similar trend of smoke opacity. Whereas CO_2 emission increased with compression ratio and reduced with induction of EGR. It can be concluded from the study that at higher compression ratio and low EGR rates D70H30 blend can be effectively utilized in a CRDI engine. © The Author(s) 2020.

Author keywords

(Diesel engine) (emissions) (HDPE) (plastics) (waste to energy)

Indexed keywords

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Document details - Quantum chemical insight properties of glyphosine(N, N-Bis (phosphonomethyl) glycine) – a combined hf and density functional study

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Digest Journal of Nanomaterials and Biostructures

Volume 16, Issue 2, April - June 2021, Pages 535-554

Quantum chemical insight properties of glyphosine(N, N-Bis (phosphonomethyl) glycine) – a combined hf and density functional study(Article)(Open Access)

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[b]Department of Physics, Government College of Technology, Tamil Nadu, Coimbatore, 64101, India

Abstract

The ab initio HF and Density Functional (DFT / B3LYP) method with a 6-31G(d, p) basis was used to declare a geometric structure and vibrational wave ranges of the glyphosine (GPS) (N, N-Bis (phosphonomethyl) glycine). HF and DFT calculations have optimized geometric hops. The B3LYP method, basis set on a 6-31 G (d, p), is the best level in theory for repeating constructive wave numbers.Density functional theory was used to explore the first hyperpolarizability (β) of the GPS. The results of the computations also indicate that the fragment GPS could be analyzed with Natural Bond Orbital (NBO). The FT-IR and FT-Raman theoretical spectra were constructed for the title component. The prospective, absolute and partial molecular electrostatic density (TDOS, PDOS) was evaluated for the GPS. The established energy from HOMO and LUMO shows that the charge is transferred in the fragment. © 2021, S.C. Virtual Company of Phisics S.R.L. All rights reserved.

Author keywords

(DOS) (Glyphosine (GPS)) (HOMO-LUMO) (NBO analysis) (PES scan)

ISSN: 18423582
Source Type: Journal
Original language: English

DOI: 10.15251/DJNB.2021.162.535
Document Type: Article
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Document details - Spatial Rough Intuitionistic Fuzzy C-Means Clustering for MRI Segmentation

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Neural Processing Letters
Volume 53, Issue 2, April 2021, Pages 1305-1353

Spatial Rough Intuitionistic Fuzzy C-Means Clustering for MRI Segmentation(Article)

Kala, R., Deepa, P.

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[b]Electronics and Communication Engineering, Government College of Technology, Coimbatore, Tamilnadu 641 013, India

Abstract

Medical image segmentation is the challenging problem in real-time applications due to the occurrence of noise and uncertainties between different tissues in the magnetic resonance images (MRI). To overcome the issue, spatial rough intuitionistic fuzzy C-means method has been proposed. The segmentation of MR brain image has been implemented by updating the MRI based on global spatial information of pixel with intuitionistic fuzzy c-means algorithm for segmenting cerebro spinal fluid, white matter and gray matter tissues. Intuitionistic fuzzy sets and rough sets have been used to deal with uncertainty and vagueness in medical images. Intuitionistic fuzzy sets are used for image representations by using non-membership value, hesitation along with the membership value for the MR image. The membership value and non-membership value have been obtained using fuzzy hexagonal membership and fuzzy complement function respectively. Further, roughness measures are done to determine the initial cluster centroids by considering lower and upper approximation and the fuzzy c-means clustering algorithm has been updates by the euclidean distance between the pixels based on global spatial information for segmenting MR brain image. The proposed method have been implemented and analysed with quantitative and qualitatively for the synthetic and real MR images. Experimental results exhibit a higher degree of segmentation accuracy on both synthetic and real MR images compared to existing methods and achieves better performance. Graphic abstract: [Figure not available: see fulltext.] © 2021, The Author(s), under exclusive licence to Springer Science+Business Media, LLC part of Springer Nature.

Author keywords

Classification, Fuzzy set, Intuitionistic fuzzy set, Magnetic resonance image, Rough set theory

Indexed keywords

Engineering controlled: Approximation algorithms, Brain mapping, Cerebrospinal fluid, Clustering algorithms, Cosine, Fuzzy clustering

Document details - Magnetic materials and magnetic separation of dyes from aqueous solutions: a review

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Environmental Chemistry Letters
Volume 19, Issue 2, April 2021, Pages 1275-1294

Magnetic materials and magnetic separation of dyes from aqueous solutions: a review(Review)

Nithya, R., Thirunavukkarasu, A., Sathya, A.B., Sivashankar, R.

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[c]Department of Chemical Engineering, Hindustan Institute of Technology and Science, Chennai, 603103, India

Abstract

Dye pollution from industries such as dyeing, textile, leather, cosmetics and pigments is of increasing concern, calling for advanced methods of wastewater remediation. Many techniques have been applied to treat such effluents, but adsorption remains the easiest, low-cost, effective and reliable strategies. The recent development of magnetic composites combines properties of both organic and inorganic components and is thus opening new applications for color removal. Here, we review the use of magnetic nanomaterials to adsorb dyes from aqueous solutions. We present sources of water contamination, actual technologies for wastewater treatment, the impact of dyes on health and the environment, dye removal methodologies, and the advantages of magnetic separation. We also discuss nanoparticle synthesis, results on magnetic nanomaterials for dye adsorption, and adsorption models. © 2021, Springer Nature Switzerland AG.

Author keywords

Adsorption, Dyes, Magnetic nanomaterials, Magnetic separation

Funding details

Funding sponsor	Funding number	Acronym
Henan Institute of Science and Technology		HIST

https://www.scopus.com/record/display.uri?eid=2-s2.0-85096311818&doi=10.1007%2fs10311-020-01139-x&origin=inward&txGid=4a9bc5c1a275f77b...

Document details - Hydrothermal production of algal biochar for environmental and fertilizer applications: a review

1 of 1

Environmental Chemistry Letters

Volume 19, Issue 2, April 2021, Pages 1025-1042

Hydrothermal production of algal biochar for environmental and fertilizer applications: a review(Review)

Karthik, V., Kumar, P.S., Vo, D.-V.N., Sindhu, J., Sneka, D., Subhashini, B., Saravanan, K., Jeyanthi, J.

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View additional affiliations

Abstract

Climate change and pollution induced by fossil fuel consumption is calling for alternative, renewable organic products in the context of the future circular economy. For instance, biochar has emerged as a versatile material produced during pyrolysis, hydrothermal liquefaction and gasification of biomass such as algae, plant and organic waste. Here, we review algal biomass, biochar production by hydrothermal liquefaction, biochar properties and biochar fertilizer value for plant growth. © 2020, Springer Nature Switzerland AG.

Author keywords

Algal biomass | Biochar | Fertilizer | Hydrothermal process | Pollution

ISSN: 16103653
Source Type: Journal
Original language: English

DOI: 10.1007/s10311-020-01139-x
Document Type: Review
Publisher: Springer Science and Business Media Deutschland GmbH

https://www.scopus.com/record/display.uri?eid=2-s2.0-85092800693&doi=10.1007%2fs10311-020-01111-9&origin=inward&txGid=d3878cdf0aa91d2...

Document details - Electronic waste generation, regulation and metal recovery: a review

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Environmental Chemistry Letters

Volume 19, Issue 2, April 2021, Pages 1347-1368

Electronic waste generation, regulation and metal recovery: a review(Review)

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Abstract

Waste will become the major resource in the future circular economy. In particular, E-waste is a major sector growing at an annual rate of about 2 million tonnes (Mt) with rising users of electrical and electronic items worldwide. This is a consequence of versatility and affordability of technological innovation, thus resulting in massive sales and e-waste increases. Most end-users lack knowledge on proper recycling or reuse, often disposing of e-waste as domestic waste. Such improper disposals are threatening life and ecosystems because e-waste is rich in toxic metals and other pollutants. Here we review e-waste generation, policies and recycling methods. In 2019, the world e-waste production reached 53.6 Mt, including 24.9 Mt in Asia, 13.1 Mt in USA, 12 Mt in Europe. In Asia, China (10.1 Mt), India (3.23 Mt), Japan (2.57 Mt) and Indonesia (1.62 Mt) are the largest producers contributing to about 70% of the total world e-waste generated. Only 17.4% (9.3 Mt) of the world e-waste was recycled by formal means, and the remaining 82.6% (44.3 Mt) was left untreated or processed informally. As a consequence, most countries have framed policies to provide regulatory guidelines to producers, end-users and recyclers. Yet the efficiency of these local policies are limited by the transfer of products across borders in a globalized world. Among formal recycling techniques, biohydrometallurgy appears most promising compared to pyrometallurgy and hydrometallurgy, because biohydrometallurgy overcomes limitations such as poor yield, high capital cost, toxic chemicals, release of toxic gases and secondary waste generation. Challenges include consumer's contempt on e-waste disposal, the deficit of recycling firms and technology barriers. © 2020, Springer Nature Switzerland AG.

Author keywords

Bio-hydrometallurgy | e-waste | e-waste management | Generation | Hydro-metallurgy | Informal and formal recycling | Metal recovery process | Practical challenges | Pyro-metallurgy | Regulations

Document details - System Level Protection Against Side-Channel Attack Using High Performance Virtual Secure Circuit for Cryptographic Processor

Wireless Personal Communications
Volume 117, Issue 4, April 2021, Pages 2667-2677

System Level Protection Against Side-Channel Attack Using High Performance Virtual Secure Circuit for Cryptographic Processor(Article)

Madhavapandian, S., MaruthuPandi, P.
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Abstract

The proposed system portrays the application space examination of a diverse cryptosystem processor with dynamic reconfiguration abilities. It is appropriate to a variety of signal processing application domains namely telecommunications, image processing, video coding and cryptographic processing. To differentiate between application spaces of the processor, the performance is correlated with cutting edge devices, taking ability to program, energy efficiency and computational potential as the important factors. In general the conventional method of computation is processed by means of Virtual Secure Circuit (VSC) on Advanced Encryption Standard (AES) and performance of the device Field Programmable Gate Array (FPGA) after implementation is analyzed in terms of delay and throughput. In the conventional method area overhead and power consumption are less where as the architecture lags in performance and throughput. It has been overcome through the fully parallel pipelined Architecture of the VSC on AES which outperforms the existing method in terms of performance and throughput. The energy efficiency and performance are considerably more important than processor that are used for general purpose, while still preserving a Convenient approach of programming that mainly bank on software oriented languages. The exploit of VSC based AES is to formulate the cryptographic processor held against Side Channel Attacks like attacks based on power supply and electromagnetic signals. Then the experimental result shows the promising outcomes when compared to previous methods. © 2019, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

AES, Electromagnetic signals, FPGA, VSC

Indexed keywords

Document details - Natural language processing based identification of Related Short Forum Posts through Knowledge Based Conceptualization

Proceedings - International Conference on Artificial Intelligence and Smart Systems, ICAIS 2021
25 March 2021, Article number 9396051, Pages 1733-1740
2021 International Conference on Artificial Intelligence and Smart Systems, ICAIS 2021; JCT College of Engineering and TechnologyCoimbatore; India; 25 March 2021 through 27 March 2021; Category numberCFP21OAB-ART; Code 168394

Natural language processing based identification of Related Short Forum Posts through Knowledge Based Conceptualization(Conference Paper)

Miraclin Joyce Pamila, J.C., Ajithkumar, A., Senthamil Selvi, R.
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Abstract

Online communities collaborate and users share their views using online forums. The experience and ideas shared by the users in the forum are rich but finding relevant forum posts is laborious and frustrating. This research is targeted towards comparing a post at hand to find forum posts related to it. The conventional methods for identifying text similarity are not as efficient as they do not conceptualize the short text and lead to poor performance in finding related content. This paper proposes a novel scheme for the identification of related short forum posts in discussion forums. Contrary to the use of fixed vocabulary sets in the existing schemes, the proposed method uses distinct words in the forum post pair to form a joint word set dynamically. The knowledge base is used for deriving a raw semantic vector for each forum post. Further, the two semantic vectors are used for the computation of semantic similarity. The proposed framework uses Inverted Indexing to improve the efficiency of retrieving relevant forum posts by reducing the search space with synonyms of the forum post at hand. It is proven to be efficient in finding related forum posts in discussion forums with a recall of 90% through a set of tests conducted. It is also observed that precision can be improved with the Named Entity Recognition method. © 2021 IEEE.

Author keywords

Cosine Similarity, Forum Posts, Inverted Index, Knowledge Base, Semantic Similarity, Web Forum

Indexed keywords

Engineering controlled: Artificial intelligence, Knowledge based systems, Semantics, Social networking (online)

Document details - Enhanced corrosion protection of reinforcement steel with nanomaterial incorporated fly ash based cementitious coating

Construction and Building Materials

Volume 275, 15 March 2021, Article number 122130

Enhanced corrosion protection of reinforcement steel with nanomaterial incorporated fly ash based cementitious coating(Article)

Rooby, D.R., Kumar, T.N., Harilal, M., Sofia, S., George, R.P., Philip, J.

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[b]Department of Structural Engineering, Government College of Technology, Coimbatore, Tamil Nadu 641 013, India
[c]Homi Bhabha National Institute, Mumbai, 600 094, India

Abstract

This work evaluated the performance of a novel nanophase modified fly ash based cement polymer coating over steel reinforcements in a corrosive environment. Five types of coatings were prepared with 100 wt. % Ordinary Portland Cement (CC), OPC replaced with 40 wt. % fly ash (CF), and CF admixed with 2 wt. % nano-$CaCO_3$ (CFC), nano-SiO_2 (CFS) and nano-ZrO_2 (CFZ). Electrochemical studies were carried out under exposure to chlorides and the long term performance was evaluated by impressed voltage test. The microstructure of the developed coatings and chemical composition of corrosion products were analyzed using SEM, XRD, and LRS. The instantaneous corrosion rates of CFC, CFS, and CFZ coated rebars were found to be notably lower than CF coated rebars. The accelerated studies using impressed voltage test indicated a significantly longer initiation time for cracking in nanomaterials incorporated coatings than the conventional cement polymer coating. The evaluation of electrochemical parameters like open circuit potential, corrosion current, and polarization resistance showed that the addition of nano-ZrO_2 significantly enhanced the corrosion performance of cementitious coatings as compared to other nanomaterials owing to its better dispersibility, without aggregation in cementitious product, which was further confirmed from the particle size distribution measurement using dynamic light scattering technique. The XRD patterns and laser Raman spectra results confirm negligible corrosion products on CFZ coated rebars. The visual inspection of rust formation and weight loss measurements of CFZ coated rebars, subjected to salt spray and chemical resistance tests corroborated its long term durability in chloride-rich environment. Our results suggest the important benefits of nanomaterial incorporated fly ash cementitious coating on rebars in corrosion protection. © 2020 Elsevier Ltd

Author keywords

Document details - Experimental and analytical study on properties of self-curing concrete

AIP Conference Proceedings

Volume 2327, 9 February 2021, Article number 020029

3rd International Conference on Material Science, Smart Structures and Applications, ICMSS 2020; Surya Engineering College [SEC]Erode; India; 15 October 2020 through 16 October 2020; Code 167032

Experimental and analytical study on properties of self-curing concrete(Conference Paper)

Sowdambikai, S., Vijayaprabha, C., Prakash, R., Ravathi, M.C.

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[b]Government College of Technology, Coimbatore, India

Abstract

Proper and complete curing in concrete is a predominant problem prevailing in the field of construction and management. Hence, to ensure complete curing in concrete, a supplementary self-curing agent can be added. The current investigational study observes the effects of self-curing agent Poly Ethylene Glycol (PEG) on various properties such as compressive strength, split tensile strength and flexural strength at discrete proportions of 0.5%, 1.0%, 1.5% & 2.0% by weight of cement. Also, the properties of concrete are predicted by the regression analysis. The amount of PEG to be added is optimized to be 1.5% by the weight of cement. Regression coefficients of 0.971 and 0.891 shows a proper correlation between compressive strength and flexural strength and also between compressive strength and split tensile strength. © 2021 Author(s).

ISSN: 0094243X
ISBN: 978-073544071-5
Source Type: Conference Proceeding
Original language: English

DOI: 10.1063/5.0039424
Document Type: Conference Paper
Volume Editors: Baraneetharan E.
Publisher: American Institute of Physics Inc.

Vijayaprabha, C.; Alagappa Chettiar Government College of Engineering and Technology, Karaikudi, India;

Document details - Investigations on the effects of nitrogen gas in CNC machining of SS304 using Taguchi and Firefly Algorithm

Bulletin of the Polish Academy of Sciences: Technical Sciences

Volume 69, Issue 1, February 2021, Article number e136211

Investigations on the effects of nitrogen gas in CNC machining of SS304 using Taguchi and Firefly Algorithm(Article)(Open Access)

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Abstract

This work attempts to use nitrogen gas as a shielding gas at the cutting zone, as well as for cooling purposes while machining stainless steel 304 (SS304) grade by Computer Numerical Control (CNC) lathe. The major influencing parameters of speed, feed and depth of cut were selected for experimentation with three levels each. Totally 27 experiments were conducted for dry cutting and N_2 gaseous conditions. The major influencing parameters are optimized using Taguchi and Firefly Algorithm (FA). The improvement in obtaining better surface roughness and Material Removal Rate (MRR) is significant and the confirmation results revealed that the deviation of the experimental results from the empirical model is found to be within 5%. A significant improvement of reduction of the specific cutting energy by 2.57% on average was achieved due to the reduction of friction at the cutting zone by nitrogen gas in CNC turning of SS 304 alloy. © 2021 Polish Academy of Sciences. All rights reserved.

Author keywords

Firefly Algorithm, Optimization, SS304 alloy, Taguchi method, Turning

Indexed keywords

Engineering controlled terms: Bioluminescence, Computer control systems, Optimization, Surface roughness

Document details - Dynamic modelling of Alginate - Cobalt ferrite nanocomposite for removal of binary dyes from textile effluent

Journal of Environmental Chemical Engineering

Volume 9, Issue 1, February 2021, Article number 104924

Dynamic modelling of Alginate - Cobalt ferrite nanocomposite for removal of binary dyes from textile effluent(Article)

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Abstract

The performance of Alginate - Cobalt ferrite (ACF) in a fixed bed column was assessed for the simultaneous removal of binary dyes from textile effluent. The binary dye effluent containing 32.5 mg/L of reactive red 195 (RR195) and 21 mg/L of reactive yellow 145 (RY145) was used for the study. The effect of various parameters like bed depth (3, 6, 9 and 12 cm) and flow rate of influent (5, 7.5 and 10 mL/min) for the binary adsorption using ACF was studied. The results revealed that ACF bed capacity and maximum adsorption capacity showed an increasing trend with an increased bed depth and decreased flow rate. Dynamic modeling such as Yoon - Nelson model, Thomas model and Bed Depth Service Time model (BDST) were evaluated with the experimental data. Comparatively, Yoon - Nelson and Thomas model presented better fitness for the elimination of RR195 and RY145 dye. The experimental data from dynamic studies revealed ACF's effectiveness for the sequestration of binary dyes from textile effluent. © 2021 Elsevier Ltd.

Author keywords

Alginate - Cobalt ferrite nanocomposite, Binary dye adsorption, Dynamic modeling, Fixed bed column, Real-time effluent

Indexed keywords

Engineering controlled terms: Cobalt, Ferrite, Stripping (dyes), Textiles

Engineering uncontrolled: Adsorption capacities, Bed depth service time model, Binary adsorption, Cobalt ferrites, Fixed bed columns https://www.scopus.com/record/display.uri?eid=2-s2.0-85098146886&doi=10.1016%2fj.jece.2020.104876&origin=inward&txGid=dbb8ff31cb58f35d0e...

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Document details - Heterogeneous nanocatalysts for sustainable biodiesel production: A review

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Journal of Environmental Chemical Engineering

Volume 9, Issue 1, February 2021, Article number 104876

Heterogeneous nanocatalysts for sustainable biodiesel production: A review(Review)

Narasimhan, M., Chandrasekaran, M., Govindasamy, S., Aravamudhan, A.

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Abstract

Recently, biodiesel production gained more attention due to its benefits against environmental pollution. For biodiesel production, heterogeneous catalysts were highly preferred in comparison to homogeneous catalysts due to its effective separation steps for both products and catalysts, eliminate quenching process, and offer conditions for the continuous production system. Recent studies revealed that nanoparticles are widely used as a heterogeneous catalyst for the production of biodiesel and usage of heterogeneous nanocatalyst is increasing rapidly. To reach its depth, the current review is focused on the application of various heterogeneous nanocatalysts for the production of biodiesel. © 2020 Elsevier Ltd.

Author keywords

(Biodiesel) (Heterogeneous) (Nanocatalyst)

Indexed keywords

Engineering controlled terms: (Nanocatalysts)

Engineering uncontrolled terms: (Biodiesel production) (Continuous production systems) (Environmental pollutions) (Heterogeneous catalyst) (Homogeneous catalyst) (Nano-catalyst) (Quenching process)

Engineering main heading: (Biodiesel)

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Document details - Crystallization of pure adipic acid from methanol solvent and their characterization studies: Intense NLO activity from Centrosymmetric crystal

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Volume 227, February 2021, Article number 166002

Crystallization of pure adipic acid from methanol solvent and their characterization studies: Intense NLO activity from Centrosymmetric crystal(Article)

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[b]Department of Physics, Sri Krishna College of Technology, Coimbatore, 641042, India

Abstract

The influence of methanol solvent in assisting the nucleation of adipic acid crystals has been investigated for the first time. The pH value and nucleation period was determined. The better- quality adipic acid single crystals having crystal size up to 10 x 7 x 6mm^3 were grown successfully by conventional slow solvent evaporation experiment at room temperature and their solubility has been experimented with four different solvents namely methanol, ethanol, acetone and water at three different temperature 30°, 40° and 50° respectively. Crystallographic information, crystalline nature and characteristic h k l planes of adipic acid was revealed by single crystal XRD and powder XRD studies. The direct optical band gap energy, characteristic functional groups and other information like thermal decomposition temperature, melting point were studied from UV -Vis-NIR, Spectroscopic FTIR and TG-DTA instrument analysis. The measured powder SHG efficiency of adipic acid is found to be 2.14 times superior to the reference material potassium dihydrogen phosphate (KDP). © 2020

Author keywords

(adipic acid) (Crystal growth) (Crystal structure) (FTIR) (Recrystallization) (Thermal properties)

Indexed keywords

Engineering controlled terms: (Acetone) (Crystallization) (Decomposition) (Energy gap) (Harmonic generation) (Methanol) (Nanocrystalline materials) (Nucleation) (Potassium compounds) (Single crystals) (Spectroscopic analysis) (Thallium alloys) (Uranium metallography) (Vanadium metallography) (X ray diffraction)

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Document details - Transesterification kinetics of waste cooking oil and its diesel engine performance

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Fuel

Volume 285, 1 February 2021, Article number 119108

Transesterification kinetics of waste cooking oil and its diesel engine performance(Article)

Mercy Nisha Pauline, J., Sivaramakrishnan, R., Pugazhendhi, A., Anbarasan, T., Achary, A.

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View additional affiliations

Abstract

Biodiesel is one of the renewable forms of energy and waste cooking oil (WCO) serves as an effective source to produce biodiesel through the process of transesterification. Kinetic studies on such chemical reactions help in scaling up the process, simulation studies including designing of reactors. In the present study, waste cooking oil was subjected to conventional transesterification process catalyzed by methanol and 3% (w/v) catalyst sodium hydroxide under different temperatures (40–65 °C). Methanol-oil was taken in the ratio 6:1 and maximum yield of biodiesel obtained was found to be 90% at 60 °C. The activation energy E_a of transesterification reaction of WCO to biodiesel was calculated and found to be 27.24 kJ/mol. A linear Arrhenius plot and high value of R^2 confirmed the irreversible pseudo-second order of the reaction. The biodiesel was characterized for various fuel properties such as calorific value, ash content and cetane number. Engine testing using lab scale internal combustion engine (ICE) revealed an increase in power output with lower fuel consumption with reduction of CO, CO_2, NOx, HC emission. Hence this study concluded that the WCO could be a potential feedstock to produce biodiesel. © 2020 Elsevier Ltd

Author keywords

Activation energy | Biodiesel | Emission reduction | Engine testing | Transesterification | Waste cooking oil

Indexed keywords

Engineering controlled terms: Activation energy | Arrhenius plots | Biodiesel | Diesel engines | Methanol | Sodium hydroxide | Transesterification | Waste incineration

Engineering uncontrolled terms: Diesel engine performance | Fuel properties | Potential feedstock | Pseudo second order | Simulation studies

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Document details - Secure Image Communication Through Adaptive Deer Hunting Optimization Based Vector Quantization Coding of Perceptually Encrypted Images

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Wireless Personal Communications

Volume 116, Issue 3, February 2021, Pages 2239-2260

Secure Image Communication Through Adaptive Deer Hunting Optimization Based Vector Quantization Coding of Perceptually Encrypted Images(Article)

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Abstract

Communication fields are growing rapidly in the recent era, so transmitting the multimedia contents through an open channel becomes a challenging task. The multimedia contents that are transmitted through this channel are highly prone to vulnerabilities and attacks. Therefore, secure and efficient data communication is considered as a major concern in the multimedia communication systems. So, major efforts are taken by researchers to safeguard the originality of each image. In a conventional system, the secure image communication process was achieved by compressing the content first, and then encryption is performed over the compressed data. Even though it met the required security and compression ratio, but some applications may require the reverse system. In this method, the encryption process is conducted prior to compression to improve the privacy of user data. Moreover, the initial concentration is given for improving content privacy rather than concentrating on size reduction. This paper proposes a reversed system that uses block based perceptual encryption algorithm for encryption and vector quantization (VQ) with hybrid Lloyd–Buzo–Gray (LBG)-Adaptive Deer Hunting Optimization (ADHO) algorithm (VQ-LBG-ADHO) for compression. So, the content secrecy gets improved. The involvement of this adaptive optimization method enhances the performance of VQ in the compression process. This method highly concentrates on secure communication, so the reverse process is followed in this method. It not only improves the image secrecy, however, it further enhances the image quality. The performance of this secure communication process is compared with state-of-the-art algorithms, and the results reveal that the proposed method outperforms the other existing methods. © 2020, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Adaptive scanning | Compression and vector quantization | Encryption | Perceptual encryption | Permutation https://www.scopus.com/record/display.uri?eid=2-s2.0-85089296594&doi=10.1002%2fsuco.201900390&origin=inward&txGid=cb9cc6648dbb&cb111a...

Document details - Characterization and behavior of basalt fiber-reinforced lightweight concrete

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Structural Concrete

Volume 22, Issue 1, February 2021, Pages 422-430

Characterization and behavior of basalt fiber-reinforced lightweight concrete(Article)

Divyah, N., Thenmozhi, R., Neelamegam, M., Prakash, R.

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Abstract

The improvised construction techniques and utilization of industrial wastes in manufacturing concrete play a major role in sustainability. The artificially manufactured aggregates are gaining importance in the present era. The use of fibers as secondary reinforcement is greatly pronounced. Sintered fly ash aggregate concrete and normal aggregate concrete with and without basalt fiber with 28 days compressive strength of 30 Mpa were cast and tested. The stress–strain curve of the lightweight concrete has a lower modulus of elasticity when compared with the normal aggregate concrete. A simple linear relationship has been developed between the mechanical properties using regression analysis. The water absorption and void ratio had a direct relationship with the sorptivity and ponding of concrete. The strength and durability aspects of the lightweight aggregate concrete had better agreement with the requirements of the structural lightweight concrete. Strict adherence to codal provisions with respect to strength and durability can be made for improvised behavior. © 2020 fib. International Federation for Structural Concrete

Author keywords

basalt fiber | compressive strength | flexural strength | ponding | sintered fly ash aggregate | sorptivity | split tensile strength | void ratio

Indexed keywords

Engineering controlled terms: Aggregates | Basalt | Compressive strength | Concrete industry | Concrete products | Durability | Fiber reinforced concrete | Fly ash | Light weight concrete | Regression analysis | Reinforcement | Waste utilization | Water absorption

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Document details - Groundwater chemistry and demarcation of seawater intrusion zones in the Thamirabarani delta of south India based on geochemical signatures

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Environmental Geochemistry and Health

Volume 43, Issue 2, February 2021, Pages 757-770

Groundwater chemistry and demarcation of seawater intrusion zones in the Thamirabarani delta of south India based on geochemical signatures(Article)

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[c]Department of Remote Sensing, Bharathidasan University, Tiruchirappalli, Tamil Nadu, India

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Abstract

Sub-surface water samples from the delta of Thamirabarani River of south India were evaluated for human health risks and seawater intrusion using the geochemical signatures. Electrical conductivity (EC), total dissolved solids (TDS), pH and the concentrations of major cations and anions in 40 samples collected during the winter (January) and summer (July) of 2018 show comparable values. Subsequently, the results were verified with respect to the international drinking water quality standards. The piper trilinear diagram shows mixed Ca–Mg–Cl, Na–Cl, Ca–HCO_3 and mixed Ca–Na–HCO_3 facies in the samples. Similarly, the plenteous of cations are sequenced as $Na^+ > Ca^{2+} > Mg^{2+} > K^+$ and the plenteous of anions are sequenced as $Cl^- > SO_4^{2-} > HCO_3^- > Br^- > NO_3^- > PO_4^-$. Gibbs plots illustrate that rock-water interaction and evaporation control the geochemistry of sub-surface water. More than 40% of the samples are unsuitable for drinking, and their higher EC and TDS values reflected the seawater intrusion, in addition to the anthropogenic activities (salt panning). Interrelationship between ions of sub-surface water was used to get a better insight into the saline water intrusion in the study area. To mitigate the river water salinization and seawater incursion in the aquifers, engineering solution such as weir construction across the Thamirabarani River near Mukkani village has been proposed. After construction of the weir, freshwater in the river can be diverted to the salt-affected and seawater-intruded areas to improve the scenario. © 2020, Springer Nature B.V.

Author keywords

Drinking water quality | Geochemical signature | Seawater intrusion | South India | Thamirabarani delta

Indexed keywords

Document details - Optimal Ice Thermal Energy Storage Charging Operation of Chiller Plant during Off-peak Hours

Journal of Mechanical Engineering

Volume 10, Issue Special Issue 1, 2021, Pages 159-170

Optimal Ice Thermal Energy Storage Charging Operation of Chiller Plant during Off-peak Hours(Article)

Shaari, S.R., Othman, M.L., Hizam, H., Veerasamy, V., Dahlan, N.Y., Ramachandran, R., Chik, M.H., Anuar, S.Z.

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[c]Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India

Abstract

A chiller plant (CHIP) consumes high electrical energy when high cooling thermal is required to be charged into ice thermal energy storage (ITES). This is because the electrical energy consumption of a chiller is proportional to cooling thermal. Therefore, this study aims to reduce energy consumption, E (kWh) of CHIP to charge ITES tank by using Linear Programming (LP). This technique may investigate the optimal operating period (OP) of chillers and other auxiliary equipment for ITES charge during the off-peak hour. Then, energy consumption, E (kWh) of CHIP resulted through this optimization technique support is compared to CHIP loading for ITES charge without using optimization technique. Results showed that energy saving of 11.25% was probably achieved by using optimization technique compared to ITES charging without using optimization technique. © 2021 School of Engineering, Universiti Teknologi MARA (UiTM), Malaysia.

Author keywords

Chiller plant; Energy consumption; Ice thermal energy storage; Lp; Optimization technique

Funding details

Funding sponsor	Funding number	Acronym
Universiti Putra Malaysia		UPM

Document details - Vermicomposting: An efficient technology for the stabilization and bioremediation of pulp and paper mill sludge

Cost Effective Technologies for Solid Waste and Wastewater Treatment

1 January 2021, Pages 209-217

Vermicomposting: An efficient technology for the stabilization and bioremediation of pulp and paper mill sludge (Book Chapter)

Sivakumar, S., ThamaraiselvI, K., Prabha, D., Lakshmi Priya, T., Sung-Chul, H., Pyoung-In, Y., Seong-Ho, J., Jeong-Min, S.

[a]Department of Bioenvironmental Energy, College of Natural Resources and Life Science, Pusan National University, Gyeongsangnam-do, Miryang, South Korea
[b]Bharathidasan University, Tiruchirappalli, India
[c]Department of Environmental Sciences, Bharathiar University, Tamil Nadu, Coimbatore, India

Abstract

Sludge from various industries is an efficient source of plant nutrients. Disposal of these sludges is a major problem due to their production in large quantities. On the other hand, sludge holds a large amount of organic matter and nutrients, such as nitrogen, potassium, phosphorus, and calcium, and these components are not in forms that are immediately available to crops. Earthworms and microorganisms perform a major role in releasing these minerals from the sludge to the soil. Therefore, it has been suggested that vermicomposting by using earthworms might be an excellent method in the management of industrial sludge. Stabilization of the sludge by vermicomposting prior to soil application can affect the breakdown processes prior to application, providing a humus-rich, concentrated amendment with favorable physical and structural properties. Therefore, this review article discusses the stabilization of pulp and paper mill sludge, including pH, electrical conductivity, total nitrogen, organic carbon, and the removal efficiency of metals by vermitreatment methods. © 2022 Elsevier Inc. All rights reserved.

Author keywords

C/N ratio; Earthworms; Metal removal; Pulp and paper mill sludge; Vermicompost

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Document details - Studies on the Diesel Blends Oxidative Stability in Mixture with TBHQ Antioxidant and Soft Computation Approach Using ANN and RSM at Varying Blend Ratio

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Liquid Biofuels: Fundamentals, Characterization, and Applications

1 January 2021, Pages 543-631

Studies on the Diesel Blends Oxidative Stability in Mixture with TBHQ Antioxidant and Soft Computation Approach Using ANN and RSM at Varying Blend Ratio
(Book Chapter)

Kasimani, R.

Department of Mechanical Engineering, Government College of Technology, Coimbatore, India

Abstract

Oxidation of biofuel affects the fuel quality heavily by an increase in the production of acids and other degradation products from the biofuels. This can be controlled by adding antioxidants for the biofuel to be oxidative stability by prolonging the storage. In this research, the experiments were conducted for performance and emission parameters in CI engine using ND, CIB5, CIB10, CIB15 and, CIB20 with and without the addition of antioxidant (1000ppm TBHQ) as fuel. The addition of TBHQ seems to perform better with lower BSFC and higher BTE with 12.5% and 2.9%, respectively. Also, CIB+TBHQ fuelled engine emission has increased CO, HC, NO_x and decreased CO_2 with 5%, 3%, 2.3% and 4%, respectively. NLRM was also developed for the CIB+TBHQ for easy prediction of the performance and emission parameters with a maximum absolute average error of 9.06% and minimum absolute error of 2.43%. An artificial neural network was also developed for CIB+TBHQ for predicting the performance and emission parameters with an RMSE value of 0.0255 and, 0.0033 MRE value of 1.71% and 1.62% as well as R-value of 0.97287 and 0.99858. © 2021 Scrivener Publishing LLC.

Author keywords

Antioxidant additives · biofuel · neural network · oxidative stability · RSM

Chapters in this book

Document details - Perovskite Solar Cells

1 of 1

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Materials for Solar Energy Conversion: Materials, Methods and Applications

1 January 2021, Pages 107-131

Perovskite Solar Cells
(Book Chapter)

Sivaraj, S., Rathanasamy, R., Kaliyannan, G.V., Thanigachalam, M.

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[b]Department of Mechatronics Engineering, Kongu Engineering College, Erode, Tamil Nadu, Perundurai, India
[c]Department of Mechanical Engineering, Government College of Technology, Coimbatore, India

Abstract

Renewable energy will compensate the futuristic energy demand, as non-renewable sources goes on decreasing day by day. The major renewable energy is utilized at present through photovoltaic cells. Silicon-based solar cells are readily available in market due to their longer stability and life span. However, other generation solar cells are engineered for obtaining improved performance and stability in the transition of laboratory to large-scale fabrication. Among all other solar cells, perovskite-based solar cells alone reported sudden improvement in efficiency from 14% in 2012 to 26.1% in 2020. In order to reach 25% efficiency, Si solar cells are taken an average of 40 years. In comparison with the Si solar cells, perovskite solar cells are lesser in weight, available at lower cost and non-toxic synthesis. These made the researchers to focus much more on perovskite-based solar cells. Organic lead halide perovskites are mostly used due to their physical and chemical stability and also easier availability. Slight modification in internal structures of perovskite might also have greater impact in overall performance in photoconversion process. Perovskite solar cells were employed in the applications of LEDs, photodetectors, solar cells, photoemitters, integrated circuit systems, photovoltaic cells, etc. © 2022 Scrivener Publishing LLC.

Author keywords

fabrication techniques · perovskite materials · solar cell losses · Solar cells

ISBN: 978-111975220-2;978-111975060-4
Source Type: Book
Original language: English

DOI: 10.1002/9781119752202.ch5
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Publisher: wiley

Chapters in this book

Document details - Eco-friendly fiber-reinforced concretes

1 of 1

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Handbook of Sustainable Concrete and Industrial Waste Management: Recycled and Artificial Aggregate, Innovative Eco-friendly Binders, and Life Cycle Assessment

1 January 2021, Pages 109-145

Eco-friendly fiber-reinforced concretes (Book Chapter)

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[c]Department of Civil Engineering, Government College of Technology, Tamilnadu, Coimbatore, 641013, India

Abstract

Environmental sustainability and ecofriendliness are essential components of the present and future construction industry. Ecofriendly fiber-reinforced concrete is one example of sustainable solutions in the built environment. This chapter discusses on the development of ecofriendly fiber-reinforced concretes, with a special focus to the work undertaken by the authors on the behavior and performance of ecofriendly fiber-reinforced concretes produced with fly ash, a byproduct of thermal power plants, as a partial substitute for cement, and coconut shell, a discarded agricultural solid waste, as coarse aggregates, with the incorporation of manufactured fiber (steel fiber), and plant-based natural fibers (sisal and roselle fibers). The development process as well as the mechanical properties of the resulting ecofriendly fiber-reinforced concretes were studied. The findings showed that the manufactured and natural fibers revealed a promising result on the strength and mechanical characteristics of coconut-shell aggregate-based ecofriendly fiber-reinforced concretes.

Author keywords

Concrete | Fiber-reinforced concrete | Fibers | Fly ash | Mechanical properties | Sustainability

ISBN: 978-012821730-6
Source Type: Book
Original language: English
DOI: 10.1016/B978-0-12-821730-6.00031-0
Document Type: Book Chapter
Publisher: Elsevier

Chapters in this book

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Document details - Computer-Aided Thermal Control System of 3L-ANPCI Using LabVIEW

1 of 1

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Springer Proceedings in Materials

Volume 5, 2021, Pages 1025-1034

Computer-Aided Thermal Control System of 3L-ANPCI Using LabVIEW(Book Chapter)

Sarangapani, E., Narmadhai, N., Kokila Vani, C.

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[b]Department of Electrical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract

In this paper, computer-aided (IoT) thermal control system of three-level active neutral point clamped inverter (3L-ANPCI) was proposed using LabVIEW. The Internet of Things (IoT) allows objects to be sensed or remotely controlled through existing network, creating opportunities to incorporate the physical world more deeply into the computer-based system. In addition to reducing human intervention, this results in improved efficiency, reliability and economic benefit. In many applications such as a PV network, active neutral point clamped inverter is the most desirable inverter topology due to the equal distribution of losses for switches. This topology helps the capacitors to achieve voltage balancing. The goal is to control the temperature of the junction and protect the system's uneven switching losses. LabVIEW is commonly used as an industrial monitoring and control system interface. Multisim can be used to co-simulate the three-level neutral point clamped inverter. The inverter input SPWM pulse can be supplied from LabVIEW to Multisim. The results of the simulation are confirmed by those derived from a mathematical calculation. The analysis of both tests verifies the reliability and validity of the IoT temperature monitoring from the specific IP address.

Author keywords

ANPC inverter | Internet of Things (IoT) | IOT control | Junction temperature | NPC inverter

ISSN: 26623161
DOI: 10.1007/978-981-15-8319-3_102

Cited by 1 document

Hamil, H. , Azzaz, M.S. , Sakhi, S.
Design of a thermal stabilizer based on USB data acquisition and control using LabVIEW and PIC microcontroller
(2023) 2023 International Conference on Advances in Electronics, Control and Communication Systems, ICAECCS 2023

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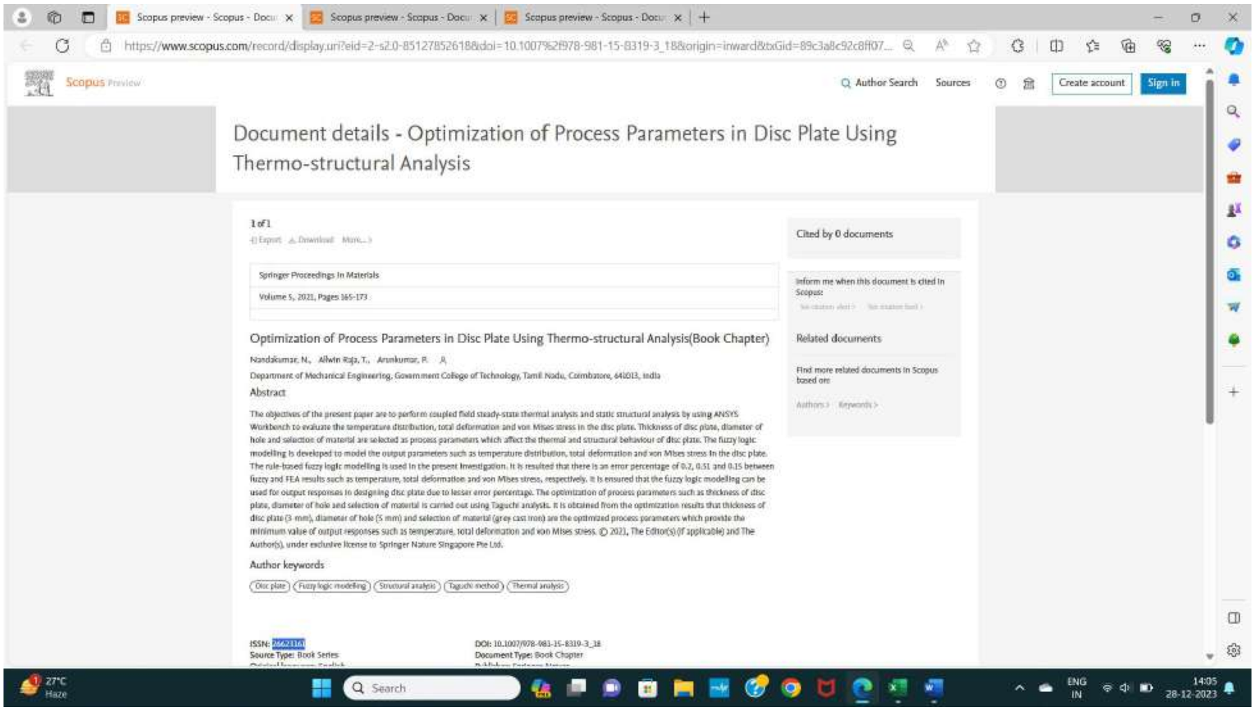

Document details - Optimization of Process Parameters in Disc Plate Using Thermo-structural Analysis

1 of 1

Springer Proceedings in Materials
Volume 5, 2021, Pages 165-173

Optimization of Process Parameters in Disc Plate Using Thermo-structural Analysis(Book Chapter)

Nandakumar, N., Allwin Raja, T., Arunkumar, P.
Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract

The objectives of the present paper are to perform coupled field steady-state thermal analysis and static structural analysis by using ANSYS Workbench to evaluate the temperature distribution, total deformation and von Mises stress in the disc plate. Thickness of disc plate, diameter of hole and selection of material are selected as process parameters which affect the thermal and structural behaviour of disc plate. The fuzzy logic modelling is developed to model the output parameters such as temperature distribution, total deformation and von Mises stress in the disc plate. The rule-based fuzzy logic modelling is used in the present investigation. It is resulted that there is an error percentage of 0.2, 0.51 and 0.15 between fuzzy and FEA results such as temperature, total deformation and von Mises stress, respectively. It is ensured that the fuzzy logic modelling can be used for output responses in designing disc plate due to lesser error percentage. The optimization of process parameters such as thickness of disc plate, diameter of hole and selection of material is carried out using Taguchi analysis. It is obtained from the optimization results that thickness of disc plate (3 mm), diameter of hole (5 mm) and selection of material (grey cast iron) are the optimized process parameters which provide the minimum value of output responses such as temperature, total deformation and von Mises stress. © 2021, The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author keywords

Disc plate · Fuzzy logic modelling · Structural analysis · Taguchi method · Thermal analysis

ISSN: 26623161
Source Type: Book Series
DOI: 10.1007/978-981-15-8319-3_18
Document Type: Book Chapter

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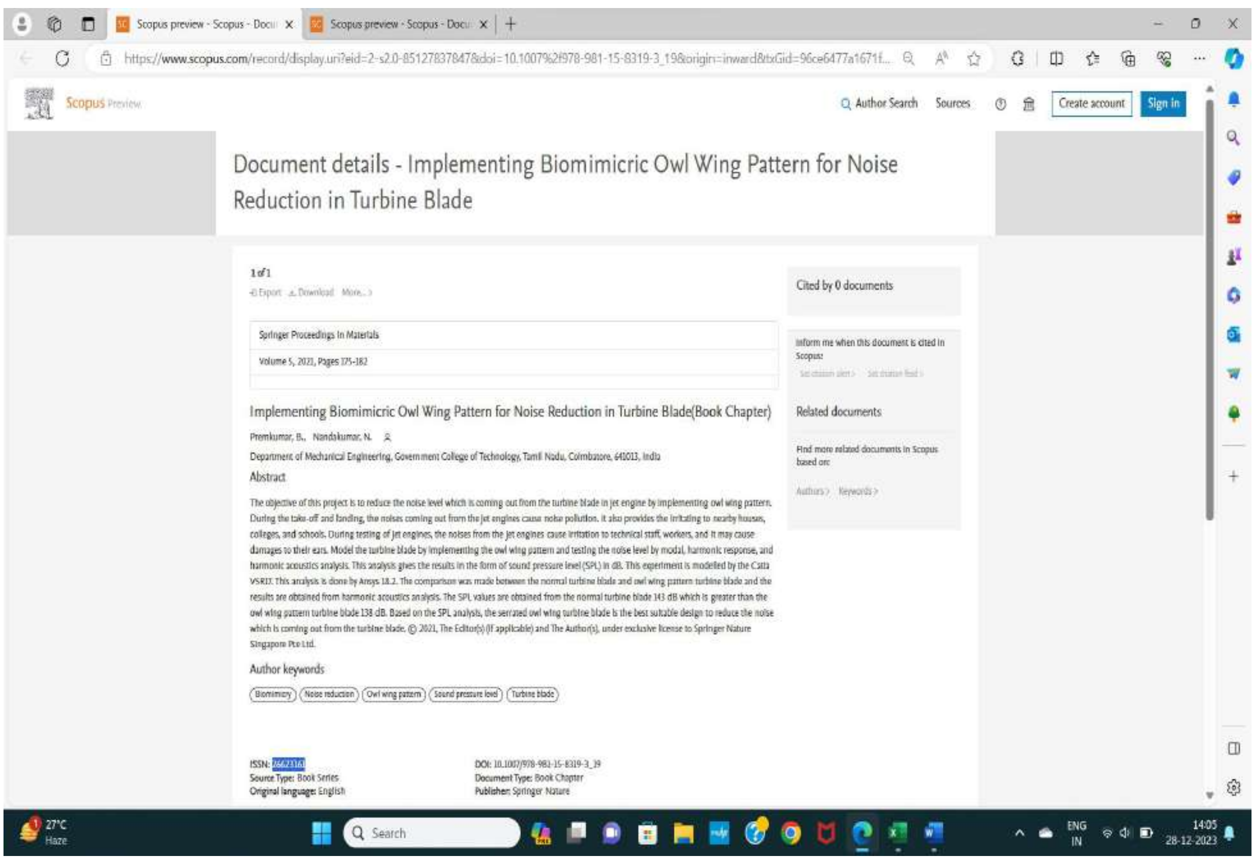

Document details - Implementing Biomimicric Owl Wing Pattern for Noise Reduction in Turbine Blade

1 of 1

Springer Proceedings in Materials
Volume 5, 2021, Pages 175-182

Implementing Biomimicric Owl Wing Pattern for Noise Reduction in Turbine Blade(Book Chapter)

Premkumar, B., Nandakumar, N.
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Abstract

The objective of this project is to reduce the noise level which is coming out from the turbine blade in jet engine by implementing owl wing pattern. During the take-off and landing, the noises coming out from the jet engines cause noise pollution. It also provides the irritating to nearby houses, colleges, and schools. During testing of jet engines, the noises from the jet engines cause irritation to technical staff, workers, and it may cause damages to their ears. Model the turbine blade by implementing the owl wing pattern and testing the noise level by modal, harmonic response, and harmonic acoustics analysis. This analysis gives the results in the form of sound pressure level (SPL) in dB. This experiment is modelled by the Catia V5R17. This analysis is done by Ansys 18.2. The comparison was made between the normal turbine blade and owl wing pattern turbine blade and the results are obtained from harmonic acoustics analysis. The SPL values are obtained from the normal turbine blade 143 dB which is greater than the owl wing pattern turbine blade 138 dB. Based on the SPL analysis, the serrated owl wing turbine blade is the best suitable design to reduce the noise which is coming out from the turbine blade. © 2021, The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author keywords

Biomimicry · Noise reduction · Owl wing pattern · Sound pressure level · Turbine blade

ISSN: 26623161
Source Type: Book Series
Original language: English
DOI: 10.1007/978-981-15-8319-3_19
Document Type: Book Chapter
Publisher: Springer Nature

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Document details - Synthesis of Graphene and fabrication of Aluminium-Gr_p nanocomposites: A review

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Volume 50, 2021, Pages 2436-2442

2nd International Conference on Functional Materials, Manufacturing and Performances, ICFMMP 2021; Lovely Professional UniversityPhagwara; India; 17 September 2021 through 18 September 2021; Code 147158

Synthesis of Graphene and fabrication of Aluminium-Gr_p nanocomposites: A review(Conference Paper)

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[b]Department of Production Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

Graphene, a two-dimensional crystalline allotrope of carbon, has attracted the interest of a growing number of researchers due to its exceptional mechanical properties. Its higher optical transparency, superior thermal and electrical conductivity, and large specific area are all important characteristics that allow it to be used in a wide range of industries, including aircraft, electronics, newer materials, solar cells, and more. In this article, the various methods of graphene synthesis such as Mechanical Exfoliation, Chemical Vapor Deposition, Chemical Exfoliation, Liquid Phase Exfoliation and Epitaxial growth and the fabrication techniques of aluminium nanocomposites have been discussed. Even though graphene could be synthesized using various techniques, each one has its own set of advantages and disadvantages. This study examines and proposes one such approach to eliminate the problems with the traditional graphene production process. Further, the properties, structures, and Graphene-based aluminium Nanocomposites have been enumerated. Graphene could also be synthesized from agricultural waste to eradicate the problems in the conventional techniques and liquid metallurgy technique shall be used to produce aluminium-graphene nanocomposites.

Author keywords

(Aluminium nanocomposites) (Graphene) (Liquid metallurgy technique) (Properties and characterization of graphene) (Synthesis methods of graphene)

Indexed keywords

Document details - SAPON approach: A new technique for Low Power VLSI Design

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2021

2nd IEEE International Conference on Applied Electromagnetics, Signal Processing, and Communication, AESPC 2021; Bhubaneswar; India; 26 November 2021 through 28 November 2021; Category numberCFP21Q16-ART; Code 177333

SAPON approach: A new technique for Low Power VLSI Design(Conference Paper)

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Abstract

Nowadays, low power VLSI is an emerging discipline where high power consumption has become a key metric in VLSI design. High power dissipation is not regarded as good when it comes to battery lifespan in the case of battery-operated applications. It alters reliability, cooling costs, and also contributes to the reduction of battery life. Switching and short circuit leakage power play a significant role in the high-frequency dynamic transition of inputs. Several standard reduction techniques exist to reduce the power consumption of circuits. In this paper, we have scrutinized the source of power consumption in static and dynamic leakage power and introduced a new technique called the SAPON (Stackly Arranged low Power ON transistor) technique to mitigate the power reduction of circuits. We have utilized various CMOS logic circuits such as INVERTER, NAND, NOR, and MUX to implement these techniques and compared their total power consumption with the standard reduction techniques. We have examined the proposed SAPON technique along with conventional, LECTOR, LCNT, and STACK ONOFIC techniques to interpret the utility of SAPON in low-power VLSI and obtained results showing that SAPON consumes low power than standard reduction techniques. These circuits are simulated in Tanner EDA Tool with Generic 250 nm transistors.

Author keywords

(CMOS) (Dynamic leakage power) (LCNT) (LECTOR) (Low power consumption) (SAPON) (short circuit leakage) (STACK ONOFIC) (VLSI)

Indexed keywords

Engineering controlled terms: (CMOS integrated circuits) (Computer circuits) (Electric batteries) (Electric power utilization) (Integrated circuit design) (Logic circuits) (Low power electronics) (Timing circuits)

Document details - Evaluating the Crucial Qualities of Hybrid Esters for Transformer Applications

2021 International Conference on Advancements in Electrical, Electronics, Communication, Computing and Automation, ICAECA 2021

2021

2021 International Conference on Advancements in Electrical, Electronics, Communication, Computing and Automation, ICAECA 2021; Virtual, Online; India; 8 October 2021 through 9 October 2021; Category numberCFP21AP9-ART; Code 176487

Evaluating the Crucial Qualities of Hybrid Esters for Transformer Applications(Conference Paper)

Karthik, M., Narmadhai, N., Thangaraj, R., Ramya, E., Rubia Gandhi, R.R., Abinaya, I.

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[b]Government College of Technology, Department of Electrical and Electronics Engineering, Tamil Nadu, Coimbatore, 641 013, India
[c]Coimbatore Institute of Engineering Technology, Department of Electrical and Electronics Engineering, Tamil Nadu, Coimbatore, 641 109, India

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Abstract

Transformer is a renowned gadget in various applications of power system without which the entire life on earth will be exterminated. The major task of transformer is to offer the endless power to the society. The foremost problem figured out with transformer is the failure of insulation. Overall, two types of insulations like liquid and solid insulations are preferred for designing the transformer in which a good number problem deals with liquid insulation which causes degradation of solid insulation and affects the efficiency of transformers. In this manuscript the transformer based mineral oil along with various natural based esters being rape-seed oil, honge oil and neem oil are tested for various characteristics like break-down voltage, flashing point, firing point and viscosity. By this exertion, the superior compositions of natural esters-based hybrid oil for transformer applications are figured out. © 2021 IEEE.

Author keywords

(breakdown voltage) (insulation) (natural esters) (regression) (transformer)

Indexed keywords

Engineering controlled terms: (Esters) (Oil filled transformers)

Document details - Wastewater to biogas recovery

Clean Energy and Resource Recovery: Wastewater Treatment Plants as Biorefineries, Volume 2

1 January 2021, Pages 301-314

Wastewater to biogas recovery
(Book Chapter)
(Open Access)

Periyasamy, S., Temesgen, T., Karthik, V., Isabel, J.B., Kavitha, S., Banu, J.R., Sivashanmugam, P.

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View additional affiliations

Abstract

The effect on climate change of greenhouse gases from fossil fuel combustion has increased the need for clean and renewable biological energies necessary for the future. A substitution for fossil-based fuels may be renewable biofuel biogas from wastewater (WW), which has the tremendous potential to meet energy demand and minimize greenhouse gas emissions. In green energy production technology, WW is wildly attracted to biogas recovery because it has environmental and economic benefits from domestic to industrial sectors. Owing to the growth of human lifestyles, urbanization, construction of WW treatment plants, and environmental legislation, the discharge of WW with high organic strength has increased enormously in recent decades. The organics present in the WW could be transformed into biogas through biological or biochemical processes and also, the contaminants could be alleviated. The knowledge of WW to biogas conversion is crucial to improve bioenergy production with a reduced operating economy. © 2022 Elsevier Inc. All rights reserved.

Author keywords

(Anaerobic digestion) (Biogas) (Organic pollutants) (Renewable energy) (Wastewater)

ISBN: 978-032390178-9;978-032390179-6 DOI: 10.1016/B978-0-323-90178-9.00029-9

Chapters in this book

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26 chapters found in Scopus

Document details - Recent Approaches in the Preparation of Various Biosorbents

Biosorption for Wastewater Contaminants

1 January 2021, Pages 79-101

Recent Approaches in the Preparation of Various Biosorbents (Book Chapter)

Nithya, R., Thirunavukkarasu, A.

Department of Industrial Biotechnology, Government College of Technology, Tamilnadu, Coimbatore, India

Abstract

Biosorbents are biomass-based materials that are capable of translocating adsorbate molecules from the bulk liquid phase to their surfaces by means of preferential adsorption. These biosorbents are ample, biodegradable, and inexpensive; they generate minimal or no sludge; they have simple pretreatment methods and are easy to operate; and they have highly versatile or manipulable surface functional groups and constructive surface-related properties. Thus they have been identified as promising candidates for removing contaminants from wastewater. The physicochemical properties of these sorbents are usually dependent on the phytochemistry of the biomass and their pretreatment synthesis routes. In addition to these conventional classes, new-generation biosorbents are emerging that have tailor-made functional groups through surface modification approaches and are augmented with natural polymers using cross-linkers. Hence, research focusing on using various pretreatment methods in the development of novel biosorbents is increasing. This chapter is intended to comprehensively review the synthetic routes of such novel biosorbents and critically examine their adsorptive capability for removing heavy metal ions, dyes, and other organic contaminants from wastewater. Challenges in the functional integrity, regeneration potential, multi-contaminant removal capacity, scale-up ability, material toxicity, and disposal practices for spent biosorbents are collectively explored. Also, the feasibility of using recombinant strains technology with the potential constraints of random mutations, creation of superbugs, plasmid stability, and unsteady diffusional behavior at interfaces have been identified as focus areas for future research.

Author keywords

(Biosorbents) (polymer crosslinking) (surface modification) (synthetic route) (wastewater)

Chapters in this book

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16 chapters found in Scopus

Document details - Dynamic Biosorption for Removal of Wastewater Contaminants

Biosorption for Wastewater Contaminants

1 January 2021, Pages 147-166

Dynamic Biosorption for Removal of Wastewater Contaminants (Book Chapter)

Thirunavukkarasu, A., Nithya, R.

Department of Industrial Biotechnology, Government College of Technology, Tamilnadu, Coimbatore, India

Abstract

Biosorption is a separation process driven by the concentration gradient in which solute molecules are diffused into a biosorbent at the solid-liquid interface until equilibrium is attained. Among the conventional water treatment techniques, biosorption is highly efficient and cost-effective, as most of biosorbents are versatile and derived from recycled biomasses. The presence of specified functional groups and the ease of tailor-made modifications to the surface of the sorbents have attracted scientific researchers to exploit their potential for removing heavy metals and a wide range of organic compounds in batch- and continuous-mode operations. This chapter critically reviews the reported dynamic biosorption studies of the removal of various pollutants from wastewater. Further, it focuses on the influence of various operational parameters that significantly affect the breakthrough curves and thus the efficacy of the fixed-bed column studies. In addition, the findings from comparative investigations of batch and column biosorption studies are reported. Finally, challenges in using biosorbents - such as stability, reactivity, regeneration, fouling, etc. - and operational constraints - including diffusional resistance, channeling effects, temperature homogeneity, and the feasibility of a series of fixed-bed columns - are discussed.

Author keywords

(biosorbents) (biosorption) (fixed-bed studies) (future challenges) (wastewater treatment)

ISBN: 978-111973762-9;978-111973759-9
Source Type: Book
Original language: English

DOI: 10.1002/9781119737629.ch8
Document Type: Book Chapter
Publisher: wiley

Chapters in this book

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- Industrial Wastewater Contaminants and Their Hazardous Impacts
- Preface
- Foreword
- Biosorption and Different Native Sources for Preparation of Biosorbents
- Biosorption for Eliminating Inorganic Contaminants (IOCs) from Wastewater
- Biosorption for Eliminating Organic Contaminants from Wastewater
- Recent Approaches in the Preparation of Various Biosorbents
- Characterization of the Biosorption Process
- Isotherm and Kinetic Modeling Analysis of Water Decontamination through Biosorption
- Dynamic Biosorption for Removal of Wastewater Contaminants
- Applications of Electrospun Membranes Immobilized with Biosorbents for the Removal of Contaminants
- Biosorption of Precious Metals from Wastewater
- Biosorption as a Strategy for the Recovery of Rare Earth Elements
- Deployment of Used Biosorbents in Environmental Remediation: Prospects and Challenges
- Removal of Hexavalent Chromium from Aqueous Media Using Eco-Friendly and Cost-Effective Biological Methods
- Biosorption of Arsenic from Wastewater

Document details - Vulnerability analysis of the groundwater quality around Vellalore-Kurichi landfill region in Coimbatore

Environmental Chemistry and Ecotoxicology
Volume 3, January 2021, Pages 125-130

Vulnerability analysis of the groundwater quality around Vellalore-Kurichi landfill region in Coimbatore(Article)(Open Access)

Thyagarajan, L.P., Jeyanthi, J., Kavitha, D.
[a]Government College of Technology, Coimbatore, India
[b]Department of Chemistry, Dr. M.G.R Educational and Research Institute, Chennai, Tamil Nadu, India

Abstract

Groundwater resources are explored and exploited to their maximum for the use in households, industries and other domestic activities. It becomes sensible to recognize its importance in quantity view point and take necessary measures to maintain its purity. The present study assesses the vulnerability of the groundwater resources to pollution due to the plume movement from the nearby landfill region of Vellalore-Kurichi village in Coimbatore. This gives better understanding of the groundwater pollution with the spatial maps outlined from the Arc GIS software. The physico-chemical parameters like pH, EC, resistivity, alkalinity, total hardness, total dissolved solids, turbidity, salinity, DO, BOD, COD, chlorides, sulphates, nitrates were analysed and the WQI values were derived from the above parameters to quantify the pollution potential in this area. The groundwater from Konavaikalpolayam, Azhumedu, Mettu-thottum and Rukmaniammal road are the most affected by contamination. The plume movement is suspected towards the North and North-western side of the landfill region. This may be due to the presence of slope towards the North-western side of the landfill. The most of the samples come under the category of poor water and so the water is unfit for even domestic purposes. The results stresses the need for the local bodies to take necessary action to prevent contamination of the groundwater in this region by following a holistic approach to prevent further contamination. © 2021 The Authors

Author keywords

Contamination | GIS | Groundwater | Plume movement | Spatial maps | Water quality index

Document details - Frontiers of Advanced Sciences and Technologies: Results, Challenges and Perspectives

Engineered Science
Volume 16, 2021, Pages 1-4

Frontiers of Advanced Sciences and Technologies: Results, Challenges and Perspectives(Editorial)

Gu, H., Guo, Z., Naik, N., Shetty, D.K., Hameed, B.M.Z., Chakraborty, U.K., Paul, R., Vanahalli, M.K., Srivastava, D.K., Gupta, A., Singh, B., Kumar, S., Aaydee, N., Liu, C., Hao, Q., Zhang, H., Patil, S., John, B., Karuppanan, S., Sun, L., Le, T.Q., Gurunathan, B., Muthukumaran, C., Sham Aan, M.P., Lu, N., Zhou, H.N., Manoharan, A.N., Maddodi, B.
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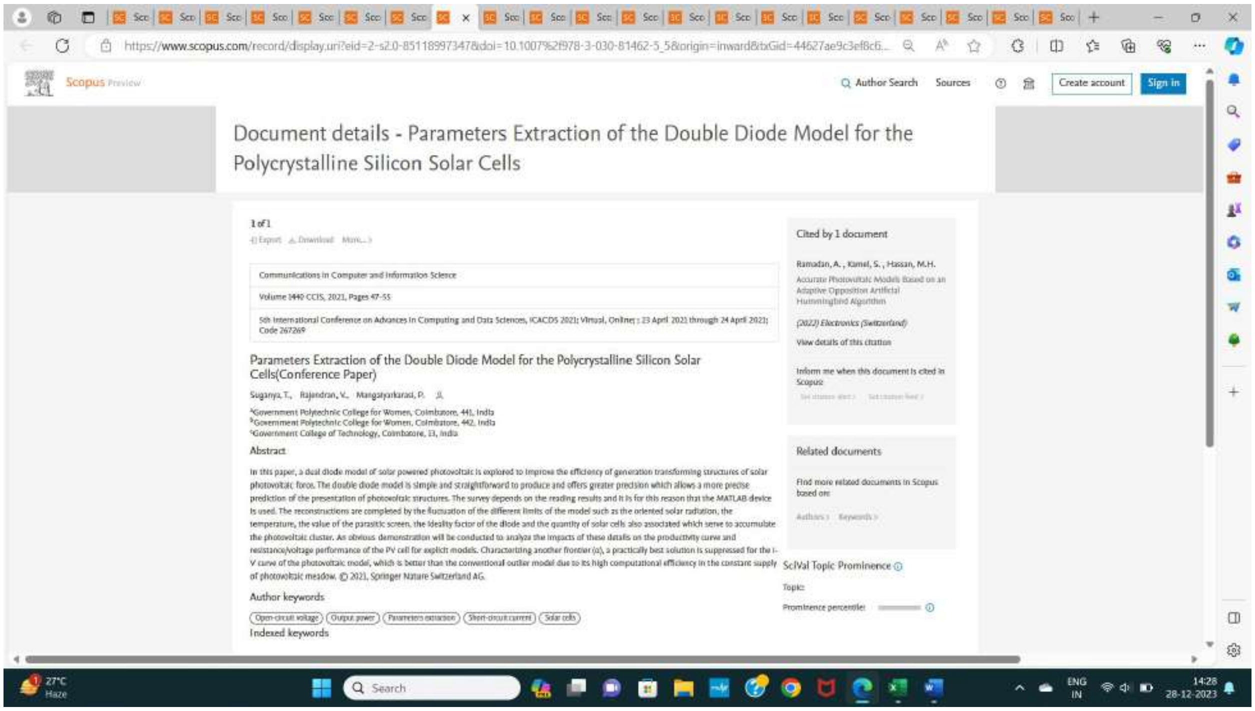
View additional affiliations

Abstract

[No abstract available]

ISSN: 2576988X
Source Type: Journal
Original language: English
DOI: 10.30919/es8e557
Document Type: Editorial
Publisher: Engineered Science Publisher

Gu, H.; Shanghai Key Lab of Chemical Assessment and Sustainability, School of Chemical Science and Engineering, Tongji University, Shanghai, China;



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Document details - Parameters Extraction of the Double Diode Model for the Polycrystalline Silicon Solar Cells

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Communications in Computer and Information Science

Volume 1440 CCIS, 2021, Pages 47-55

5th International Conference on Advances in Computing and Data Sciences, ICACDS 2021; Virtual, Online; 23 April 2021 through 24 April 2021; Code 267269

Parameters Extraction of the Double Diode Model for the Polycrystalline Silicon Solar Cells(Conference Paper)

Suganya, T., Rajendran, V., Mangaiyarkarasi, P.

[a]Government Polytechnic College for Women, Coimbatore, 441, India
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[c]Government College of Technology, Coimbatore, 13, India

Abstract

In this paper, a dual diode model of solar powered photovoltaic is explored to improve the efficiency of generation transforming structures of solar photovoltaic force. The double diode model is simple and straightforward to produce and offers greater precision which allows a more precise prediction of the presentation of photovoltaic structures. The survey depends on the reading results and it is for this reason that the MATLAB device is used. The reconstructions are completed by the fluctuation of the different limits of the model such as the oriented solar radiation, the temperature, the value of the parasitic screen, the ideality factor of the diode and the quantity of solar cells also associated which serve to accumulate the photovoltaic cluster. An obvious demonstration will be conducted to analyze the impacts of these details on the productivity curve and resistance/voltage performance of the PV cell for explicit models. Characterizing another frontier (α), a practically best solution is suppressed for the I-V curve of the photovoltaic model, which is better than the conventional outlier model due to its high computational efficiency in the constant supply of photovoltaic meadow. © 2021, Springer Nature Switzerland AG.

Author keywords

Open-circuit voltage, Output power, Parameters extraction, Short-circuit current, Solar cells

Indexed keywords

Cited by 1 document

Ramadan, A., Kamel, S., Hassan, M.H.
Accurate Photovoltaic Models Based on an Adaptive Opposition Artificial Hummingbird Algorithm
(2022) Electronics (Switzerland)
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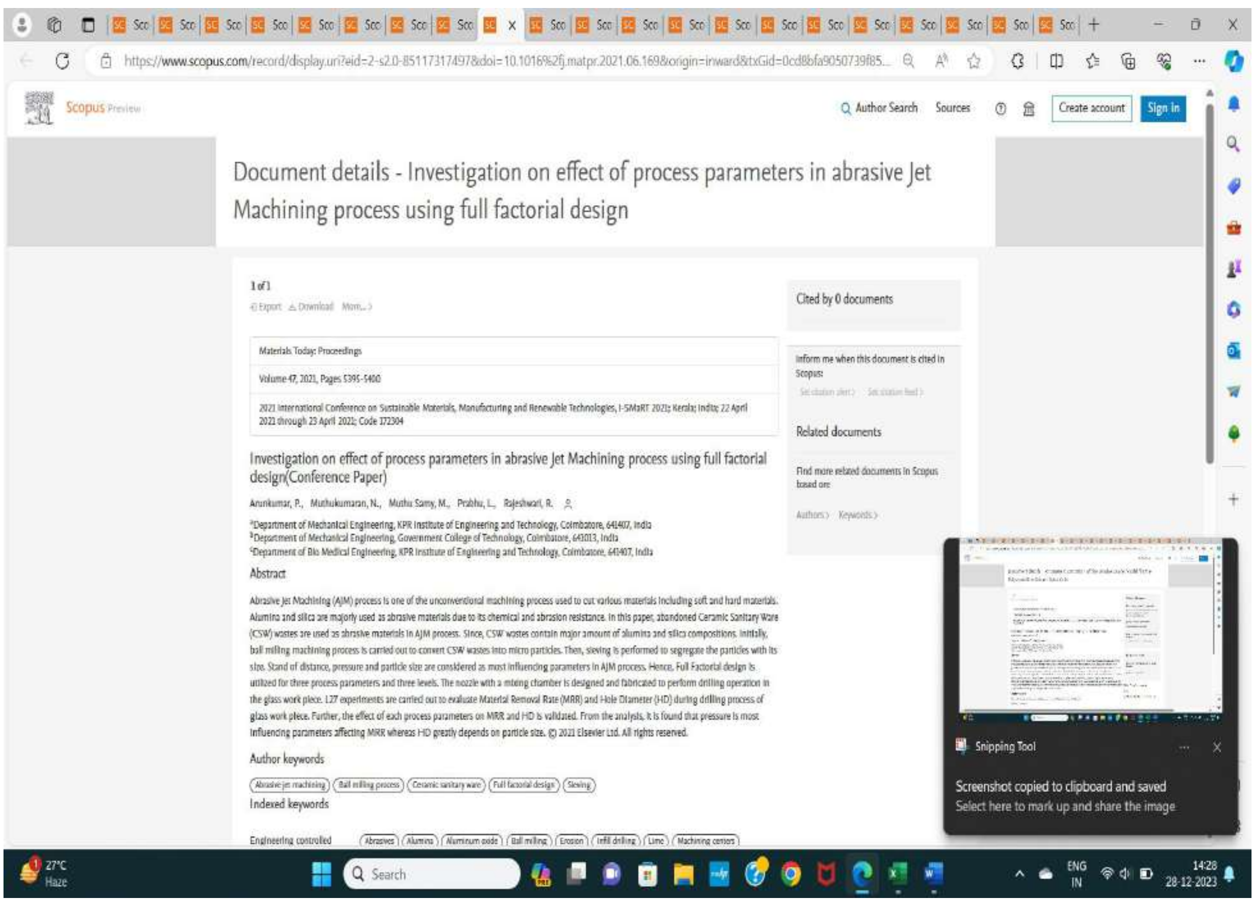

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Document details - Investigation on effect of process parameters in abrasive Jet Machining process using full factorial design

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Materials Today: Proceedings

Volume 47, 2021, Pages 5395-5400

2021 International Conference on Sustainable Materials, Manufacturing and Renewable Technologies, I-SMaRT 2021; Kerala; India; 22 April 2021 through 23 April 2021; Code 172304

Investigation on effect of process parameters in abrasive Jet Machining process using full factorial design(Conference Paper)

Arunkumar, P., Muthukumaran, N., Muthu Samy, M., Prabhu, L., Rajeshwari, R.

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Abstract

Abrasive Jet Machining (AJM) process is one of the unconventional machining process used to cut various materials including soft and hard materials. Alumina and silica are majorly used as abrasive materials due to its chemical and abrasion resistance. In this paper, abandoned Ceramic Sanitary Ware (CSW) wastes are used as abrasive materials in AJM process. Since, CSW wastes contain major amount of alumina and silica compositions. Initially, ball milling machining process is carried out to convert CSW wastes into micro particles. Then, sieving is performed to segregate the particles with its size. Stand of distance, pressure and particle size are considered as most influencing parameters in AJM process. Hence, Full Factorial design is utilized for three process parameters and three levels. The nozzle with a mixing chamber is designed and fabricated to perform drilling operation in the glass work piece. 127 experiments are carried out to evaluate Material Removal Rate (MRR) and Hole Diameter (HD) during drilling process of glass work piece. Further, the effect of each process parameters on MRR and HD is validated. From the analysis, it is found that pressure is most influencing parameters affecting MRR whereas HD greatly depends on particle size. © 2021 Elsevier Ltd. All rights reserved.

Author keywords

Abrasive jet machining, Ball milling process, Ceramic sanitary ware, Full factorial design, Sieving

Indexed keywords

Engineering controlled: Abrasives, Alumina, Aluminum oxide, Ball milling, Erosion, Infill drilling, Lime, Machining centers

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Document details - Reliable energy preserving cluster-based routing policy with optimal route selection for wireless sensor networks

International Journal of Enterprise Network Management
Volume 12, Issue 3, 2021, Pages 221-238

Reliable energy preserving cluster-based routing policy with optimal route selection for wireless sensor networks(Article)

Yasotha, S., Gopalakrishnan, V.
[a]Faculty of ICE, Anna University, Chennai, India
[b]Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India

Abstract

Wireless sensor networks (WSNs) is one of the hottest research areas, owing to its wider applicability. Due to its effectiveness and inexpensiveness, most of the domains enjoy the benefits of WSN. However, WSN still combats with the major issue, which is energy efficiency. Though WSN is capable of performing numerous activities, the energy stringency controls the actual functionality of WSN. Energy conservation is the crucial requirement of WSN and this paper attempts to propose an energy preserving cluster-based routing policy for WSN. The underlying roots of the proposed approach are clustering approach and optimal route selection. The sensor nodes are clustered and the cluster leader is selected by means of trust level of the nodes. The optimal route selection is performed by cuckoo search algorithm. The performance of the proposed routing policy is analysed and evaluated in terms of packet delivery rate, latency, energy consumption and network lifetime. The proposed approach shows better network lifetime than the existing approaches.

Author keywords

Energy conservation | Network lifetime | Routing | Wireless sensor networks | WSNs

ISSN: 17481252
Source Type: Journal
Original language: English
DOI: 10.1504/IJENM.2021.118056
Document Type: Article
Publisher: Inderscience Publishers

Document details - Green synthesis of clean edge graphene nanosheets using natural precursor

Materiale Plastice
Volume 58, Issue 3, 2021, Pages 210-216

Green synthesis of clean edge graphene nanosheets using natural precursor(Article)(Open Access)

Somasekaran, B., Thirunarayanaswamy, A., Palanivel, I.
[a]Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India
[b]Department of Production Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

Graphene, a two-dimensional crystalline allotrope of carbon, has received greater attention from numerous researchers due to its excellent properties. Graphene could be produced by various techniques, each method has its advantages and disadvantages. In this research article, a novel method using agricultural waste rice husk as a precursor and chemical activation to produce few-layer graphene nanosheets was developed. Traditional approaches' significant shortcomings and the environmental concern of agricultural waste have been eliminated. The synthesized material was characterized using FESEM, Raman Spectroscopy, X-Ray diffractometer, UV-Vis absorbance and FTIR analysis. FESEM analysis of the surface morphology revealed smooth edge few-layer graphene. The formation of sp^2hybridized atoms can be seen in XRD spectra at 26.3 degrees. The C-C stretching bonds detected at 1612 cm^{-1}wavelength are responsible for the graphitic structure.

Author keywords

Characterization | Graphene | Green synthesis | Natural precursor

Funding details

Funding sponsor	Funding number	Acronym
Bharathiar University		

Funding text
Acknowledgements: Authors would like to acknowledge the Department of Nanoscience and Technology, Bharathiar University for extending their

Document details - Enhancement of end-to-end security in advanced metering infrastructure

Journal of Ambient Intelligence and Humanized Computing

2021

Enhancement of end-to-end security in advanced metering infrastructure

(Article in press ?)

Kalidass, J., Purusothaman, T., Suresh, P.

[a]Department of Information Technology, Government College of Technology, Coimbatore, India
[b]Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, India
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Abstract

Advanced Metering Infrastructure (AMI) is enabling technology for smart grid and it act as a bridge between cyber and physical systems of the smart grid. The major parts of AMI are cyber systems; hence it's more vulnerable to attacks. The normal security protection scheme is not suitable for AMI because it consists of computation restricted components such as smart meters. The AMI networks also increase the challenges in the design of common protocol for end-to-end security (E2S) due to interoperability of its components. Data transfer in the AMI system requires E2S protection and security is one of the most challenging in AMI components development and deployment. Motivated by these limitations, the E2S scheme for AMI smart grid is proposed. In the proposed scheme includes the following properties. (i) Protracted publisher key per smart meter that are given by the Head End System (ii) Encryption key for each message sent from smart meter is derived from the publisher key (iii) Authentication of every message sent that consist of identity of smart meter such as Message Authentication Code (MAC). Compare with the existing end-to-end security schemes, the proposed scheme improves the E2S in terms of confidentiality, integrity and authentication with increasing scalability. © 2021, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

(Advanced metering infrastructure) (Amalgamation) (Cyber physical system) (Group key management) (Message authentication) (Smart grid)

Indexed keywords

Engineering controlled (Advanced metering infrastructures) (Authentication) (Cryptography) (Cyber Physical System) (Data transfer)

Document details - Design of trust identification system for cloud services

International Journal of Ad Hoc and Ubiquitous Computing

Volume 37, Issue 4, 2021, Pages 218-226

Design of trust identification system for cloud services(Article)

Devi, R., Shanmugalakshmi, R.

[a]Government College of Technology, Coimbatore, India
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Abstract

Cloud computing is merging into every aspect of our information exchange including our personal information, business environment and other environments along with numerous security and trust challenges. With rapidly developing cloud utilisation, the range of security issues and trust challenges also increases exponentially. Hence an efficient trust identification system (TIS) is needed to identify the region of trusted cloud service providers (CSPs) for a particular service. In this paper, a novel trust identification technique is proposed based on linear programming using objective functions which can smartly spot the region of trust from the CSP pool. In this system, the cluster of trusted CSP is defined and the remaining CSPs are not recommended to the cloud customer (CC). The internet architecture is a wide area network with interoperability, scalability and durability. The analysis of the proposed system proves to be efficient in terms of accuracy and time complexity. Copyright © 2021 Inderscience Enterprises Ltd.

Author keywords

(Cloud computing) (Cloud service provider) (CSP) (Linear programming) (TIS) (Trust identification system)

Indexed keywords

Engineering controlled terms: (Linear programming) (Web services) (Wide area networks)

Engineering uncontrolled terms: (Business environments) (Identification techniques) (Information exchanges) (Internet architecture) (Objective functions) (Personal information) (Security and trust) (Security issues)

Engineering main heading: (Trusted computing)

Document details - Analysis of a black chrome coated copper absorber plate in a flat plate solar collector

Transactions of the Canadian Society for Mechanical Engineering
Volume 45, Issue 3, 2021, Pages 473-478

Analysis of a black chrome coated copper absorber plate in a flat plate solar collector(Article)

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[b]Department of Mechanical Engineering, Government College of Technology, Coimbatore, Tamil Nadu, 641013, India

Abstract

With the depletion of conventional energy sources, the need for unconventional energy is focused on solar energy as it is avail plentiful. Converting solar energy into thermal energy is an effective way of utilizingsolar energy rather than the conversion of electrical energy. This paper compared the behavior of a solar collector at 30° and 45° angles with a black chrome coated absorber plate without and with glass reflectors. In view of the performance enhancement of the collector, the reflector was adjusted to maximize the incident ray for every hour. It was found that the collector fixed at a 30° inclination to the ground heats the water better, and again the performance can be increased by the reflector. © 2021, Canadian Science Publishing. All rights reserved.

Author keywords

Black chrome coating · Copper absorber plate · Glass reflector · Sun tracking and tilt angle of collector

Indexed keywords

Engineering controlled terms: Reflection · Solar collectors

Engineering uncontrolled terms: Absorber plates · Black chrome · Conventional energy sources · Electrical energy · Flat-plate solar collectors · Ground heats · Performance enhancements

Engineering main heading: Solar energy

Document details - Lipid study from oleaginous yeast using sugarcane bagasse substrate

Journal of Environmental Protection and Ecology
Volume 22, Issue 3, 2021, Pages 1064-1071

Lipid study from oleaginous yeast using sugarcane bagasse substrate(Article)

Sumathi, S., Meiaraj, C.
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[b]Department of Civil Engineering, Government College of Technology, Coimbatore, Tamil Nadu, India

Abstract

Global climate changes and alarming scarcity of fossil fuel stores for future use drive humanity's feverish search for efficient alternatives to conventional fossil fuel sources. In this scenario, production of biodiesel from renewable plant sources is considered an eco-friendly alternative next to electric power. Standard, non-detoxified and detoxified sugar cane bagasse hydrolysate mediums are considered for the study. These media are prepared and made to interact with Rhodosporidium toruloides, an oleaginous yeast strain and their suitability for the production of microbial lipids through fermentation is studied. The results obtained for the three media establish that detoxified sugar cane bagasse hydrolysate can be used as a potential carbon source for the production of lipids using R. toruloides as it produces comparatively higher microbial oil yields than the other standard media. © 2021, Scibulcom Ltd.. All rights reserved.

Author keywords

Biomass · Detoxification · Fermentation · Pre-treatment · Rhodosporidium toruloides

Indexed keywords

GEOBASE Subject Index: biomass · detoxification · fermentation · lipid · substrate · sugar cane · yeast

Species Index: Rhodosporidium toruloides · Saccharum

Document details - Diagnosing COVID-19 Virus in the Cardiovascular System Using ANN

1 of 1

Studies in Systems, Decision and Control

Volume 358, 2021, Pages 63-75

Diagnosing COVID-19 Virus in the Cardiovascular System Using ANN(Book Chapter)

Satheesh Kumar, P., Jeevitha, Manikandan

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[b]Government College of Technology, Coimbatore, Tamil Nadu, India

Abstract

The novel corona virus disease (COVID-19) is a deadly SARS- COV-2 communicable virus causing the world economy to crash. COVID-19, which causes interstitial pneumonitis and severe acute respiratory distress syndrome (ARDS), primarily affects the lungs multiple organs, especially the cardiovascular system. The ability of this virus to spread through human-to - human and surface-to-human transmission contributes to a devastating process in the world Biological signal analysis based on computer system allows medical officers to manage Covid-19 tasks such as intensive care ECG monitoring, fatal ventricular fibrillation, etc. The most common complications include heart dysfunctions such as tachycardia, bradycardia, ventricular fibrillation, cardiac arrhythmias, heart injury [highly responsive troponin I (hs-cTnI) elevation and creatine kinase, fulminant myocarditis, heart failure, pulmonary embolism, and disseminated intravascular coagulation (DIC). Mechanistically, SARS-CoV-2 binds to transmembrane angiotensin-converting enzyme 2 (ACE2), a homologue of ACE, after proteolytic cleavage of its S protein by a serine protease, to join type 2 pneumocytes, macrophages, perivascular pericytes, and cardiomyocytes. This can result in myocardial dysfunction and injury, endothelial dysfunction, plaque instability, microvascular dysfunction, and myocardial infarction (MI). In this research, for classification purposes, the heart pulse base signal and characteristics such as spectral entropy, largest lyapunov exponent, Poincare plot and detrended fluctuation analysis are extracted and presented. The Poincare plot RR intervals summarise the RR time series obtained in one image from an ECG, and the quantity of a time interval derives the HRV information length. The prediction of heart rate fluctuation due to Covid or other heart problems is made simpler by this study.The better accuracy level in diagnosing heart pulse irregularity using Artificial Neural network(ANN) is an integer value (0 to 4).The processing time for analyzing heart dysfunctionalties is 0.05 s using ANN. © 2021, The Author(s), under exclusive license to Springer Nature Switzerland AG.

Author keywords

(Artificial neural network) (COVID-19) (ECG) (First return maps) (Lyapunov exponent) (Spectral entropy)

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Document details - Modified mangosteen shell carbon in the removal of pb (Ii) and hg (ii) from aqueous solution – isotherm and kinetic studies

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Volume 23, Issue 1, 2021, Pages 112-118

Modified mangosteen shell carbon in the removal of pb (ii) and hg (ii) from aqueous solution – isotherm and kinetic studies(Article)(Open Access)

Anitha, D., Ramadevi, A.

[a]Department of Chemistry, Karpagam Institute of Technology, Coimbatore, 641105, India
[b]Department of Chemistry, Government College of Technology, Coimbatore, 641013, India

Abstract

An adsorbent was prepared from Mangosteen shell using sulphuric acid and sodium bicarbonate as modifiers. Bicarbonate treated mangosteen shell (BTMC) was characterized using FT-IR, SEM, EDAX and XRD data. The Freundlich adsorption isotherm model gives a good fit. The maximum adsorption capacities of BTMC were found to be 58.48 mg g-1 and 49.75 mg g-1 for Pb (II) and. Hg (II). Adsorption of Pb (II) and Hg (II) followed pseudo-second-order kinetics. The adsorption mechanism was explained using the Weber and Morris's intra-particular diffusion process. Batch mode studies with synthetic wastewater suggest that BTMC can be efficiently used in wastewater treatment. © 2021 Global NEST.

ISSN: 17907632
Source Type: Journal
Original language: English

DOI: 10.30955/gnj.003188
Document Type: Article
Publisher: Global NEST

Anitha, D.; Department of Chemistry, Karpagam Institute of Technology, Coimbatore, India;

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Jamil, I.N. , Abdul-Rahman, A. , Goh, H.-H.
Transcriptomics analysis of mangosteen ripening revealed active regulation of ethylene, anthocyanin and xanthone biosynthetic genes
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Trends in the mitigation of heavy metal ions from aqueous solutions using unmodified and chemically-modified agricultural waste adsorbents
(2021) Current Research in Green and Sustainable Chemistry

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Document details - Adsorption of endosulfan from aqueous solution using graphene clay matrix (GCM)

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Materials Today: Proceedings

Volume 45, 2021, Pages 5665-5671

2nd International Conference on Aspects of Materials Science and Engineering, ICAMSE 2021; Chandigarh; India; 5 March 2021 through 6 March 2021; Code 169287

Adsorption of endosulfan from aqueous solution using graphene clay matrix (GCM)(Conference Paper)

Mathanakeerthi, S., Sadheesh, S., Nandha Kumar, M., Gowtham, S., Manoj Kumar, V.

[a]M.E. Environmental Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[b]Department of Civil Engineering, Sri Krishna College of Engineering and Technology, Tamil Nadu, Coimbatore, 641008, India

Abstract

This study involves the adsorption of endosulfan, an organo-chlorine pesticide from aqueous solution using synthesized graphene clay matrix (GCM). Graphene was synthesized from Sucrose $C_{12}H_{22}O_{11}$ at high temperature and pressure and embedded on the surface of clay to avoid liquid solid separation and was activated by 30% Conc. sulphuric acid. GCM was characterized by various instrumentations like Raman spectroscopy, Fourier transform infra - red spectroscopy (FTIR), thermo gravimetric analyzer (TGA), differential thermo analyzer (DTA). The peak range obtained in raman spectroscopy was 1000-1500 Cm^{-1} at G band and 2500 - 3500 at the 2D band. FTIR was analyzed for infrared spectral bonds of adsorbent and the C=N, C=C, C=O spectrum indicated Graphene. TGA showed the change of structural composition with respect to increase in temperature and DTA gave the heat evolution graph of graphene monomer respectively. The aqueous solution of endosulfan after adsorption was analyzed by batch and column adsorption methods by varying its concentration, contact time, quantity of adsorbent used, etc. and the favorable results were obtained for the removal efficiency of endosulfan from aqueous solution. The analyte solution was characterized by high performance liquid chromatography (HPLC) and the maximum removal efficiency obtained was 98% in batch studies and 94% in column adsorption method. This method of endosulfan removal will be one of the best methods for the degradation of organo-chlorine derivatives by harmless natural method in a cost-effective manner.

Author keywords

Adsorption · Characterization · Degradation · Endosulfan · Pesticide · Sucrose

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Highly efficient removal of endocrine disrupting pesticides by metal ferrites loaded Guar gum based green nanomaterials
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Document details - Ballistic impact analysis of graphene nanosheets reinforced kevlar-29

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Materials Today: Proceedings

Volume 45, 2021, Pages 788-793

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Ballistic impact analysis of graphene nanosheets reinforced kevlar-29(Conference Paper)

Vignesh, S., Surendran, R., Sekar, T., Rajeswari, B.

Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

The bulletproof vests used by law enforcement officials can be appropriately termed as "Bullet-resistant" vests instead of bulletproof vests since they are not completely threat proof. The bullets released from handgun calibers such as 0.357 SIG or 9 mm guns travel at a very high velocity which the vests cannot withstand. These vests are mostly made of ceramic or steel plates backed with para-aramids such as kevlar, spectra, and dyneema. Kevlar is an organic fiber from an aromatic polyamide family. Kevlar has a unique molecular structure that distinguishes it from other polyamide families. The para-aramid structure gives kevlar an optimum combination of high tensile strength, high modulus, resilience, thermal stability, and toughness [1]. Different varieties of Kevlar are produced to be used in different applications. Kevlar-29 has been the most widely used material in bulletproof vests for ballistic protection. Despite its strength and resilience kevlar has its disadvantages such as poor compression strength, which makes it less reliable for ballistic protection. Although kevlar fibers are strong and have high tensile strength its ability to cope with the force of compression is poor [2]. Also, the inclusion of these plates significantly increases the weight of the jackets. Graphene, on the other hand, is a two-dimensional allotrope of carbon atoms arranged in a hexagonal lattice structure [3]. It is found to be the strongest material ever found yet weighs much less than a paper [4]. In this work, graphene nanoparticles are inserted as laminates in-between the kevlar fiber layers and dynamic ballistic impact analysis is done on this reinforced material. The equivalent stresses, total deformation, maximum principal stress and directional velocity of the vests and bullet are investigated and the results show a significant increase in the ballistic performance of vests reinforced with graphene laminates. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

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Recent Advances in Ballistic Resistance of Lightweight Metal Sandwich Cores
(2023) Journal of Physics: Conference Series

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Document details - Activated Mangosteen shell in removal of mercury ion from aqueous solution

Materials Today: Proceedings

Volume 45, 2021, Pages 658-662

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Activated Mangosteen shell in removal of mercury ion from aqueous solution(Conference Paper)

Anitha, D., Ramadevi, A., Seetharaman, R.

[a]Department of Chemistry, Karpagam Institute of Technology, Coimbatore, India
[b]Department of Chemistry, Government College of Technology, Coimbatore, India
[c]Department of Electronics and Communication Engineering, CEG Campus, Anna University, Chennai, India

Abstract

The poisonous heavy metal mercury was removed from aqueous solution using bicarbonate treated mangosteen shell a biosorbent available at low cost. Batch experiments were performed to evaluate the parameters like contact time, pH, carbon dose on the removal efficiency of Hg (II) from aqueous solution. Scanning electron microscopy and Energy-dispersive X-ray spectroscopy analysis were carried out to study the surface morphology. Removal of mercury occurs at the optimum experimental condition at pH 5 and carbon dosage of 120 mg. Adsorption isotherm was evaluated using Langmuir, Freundlich and Temkin isotherm adsorption models. The Langmuir adsorption shows Q_0 value of 49.75 mg g^{-1} for BTMC.

Author keywords

Adsorption, Aqueous solution, Isotherm, Mangosteen shell, Mercury

Indexed keywords

Engineering controlled terms: Adsorption isotherms, Carbon, Energy dispersive spectroscopy, Heavy metals, Mercury compounds, Morphology, Scanning electron microscopy, Surface morphology

Document details - Re-use of abandoned sanitary ware waste as abrasive particles for abrasive jet machine

Materials Today: Proceedings

Volume 45, 2021, Pages 562-568

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Re-use of abandoned sanitary ware waste as abrasive particles for abrasive jet machine(Conference Paper)

Muthukumaran, N., Devaraj, P., Arunkumar, P., Sekar, T.

[a]Department of Mechanical Engineering, GCT Coimbatore, India
[b]Faculty of Mechanical Engineering, GCT Coimbatore, India

Abstract

In recent years, the growth in the machinery industries has emerged to produce the ceramic components which are non-bio degradable wastes. In this paper, the abrasive particles are produced through a rehash of ceramic sanitary ware wastes to machine the glass material in the abrasive jet machining process. Beforehand, computational fluid dynamics (CFD) analysis is performed on the nozzle to evaluate the flow velocity at the corresponding pressure distributions. It results that the velocity of 330 m/s is achieved at the outlet of the nozzle. The nozzle is designed based on the consequent results of flow analysis. Further, the sanitary ware wastes from washbasin urinals, sinks, bathtubs, toilets, etc are collected and renewed to the form of abrasive particles using sieving and segregation processes. The mixing chamber is fabricated and abrasive particles, dry air is made to mix in the mixing chamber. Then mixed particles are made to flow out to the working chamber through the outlet opening. The high jet velocity of the air and abrasive particle mixture has impinged through a convergent nozzle for machining the glass workpiece in the abrasive jet machining process. Moreover, the performance characteristics of abrasive particles in the abrasive jet machining process are evaluated.

Author keywords

Abandoned sanitary ware waste, Abrasive jet machining, Abrasive particles, Computational fluid dynamics, Material removal rate

Indexed keywords

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Document details - A survey on natural esters based insulating fluid medium for transformer applications

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Materials Today: Proceedings

Volume 45, 2021, Pages 2022-2028

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

A survey on natural esters based insulating fluid medium for transformer applications(Conference Paper)

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[a]Department of Electrical and Electronics Engineering, Sri Ramakrishna Engineering College, Coimbatore, Tamil Nadu, 641 022, India
[b]Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, Tamil Nadu, 641 013, India

Abstract

Insulating fluid priorities as an imperative part for the being expectancy of the electrical device such as transformer. A product of gasoline fuel like mineral oil has turned out to be overwhelming insulating fluid of t transformer for over several decades for its sublime cooling as well as dielectric properties. In any case, utilization of gasoline fuel like mineral oil, obtained as of a non-sustainable power trails, has impacted nature of its non-biodegradability characteristics. As a result, many authors guide their preference and priority for renewable and biodegradable choices. The various vegetable based natural fuel like Coconut oil, sunflower oil, rice bran oil, corn oil, soybean oil and so forth are well thought-out as contrasting options toward supplant mineral oil as insulating fluid of the electrical device such as transformer. This paper accords a latitudinous survey of various insulating fluid utilized in a transformer. The various research findings by the author has been inferred towards the superior quality renewable and biodegradable insulating fluid. Finally the qualities of natural esters (vegetable oil) to overcome the drawback of existing fluid is commented.

Author keywords

(Biodegradability) (Cooling property) (Insulating fluids) (Mineral oil) (Renewable) (Transformer)

Indexed keywords

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Document details - Comparative study of ANN and fuzzy classifier for forecasting electrical activity of heart to diagnose Covid-19

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Materials Today: Proceedings

Volume 45, 2021, Pages 2293-2305

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Comparative study of ANN and fuzzy classifier for forecasting electrical activity of heart to diagnose Covid-19(Conference Paper)(Open Access)

Nivethitha, T., Palanisamy, S.K., Prakash, K.M., Jeevitha, K.

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Abstract

Covid-19 is a dangerous communicable virus which lets down the world economy. Severe respiratory syndrome SARS-COV-2 leads to Corona Virus Disease (COVID-19) and has the capability of transmission through human-to-human and surface-to-human transmission leads the world to catastrophic phase. Computational system based biological signal analysis helps medical officers in handling COVID-19 tasks like ECG monitoring at intensive care, fatal ventricular fibrillation, etc., This paper is on diagnosing heart dysfunctions such as tachycardia, bradycardia, ventricular fibrillation, cardiac arrhythmia using fuzzy relations and artificial intelligence algorithm. In this study, the heart pulse base signal and features like spectral entropy, largest lyapunov exponent, Poincare plot and detrended fluctuation analysis are extracted and presented for classification purpose. The RR intervals of Poincare plot summarize RR time series obtained from an ECG in one picture, and a time interval quantities derives information duration of HRV. This analysis eases the prediction of heart rate fluctuation due to Covid or other heart disorders. The better accuracy level in diagnosing heart pulse irregularity using Artificial Neural network(ANN) is an integer value (0 to 4)but for Fuzzy Classifier, it is 0.8 to 0.9.The processing time for analyzing heart dysfunctionalities is 0.05 s using ANN which is far better than Fuzzy classifier.

Author keywords

(Covid-19) (First return maps) (HRV signal) (Lyapunov exponent) (Spectral entropy)

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Document details - A Multi Criteria Decision Making (MCDM) based on TOPSIS and RSM for process improvement in electrical discharge machining of silicon nitride-titanium nitride ceramic composites

Materials Today: Proceedings

Volume 45, 2021, Pages 1319-1327

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

A Multi Criteria Decision Making (MCDM) based on TOPSIS and RSM for process improvement in electrical discharge machining of silicon nitride-titanium nitride ceramic composites(Conference Paper)

Srinivasan, V.P., Palani, P.K., Dhayananthan, S., Gopi, S., Balamurugan, S., Venkatesh, S.M.

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Abstract

This experiment is an attempt to choose the optimal machining parameters for electrical discharge machining (EDM) of silicon nitride-titanium nitride (Si_3N_4-TiN) ceramic composites based on MCDM approach. The electrical discharge machining have been conducted according to L_{31} orthogonal array with preferred input parameters like current (I), spark gap voltage (SV), pulse-on duration (T_{on}) and pulse-off duration (T_{off}). The response parameters measured are material eradication rate (MRR), electrode eradication rate (EWR) and surface roughness (Ra). The MCDM techniques namely Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) and Response Surface Methodology (RSM) are used to find the optimal machining parameters which provide better value of all responses. Also, scanning electron microscopy (SEM) is employed for examining the surface defects like micro-cracks, micro-pores, droplets, surface craters, globules, etc. © 2021 Elsevier Ltd. All rights reserved. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

(ANOVA) (Current) (Gap voltage) (MCDM) (RSM) (TOPSIS)

Document details - Biosorptive removal of Nickel(II) from aqueous solution by Mangosteen shell activated carbon

Materials Today: Proceedings

Volume 45, 2021, Pages 718-722

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Biosorptive removal of Nickel(II) from aqueous solution by Mangosteen shell activated carbon(Conference Paper)

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Abstract

The adsorption of heavy metal Ni (II) from aqueous solution by sulphuric acid modified agricultural byproduct mangosteen shell was studied. The effect of adsorbent dose, contact time, pH, on the removal efficiency of Ni (II) was evaluated by batch mode studies. At optimum experimental condition removal of nickel was observed at pH 5 and a carbon dosage of 60 mg. The surface morphology and functional groups were analyzed using FT-IR data and scanning electron microscope. Freundlich and Langmuir adsorption isotherm studies were performed. The adsorbent was noted to be economical and efficient in the removal of Ni (II) from aqueous solution. © 2021 Elsevier Ltd. All rights reserved. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

(Adsorption) (Kinetics) (Mangosteen shell) (Nickel)

Indexed keywords

Engineering controlled terms: (Activated carbon) (Heavy metals) (Morphology) (Nickel compounds) (Scanning electron microscopy) (Surface morphology) https://www.scopus.com/record/display.uri?eid=2-s2.0-85107336338&doi=10.1016%2fj.matpr.2020.09.074&origin=inward&txGid=01025e7e70e69859...

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Document details - Finite element modeling of energy storage materials alumina using heat recovery in packed pebble bed heat exchanger

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Materials Today: Proceedings

Volume 45, 2021, Pages 1872-1877

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Finite element modeling of energy storage materials alumina using heat recovery in packed pebble bed heat exchanger(Conference Paper)

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Abstract

The studies of thermal energy storage material Alumina (Al_2O_3) as a function of average bed temperature. Aluminum oxide is engineering properties and uses commercially available. Alumina is one of the most cost-effective and widely used materials in the family of ceramics. The raw materials, from which this high-performance technical grade ceramic is made aluminum oxide, commonly referred to as alumina high strength characteristics of the material. Aluminum oxide is used in the energy storage of heat exchanger. The Al_2O_3 pebbles are 6 mm to 14 mm and are randomly dumped and packed in a 450 mm long hollow tube of 45 mm inner diameter. The tube was fully covered the asbestos ropes to reduce the heat loss. Hot air from a source was used to flow in the packed bed at various inlet conditions of velocity varying from 2 to 3 m/s. The spheres were heated from an inlet temperature of 32 °C. The experimental work was done in the heat exchanger is given to air in the multistage compressor and diesel engine exhaust. Waste heat energy was stored in the pebbles. The experimental results indicated that the increased porous media temperature increased the outer surface temperature, increased the heat transfer rate with an increase in the average bed temperature of 342 K to 402 K. The entire results obtained by using experimentation were cross verified using Finite Element Analysis modeling. Finally the results of both experimental and Finite Element Analysis Modeling were found to be in good co-relation. © 2021 Elsevier Ltd. All rights reserved. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

(Alumina pebbles) (Heat transfer) (Pebble bed heat exchanger) (Porous media) (Sensible heat storage)

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Document details - LSTM Recurrent Neural Network Classifier for High Impedance Fault Detection in Solar PV Integrated Power System

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Volume 9, 2021, Article number 2966, Pages 32672-32687

LSTM Recurrent Neural Network Classifier for High Impedance Fault Detection in Solar PV Integrated Power System(Article)(Open Access)

Veerasamy, V., Wahab, N.I.A., Othman, M.L., Padmanaban, S., Sekar, K., Ramachandran, R., Hizam, H., Vinayagam, A., Islam, M.Z.

[a]Advanced Lightning Power and Energy Research (ALPER), Department of Electrical and Electronics Engineering, Universiti Putra Malaysia (UPM), Seri Kembangan, 43400, Malaysia
[b]Department of Energy Technology, Aalborg University Esbjerg, Esbjerg, 6700, Denmark
[c]Department of Electrical and Electronics Engineering, Panimalar Engineering College, Chennai, 600123, India

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Abstract

This paper presents the detection of High Impedance Fault (HIF) in solar Photovoltaic (PV) integrated power system using recurrent neural network-based Long Short-Term Memory (LSTM) approach. For study this, an IEEE 13-bus system was modeled in MATLAB/Simulink environment to integrate 300 kW solar PV systems for analysis. Initially, the three-phase current signal during non-faulty (regular operation, capacitor switching, load switching, transformer inrush current) and faulty (HIF, symmetrical and unsymmetrical fault) conditions were used for extraction of features. The signal processing technique of Discrete Wavelet Transform with db4 mother wavelet was applied to extract each phase's energy value features for training and testing the classifiers. The proposed LSTM classifier gives the overall classification accuracy of 91.21% with a success rate of 92.42 % in identifying HIF in PV integrated power network. The prediction results obtained from the proffered method are compared with other well-known classifiers of K-Nearest neighbor's network, Support vector machine, J48 based decision tree, and Naïve Bayes approach. Further, the classifier's robustness is validated by evaluating the performance indices (PI) of kappa statistic, precision, recall, and F-measure. The results obtained reveal that the proposed LSTM network significantly outperforms all PI compared to other techniques. © 2013 IEEE.

Author keywords

(discrete wavelet transform) (high impedance fault) (long short term memory) (recurrent neural network) (Solar photovoltaic)

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Document details - Experimental research to predict optimistic nanoparticle additives graphene oxide (GO) diesel blend and optimistic operating condition by varying fuel injector holes

Journal of Environmental Protection and Ecology
Volume 22, Issue 1, 2021, Pages 277-289

Experimental research to predict optimistic nanoparticle additives graphene oxide (GO) diesel blend and optimistic operating condition by varying fuel injector holes(Article)

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Abstract

In this article was investigated performance, combustion and emission by modifying the nozzle, (singles holes (modified), (3 holes (based) and (five holes). The tests were performed in four-stroke Kirloskar single-cylinder diesel engine-fueled by graphene oxide (30 ppm) at 1500 rpm, and the water-cooled direct injection diesel engine with an eddy current dynamometer has been maintained throughout the experiment at a standard injection timing at 240 bar is 23° BTDC (before Top Dead Centre). Three different nozzles from the results were noted. The impressive results in performance, combustion, and emissions (3 holes fuelled with diesel and 30 ppm of graphene oxide) are improved. The only drawback is that the amount of NO_x is increased due to complete combustion, with diesel and graphene oxide at 30 ppm.

Author keywords

Brake specific fuel consumption, Brake thermal efficiency, Carbon monoxide, Cylinder pressure, Unburnt hydrocarbon

Indexed keywords

GEOBASE Subject Index: carbon monoxide, cylinder, diesel engine, experimental study, optimization, performance assessment

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Document details - Experimental and numerical studies on punching shear strength of concrete slabs containing sintered fly ash aggregates

Revista de la Construccion
Volume 20, Issue 1, 2021, Pages 15-25

Experimental and numerical studies on punching shear strength of concrete slabs containing sintered fly ash aggregates(Article)(Open Access)

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[b]Department of Civil Engineering, Government College of Technology, Coimbatore, Tamil Nadu 641013, India

Abstract

This paper presents experimental and numerical investigations on M30 grade of concrete containing 40% of sintered fly ash aggregates (SFAs) on the punching behaviour of reinforced concrete (RC) slabs. Two 1000 x 1000 x 100 mm reinforced concrete slabs were cast and subjected to punching tests. The experimental results were compared with creating a nonlinear finite element programme using ABAQUS. These 3D Finite element analyses were performed with the appropriate modelling of element size and the constitutive modelling of concrete. The material parameters of the damaged plasticity model in ABAQUS were calibrated based on the test results of the slab - plate connection. The comparison between experimental and numerical results indicates that the calibrated model correctly predicts the punching shear response of the slabs. A modification of 0.4 is introduced in MC2010 code.

Author keywords

ABAQUS, finite element analysis, reinforced concrete slabs, sintered fly ash aggregates (SFAs)

ISSN: 07177925
Source Type: Journal
Original language: English
DOI: 10.7764/RDLC.20.1.15
Document Type: Article
Publisher: Pontificia Universidad Catolica de Chile, Escuela de Construccion Civil

Document details - Shaking Table Tests on Liquefiable Sand Deposits Treated with Sand Compaction Piles

Lecture Notes in Civil Engineering

Volume 138, 2021, Pages 523-532

Indian Geotechnical Conference, IGC 2019; Surat; India; 19 December 2019 through 21 December 2019; Code 256869

Shaking Table Tests on Liquefiable Sand Deposits Treated with Sand Compaction Piles(Conference Paper)

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[b]Geotechnical Engineering Division, CSIR—Central Building Research Institute, Roorkee, Uttarakhand, India

Abstract

Soil liquefaction and its associated ground failures during earthquake is one of the major hazards causing risk to life and infrastructures. Even though several literatures available using sand compaction pile (SCP) technique, investigations under sequential acceleration conditions for SCP-treated soil deposits were limited. Hence in this study, liquefaction resistance of sand treated with sand compaction pile under sequential acceleration conditions was performed and reported. For experimental studies, an acrylic tank having dimensions of 1.4 m × 1 m × 1 m was selected and mounted on uniaxial shaking table. Soil deposits having 600-mm depth were prepared with 40 and 60% relative density using sand pluviation method. For soil reinforcement, SCP having diameter 110 and 600 mm length was installed inside the soil deposit. Then, shaking table experiments were performed with and without improvement technique under sequential accelerations. For sequential acceleration, the selected accelerations are 0.1, 0.2, 0.3 and 0.4 g with 5 Hz frequency. Initially, the sand deposit was subjected to 0.1 g acceleration amplitude and generation of excess pore water pressure with time was continuously monitored and recorded. After 0.1 g loading, the tank was left undisturbed for 24 h or until complete dissipation of generated pore water pressure whichever earlier. Then, next sequential loading of 0.2 g acceleration amplitude was applied and the same procedure was repeated up to 0.3 and 0.4 g testing conditions. The influence of various parameters affecting the performance of SCP improvement technique under sequential loading was compared and reported.

Author keywords

Liquefaction | Nepal earthquake | Uniaxial shaking table

Indexed keywords

Document details - Investigations on Electrochemical Discharge Machining of Al₂O₃ Ceramics

Smart Innovation, Systems and Technologies

Volume 213 SIST, 2021, Pages 33-43

International Conference on Intelligent Manufacturing and Energy Sustainability, ICIMES 2020; Hyderabad; India; 21 August 2020 through 22 August 2020; Code 257489

Investigations on Electrochemical Discharge Machining of Al_2O_3 Ceramics(Conference Paper)

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[c]Department of Mechanical Engineering, TPEVR Government Polytechnic College, Vellore, Tamilnadu, India

Abstract

The machining of ceramics materials in the conventional machining process is a tedious one. This research work attempts the investigations on electrochemical discharge machining (ECDM) used to material removal of ceramics such as aluminum oxide (Al_2O_3) with the working medium of the NaOH electrolyte. This machining method will be a better alternative method for industrial applications. The key effort of this work is to attain better material removal rate (MRR) and to minimize the overcut problem. The process parameters are selected for machining such as applied voltage, electrolyte concentration with three different levels. The results reveal that machining of ceramics can be done by electrochemical discharge machining, and the maximum material removal rate is obtained by using the higher concentration of electrolyte.

Author keywords

Al_2O_3 ceramics | ECDM | MRR | NaOH electrolyte | Overcut

Indexed keywords

Engineering controlled terms: Alumina | Aluminum oxide | Electrolytes | Machining | Manufacture | Sodium hydroxide | Sustainable development

Engineering uncontrolled: Conventional machining | Electro chemical discharge machining | Electrolyte concentration | Machining methods

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Document details - Effective data management and real-time analytics in internet of things

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Effective data management and real-time analytics in internet of things(Conference Paper)

Jeba, N., Rathi, S.

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Abstract

Integrating various embedded devices and systems in our socio-economic living environment enables Internet of things (IoT) for smart cities. The underlying IoT infrastructure of smart and connected cities would generate enormous amount of heterogeneous data that are either big in nature or fast and real-time data streams that can be leveraged for safety and efficient living of the inhabitants. Real-time analytics on data enable to extract useful information from the voluminous data and provide information to users for decision making and help in feedback mechanism. In this paper, the effective management of heterogeneous data and real-time analytics on data are studied. Data management deals with collecting and storing useful information to reduce manual tasks. Therefore, data management techniques should be consistent, interoperable and ensure reusability and integrity. We have explained the various architectures that can be used to deploy IoT in neural networks and the various streaming techniques for real-time analytics. Copyright © 2021 Inderscience Enterprises Ltd.

Author keywords

Data management · Heterogeneous data · Internet of things · IoT · Real-time analytics

Indexed keywords

Engineering controlled terms: Decision making · Embedded systems · Information management · Information use · Reusability

Engineering uncontrolled terms: Devices and systems · Embedded device · Embedded-system · Fast-time · Heterogeneous data · Living environment · Real-time analytics · Real-time data streams · Socio-economics · Voluminous data

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Document details - Fault Diagnosis of Nonlinear System Using Particle Filter

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Lecture Notes in Electrical Engineering
Volume 700, 2021, Pages 1641-1649
International Conference on Automation, Signal Processing, Instrumentation and Control, I-CASIC 2020; Vellore; India; 27 February 2020 through 28 February 2020; Code 256259

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Fault Diagnosis of Nonlinear System Using Particle Filter(Conference Paper)

Raghappriya, M., Kanthalakshmi, S.

[a]Government College of Technology, Coimbatore, India
[b]PSG College of Technology, Coimbatore, India

Abstract

Fault detection and diagnosis (FDD) for nonlinear systems gains popularity due to its ability to distinguish faults in spite of very high nonlinearity of system dynamics. Increasingly in many application areas, it is important to include parameters of nonlinearity and non-gaussianity to accurately represent the innate dynamics of the physical system. Particle filtering (PF)-based FDD approach is designed to deal with the nonlinearity and non-gaussianity problems of system dynamics. The physical system chosen is a two degrees of freedom helicopter, and PF based approach is developed for various fault cases which includes sensor, actuator, and component faults. Results of various fault cases are presented which shows the identification of fault and time of occurrence of faults in the system. © 2021, Springer Nature Singapore Pte Ltd.

Author keywords

Fault detection and diagnosis · Nonlinear systems · Sensor and actuator faults

Indexed keywords

Engineering controlled terms: Degrees of freedom (mechanics) · Monte Carlo methods · Nonlinear systems · Signal processing · System theory

Engineering uncontrolled terms: Application area · Component faults · Fault detection and diagnosis · High nonlinearity · Particle Filtering · Physical systems · System Dynamics · Two degrees of freedom

Engineering main heading: Fault detection

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Document details - Experimental Validation of Fuzzy SMC and Lyapunov Fuzzy SMC Over a Cylindroconical Fermenter

Lecture Notes in Electrical Engineering

Volume 700, 2021, Pages 1599-1607

International Conference on Automation, Signal Processing, Instrumentation and Control, I-CASIC 2020; Vellore; India; 27 February 2020 through 28 February 2020; Code 256259

Experimental Validation of Fuzzy SMC and Lyapunov Fuzzy SMC Over a Cylindroconical Fermenter(Conference Paper)

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Abstract

Fermenters are used in industries for the production of foodstuffs, alcoholic beverages, vaccines, and many others. Fermentation results in the formation of foam and release of gases. As the level of foam rises, it may enter the pump used to remove the gases produced and damage the pump. This results in shutdown of the process for cleaning and replacement of pumps, increasing the running cost. The main objective of this work is to reduce the running cost by controlling the level of foam. To achieve this goal, robust sliding mode controller with an equivalent control and a switching control is designed. The switching control is varied in two different ways, and the controller performance is analyzed. Lyapunov fuzzy sliding mode control is found to outperform fuzzy sliding mode control. This controller reduces the overshoot preventing foam from entering the pump, thus avoiding frequent replacement of pumps. © 2021, Springer Nature Singapore Pte Ltd.

Author keywords

Cylindrocone, Fuzzy SMC, Lyapunov fuzzy SMC, Robust, SMC

Indexed keywords

Engineering controlled terms: Alcoholic beverages, Fermenters, Fuzzy systems, Pumps, Signal processing, Sliding mode control

Engineering uncontrolled

images using deep convolutional neural network and content-based image retrieval techniques

Journal of Ambient Intelligence and Humanized Computing

2021

Detection of pneumonia infection in lungs from chest X-ray images using deep convolutional neural network and content-based image retrieval techniques

(Article in press ?)

(Open Access)

Rajasenbagam, T., Jeyanthi, S., Pandian, J.A.

[a]Department of CSE, Government College of Technology, Coimbatore, India
[b]Department of CSE, PSNA College of Engineering and Technology, Dindigul, India
[c]Department of CSE, Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology, Avadi, India

Abstract

In this research, A Deep Convolutional Neural Network was proposed to detect Pneumonia Infection in the lung using Chest X-ray Images. The proposed Deep CNN models were trained with a Pneumonia Chest X-ray Dataset containing 12,000 images of infected and not infected chest X-ray images. The dataset was preprocessed and developed from the Chest X-ray8 dataset. The Content-based image retrieval technique was used to annotate the images in the dataset using Metadata and further contents. The data augmentation techniques were used to increase the number of images in each of class. The basic manipulation techniques and Deep Convolutional Generative Adversarial Network (DCGAN) were used to create the augmented images. The VGG19 network was used to develop the proposed Deep CNN model. The classification accuracy of the proposed Deep CNN model was 99.34 percent in the unseen chest X-ray images. The performance of the proposed deep CNN was compared with state-of-the-art transfer learning techniques such as AlexNet, VGG16Net and InceptionNet. The comparison results show that the classification performance of the proposed Deep CNN model was greater than the other techniques. © 2021, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Content-based image retrieval, Data augmentation, Deep convolutional generative adversarial network, Deep convolutional neural network, VGG19Net

Indexed keywords

Engineering controlled terms: Content based retrieval, Convolution, Deep neural networks, Transfer learning

https://www.scopus.com/record/display.uri?eid=2-s2.0-85102631018&doi=10.1007%2f978-981-15-9809-8_13&origin=inward&txGid=e1217f5e738880...

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Document details - Ballistic Performance Simulation of Graphene–Dyneema Multi-layered Armor

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Lecture Notes in Mechanical Engineering

2021, Pages 165-173

1st International Conference on Materials, Design and Manufacturing for Sustainable Environment, ICMDMSE 2020; Coimbatore; India; 13 March 2020 through 14 March 2020; Code 255229

Ballistic Performance Simulation of Graphene–Dyneema Multi-layered Armor(Conference Paper)

Vignesh, S., Surendran, R., Sekar, T., Rajeswari, B.

Department of Mechanical Engineering, Government College of Technology, Coimbatore, Tamil Nadu, India

Abstract

Dyneema (unidirectional bullet-resistant fiber) is a crucial ballistic ingredient for the finest life-protecting ballistic applications, protecting law enforcement officials and soldiers. Since dyneema requires material quantity much less than others to achieve a given performance and due to its high durability and long service life, it has been a prime option for ballistic material. Also, dyneema leaves the lowest carbon impression per unit tenacity. Dyneema-made vests have the ability to protect against a large variety of ballistic threats including a direct barrage from AK47 but fail when bullets from armor-piercing Type-V rifles like 0.30–0.06 Springfield or 0.50 caliber had a direct impact on the vests. On the other hand, graphene is one of the strongest materials ever found having a single-atom-thick layer of 2D carbon atoms arranged in a hexagonal lattice. It exhibits properties like high tensile strength, thermal conductivity, toughness, stiffness, transparency and surface area. This high combination of a variety of properties is due to the covalent trigonal bonding of the carbon atoms arranged in sp^2 hybridization. This study is a performance evaluation of graphene-sandwiched dyneema laminates against a 0.50 caliber using ANSYS 18.1. The resulting deformation of the armor laminates and stresses induced in the vest and bullet are studied and analyzed for improving the efficiency of the armors. © 2021, The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author keywords

Ballistic performance | Deformation | Dyneema | Equivalent stress | Graphene

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Kumar, S., Saxena, S., Sharma, H.

Development of design guidelines using probabilistic framework for the development of smart thickening fluid based ultra resistant adaptive kinematic soft human armor (SURAKSHA)

(2023) Reliability Engineering and System Safety

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Document details - Experimental Studies on Biomachining of Copper and Its Behavioural Characteristics

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Lecture Notes in Mechanical Engineering

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1st International Conference on Materials, Design and Manufacturing for Sustainable Environment, ICMDMSE 2020; Coimbatore; India; 13 March 2020 through 14 March 2020; Code 255229

Experimental Studies on Biomachining of Copper and Its Behavioural Characteristics(Conference Paper)

Hemalatha, B., Rajeswari, B., Sekar, T., Rajasekar, V.

[a]Department of Mechanical Engineering, Government College of Technology, Coimbatore, India
[b]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India

Abstract

The methods being utilized for micromachining have adverse effect on the environment. They probably cause porosity, heat-affected zone and also damages the metallurgical properties. There have been severe effects due to chemicals on human health and environment. To achieve high efficiency, researches have evolved a new field in micromachining as biomachining. The fungal species of Aspergillus niger has been used for metal removal. The biomachining is done using the fungal culture on the workpiece of copper. The material removal rate was calculated. The microstructural analysis and hardness test were carried out. The colour change was also analysed. In this paper, the results of the samples before and after machining were compared. © 2021, The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author keywords

Aspergillus niger | Biomachining | Copper | Hardness | Material removal rate | Microstructural analysis

ISSN: 21954356
ISBN: 978-981159808-1
Source Type: Book Series
Original language: English

DOI: 10.1007/978-981-15-9809-8_4
Document Type: Conference Paper
Volume Editors: Mohan S., Shankar S., Rajeshkumar G.
Publisher: Springer Science and Business Media Deutschland GmbH

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Document details - Optimization of Particle Size of Teak Wood Saw Powder Using Taguchi Method

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Lecture Notes in Mechanical Engineering

2021, Pages 409-421

1st International Conference on Materials, Design and Manufacturing for Sustainable Environment, ICMDMSE 2020; Coimbatore; India; 13 March 2020 through 14 March 2020; Code 255229

Optimization of Particle Size of Teak Wood Saw Powder Using Taguchi Method(Conference Paper)

Palani, P.K., Chithambaram, K., Rajeswari, B.

Department of Mechanical Engineering, Government College of Technology, Coimbatore, Tamil Nadu, India

Abstract

Teak is a tropical wood species and placed in the flowering plant family Lamiaceae. It has a high degree of natural durability, moderately hard, excellent decay resistance, and good dimensional stability. The major applications of the teak wood are exterior and interior, indoor and outdoor furniture, ship decks. The major issue in wooden doors is that it absorbs moisture over a period of time and results in condensation where the stability gets decreased. Also during the high temperature season, the wood material undergoes expansion. But the wooden materials made from the micro-particles provide a greater strength than made from the normal size particles. In this project, teak wood saw particles are collected as a waste material from wooden design door industry and the size of the particles is reduced in ball mill machine. Optimization of these wood particles involving the various factors was carried out by using Taguchi method. Then the micro-wood particles are finally obtained by using sieve. The results indicate that the samples obtained from the factors having speed 150 rpm, 18 numbers of balls, and a period of 2 h provides the optimum size. © 2021, The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author keywords

Ball milling, Optimization, Sieve analysis, Taguchi method and parameters, Windows

ISSN: 21954356
ISBN: 978-981159808-1
Source Type: Book Series

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Document details - Ultra-sensitive behaviour of ruthenium-doped nickel ferrite thin film humidity sensor

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Journal of Experimental Nanoscience

Volume 16, Issue 1, 2021, Pages 44-51

Ultra-sensitive behaviour of ruthenium-doped nickel ferrite thin film humidity sensor(Letter) (Open Access)

Manikandan, V., Sikarwar, S., Yadav, B.C., Vignesalvan, S., Mane, R.S., Chandrasekaran, J.

[a]Department of Physics, Kongunadu Arts and Science College, Coimbatore, India
[b]Nanomaterials and Sensors Research Laboratory, Department of Physics, Babasaheb Bhimrao Ambedkar University, Lucknow, UP, India
[c]Department of Physics, Government college of Technology, Coimbatore, India

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Abstract

Chemical sensors of homogenous particles, act as active centres, are envisaged for adsorption/desorption of water molecules. The adsorption/desorption of water molecules are lined up with surface of the sensor device. The sensor material was prepared via efficient chemical co-precipitation method. The ruthenium-doped nickel ferrite sensor endows ultra-sensitivity for humidity i.e. 4.04 and 4.37 4.04 MΩ/% relative humidity at low- and mid-range, respectively with rapid response/recovery time of 35/148 s. © 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

Author keywords

adsorption, desorption, ferrites, Humidity sensor, nanoparticles

Indexed keywords

Engineering controlled terms: Ferrite, Molecules, Nickel, Ruthenium

Engineering uncontrolled terms: Adsorption/desorption, Chemical coprecipitation method, Nickel ferrite, Rapid response, Ruthenium doped

Cited by 8 documents

Hublikar, L.V., Ganachari, S.V., Patil, V.B.
Zn and Cu ferrite nanoparticles: towards the applications of sensing and adsorption studies
(2023) Environmental Science and Pollution Research

Kumar, P., Kumar, P., Kumar Kansal, M.
Green energy production by NiFe2O4 based hydroelectric cells
(2023) Materials Today: Proceedings

Al Boukhari, J., Rasma, H., Khshehsh, M.
The effect of ruthenium substitution on the optical and magnetic properties of zinc ferrite nanoparticles
(2022) Journal of Materials Science: Materials in Electronics

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Document details - Numerical behavior of sustainable beam column joints reinforced using hybrid fibers under reversed cyclic loading

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Journal of Green Engineering

Volume 11, Issue 2, 2021, Pages 1549-1562

Numerical behavior of sustainable beam column joints reinforced using hybrid fibers under reversed cyclic loading(Article)

Stella, S., Mercyshanthi, R., Subramanian, K.

[a]Karunya Institute of Science and Technology, Coimbatore, Tamil Nadu, India
[b]Government College of Technology, Coimbatore, Tamil Nadu, India

Abstract

The behavior of exterior beam column joints reinforced with hybrid fibers subjected to cyclic loading were studied analytically. The beam column joint is one of the most essential structural element and modeling such an element strengthened with hybrid fibers. Five specimens were casted using M60 grade designed using ACI method. The detailing was done according to IS 13920:1993.The specimens were tested under reversal cyclic loading and validated using abaqus C3D8 elements for the structures and B31elements were used to model the reinforcement. The addition of hybrid fibers enhances the structural performance. © 2021 Alpha Publishers. All rights reserved.

Author keywords

(Abaqus) (Beam column joint) (Cyclic loading) (Hybrid fibers) (Sustainable)

ISSN: 19044720
Source Type: Journal
Original language: English

Document Type: Article
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Document details - Prediction of RSM and ANN in the decolorization of reactive orange 16 using biochar derived from ULVA lactuca

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Desalination and Water Treatment

Volume 211, 2021, Pages 304-318

Prediction of RSM and ANN in the decolorization of reactive orange 16 using biochar derived from ULVA lactuca(Article)

Kumar, M., Sujatha, S., Gokulan, R., Vijayakumar, A., Praveen, S., Elayaraja, S.

[a]Department of Civil Engineering, Government College of Technology, Coimbatore, Tamil Nadu, 641 013, India
[b]Department of Civil Engineering, K. Ramakrishnan College of Technology, Trichy, Tamil Nadu, 621 112, India
[c]Department of Civil Engineering, GMR Institute of Technology, Rajam, Andhra Pradesh, 532 127, India

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Abstract

The present research compares the prediction of the response surface methodology (RSM) and artificial neural network (ANN) on the decolorization of Reactive Orange 16 (RO16) using a novel adsorbent produced from Ulva lactuca (seaweed). These mathematical models were designed based on four process conditions biochar dose, pH, temperature, and initial concentration. The experimental trials concluded that the dye removal of 93.10% was achieved at an optimum biochar dosage of 2 g/L, pH of 2, initial concentration of 0.5 mmol/L, and temperature of 40°C. The biochar characterization confirmed the presence of functional groups that are responsible for the adsorption of dye. The mathematical predictive model of RSM and ANN was compared with the experimental trials and a correlation coefficient (R^2) of 0.95 is obtained for RSM, whereas a correlation coefficient (R^2) of 0.99 was obtained for ANN. ANN prediction model was far better than RSM in the prediction of decolorization of Reactive Orange 16 (RO16) using U. lactuca as a novel adsorbent. The adsorp-tion isotherm studies concluded that four parameter model Fritz–Schlunder – IV and Marczewski– Jaroniec were found to best fit with a correlation coefficient of 0.9999. Pseudo-second-order kinetic model was found to best fit the experimental data. © 2021 Desalination Publications. All rights reserved.

Author keywords

(Artificial neural network) (Biochar) (Decolorization) (Reactive Orange 16 (RO16)) (Response surface methodology)

Indexed keywords

Related documents

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Document details - Chromatographic separation of bioactive compounds of Leucas aspera (L) and larvicidal activity of Anopheles stephensi larvae

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Research Journal of Biotechnology

Volume 16, Issue 1, January 2021, Pages 53-60

Chromatographic separation of bioactive compounds of Leucas aspera (L) and larvicidal activity of Anopheles stephensi larvae(Article)

Jambulingam, K., Ezhil, M.E.P., Karuppusamy, K.

Department of Industrial Biotechnology, Government College of Technology, Coimbatore, Tamilnadu, 641013, India

Abstract

Malaria is a life-threatening disease caused by plasmodium parasites that are transmitted to people through the bites of infected female mosquito Anopheles stephensi. Medicinal plant Leucas aspera was selected to determine the larvicidal activity due to its potent pharmacological activity. The present study evaluates the bioactive components and larvicidal potential of leaf extracts of Leucas aspera against Anopheles stephensi larvae. The bioactive components were identified using thin layer chromatography (TLC). Larvicidal efficacy was studied with different concentration of Leucas aspera leaf extracts against Anopheles stephensi. The yield of leaf extract was 45%, 21.25%, 37.2% for ethanol, distilled water and hexane solvents respectively. The presence of phytochemicals was higher in ethanolic leaf extract rather than water and hexane extract. The phytochemical screening showed the presence of tannin, phlobatanins, steroids, saponin, terpenoids, phenol, glycosides, mentione, terpene alcohol, sterol and quercetin. The LC50 and LC90 for the Leucas aspera ethanolic extract against the 4th instar larvae after 24hrs of incubation were 24.08 ppm and 168.96 ppm respectively and after 48hrs of exposure 51.67 ppm and 189.46 ppm respectively. It is clearly evident from the study that the ethanolic leaf extract of Leucas aspera will probably function as an eco-friendly vector controlling agent.

Author keywords

Anopheles stephensi · Eco-friendly larvicides · Larvicidal activity · Leucas aspera · Phytochemicals

ISSN: 09736263

Document Type: Article

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Document details - Sustainability Approaches in Ground Improvement Measures

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Lecture Notes in Civil Engineering

Volume 79, 2021, Pages 249-255

1st International Conference on Sustainable Practices and Innovations in Civil Engineering, SPICE 2019; Chennai; India; 26 March 2019 through 27 March 2019; Code 244569

Sustainability Approaches in Ground Improvement Measures(Conference Paper)

Padmanabhan, G., Shanmugam, G.K., Subramaniam, S.

[a]Government College of Technology, Coimbatore, India
[b]CSIR-Central Building Research Institute, Roorkee, India

Abstract

This paper presents an overview of sustainability approaches followed in ground improvement techniques. A review on research works performed in ground improvement techniques such as solar prefabricated vertical drains and microbial induced partial saturation and the way these techniques promotes the global sustainability. The tools used for evaluating the sustainability applicable to ground improvement are discussed and a comprehensive review is done for the research studies performed in ground improvement which contributes to the sustainable development. Accordingly, multi criteria-based sustainability evaluation framework consisting of Environmental Impact Assessment, Life Cycle Cost and Life Cycle Assessment was reviewed and its contribution towards global sustainability was presented. By estimating sustainability index through detailed sustainable assessment and evaluation, new and innovative ground improvement measures can be developed which enable global sustainability and eco-friendly geotechnical engineering. Also in this paper, the sustainable ground improvement developments in India and abroad are presented through available case studies. © 2021, Springer Nature Singapore Pte Ltd.

Author keywords

Case studies · Eco-friendly · Environmental impact assessment · Ground improvement techniques · Sustainability

Indexed keywords

Engineering controlled terms: Circuit simulation · Drainage · Environmental impact · Environmental impact assessments · Geotechnical engineering · Life cycle

Cited by 1 document

Bajaj, M., Padmanabhan, G.

Experimental Study on the Factors Influencing the Performance of Geogrid Encased Granular Pile Anchor Installed in Cohesionless Soils

(2022) *International Journal of Geosynthetics and Ground Engineering*

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Document details - Classification by learning of wavelet and texture features

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Advances in Intelligent Systems and Computing

Volume 1163, 2021, Pages 595-603

1st International Conference on Frontiers in Smart Systems Technologies, ICFSST 2019; Chennai; India; 3 April 2019 through 5 April 2019; Code 244519

Classification by learning of wavelet and texture features(Conference Paper)

Bagavathi, C., Saranya, O.

Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

Image classification is one among the significant tasks that can benefit industry through advancement in science and technology. Texture images possess a specific pattern that can be utilized to uniquely identify a texture class. Classification of Texture images can be done through proper selection of parameter that uniquely identifies an image in a group containing images of different classes. Machine learning approaches are currently the choice of implementation to provide accuracy and robustness in various fields like automatic image recognition, registration, and analysis. This work addresses machine learning methods to classify learnt texture samples through feature fusion of parameters obtained through wavelet and texture analysis. © Springer Nature Singapore Pte Ltd 2021.

Author keywords

Gray level co-occurrence matrix · Haar wavelets · K-Nearest neighbor classifier · Support vector machines · Texture analysis

Indexed keywords

Engineering controlled terms: Image classification · Image recognition · Machine learning · Textures

Engineering uncontrolled terms: Different class · Feature fusion · Machine learning approaches · Machine learning methods · Science and Technology · Texture analysis · Texture class · Texture features

Engineering main heading: Image texture

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Document details - Energy efficient multifocus image fusion in dct domain

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Advances in Intelligent Systems and Computing

Volume 1163, 2021, Pages 713-718

1st International Conference on Frontiers in Smart Systems Technologies, ICFSST 2019; Chennai; India; 3 April 2019 through 5 April 2019; Code 244519

Energy efficient multifocus image fusion in dct domain(Conference Paper)

Sreeja, G., Saranya, O.

Department of ECE, Government College of Technology, Coimbatore, 641013, India

Abstract

Fusion of multifocus images in discrete cosine transform (DCT) domain has been extensively exploited in recent years due to low complexity. In particular, the fusion by DCT is useful in visual sensor networks (VSN), where the images have to be transferred in coded format. Many research works have been done by combining spatial domain methods in DCT domain. In the proposed work, the energy of correlation coefficient in DCT domain is chosen as fusion criteria. The method works by evaluating the focus measurement between the input images and Laplacian-based sharpened images in DCT domain. The results obtained by the proposed method are compared in terms of objective metrics and the results show that the proposed work avoids inappropriate block selection which exists in available methods. © Springer Nature Singapore Pte Ltd 2021.

Author keywords

Consistency verification · DCT · Energy of correlation coefficient · Image enhancement · Multifocus image fusion

Indexed keywords

Engineering controlled terms: Discrete cosine transforms · Energy efficiency · Image compression · Sensor networks

Engineering uncontrolled terms: Correlation coefficient · Discrete Cosine Transform(DCT) · Focus measurement · Multifocus image fusion · Multifocus images · Objective metrics · Spatial domain methods · Visual sensor networks

Engineering main heading: Image fusion

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Document details - Enhancement of ultrasound assisted aqueous extraction of polyphenols from waste fruit peel using dimethyl sulfoxide as surfactant: Assessment of kinetic models

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Chemosphere

Volume 263, January 2021, Article number 128071

Enhancement of ultrasound assisted aqueous extraction of polyphenols from waste fruit peel using dimethyl sulfoxide as surfactant: Assessment of kinetic models(Article)

Selvakumar, P., Karthik, V., Kumar, P.S., Asaithambi, P., Kavitha, S., Shoshanmugam, P.

[a]Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia
[b]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, Tamil Nadu 13, India
[c]Department of Chemical Engineering, Sri Sivasubramaniya Nadar College of Engineering, Chennai, 603 110, India

View additional affiliations

Abstract

Pomegranate peel, a major waste from the food processing industries containing biologically active compounds, could be converted into value-added products having medicinal properties. Present study deals with the ultrasound-assisted surfactant, namely dimethyl sulfoxide (DMSO) aided polyphenolics extraction from pomegranate peel waste using double distilled water (DDW) as a solvent. Maximum total yield of extraction and total polyphenolic content (TPC) were found respectively to be 43.58 ± 1.0 and 49.55 ± 0.8%, at optimized sonication parameters viz. temperature 50 °C, power density 1.2 W/mL and time 40 min followed by surfactant aided extraction under optimum conditions 0.6% DMSO, 50 °C and 150 rpm for 90 min. Kinetic models were developed to determine the polyphenolics concentration and validated. GC-MS analysis of the extract revealed 22 phenolic compounds. Thus, the acquired results have ensured the significance of ultrasound pre-treated surfactant aided extraction of polyphenolic compounds and this process can be developed for commercial production. © 2020 Elsevier Ltd

Author keywords

GC-MS · Kinetic study · Organic solid waste · Polyphenolic compounds · Surfactant · Ultrasound aided extraction

Indexed keywords

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Structural Concrete

Volume 22, Issue S1, January 2021, Pages E985-E996

An investigation of key mechanical and durability properties of coconut shell concrete with partial replacement of fly ash(Article)

Prakash, R., Thenmozhi, R., Raman, S.N., Subramanian, C., Divyah, N.

[a]Department of Civil Engineering, Alagappa Chettiar Government College of Engineering and Technology, Karaikudi, India
[b]Department of Civil Engineering, Government College of Technology, Coimbatore, India
[c]Department of Architecture and Built Environment, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia, Bangi, Malaysia

Abstract

This study investigated the effect of adding fly ash on the mechanical and durability characteristics of coconut shell (CS) concrete. Two different mixes were developed, one with CS and the other with conventional aggregate and CS as coarse aggregate. Cement was replaced with Class F fly ash in terms of weight at 0, 10, 20, and 30% in both mixes. Test result showed that the CS concrete with 10% fly ash replacement level exhibited the highest compressive and tensile strength. The addition of fly ash decreased the porosity of CS concrete due to its fineness and increased hydration products in the matrix at later ages. Additionally, it also improved the weak aggregate interfacial transition zone of CS lightweight concrete. Thus, the fly ash addition in CS concrete showed lower values of water absorption, permeable voids, sorptivity, and chloride permeability. Furthermore, the increasing content of fly ash addition improved the durability characteristics of CS concrete considerably. © 2020 fib. International Federation for Structural Concrete

Author keywords

agricultural wastes · concrete · durability · industrial by product · sustainability

Indexed keywords

Engineering controlled terms: Aggregates · Agricultural wastes · Chlorine compounds · Concretes · Durability · Fly ash · Hydration · Light weight concrete · Sustainable development · Tensile strength · Water absorption

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Document details - Investigation and improvement on storage stability of pyrolysis oil obtained from Aegle marmelos de-oiled seed cake

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Energy Sources, Part A: Recovery, Utilization and Environmental Effects

Volume 43, Issue 8, 2021, Pages 953-967

Investigation and improvement on storage stability of pyrolysis oil obtained from Aegle marmelos de-oiled seed cake(Article)

Paramasivam, B., K, R., R, S.

[a]Department of Mechanical Engineering, Government College of Technology, Coimbatore, India
[b]Department of Mechanical Engineering, Amrita School of Engineering, Ettimadai, India

Abstract

This study focuses on the effects of commercially available natural and synthetic antioxidants on the fuel stability of Aegle marmelos pyrolysis oil blends. Bio-oil was obtained from Aegle marmelos de-oiled seed cake in a pyrolysis reactor at 600°C temperature. Characterization of pyrolysis oil blends regarding fuel stability was assessed by FTIR by analyzing the band regions of C-H bonds. TBHQ dosage with bio-oil/diesel blend (F20D) augments the oxidation stability of 22.33%, and thermal stability of 27.05% when compared with pure pyrolysis oil/diesel blend (F20). The F20D was spectacles the superior fuel stability as compared with other blends. © 2020 Taylor & Francis Group, LLC.

Author keywords

Aegle marmelos bio-oil · natural antioxidant · oxidation stability · synthetic antioxidants · thermal stability

Indexed keywords

Engineering controlled terms: Antioxidants · Pyrolysis · Synthetic fuels · Thermodynamic stability

Engineering uncontrolled terms: Aegle marmelos · Bio oil · Fuel stability · Natural antioxidants · Oxidation stability · Pyrolysis reactor · Storage stability · Synthetic antioxidants

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Document details - Production of biodiesel from high free fatty acid feedstock using heterogeneous acid catalyst derived from palm-fruit-bunch

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Energy Sources, Part A: Recovery, Utilization and Environmental Effects

Volume 43, Issue 24, 2021, Pages 3393-3402

Production of biodiesel from high free fatty acid feedstock using heterogeneous acid catalyst derived from palm-fruit-bunch(Article)

Choksi, H., Pandian, S., Arumugamurthi, S.S., Sivanandi, P., Sircar, A., Booramurthy, V.K.

[a]School of Petroleum Technology, Pandit Deendayal Petroleum University, Gandhinagar, India
[b]Department of Petrochemical Engineering, RVS College of Engineering and Technology, Coimbatore, India
[c]Department of Mechanical Engineering, Government College of Technology, Coimbatore, India

Abstract

A novel solid acid catalyst was prepared from the palm-fruit-bunch by in-situ incomplete sulphonation carbonization method. The prepared catalyst was characterized to determine its physical and chemical properties which are determine its performance in a reaction. The catalyst was then subjected to esterification and transesterification reactions to produce biodiesel from high free fatty acid (FFA) Calophyllum inophyllum (C. inophyllum) oil. An optimum yield of 88.5 wt% methyl ester was achieved at 4 wt% of catalyst, methanol to oil molar ratio of 21:1 and a reaction temperature of 60°C in 180 min. The fuel properties of the biodiesel were analyzed as per ASTM standard methods, and their properties were found to be in accordance with ASTM D6751. © 2019 Taylor & Francis Group, LLC.

Author keywords

biodiesel · Calophyllum inophyllum · optimization · palm-fruit-bunch · solid acid catalyst

Indexed keywords

Engineering controlled terms: ASTM standards · Biodiesel · Carbonization · Catalysts · Esters · Fruits · Molar ratio · Optimization

Engineering uncontrolled terms: Calophyllum inophyllum · Carbonization methods · Heterogeneous acid catalysts · High free fatty acids

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Document details - High Performance Error Tolerant Adders for Image Processing Applications

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IETE Journal of Research

Volume 67, Issue 2, 2021, Pages 205-216

High Performance Error Tolerant Adders for Image Processing Applications(Article)

Jothin, R., Vasanthanayaki, C.

[a]Department of Electronics and Communication Engineering, KGiSL Institute of Technology, Coimbatore, India
[b]Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, India

Abstract

In this paper, we proposed High Performance Error Tolerant Adders (HPETA) which have an efficient design and quality metrics for inexact computing applications. To achieve high performance, Multiplexer Based Approximate Full Adders (MBAFA) are proposed in the inaccurate part of the HPETA design. High speed, energy and area efficiency have been achieved by the critical path delay reduction and the number of gate-level logic reduction. The performances of the proposed MBAFA and HPETA are investigated by comparing its speed, area, power and accuracy parameters with those of other existing error tolerant adder structures. The investigation of these designs is performed in the Cadence Encounter software using the Application Specific Integration Circuits (ASIC) TSMC 90-nm technology library. From the Simulation results, the proposed MBAFA-I based HPETA-I adder exhibits high speed, area efficiency, low power consumption, less Area-Delay Product (ADP) and 56.25%, 47.98%, 37.58%, 34.03%, 39.32% lesser Power-Delay Product (PDP) than the existing conventional CSLA, SAET-CSLA, ETCSLA, HSETA, HSSSA, respectively. © 2021 IETE.

Author keywords

Approximate · Energy efficiency · FPGA · High speed · HPETA · MBAFA · Multiplexer · PSNR

Indexed keywords

Engineering controlled terms: Application programs · Computation theory · Energy efficiency · Errors · Field programmable gate arrays (FPGA) · Image processing · Multiplexing equipment

Engineering uncontrolled terms: Approximate · High Speed · HPETA · MBAFA · multiplexer · PSNR

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Document details - Hybridisation of single-image superresolution with edge-aware multi-focus image fusion for edge enrichment

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IET Image Processing

Volume 14, Issue 16, 19 December 2020, 9p

Hybridisation of single-image superresolution with edge-aware multi-focus image fusion for edge enrichment(Article)

Gopalakrishnan, S., Ovireddy, S.

Department of ECE, Government College of Technology, Coimbatore, TN, 641013, India

Abstract

To break the curtailment of digital imaging and retrieve appropriate information with different focused images, a novel edge-aware multi-focus image fusion is proposed by integrating the single-image super-resolution (SISR) method along with the edge-preserving filters. Initially, the multi-focus images are converted to high resolution images by estimating missing high frequency details from its blurred versions. With acquired high resolution images, smoothing by median and the anisotropic diffusion filters are performed to extract focused regions. An initial weight map is constructed by using maximum selection of pixel intensities of the difference images obtained with filtering. The precision of estimated weight map is further improved by exhibiting morphological operations and guided filter. Finally, the images are fused based on the optimised decision map. Simulation results of proposed fusion work are evaluated with seven metrics and the values are compared with different stateof- the-art methods. Both the quantitative and qualitative analyses showed the excellence of proposed work over other fusion methods. © The Institution of Engineering and Technology 2020.

Indexed keywords

Engineering controlled terms: Mathematical morphology, Median filters, Optical resolving power

Engineering uncontrolled terms: Anisotropic diffusion filters, Edge-preserving filter, High resolution image, Morphological operations, Multifocus image fusion, Pixel intensities, Quantitative and qualitative analysis, State-of-the-art methods

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Document details - New Inequalities for Rotor Frames in Hilbert Space

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Journal of Mathematical Inequalities

Volume 14, Issue 4, December 2020, Pages 977-988

New Inequalities for Rotor Frames in Hilbert Space(Article)(Open Access)

Raju Pillai, K., Palaniamma, S.

[a]Department of Mathematics, Government College of Technology, Coimbatore, Tamil Nadu 641 013, India
[b]Department of Science and Humanities, Sri Krishna College of Technology, Coimbatore, Tamil Nadu 641 042, India

Abstract

In this paper, a new identity of the Weyl-Heisenberg frame using a rotation operator has been investigated in Hilbert space. The characterization and significance of Rotor frame inequalities have been discussed by using rotation and translation operators. Also discussed the application of Rotor frames using a rotation operator. Finally, the reconstruction theorem has been investigated for recovers original data. In this work, we would like to highlight that the reconstruction theorem used to obtain the energy of the signal and reconstruct the original signal with eradicated the garbage vector using frame operator in Hilbert space. Today, this technique is very useful in communication systems. ©, Zagreb

Author keywords

frames, Hilbert space, operators, orthonormal basis, Weyl-Heisenberg frame

ISSN: 1846579X
Source Type: Journal
Original language: English

DOI: 10.7153/jmi-2020-14-64
Document Type: Article
Publisher: Element D.O.O.

Raju Pillai, K.; Department of Mathematics, Government College of Technology, Coimbatore, Tamil Nadu, India;
Palaniamma, S.; Department of Science and Humanities, Sri Krishna College of Technology, Coimbatore, Tamil Nadu, India;

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Document details - Clad-modified fiber optic ammonia sensor based on Cu functionalized ZnO nanoflakes

Sensors and Actuators, A: Physical

Volume 316, 1 December 2020, Article number 112374

Clad-modified fiber optic ammonia sensor based on Cu functionalized ZnO nanoflakes(Article)

Narasimman, S., Balakrishnan, L., Alex, Z.C.

[a]School of Electronics Engineering, VIT, Vellore, 632 014, India
[b]Department of Physics, Government College of Technology, Coimbatore, 641 013, India

Abstract

Fabrication and characterization of fiber optic volatile organic compounds (VOCs) sensor using pristine and copper (Cu) functionalized zinc oxide (ZnO) nanoflakes have been reported. Pristine ZnO nanoflakes were synthesized by co-precipitation method and were functionalized with Cu nanoparticles. Further, the synthesized nanoflakes were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS) and X-ray photoelectron spectroscopy. The characterization results reveal that the nanoparticles are in flakes shape with wurtzite structure and also confirm the Cu functionalization. Cladding modification technology was adopted to fabricate the sensor probe followed by dip coating of Cu functionalized ZnO nanoflakes over un-cladded part of an optical fiber. Different VOC concentrations of 0–350 ppm (such as acetone, ammonia, ethanol, methanol, hexane and chloroform) were prepared and their spectral characteristics were recorded at ambient temperature. The sensing analysis revealed that Cu functionalized ZnO nanoflakes can significantly improve the sensitivity towards all VOCs than pristine ZnO and exhibited highest sensitivity (~ 47.4 at 350 ppm) towards ammonia with the limit of detection 10 ppm, being 6 times higher than pristine ZnO. The response towards ammonia was linear (R^2 = 0.9912) over the concentration range of 10 ppm–50 ppm. Further, the sensor showed shorter response/recovery time of 11 s and 13 s, stable repeatability along with the long-term stability. The remarkable sensing property advocates that Cu functionalized ZnO nanoflakes are propitious candidate for ammonia sensor. © 2020

Author keywords

Co-precipitation method | Cu functionalized ZnO nanoflakes | Environment safety | Fiber optic ammonia sensor | Sensitivity | Structural and optical properties

Indexed keywords

Document details - Photocatalytic degradation of rhodamine B using BiMnO₃ nanoparticles under UV and visible light irradiation

Journal of Materials Science: Materials in Electronics

Volume 31, Issue 24, December 2020, Pages 22487-22497

Photocatalytic degradation of rhodamine B using $BiMnO_3$ nanoparticles under UV and visible light irradiation(Article)

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View additional affiliations

Abstract

Rhodamine B (RhB), a toxic dye is environmentally hazardous and harmful to living organisms, which is primarily used in various industries. Multiferroic $BiMnO_3$ (BMO) with (BMO 1) and without (BMO 2) surfactant (CTAB) was synthesized using hydrothermal method, which acts as a photocatalyst for the Rhodamine B dye degradation process. BMO had tested as a photocatalyst for dye degradation of Rhodamine B dye in UV and Visible light irradiation due to its narrow bandgap. On performing various structural and optical characterizations, the structure of as-prepared BMO samples confirmed, and their crystallite size and bandgap were compared for with and without CTAB treated BMO samples. Under UV irradiation, the decomposition of RhB efficiency and decay time had been calculated as 68% and 75 min for BMO 1. In H_2O_2 assisted visible light irradiation, BMO 2 shows better performance (90% and 55 min). © 2020, Springer Science+Business Media, LLC, part of Springer Nature.

Indexed keywords

Engineering controlled terms: Biology | Crystallite size | Energy gap | Irradiation | Light | Multiferroics | Photocatalytic activity | Photodegradation

Engineering uncontrolled terms: Hydrothermal methods | Living organisms | Narrow band gap | Photo catalytic degradation | Rhodamine B dye

Document details - Critical review on the necessity of bioelectricity generation from slaughterhouse industry waste and wastewater using different anaerobic digestion reactors

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Renewable and Sustainable Energy Reviews

Volume 134, December 2020, Article number 110360

Critical review on the necessity of bioelectricity generation from slaughterhouse industry waste and wastewater using different anaerobic digestion reactors(Review)

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[b]Department of Civil Engineering, Government College of Technology, Coimbatore, Tamilnadu 641013, India

Abstract

In this review article, a complete review on the generation of bioenergy from various anaerobic reactors was highlighted with respect to the slaughterhouse waste (SHW). The necessity of generation of the bioenergy and an overview of the treatment efficiency of various anaerobic reactor was discussed and also their performance efficiency was also addressed in detail. Ultimately this review facilitates that state-of-art knowledge in production of electrical energy from generated biogas from the slaughterhouse solid and liquid wastewater with respect to all kind of anaerobic reactors. Moreover, this review also highlights the factors which affects the biogas production in slaughterhouse industry. The biogas generation from the SHW is assessed as 16,026 million m^3/year. Based on this study finding SHW have high potential to generate the bioelectricity production. This study finds that bioelectricity generation from SHW was around $62,808 \times 10^6$ kWh/year, which contributing the 27% of the total electricity requirement of Iran. The generation of bioelectricity from SHW saves the greenhouse gas emission of about 4096×10^3 tonnes of CO_2-eq/year. Similarly, in 2016 USA slaughterhouse industries discharged 18.4 million metric tons of SHW, which has generated the 22.7×10^7 kWh of bioelectricity. This review paper provides the valuable insights and data to the policy makers to frame the sustainable long-term energy policy by considering the SHW as a case study. © 2020 Elsevier Ltd

Author keywords

Anaerobic digestion, Bioelectricity, Bioenergy, Bioreactors, Slaughterhouse waste, Slaughterhouse wastewater

Document details - A review on the role of nanomaterials in the removal of organic pollutants from wastewater

1 of 1

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Reviews in Environmental Science and Biotechnology

Volume 19, Issue 4, December 2020, Pages 751-778

A review on the role of nanomaterials in the removal of organic pollutants from wastewater(Review)

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[b]Department of Chemical Engineering, Hindustan Institute of Technology and Science, Chennai, India

Abstract

Water scarcity will be the prime threat to the millions of the human race across the globe in the future. In the recent report of WHO, about 50% of people will sustain their livings in the water-stressed zones by 2025. As every industrial sector are demanding clean water resource, it is the high time for the development of reliable strategies to recycle the wastewater efficiently. With the conventional techniques, the supply of resources with an exponential increase in the demand is highly challenging. Hence, the alternative, sustainable, and technologically advanced wastewater treatment processes need to be employed instantaneously to compete for the pace. One such promising approach is the use of nano-sized materials with the high surface area and increased surface reactivity in the removal of pollutants from the wastewater. These nanomaterials possess unique properties than their bulk forms enabled the researchers from the various fields to exploit their use in the wastewater treatment processes. As a result, multidisciplinary researches targeting water pollution has increased manifold in recent decades. For instance, the nanomaterials assisted photo-catalysis, membrane filtration, and adsorption processes showed effective results in the removal of organic dyes, heavy metal ions, oil spills, and hydrocarbons, etc. The intrinsic physicochemical, electrical, magnetic properties, and the ease of tailor-made functionalization of nanomaterials identified them as one of the most potent candidates in the water technology. However, the specified challenges such as material toxicity, stability, recovery, fouling, etc. are existing in the use of nanomaterials and several successful innovations are prospering to counteract them in recent years. With such high intentness of these nano-sized materials, the present chapter provides a comprehensive report on the pivotal researches made on the wastewater treatment processes. © 2020, Springer Nature B.V.

Author keywords

Adsorption, Membrane filtration, Nanomaterials, Photo-catalysis, Wastewater treatment, Water scarcity

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Document details - Enhanced photocatalytic and antimicrobial activities of ultrasound assisted exfoliated graphitic carbon nitride nanorods

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AIP Conference Proceedings

Volume 2270, 2 November 2020, Article number 70002

2020 International Conference on Physics and Chemistry of Materials in Novel Engineering Applications, PCMNEA 2020; Kumaraguru College of TechnologyCoimbatore, Tamilnadu; India; 6 February 2020 through 7 February 2020; Code 164723

Enhanced photocatalytic and antimicrobial activities of ultrasound assisted exfoliated graphitic carbon nitride nanorods(Conference Paper)

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[b]Department of Physics, Academy of Maritime Education and Training, Chennai, India

Abstract

Polymeric metal free graphitic carbon nitride nanorods were prepared by direct pyrolysis of thiourea at 500? in an air atmosphere and subsequent liquid-phase exfoliation. Synthesized nanomaterials were characterized using X-ray diffraction, FESEM, High resolution TEM, UV-visible spectroscopy, Photo luminescence spectroscopy and Surface area analysis. XRD studies reveal the prepared nanoparticles have a hexagonal structure and the particle size is in the range of 35-80 nm. The FESEM micrograph analysis the surface and visibly reveals nanophase formation and purity of the synthesized sample were confirmed by EDAX analysis. The photocatalytic activity of the graphitic carbon nitride was estimated by degrading 4-Nitrophenol in an aqueous medium. The antibacterial activity of the g-C_3N_4 nanostructures against Staphylococcus aureus and Escherichia coli bacterial strain for various concentrations (25-100μg/disc) were evaluated using the disc diffusion method. The graphitic carbon nitride nanorods against Escherichia coli showed the strong Zone of inhibition for 100μg/disc concentration. Evaluated results were compared with the standard commercial drug Ciprofloxacin.

Author keywords

(Escherichia coli) (Exfoliated porous nanorods) (Ultrasonication)

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Document details - Characterization of tannery effluent and synthesis of natural coagulant

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AIP Conference Proceedings

Volume 2270, 2 November 2020, Article number 60003

2020 International Conference on Physics and Chemistry of Materials in Novel Engineering Applications, PCMNEA 2020; Kumaraguru College of TechnologyCoimbatore, Tamilnadu; India; 6 February 2020 through 7 February 2020; Code 164723

Characterization of tannery effluent and synthesis of natural coagulant(Conference Paper)

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Department of Environmental Engineering, Government College of Technology, Coimbatore, Tamilnadu, India

Abstract

Tannery is an oldest and quickest growing trade in Asian nation. Just about each work trade uses notable amounts of chemicals within the method of reworking animal hides into animal skin. Those chemicals discharged through work effluent have pollution. Thus this paper recommend the characterization of work effluent and synthesis of aloevera leaf as a natural coagulant. The study results show that the effluents have extraordinarily high values of turbidity, hardness, chlorides, TSS, Total solids, TDS, BOD and COD. Those values were so much higher than the standard permissible limits alloted by the Central Pollution Control Board (CPCB). Hence it is necessary to treat the tannery effluent for safe disposal. This study conjointly centered on the characterization of coagulant which has particle size of concerning 260nm whereas the zeta potential values powerfully promotes the particle aggregation. The UV illumination photometer showed the absorption wavelength peaks occured inside a range of 250nm- 580nm induces adsorption bridging. The variation in apex from Fourier-Transform infrared spectroscopy analysis showed the material mechanism due to presence of hydroxyl and C-H groups. The structure and morphology of aloevera coagulant were predicted through scanning electron microscope (SEM) shows amorphous nature and comperatively porous matrix which allows inter-particle bridging.

Author keywords

(Aloevera) (FTIR) (Physico-chemical parameter) (SEM) (Synthesis) (UV) (Work effluent)

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Document details - Enhancing Diesel Engine Performance and Balancing Emissions with Effect and Contribution of MgO-ZrO₂ and AT13 Layered Piston

1 of 1

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Arabian Journal for Science and Engineering

Volume 45, Issue 11, November 2020, Pages 9699-9707

Enhancing Diesel Engine Performance and Balancing Emissions with Effect and Contribution of $MgO-ZrO_2$ and AT13 Layered Piston(Article)

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Abstract

Modern engines need to produce more efficiency in all aspects with low specific fuel consumption and lesser pollutions for environmental betterment. The purpose of this research work is to experimentally identify better thermal barrier coating and their impacts to enhance engine performance with lower specific fuel consumption. Piston crown of a single-cylinder diesel engine is coated with $MgO-ZrO_2$ and Al_2O_3-13%TiO_2 and tested under different loading conditions. The impact of thermal barrier coating performance and emissions compared with standard diesel engine characteristics is investigated. $MgO-ZrO_2$ and Al_2O_3-13% TiO_2 are selected as additional material to coat the piston crown because these materials are physically stable and thermal properties like low heat conductivity, high melting point and high thermal expansion are stable at high temperature. This experimental work has shown an increase in brake thermal efficiency of 32.1% for the TBC engine from 23.4% for the UC engine. Therefore, there is a decrease in brake-specific fuel consumption for TBC engine 0.27 kg/kWh from uncoated engine 0.37 kg/kWh at 9 kg of load decreased by 27.03%. It was observed from the heat balance sheet that the TBC engine useful work was increased by 3.5% compared with the uncoated engine which ultimately decreases the effect of gases like CO and HC due to an increase in the complete combustion by the thermal barrier coating. © 2020, King Fahd University of Petroleum & Minerals.

Author keywords

(Diesel engine) (Emissions) (Performance) (Piston) (Thermal barrier coating)

Document details - Effect of neodymium stimulation on the dielectric, magnetic and humidity sensing properties of iron oxide nanoparticles

1 of 1

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Materials Chemistry and Physics

Volume 254, 1 November 2020, Article number 123572

Effect of neodymium stimulation on the dielectric, magnetic and humidity sensing properties of iron oxide nanoparticles(Article)

Manikandan, V., Mirzaei, A., Petrila, I., Kavita, S., Mane, R.S., Denardin, J.C., Lundgaard, S., Juodkazis, S., Chandrasekaran, J., Vigneselvan, S.

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View additional affiliations

Abstract

Neodymium-doped iron oxide (Nd–Fe_2O_3) nanoparticles (NPs), synthesized via chemical co-precipitation method where particle size is reduced due to the neodymium doping. The addition of neodymium doping, the applied thermal energy of Fe_2O_3 changes the dielectric constant and loss. At this juncture, the dielectric constant increases due to the elevation of neodymium concentration and thermal energy which eventually reduces the dielectric value. On comparison of dielectric performance, the pristine Fe_2O_3 endows a high dielectric constant and loss in comparison to Nd-Fe_2O_3. Neodymium induces the transition from antiferromagnetic to superparamagnetic. The as-fabricated sensors confirm humidity sensing at different ranges. Fascinatingly, the sensitivity of the sensor has increased owing to the increase of neodymium substitution and decrease of particle size while the response time is decreased. The sensors confirm outstanding performance in corrosive environment and their response and sensitivity time values are respectively 5s and 85%. © 2020 Elsevier B.V.

Author keywords

(Dielectric) (Magnetic materials) (Magnetic properties) (Nanoparticles) (Sensors)

Indexed keywords

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Document details - Modelling Networks as Neighborly Irregular Graphs

Wireless Personal Communications

Volume 115, Issue 1, 1 November 2020, Pages 391-400

Modelling Networks as Neighborly Irregular Graphs(Article)

Muthuchelvam, M., Kowshalya, A.M.

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Abstract

Today's world is filled with numerous computing devices and electronic gadgets connected to the Internet. These devices continuously sense and deliver their desired task autonomously or via owners. Domestic applications like healthcare monitoring systems, smart farming, noise pollution control, etc., involves many sensors and wearables that tirelessly estimate, evaluate and report the desired outcome. There are circumstances where two or more sensors at the same level, sense the same information and rely to the controller/base station. Handling and processing of such duplicate information results in increased overhead messages and reduced lifetime of sensors. This paper proposes a novel idea to model a network as a Neighborly Irregular graph so that optimal placement of sensor nodes can be guaranteed and communication between sensors at the same level is restricted. A simple and novel algorithm to construct Neighborly Irregular graph is proposed which converts the underlying network to a Neighborly Irregular graph if the network is not Neighborly Irregular. The proposed idea is tested with smart irrigation system in real time to prove its effectiveness. Experimental results prove that the message overheads are drastically reduced when the underlying network is Neighborly Irregular. © 2020, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Neighborly irregular graphs; Neighborly regular strength of graphs; Sensors; Smart irrigation system

Indexed keywords

Engineering controlled terms: Cost reduction; Graph algorithms; Noise pollution; Noise pollution control; Sensor nodes

Engineering uncontrolled terms: Computing devices; Electronic gadgets; Healthcare monitoring; Irrigation systems; Message overhead; Novel algorithm; Optimal placement of sensors; Underlying networks

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Document details - Deep learning based big medical data analytic model for diabetes complication prediction

Journal of Ambient Intelligence and Humanized Computing

Volume 11, Issue 11, November 2020, Pages 5691-5702

Deep learning based big medical data analytic model for diabetes complication prediction(Article)

Vidhya, K., Shanmugalakshmi, R.

[a]Department of CSE, KPR Institute of Engineering and Technology, Coimbatore, India
[b]Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India

Abstract

The revolution in digitization makes the health care sector as a prime source of big data. The analysis of these data could be a great supporting source for deriving new insights, which increases the care and awareness about health. Diabetes together with its complications has been recognized worldwide as a chief public health threat. Predicting diabetic complications is considered as a highly effectual technique for augmenting the survival rate of diabetic patients. While many studies currently use medical images and structured medical records, very limited efforts have been dedicated for applying Data Mining (DM) techniques for unstructured textual medical records, for instance, admission and discharge records. Many DM techniques have been generated for envisaging diabetic complications. But in existing methods, the classification as well as prediction accuracy is not so high. So this paper proposes a model centered on Deep Learning (DL) for predicting complications of Type 2 Diabetes Mellitus. The proposed model follows data collection, pre-training, feature extraction, Deep Belief Network (DBN), validation process, and classification steps for predicting diabetic complications. Finally, the performances proffered by the proposed DL based Big Medical Data Analytics model using DBN as well as the prevailing techniques are contrasted with respect to Precision, accuracy, and Recall. The Training, as well as the Testing process, delineates the pervasiveness of risk with an accuracy of 81.20%. This realistic prediction model will be very much useful for effectively managing diabetes. © 2020, Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Big data; Convolutional neural network; Deep belief network; Gated recruitment unit; K nearest neighbour; Long short term memory; Random forest; Support vector machine

Indexed keywords

Cited by 13 documents

Rajavel, R., Sundaramoorthy, B., Gr, K.
Cloud-enabled Diabetic Retinopathy Prediction System using optimized deep Belief Network Classifier
(2023) Journal of Ambient Intelligence and Humanized Computing

Devaenapathy, D., Vidhya, K., Alphy, A.
Kidney Impairment Prediction Due to Diabetes Using Extended Ensemble Learning Machine Algorithm
(2023) Journal of Machine and Computing

Alex, S.A., Nayahi, J.J.V.
Classification of Imbalanced Data Using SMOTE and AutoEncoder Based Deep Convolutional Neural Network
(2023) International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems

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Document details - Effect of retarded injection timing and EGR on performance, combustion and emission characteristics of a CRDi diesel engine fueled with WHDPE oil/diesel blends

Fuel
Volume 278, 15 October 2020, Article number 118304

Effect of retarded injection timing and EGR on performance, combustion and emission characteristics of a CRDI diesel engine fueled with WHDPE oil/diesel blends(Article)

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[c]Department of Mechanical Engineering, Annamalai University, Chidambaram, TN, India

View additional affiliations

Abstract

In the present study, the effects of late injection timings and EGR rates on combustion, performance and emission characteristics were evaluated in a single cylinder diesel engine that utilizes oil extracted from waste HDPE which was blended with diesel at 30% by vol. (called as D70H30 blend). The experiments were conducted by delaying the injection timing viz., 23°bTDC, 18°bTDC, and 13°bTDC at various bmep. Later the effects of increasing EGR rates viz., 0%, 10% and 20% were studied at late injection timings at peak load condition. The results reveal that the peak cylinder pressure decreases and combustion duration gets shorter with delayed injection timing. For the same SoI timing escalating the EGR rates reduced the mean gas temperature which is reflected in lower HRR peaks. The BTE of the engine deteriorated by 4.6% when the injection timing is retarded from 23°bTDC to 13°bTDC and 3.2% when the EGR rate was escalated from 0% to 20% at peak load. NOx emission significantly decreased by 80% with retarded injection timing and further decreased with the application of EGR. On the other hand, smoke emission aggravated by 22% with retarded injection timing and 24.5% with maximum EGR addition. The HC and CO emissions followed the same trend of smoke emission. It can be concluded that, utilizing 30% waste HDPE oil blend with minimal modification like retarding injection timing and low EGR rates was beneficial in effectively reducing NOx emission with a slight drop in performance. © 2020 Elsevier Ltd

Author keywords

Document details - Studies on Microstructural and Tensile Behavior of Aluminium Metal Matrix Composites with Addition of SiCp and Coconut Shell Ash by Squeeze Casting Method

Journal of the Chinese Society of Mechanical Engineers, Transactions of the Chinese Institute of Engineers, Series C/Chung-Kuo Chi Hsueh Kung Cheng Hsuebo Pao
Volume 41, Issue 5, October 2020, Pages 663-670

Studies on Microstructural and Tensile Behavior of Aluminium Metal Matrix Composites with Addition of SiCp and Coconut Shell Ash by Squeeze Casting Method(Article)

Arulraj, M., Palani, P.K., Vijayan, S., Pugalenthi, T.

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Abstract

This experimental study focuses on processing of hybrid metal matrix (LM24-SiCp-coconut shell ash) composite for making castings through squeeze casting process. The primary objective was to analyze the influence of the process parameters namely reinforcement percentage, pouring temperature, squeeze pressure and mould temperature on response. Samples were cast for each experimental condition based on L9(34) orthogonal array. From ANOVA, it was observed that reinforcement percentage and squeeze pressure were the process parameters making a noticeable improvement in tensile strength. Scanning electron microscopy studies were carried on the fractured tensile test specimen to analyze the fracture mechanism. © 2020, Chinese Mechanical Engineering Society. All right reserved.

Author keywords

Coconut shell ash, Genetic algorithm, LM24 aluminium alloy, Silicon carbide, Squeeze casting, Taguchi method

Indexed keywords

Engineering controlled terms: Metallic matrix composites, Pressure pouring, Scanning electron microscopy, Squeeze casting, Tensile strength

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Document details - Effect of Vd-doping on dielectric, magnetic and gas sensing properties of nickel ferrite nanoparticles

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Journal of Materials Science: Materials in Electronics
Volume 31, Issue 19, 1 October 2020, Pages 16728-16736

Effect of Vd-doping on dielectric, magnetic and gas sensing properties of nickel ferrite nanoparticles(Article)

Manikandan, V., Petrila, I., Kavita, S., Mane, R.S., Denardin, J.C., Lundgaard, S., Juodkazis, S., Vigneselvan, S., Chandrasekaran, J.
[a]Department of Physics, Kongunadu Arts and Science College, Coimbatore, 641 029, India
[b]Faculty of Automatic Control and Computer Engineering, Gheorghe Asachi Technical University of Iasi, Str. Dimitrie Mangeron, Nr. 27, Iasi, 700050, Romania
[c]Centre for Automotive Energy Materials, International Advanced Research Centre for Powder Metallurgy and New Materials, Chennai, Tamil Nadu 113, India
View additional affiliations

Abstract

Pristine and vanadium-doped nickel ferrite ($NiFe_2O_4$) nanoparticles (NPs) were prepared by a chemical co-precipitation method. They were characterized by X-ray diffraction, scanning electron microscopy and X-ray photoelectron spectroscopy to explore their crystallinity, morphology and chemical states. Dielectric constant and dielectric loss properties were studied as a function of frequency and temperature and it was found that V-doping resulted in the enhancement of the dielectric properties. Both pristine and V-doped ferrites showed superparamagnetic nature and zero coercivity and retentivity. However, the saturation magnetization was decreased after V-doping, suggesting presence of superexchange interaction between A–B sites. Both pristine and V-doped $NiFe_2O_4$ NPs were also used for NO sensing studies and it was revealed that V-doped gas sensor revealed a better sensing performance (response of 5 s and sensitivity of 43 to 200 ppm NO gas) than pristine one (response of 9 s and sensitivity of 37 to 200 ppm NO gas).

Indexed keywords

Engineering controlled terms: Crystallinity, Dielectric losses, Dielectric properties, Ferrite, Gas detectors, Iron compounds, Magnetic nanoparticles, Nickel, Nickel compounds, Saturation magnetization, Scanning electron microscopy, X ray photoelectron spectroscopy

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Document details - Approach to model human appearance based on sparse representation for human tracking in surveillance

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IET Image Processing
Volume 14, Issue 11, 18 September 2020, Pages 2383-2394

Approach to model human appearance based on sparse representation for human tracking in surveillance(Article)

Damotharasamy, S.
Department of Ece, Government College of Technology, Coimbatore, Tamil Nadu, India

Abstract

In human tracking, sparse representation successfully localises the human in a video with minimal reconstruction error using target templates. However, the state-of-the-art approaches use colour and local appearance of a human to discriminate the human from the background regions, and hence fail when the human is occluded and appears in the varying illumination environment. In this study, a robust tracking algorithm is proposed that utilises gradient orientation and fine and coarse sparse representation of the target template. Sparse representation-based human appearance model utilises weighted gradient orientation that is insensitive to illumination variation. Coarse and fine representation of sparse code facilitates tracking under varying scales. Subspace learning from image gradient orientation is enforced with occlusion detection during the dictionary updation stage to capture the visual characteristics of the local human appearance that supports tracking under partial occlusion with lesser tracking error. The proposed human tracking algorithm is evaluated on various datasets and shows efficient human tracking performance when compared to the other state-of-the-art approaches. Furthermore, the proposed human tracking algorithm is suitable for surveillance applications.

Indexed keywords

Engineering controlled terms: Image processing, Signal processing

Engineering uncontrolled terms: Gradient orientations, Illumination variation, Image gradient orientations, Occlusion detection, Reconstruction error, Sparse representation, State-of-the-art approach, Surveillance applications

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Document details - Load flow analysis using intelligence-based hopfield neural network for voltage stability assessment

2020 2nd International Conference on Smart Power and Internet Energy Systems, SPIES 2020

15 September 2020, Article number 9242541, Pages 21-26

2nd International Conference on Smart Power and Internet Energy Systems, SPIES 2020; Bangkok; Thailand; 15 September 2020 through 18 September 2020; Category numberCFP20V85-ART; Code 164704

Load flow analysis using intelligence-based hopfield neural network for voltage stability assessment(Conference Paper)

Veerasamy, V., Wahab, N.I.A., Ramachandran, R., Othman, M.L., Hizam, H., Islam, M.Z., Nasir, M.N.M., Irudayaraj, A.X.R.

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[b]Government College of Technology, Department of Electrical Engineering, Coimbatore, Tamilnadu, 641013, India

Abstract

This paper presents a novel intelligence-based recurrent hopfield neural network (HNN) for solving the non-linear power flow equations. The proffered method is an energy function-based approach formulated using power residuals of the system. The dynamics associated with the neural networks are minimized by intelligence-based technique to determine the unknown parameters such as voltage magnitude (V) and phase angle (d) of the system. A hybrid particle swarm optimization-gravitational search algorithm (PSO-GSA) has been used to minimize the dynamics of HNN and its stability is proved in Lyapunov sense of notion. The effectiveness of the method is tested on IEEE 14-bus system and the results obtained are compared to the conventional newton raphson method. Moreover, the stability indices such as voltage stability load index, line stability index, fast voltage stability index and line stability factor pertaining to the assessment of stability under the contingency case of N-1-1-1 was evaluated using the presented load flow analysis technique to study the stability of the system. © 2020 IEEE.

Author keywords

Hopfield neural network | Load flow analysis | Newton raphson and voltage stability analysis | Particle swarm optimization - gravitational search algorithm

Indexed keywords

Engineering controlled terms: Electric load flow | Newton-Raphson method | Particle swarm optimization (PSO) | System stability | Voltage control

Document details - Developing a smart fuel using artificial neural network for compression ignition engine fueled with Calophyllum inophyllum diesel blend at various compression ratio

Environmental Progress and Sustainable Energy

Volume 39, Issue 5, 1 September 2020, Article number e13356

Developing a smart fuel using artificial neural network for compression ignition engine fueled with Calophyllum inophyllum diesel blend at various compression ratio(Article)

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[c]Hindusthan College of Engineering and Technology, Coimbatore, India

Abstract

In machinery, it is evident that the computing system for self-automated machinery derives nonlinear and complex equations by comparing the machinery's different input parameters with their corresponding performance output parameters. In order to operate the machinery with good performance and better efficiency, the computing system needs a machine-learning algorithm. Most recent researchers have concentrated more on self-driving vehicle, which seems to be lack of developing a strong algorithm for compression ignition (CI) engines to predict the performance and emission output parameter. Thus, this article deals with the prediction of performance and emission characteristics of CI engine fueled with 25% Calophyllum inophyllum and 75% diesel blend (CIB25) at various compression ratios using artificial neural network (ANN). Performance and emission tests were conducted in a single-cylinder four-stroke variable-compression-ratio CI engine fueled with CIB25 with varying loads and at a constant speed of operation. Experimental investigation indicates that 18:1 compression ratio gives better performance results when CIB25 is used as the fuel. Emission test results show better emission characteristics at 17:1 compression ratio. These results show that some input factors affect the output factors under some set of operating conditions, while some input factors improve them. ANN developed for the CI engine learns how the input factors affect and improve the output factors. Also, developed neural network is found to be satisfactory, and it predicts the output at a regression value of 0.998 with an average error of 1.77% in the case of CIB25. © 2019 American Institute of Chemical Engineers

Author keywords

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Document details - Response of Scenedesmus sp. to microwave treatment: Enhancement of lipid, exopolysaccharide and biomass production

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Bioresource Technology

Volume 312, September 2020, Article number 123562

Response of Scenedesmus sp. to microwave treatment: Enhancement of lipid, exopolysaccharide and biomass production(Article)

Sivaramakrishnan, R., Suresh, S., Pugazhendhi, A., Mercy Nisha Pauline, J., Incharoensakdi, A.

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[b]Department of Chemistry, SRM Institute of Science and Technology, Ramapuram Campus, Chennai, Tamil Nadu 600 089, India
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View additional affiliations

Abstract

The present study focuses on the use of microwave irradiation to improve the production of lipid, exopolysaccharide and biomass in the microalgae Scenedesmus sp. Microwave treatment conditions such as microwave power, duty cycle % and time was optimized to increase the biomass and lipid content of Scenedesmus sp. Microwave power 100 W, duty cycle 40 %, and 2 min treatment time led to a substantial improvement in the biomass and lipid content. Due to the simultaneous improvement in both the biomass and lipid content, the total lipid production was improved from 0.76 (microwave untreated) to 1.42 g/L (microwave treated) (12 days grown cells). In addition, with biomass and lipid content, microwave treatment also enhanced the production of Exopolysaccharides (EPS) up to 2.3-folds. Furthermore, biodiesel properties were improved to some extent after the microwave treatment. Microwave irradiation is a promising physical treatment method for microalgae to improve total lipid production. © 2020 Elsevier Ltd

Author keywords

Biomass | Exopolysaccharides | Lipids | Microalgae | Microwave | Oxidative stress

Indexed keywords

Engineering controlled: Algae | Biomass | Irradiation | Microorganisms | Microwave generation | Microwave heating

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Document details - FinFET-based power-efficient, low leakage, and area-efficient DWT lifting architecture using power gating and reversible logic

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International Journal of Circuit Theory and Applications

Volume 48, Issue 8, 1 August 2020, Pages 1304-1318

FinFET-based power-efficient, low leakage, and area-efficient DWT lifting architecture using power gating and reversible logic(Article)

Subannan Palanisamy, K., Ramachandran, R.

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[b]Government College of Technology, Coimbatore, Tamil Nadu, India

Abstract

For ultra-low-power applications, the computing components are smaller in size and consume less energy. In nonstationary signal analysis, the transformation plays an important role. Out of different transformation techniques, the most famous and dominant architecture is the discrete wavelet transform. The building block of the architecture should be optimized by all parameters. In this paper, the optimization was done on the power reduction and leakage current reduction. A new FinFET-based lifting-based wavelet architecture was proposed. Power gating and reversible logic methodology are proposed for the FinFET-based transform to reduce the dynamic power by about 30%. The proposed FinFET-based processing elements were utilized in the various blocks of the lifting-based DWT architecture. The implementation was done in 32-nm CMOS and FinFET technology. From the results, it has been investigated that the FinFET-based circuits are efficient when compared with CMOS technology. This is due to the second-order effects happening in CMOS circuits below 45 nm. The proposed design consumes less area and low leakage current and power when compared with the CMOS technology. Future trends of using multigate devices below 14 nm technology are presented finally. © 2020 John Wiley & Sons, Ltd.

Author keywords

adder | CMOS | DWT architecture | FinFET | leakage reduction | lifting-based DWT | low power | MAC | multiplier

Indexed keywords

Engineering controlled terms: CMOS integrated circuits | Computation theory | Computer circuits | Discrete wavelet transforms | Leakage currents | Logic gates | Signal reconstruction

Document details - A novel RK4-Hopfield Neural Network for Power Flow Analysis of power system

Applied Soft Computing Journal

Volume 93, August 2020, Article number 106346

A novel RK4-Hopfield Neural Network for Power Flow Analysis of power system(Article) (Open Access)

Veerasamy, V., Wahab, N.I.A., Ramachandran, R., Madasamy, B., Mansoor, M., Othman, M.L., Hizam, H.

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Abstract

This paper presents a novel Runge–Kutta (RK4) based modified hopfield neural network (MHNN) for solving a set of non-linear transcendental power flow equations of power system. The proffered method is a Lyapunov based energy function approach to minimize real and reactive power mismatches of the system. A set of non-linear differential equations derived from energy function, describing the dynamical behavior of HNN is framed for solving Power Flow equations. These dynamic equations of the network are solved by RK4 method to deduce the unknown variables of the system. The feasibility of proposed method is tested on 5-bus, IEEE 14-bus, 39-bus and 57-bus test system. The analytical equation describing the behavior of MHNN is coded in MATLAB software. The results obtained reveal that the suggested method gives accurate solution and reduces the computational complexity than conventional Newton Raphson (NR) method. The sensitivity analysis is also tested for change in R/X ratio of the system, initial conditions and loading of the system. The proposed method is robust for above specified changes and involves less computational effort. To prove the applicability and consistency of projected method, IEEE 118-bus system has been tested. The power flow solutions found through proffered method are compared with solutions obtained from numerical approaches in order to validate the proposed approach. Moreover, the stability of the system is studied in Lyapunov sense of notion which assures converged solution of proposed method. © 2020

Author keywords

(4th order Runge–Kutta (RK4) method) (Euler) (Iwamoto) (Modified Hopfield Neural Network (MHNN)) (Newton Raphson (NR) method) (Power Flow Analysis (PFA))

Document details - Fabrication and characterization of Spinacia oleracea extract incorporated alginate/carboxymethyl cellulose microporous scaffold for bone tissue engineering

International Journal of Biological Macromolecules

Volume 156, 1 August 2020, Pages 430-437

Fabrication and characterization of Spinacia oleracea extract incorporated alginate/carboxymethyl cellulose microporous scaffold for bone tissue engineering(Article)

Sharmila, G., Muthukumaran, C., Kirthika, S., Keerthana, S., Kumar, N.M., Jeyanthi, J.

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Abstract

In recent years, plant based scaffold due to its inherent properties such as mechanical stability, renewability, easy mass production, inexpensiveness, biocompatibility and biodegradability with low toxic effects have received much attention in the field of bone tissue engineering. Design of good tissue compatible plant based polymer scaffold plays a vital role in biomedicine, nanomedicine and in various tissue engineering applications. The present study focused on the fabrication of a novel herbal scaffold using the medicinal plants Spinacia oleracea (SO) and Cissus quadrangularis (CQ) extracts incorporated with Alginate (Alg), Carboxy Methyl Cellulose (CMC) by lyophilization method. The structural nature and the properties of prepared scaffold were analyzed by XRD, FE-SEM, FTIR, EDAX, TGA, swelling ratio, porosity, in-vitro degradation and cell viability studies. The biocompatible nature of the plant based polymer scaffold was assessed using MG-63 Human Osteosarcoma cell line. The investigation of biocompatibility study showed that Alg/CMC/SO scaffold expressed higher cell viability than Alg/CMC/SO-CQ scaffold, which possess better cellular biocompatibility. The results of the present study suggested that plant based Alg/CMC/SO scaffold serve as a potential biopolymer scaffold which could be further exploited for bone tissue applications. © 2020 Elsevier B.V.

Author keywords

(Alginate) (Scaffold) (Spinacia oleracea)

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Document details - Sequestration of methylene blue dye from aqueous solution by magnetic biocomposite: Three level Box–Behnken experimental design optimization and kinetic studies

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Separation Science and Technology (Philadelphia)

Volume 55, Issue 10, 2 July 2020, Pages 1752-1765

Sequestration of methylene blue dye from aqueous solution by magnetic biocomposite: Three level Box–Behnken experimental design optimization and kinetic studies(Article)

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[c]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India

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Abstract

An attempt was made to maximize the sequestration of methylene blue (MB) dye from aqueous solution using magnetic biocomposite (WH/$MnFe_2O_4$) synthesized by chemical co-precipitation method. WH/$MnFe_2O_4$ was characterized by different techniques such as scanning electron microscope, X-ray diffraction, Fourier-transform infrared, and Energy-dispersive X-ray spectroscopy. An ideal experimental design was carried out based on three-factors, three-level Box-Behnken design using response surface methodology in the lab-scale batch study. The adsorption of MB dye on to WH/$MnFe_2O_4$ has been found to be highly significant with very low probability (p) values (<0.0001) based on the analysis of variance statistical value. The kinetics of the dye sorption followed the pseudo-second-order equation ($R^2 > 0.996$). © 2019, © 2019 Taylor & Francis Group, LLC.

Author keywords

Box–Behnken design, magnetic biocomposite, Sequestration

Indexed keywords

Engineering controlled terms: Aromatic compounds, Composite materials, Energy dispersive spectroscopy, Magnetism, Precipitation (chemical)

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Document details - Simulation based Analysis of Transformerless Photovoltaic Inverter Topologies for Reactive Power handling Capability

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Proceedings of the 2nd International Conference on Inventive Research in Computing Applications, ICIRCA 2020

July 2020, Article number 9182839, Pages 1028-1034

2nd International Conference on Inventive Research in Computing Applications, ICIRCA 2020; Coimbatore; India; 15 July 2020 through 17 July 2020; Category numberCFP20N67-ART; Code 162766

Simulation based Analysis of Transformerless Photovoltaic Inverter Topologies for Reactive Power handling Capability(Conference Paper)(Open Access)

Ramasamy, S., Ahmad, Z., Bindu, Y., Torres, J.R.

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[b]Delft University of Technology, Delft, Netherlands
[c]IREDA Ltd, New Delhi, India

Abstract

This study investigates the reactive power generation capability of the existing transformerless Photovoltaic Inverter Topologies (PVIT) with their conventional switching strategies. The topologies such as H5, families of H6 (H6, H6-I, H6-II, H6-III and H6-IV), HERIC, and clamped topologies (optimized H5, passive clamped H6 and HB2VR) have been selected for analysis. Matlab/Simulink simulation platform is employed for the analysis of PVIT. It has been observed that transformer-less PVIT with their conventional switching strategies are not suitable for reactive power injection. These topologies are generating highly distorted current at zero crossings during the reactive power flow. The improved switching strategies are needed to make these topologies suitable for the reactive power applications without any modification in the structure of the inverter. © 2020 IEEE.

Author keywords

Grid, Inverter topologies, Photovoltaic, Reactive power, THD

Indexed keywords

Engineering controlled terms: Electric inverters, Electric load flow, MATLAB, Reactive power, Topology

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Document details - Novel exfoliated graphitic-C₃N₄ hybridised ZnBi₂O₄ (g-C₃N₄/ZnBi₂O₄) nanorods for catalytic reduction of 4-Nitrophenol and its antibacterial activity

Journal of Photochemistry and Photobiology A: Chemistry

Volume 398, 1 July 2020, Article number 112591

Novel exfoliated graphitic-C_3N_4 hybridised $ZnBi_2O_4$ (g-C_3N_4/$ZnBi_2O_4$) nanorods for catalytic reduction of 4-Nitrophenol and its antibacterial activity(Article)

Nithya, R., Ayyappan, S.

Department of Physics, Government College of Technology, Coimbatore, Tamilnadu, India

Abstract

Metal-free Graphitic carbon nitride (g-C_3N_4) nanoparticle was synthesized by an ultrasound-assisted chemical exfoliation method and g-C_3N_4/$ZnBi_2O_4$ nanorods were prepared by the cost-effective hydrothermal technique. As-synthesized nanoparticles were characterized using XRD, FESEM, HRTEM, EDX, UV, PL, BET and XPS. The photocatalytic activity of the g-C_3N_4/$ZnBi_2O_4$ nanocomposite was investigated by treating 4-Nitrophenol at different pH conditions and maximum reduction of 79 % was observed under visible light irradiation. Antibacterial activity of the g-C_3N_4/$ZnBi_2O_4$ nanoparticles were evaluated by disk diffusion method against E.coli and S.aures. The g-C_3N_4/$ZnBi_2O_4$ nanocomposite showed better antibacterial activity towards G^- E.coli. With the effect of $ZnBi_2O_4$ doping on to the g-C_3N_4 host structure, the photocatalytic and antimicrobial efficiency has been enhanced. © 2020 Elsevier B.V.

Author keywords

(4-NP) (E.coli) (Exfoliated g-C_3N_4) (Porous $ZnBi_2O_4$ nanorods) (Visible light photodegradation)

Funding details

Funding sponsor Funding number Acronym

Document details - Realization of fault tolerant capability in a multiphase SRM drive using wavelet transform

Microprocessors and Microsystems

Volume 76, July 2020, Article number 103104

Realization of fault tolerant capability in a multiphase SRM drive using wavelet transform(Article)

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[b]Assistant Professor, Department of Electrical Engineering, Government College of Technology, Coimbatore, India

Abstract

Switched Reluctance Motor (SRM) are widely used in drives market because of its elegant features such as simple arrangement, manufacturing cost, minimal maintenance and wide speed range. Significant investigation has been conducted to lengthen the feasibility of SRM drive technologies in various aspects such as control strategy, torque ripple minimization, an optimal winding arrangement, etc. Even though it has numerous virtues, there are few noticeable issues that occur in SRM. In this paper, the issues like phase open circuit fault, phase-phase short circuit fault, power switch failure, dc link capacitor failure, and encoder faults are discussed using Wavelet Transform (WT) with their experimental results. A multi-phase (10/8 pole) SRM motor is considered to investigate the fault tolerance proficiency and other performance parameters. Initially, a healthy condition of multi-phase SRM is simulated then faults are injected at different phases which are analyzed and validated using MATLAB simulink tool and the same is validated through experimental results. The performance parameters of SRM drive during various faults conditions are analyzed and the impacts of speed and torque are illustrated. © 2020

Author keywords

(Circuits) (Communication) (Drives) (Embedded) (Fault-tolerance) (Gates) (MATLAB simulink) (Multi processor chip) (Power converter faults) (SRM) (Wavelet transform)

Indexed keywords

Engineering controlled terms: (Fault tolerance) (Manufacture) (Outages) (Wavelet transforms)

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Document details - Applications of internet of things (IOT) to improve the stability of a grid connected power system using interline power flow controller

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Microprocessors and Microsystems
Volume 76, July 2020, Article number 103038

Applications of internet of things (IOT) to improve the stability of a grid connected power system using interline power flow controller(RETRACTED)

Radhakrishnan, G., Gopalakrishnan, V.
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Update notice

Retraction notice to "Applications of internet of things (IOT) to improve the stability of a grid connected power system using interline power flow controller" [Microprocessors and Microsystems 76 (2020) 103038] (Microprocessors and Microsystems (2020) 76, (S0141933119306635), (10.1016/j.micpro.2020.103038))
(2023) Microprocessors and Microsystems, 103, Article number 104941

Abstract

Using Internet of Things (IoT) technology in the clever network is an essential method to fast active the information of control Grid-system. Also, the grid system is valuable aimed at the compelling administration of the power framework foundation. This paper deals with a logical approach to design an Interline Power Flow Controller (IPFC) for a grid-connected several-line power scheme to improve the scheme strength and to improve the congestion management in a grid by considering the power flow among the multi-line, IPFC goes to a sequence of paying flexible alternating current transmission system (FACTS) device and it takes the capability toward control the power stream in multi-line transfer organizations. The Distributed Interline Power Flow Controller involves the series and shunt converters in different transmission lines that are between related utilizing a run of the DC connector. In the transmission line, is the IPFC considered for the compensation and control of power flow in a multi-line transmission system. Every converter can give plan reactive compensation off its line also with the frequency. As the converters can exchange dynamic power through their essential DC interface, it can similarly give a frequency of the current. The highest objective is to improve the power flow in transmission lines and

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Document details - Machining of microholes in Ti-6Al-4V by hybrid micro electrical discharge machining to improve process parameters and flushing properties

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Bulletin of the Polish Academy of Sciences: Technical Sciences
Volume 68, Issue 3, June 2020, Pages 565-573

Machining of microholes in Ti-6Al-4V by hybrid micro electrical discharge machining to improve process parameters and flushing properties(RETRACTED)(Open Access)

Muglan, T., Aezhisai Vallavi, M.S., Santhosh, S., Sugumar, D., Christopher Ezhil Singh, S.
[a]Department of Mechanical Engineering, Government College of Technology, Coimbatore, Tamil Nadu, India
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[c]Department of Mechanical Engineering, Vimal Jyothi Engineering College, Kannur, Kerala, India

Update notice

Retraction: Machining of microholes in Ti-6Al-4V by hybrid micro-electrical discharge machining to improve process parameters and flushing properties (Bulletin of the Polish Academy of Sciences Technical Sciences (2020) 68:3 (565-573) DOI: 10.24425/bpasts.2020.133366)
(2021) Bulletin of the Polish Academy of Sciences: Technical Sciences, 69 (4), Article number e00rett

Abstract

In this research work, the Ti-6Al-4V material was used for the investigation of machining parameters by means of hybrid micro electrical discharge machining to improve the machining process and reduce the negative effects of debris accumulation in the drilled hole. L9 orthogonal array was used in the Taguchi based grey relational analysis to optimize the parameters such as material removal rate and diametrical accuracy of the machining process for Ti-6Al-4V. This work encompasses the design, development, and calibration of the work piece vibration platform and experimental analysis of the process parameters by means of the hybrid micro electrical discharge machining process. The maximum material removal rate and minimum surface roughness was observed at the current value of 2.5 A, pulse on time is 2 µs and pulse off time is 14.5 µs. The maximum material removal rate was observed for the increase in pulse on time with 34.4 µs and 4 A current level. The diametrical accuracy of the microholes was increased while increasing the pulse off time and decreasing the pulse on time. The fluid flow simulation has been conducted to find out the pressure drop and to

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Document details - Adsorption of acid orange 7 using green synthesized CaO/CeO₂ composite: An insight into kinetics, equilibrium, thermodynamics, mass transfer and statistical models

Journal of the Taiwan Institute of Chemical Engineers
Volume 111, June 2020, Pages 44-62

Adsorption of acid orange 7 using green synthesized CaO/CeO_2 composite: An insight into kinetics, equilibrium, thermodynamics, mass transfer and statistical models(Article)

Thirunavukkarasu, A., Nithya, R.
Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India

Abstract

The present research reported the co-precipitation mediated synthesis of mixed metallic oxide composite, CaO/CeO_2 using ultrasound-assisted extract of Eichhornia crassipes leaves. Fourier Transform Infrared Spectroscopy (FT-IR), Thermo-gravimetric/Differential Thermal analysis (TG/DTA), X-ray Diffraction (XRD), and Brunauer-Emmet-Teller (BET) isotherms ensured the formation of the mixed oxide. Further, the CaO/CeO_2 composite was tested in the anionic azo dye, Acid Orange 7 (AO7) removal process. The optimal removal of 92.68% was attained in the initial solution pH of 2.0 with the composite dosage of 0.1 g for 10 mg/L of AO7 concentration, operating at the temperature of 303 K. Response Surface Methodology (RSM) and Artificial Neural Network (ANN) techniques were employed to model the dye removal process. A second-order quadratic model from Box-Behnken Design (BBD) predicted and optimized the dye removal percentage with high degree of statistical accuracy ($F_{cal} > F_{tab}$ at df=9; $p < 0.0001$). Likewise, a three-layered ANN model using the Levenberg–Marquardt backpropagation algorithm well predicted the dye adsorption process with the least root mean square error values (RMSE 0.3020). Further, the mean impact value (MIV) method identified pH_0 as the most influential batch variable in the AO7 dye adsorption process.

Author keywords

AO7 dye adsorption | Artificial neural network | Box-Behnken Design | CaO/CeO_2 composite | Eichhornia crassipes

Indexed keywords

Engineering controlled terms: Adsorption | Azo dyes | Calcium oxide | Citrus fruits | Dyes | Fourier transform infrared spectroscopy | Mean square error | Metals | Neural networks | Thermoanalysis

Document details - Enhanced humidity sensing properties of Fe-doped CeO₂ nanoparticles

Journal of Materials Science: Materials in Electronics
Volume 31, Issue 11, 1 June 2020, Pages 8815-8824

Enhanced humidity sensing properties of Fe-doped CeO_2 nanoparticles(Article)

Manikandan, V., Petrila, I., Vigneselvan, S., Mirzaei, A., Mane, R.S., Kim, S.S., Chandrasekaran, J.
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[c]Department of Physics, Government College of Technology, Coimbatore, 641 013, India
View additional affiliations

Abstract

In this study, pristine and Fe-doped CeO_2 nanoparticles (NPs) namely $Fe_xCe_{1-x}O_2$ (x = 0, 0.2, and 0.4) were synthesized through a facile chemical route. Different characterization techniques confirmed formation of NPs with desired morphology and chemical composition. Moreover, optical properties, bandgap, and functional groups were studied. The sensors were fabricated from the synthesized NPs and their relative humidity sensing was investigated. It was found that $Fe_{0.4}Ce_{0.6}O_2$ revealed the best sensing properties where it showed a maximum response of ~ 83.94% to 100% RH, and its response and recovery times were 5 and 17 s, respectively.

Indexed keywords

Engineering controlled terms: Cerium oxide | Humidity sensors | Nanoparticles | Optical properties | Synthesis (chemical)

Engineering uncontrolled terms: Characterization techniques | Chemical compositions | Chemical routes | Fe-doped | Humidity sensing property | Recovery time | Sensing property

Engineering main heading: Iron compounds

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Document details - A novel discrete wavelet transform-based graphical language classifier for identification of high-impedance fault in distribution power system

1 of 1

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International Transactions on Electrical Energy Systems

Volume 30, Issue 6, 1 June 2020, Article number e12378

A novel discrete wavelet transform-based graphical language classifier for identification of high-impedance fault in distribution power system(Article)(Open Access)

Veerasamy, V., Abdul Wahab, N.I., Vinayagam, A., Othman, M.L., Ramachandran, R., Inbamani, A., Hizam, H.

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[b]Department of Electrical and Electronics Engineering, Sri Shakthi Institute of Engineering and Technology, Coimbatore, India
[c]Department of Electrical Engineering, Government College of Technology, Coimbatore, India

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Abstract

This paper proposes a discrete wavelet transform (DWT)-based Graphical Language classifier algorithm for identification of high-impedance fault (HIF) in medium voltage (MV) distribution network of 13.8 kV. The proposed method of classifier is developed using virtual instrumentation LabVIEW facility, for detection of various faults such as symmetrical, unsymmetrical, and HIF in the system. Initially, the MV distribution feeder network has been modeled in MATLAB/Simulink, and the DWT analysis has been carried out with the introduction of various faults in the network to extract the features. The extracted features such as SD and energy values from the fault current signals have been applied to the proposed classifier algorithm to identify the type of fault. The effectiveness of the presented method has been tested and compared with the similar conventional fuzzy-based approach. The results indicate that the proposed classifier algorithm outperforms to give 100% accuracy, while the fuzzy-based approach misclassifies the double line to ground fault (LLG), three-phase fault (LLLG), and HIF. Furthermore, the proposed algorithm with LabVIEW facility is more flexible and can be implemented in real time using data acquisition unit for obtaining fault current signal from power system. © 2020 John Wiley & Sons Ltd

Author keywords

discrete wavelet transform (DWT) | fuzzy inference system (FIS) | graphical language (GL) classifier | high-impedance fault (HIF) | medium voltage distribution network

Indexed keywords

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Document details - Nano-sulfated zirconia catalyzed biodiesel production from tannery waste sheep fat

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Environmental Science and Pollution Research

Volume 27, Issue 17, 1 June 2020, Pages 20598-20605

Nano-sulfated zirconia catalyzed biodiesel production from tannery waste sheep fat(Article)

Booramurthy, V.K., Kasimani, R., Pandian, S., Ragunathan, B.

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[b]Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India
[c]Center for Nanoscience and Nanotechnology Research, School of Petroleum Technology, Pandit Deendayal Petroleum University, Gandhinagar, 382007, India

Abstract

This study makes use of tannery waste to produce biodiesel using a nano-sulfated zirconia catalyst (ferric-manganese-doped sulfated zirconia). It was through a modified wetness impregnation method that the catalyst was prepared which was then characterized by scanning electron microscopy (SEM), X-ray diffraction (XRD), and Fourier transform infrared spectroscopy (FTIR). The catalytic property of the synthesized catalyst was determined by using it to produce biodiesel from tannery waste sheep fat. A study was carried out to find the effect of the different parameters affecting the process. Optimized conditions of 15:1 methanol to fat molar ratio and catalytic loading of 8 wt% at 65 °C with a stirring rate of 400 rpm for a reaction duration of 300 min gave a maximum yield of 98.7 wt%. The performance of the catalyst during recycling was analyzed by conducting reusability study. The reused catalyst gives a maximum yield above 90 wt% up to five cycles with a catalyst recovery of 88 wt%. ASTM D6751 standard was used to compare the analyzed fuel properties of the biodiesel. © 2020, Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Biofuel | Reusability | Sulfated zirconia nano-catalyst | Transesterification | Wetness impregnation method

Indexed keywords

GEOBASE Subject Index: biofuel | catalyst | fat | nanoparticle | optimization | waste technology | zircon

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Document details - Surface integrity, fatigue performance and dry sliding wear behaviour of Si₃N₄–TiN after wire-electro discharge machining

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Ceramics International

Volume 46, Issue 8, 1 June 2020, Pages 10734-10739

Surface integrity, fatigue performance and dry sliding wear behaviour of Si_3N_4–TiN after wire-electro discharge machining(Article)

Srinivasan, V.P., Palani, P.K.

[a]Mechanical Engineering, Sri Krishna College of Engineering and Technology, Kuniamuthur, Coimbatore, Tamil Nadu 641 008, India
[b]Mechanical Engineering, Government College of Technology, Thadagam Main Road, Coimbatore, Tamil Nadu 641 013, India

Abstract

Silicon nitride–titanium nitride (Si_3N_4–TiN) ceramic composite was machined by wire-electro discharge machining (WEDM) to characterize the surface integrity and to investigate its effect on fatigue performance. Dry sliding wear behaviour of Si_3N_4–TiN sliding against EN32 steel was also tested. The polished and machined surfaces were examined for finding the hardness. The wire-EDM cut surface was examined with scanning electron microscope (SEM) for obtaining its microstructure. The wire-EDM of silicon nitride–titanium nitride produced a rough recast surface with different types of defects like micro-cracks, micro-pores, globules, droplets and surface craters. The material deposition to work specimen after machining was scrutinized by EDAX composition analyzer. The polished surface and wire-EDM cut surface were examined for determining the fatigue performance and it was observed that a deficiency of 25–35% in fatigue life in wire-EDM cut surface than that of the polished surface. Also, the wire-EDM cut surface exerts very high tensile residual stress compared to the polished surface. From the results, it is evident that the polished surface exhibits better surface finish and fatigue life, higher wear resistance and micro-hardness than that of the machined surface. © 2020 Elsevier Ltd and Techna Group S.r.l.

Author keywords

EDAX · Fatigue · SEM · Surface integrity · Wear · Wire-EDM

Indexed keywords

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Document details - Sensorless speed control of 6/4-pole switched reluctance motor with ANFIS and fuzzy-PID-based hybrid observer

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Electrical Engineering

Volume 102, Issue 2, 1 June 2020, Pages 831-844

Sensorless speed control of 6/4-pole switched reluctance motor with ANFIS and fuzzy-PID-based hybrid observer(Article)

Senthil Murugan, L., Maruthupandi, P.

[a]Department of Electrical and Electronics Engineering, RVS College of Engineering and Technology, Coimbatore, India
[b]Department of Electrical Engineering, Government College of Technology, Coimbatore, India

Abstract

This paper presents the sensorless speed control of 6/4 pole SRM drive based on hybrid observer (HO). It consists of two modes, i.e., current sliding mode observer is for high speed and flux linkage sliding mode observer is for low speed control. A nonlinear model of SRM is simulated in MATLAB/Simulink. HO is simulated from low to high speed level, and also estimated position and speed errors are optimized with ANFIS and fuzzy-PID methods. Experimental validation is taken for three set speeds, and measured results are compared with the simulated results. Overall speed and position estimated error, electromagnetic torque ripple output results are compared, and its values are tabulated at the end. This observer has the advantages of high-precision speed control without any additional hardware, and also performance has improved. © 2020, Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

ANFIS and fuzzy-PID · Hybrid observer · Sensorless speed control · SRM drive

Indexed keywords

Engineering controlled terms: Fuzzy inference · Sensorless control · Sliding mode control · Speed · Speed control · Speed regulators

Engineering uncontrolled terms: Electromagnetic torques · Experimental validations · Fuzzy-PID · Hybrid observer · Sensorless speed control

Document details - Adaptive fuzzy hexagonal bilateral filter for brain MRI denoising

Multimedia Tools and Applications
Volume 79, Issue 21-22, 1 June 2020, Pages 15513-15530

Adaptive fuzzy hexagonal bilateral filter for brain MRI denoising(Article)

Kala R., Deepa P.
Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, Tamilnadu 641 013, India

Abstract

Magnetic resonance image (MRI) plays a crucial role in medical applications for visual analysis and processing. Rician noise which arises from the MRI during acquisition can affect the quality of the image. This crucial issue should be addressed by denoising method. The proposed adaptive rician noise removal based on the bilateral filter using fuzzy hexagonal membership function improves the denoising efficiency at various noise variances and preserves the fine structures and edges. The fuzzy weights were obtained with the local mean (μ_l) and global mean (μ_g) by constructing hexagonal membership function for local order filter and bilateral filter. Bilateral filter is used to preserve the edges by smoothening the noises in MRI image and local filter is used to preserve the edges and retrieve the structural information. Brain MRI images are restored by multiplying its corresponding fuzzy weight with the restored image of local order filter and bilateral filter. Experiments on synthetic and clinical Brain MRI data were done at different noise levels by the proposed method and the existing methods. The result shows that the proposed method restores the image in better visual quality and can be well utilized for the diagnostic purpose at both low and high densities of rician noise. © 2019, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Bilateral filtering | Denoising | Fuzzy logic | Magnetic resonance imaging | Membership function | Rician noise

Indexed keywords

Engineering controlled terms: Adaptive filtering | Diagnosis | Fuzzy logic | Image reconstruction | Magnetic resonance imaging | Medical applications | Medical imaging | Membership functions | Nonlinear filtering | Restoration

Engineering uncontrolled terms: Bilateral filtering | Bilateral filters | De-noising | Denoising methods | Magnetic resonance images (MRI) | Rician noise | Structural information | Visual qualities

Document details - A framework for semantic image annotation using LEGION algorithm

Journal of Supercomputing
Volume 76, Issue 6, 1 June 2020, Pages 4169-4183

A framework for semantic image annotation using LEGION algorithm(Article)

Kishorekumar, R., Deepa, P.
Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, Tamilnadu 641 013, India

Abstract

A new method for the annotation of multispectral satellite images based on image segmentation is proposed in this paper. This method performs the multispectral image annotation by incorporating a modified locally excitatory globally inhibitory oscillatory network (LEGION) algorithm and cascaded support vector machine (SVM) classifier. Initially, images in the training set are represented with semantic concepts. The testing image is segmented into various image regions based on the color information. Segmented image regions are classified using cascaded SVM classifier based on the probabilities of semantic classes. Experiments are conducted on multispectral images of Coimbatore, Tamil Nadu, India and the result validates the effectiveness of the proposed image annotation algorithm. © 2018, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Image annotation | LEGION | Segmentation | SVM

Indexed keywords

Engineering controlled terms: Image analysis | Image segmentation | Semantics | Support vector machines

Engineering uncontrolled terms: Color information | LEGION | Multispectral images | Multispectral satellite image | Oscillatory networks | Segmented images | Semantic concept | Semantic image annotations

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Document details - Synthesis, characterization of cellulose acetate membrane and application for the treatment of oily wastewater

Environmental Technology (United Kingdom)

Volume 41, Issue 12, 24 May 2020, Pages 1590-1605

Synthesis, characterization of cellulose acetate membrane and application for the treatment of oily wastewater(Article)

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[a]Department of Civil Engineering, Government College of Technology, Coimbatore, India
[b]Department of Chemistry, Government College of Technology, Coimbatore, India

Abstract

This study reports the synthesis of cellulose acetate (CA) membranes of different weight percentages of the polymer ranging from 5 to 17.5 wt% with 2.5% increment and their behaviour towards oil removal from water. The membrane showed decreased water content and porosity and also increased hydraulic resistance upto 3.38 kPa/(l m^{-2} h^{-1}) as the concentration of polymer increases. The Atomic Force Microscopic studies reveal that the membrane shows decreased arithmetic mean roughness from 36.291 to 5.935 nm as the concentration of the polymer increases from 5% to 17.5%. Field Emission Scanning Electron Microscopy shows the surface morphology of the CA membrane. X-ray diffraction studies indicate that in the membrane having above 15% polymer concentration, the polymer chains orient to regularity showing higher crystallinity. The thermal studies indicate their stability upto 280°C, and exothermic decompositions from 338°C to 380°C implying the compactness of chains as polymer concentration increases. From Total Organic Carbon studies, the oil rejection was found to be maximum (96.4%) for the highest concentration of polymer in the membrane. © 2018, © 2018 Informa UK Limited, trading as Taylor & Francis Group.

Author keywords

Cellulose acetate membrane | oil rejection | oily wastewater | TG-DTA | water flux

Indexed keywords

Engineering controlled terms: Cellulose | Crystallinity | Field emission microscopes | Morphology | Organic carbon | Scanning electron microscopy | Surface morphology | Wastewater treatment

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Document details - The rapid response and high sensitivity of a ruthenium-doped copper ferrite thin film (Ru-CuFe₂O₄) sensor

RSC Advances

Volume 10, Issue 23, 3 April 2020, Pages 13611-13615

The rapid response and high sensitivity of a ruthenium-doped copper ferrite thin film (Ru-$CuFe_2O_4$) sensor(Article)(Open Access)

Manikandan, V., Mirzaei, A., Sikarwar, S., Yadav, B.C., Vigneselvan, S., Vanitha, A., Chandrasekaran, J.

[a]Department of Physics, Kongunadu Arts and Science College, Coimbatore, 641 029, India
[b]Department of Materials Science and Engineering, Shiraz University of Technology, Shiraz, Iran
[c]Nanomaterials and Sensors Research Laboratory, Department of Physics, Babasaheb Bhimrao University, Lucknow-226 025 UP, India
View additional affiliations

Abstract

A sensor displaying a rapid response and high sensitivity was developed by following a simple route. Ionic defects in this sensor were explored using X-ray diffraction analysis. In general, such defects arise from a mismatch of ionic radii, which actually improves the sensing performance. SEM and TEM images of the currently produced particles demonstrated negligible agglomeration, which greatly enhanced the flow of water molecules through the particles. The current sensor showed a rapid response to changes in humidity. Its sensing performance was classified into three different ranges of humidity. Of these humidity ranges, the sensor showed the highest sensitivity (8.84 MΩ per %RH) at low relative humidity (10-20% RH). Furthermore, the sensitivity fall off as the RH was increased from 20 to 99%. The sensor showed a rapid response time of 20 s. Also, the sensor showed 92.98% reproducibility and few effects of aging. This journal is © The Royal Society of Chemistry.

Indexed keywords

Engineering controlled terms: Copper | Copper alloys | Copper compounds | Defects | Ferrite | Iron compounds | Magnetic materials | Molecules | Ruthenium | Ruthenium compounds | X ray powder diffraction

Engineering uncontrolled terms: Copper ferrites | Current sensors | High sensitivity | Low relative humidities | Rapid response time | Reproducibilities

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Document details - Image SR-based NLM and DCNN improved IBP with cubic B-spline

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Imaging Science Journal

Volume 68, Issue 3, 2 April 2020, Pages 129-140

Image SR-based NLM and DCNN improved IBP with cubic B-spline(Article)

Jothi Lakshmi, S., Deepa, P.

Department of ECE, Government College of Technology, Coimbatore, India

Abstract

Image super-resolution (SR) techniques aim to estimate high-resolution (HR) image from low-resolution (LR) image. Existing SR method has slow convergence and recovery of high-frequency details are inaccurate. To overcome these issues, two algorithms have been proposed for image SR based on non-local means improved iterative back projection (NLM-IIBP), deep convolutional neural network improved iterative back projection (DCNN-IIBP) to produce high-resolution images with low noise, minimal blur by restoring high-frequency details. In NLM-IIBP denoised images have been interpolated using cubic B-spline interpolation and processed using IIBP based on guided bilateral method. NLM preserves the edges effectively, but does not consider high dimensional information and over smoothing during noise minimization. To further improve the resolution, NLM is replaced by DCNN. DCNN denoising method suppresses different noises at different noise levels. The proposed algorithms have been analysed and compared with existing approaches using various parameters to prove the effectiveness. © 2020, © 2020 The Royal Photographic Society.

Author keywords

cubic B-spline; deep convolutional neural network; denoising; edge preservation; guided bilateral filtering; image restoration; improved iterative back projection; Non-local means; super-resolution

Indexed keywords

Engineering controlled terms: Convolutional neural networks; Deep neural networks; Image enhancement; Interpolation; Iterative methods

Engineering uncontrolled: Denoising methods; High frequency HF; High resolution image; High-dimensional; Image super resolutions

Cited by 1 document

Rahim, A.N.A., Yaakob, S.N., Seng, L.Y.
Improving the iterative back projection estimation through Lorentzian sharp infinite symmetrical filter
(2022) International Journal of Electrical and Computer Engineering
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Document details - Enhanced genetic fuzzy based algorithm for PID switching

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International Journal of Scientific and Technology Research

Volume 9, Issue 4, April 2020, Pages 3681-3683

Enhanced genetic fuzzy based algorithm for PID switching(Article)

Amuthambigaiyin Sundari, K., Maruthupandi, P.

[a]RVS Technical Campus, Coimbatore, India
[b]Government College of Technology, Coimbatore, India

Abstract

Tuning of Proportional + Integral + Derivative (PID) controllers is still a challenging and global area of interest. For unstable systems, minimum and maximum value of controller gain exists. The average of the limiting value is used for the controller design and to stabilize the system. A solution to this has emerged as combinatorial optimization wherein heuristic algorithms are used as global methods and derivative free local search methods work as local methods. The solutions obtained by the global methods are further intensified using local search procedures thereby increasing the convergence property of the combined algorithm. Another approach is to alter the heuristic algorithms to cater the change in the search procedure and evolve improved solution. © IJSTR 2020.

Author keywords

AC Data set; Child classes; Middling; NLP

ISSN: 22778616
Source Type: Journal
Original language: English

Document Type: Article
Publisher: International Journal of Scientific and Technology Research

Amuthambigaiyin Sundari, K.; RVS Technical Campus, Coimbatore, India;

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Document details - Cloud providers ranking and selection using quantitative and qualitative approach

Computer Communications

Volume 154, 15 March 2020, Pages 370-379

Cloud providers ranking and selection using quantitative and qualitative approach(Article)

Devi, R., Shanmugalakshmi, R.

[a]Department of IT, Government College of Technology, Coimbatore, Tamil Nadu 641013, India
[b]Government College of Engineering & Technology, Karaikudi, Tamil Nadu 630003, India

Abstract

Cloud computing is basically an Internet based computing, whereby shared configurable resources are provided to cloud service consumers as services on demand. As an increasing growth of cloud computing, many enterprises provide different cloud services to cloud service consumers. From cloud service consumer's perspective, it is difficult to choose an appropriate cloud service that satisfies their QoS requirements. As requirements of one cloud service consumer will vary from another, dynamic ranking has to be used to satisfy the requirements of different cloud service consumers. A simple model is needed to address the dynamic ranking of cloud services. The dynamic ranking and selection of cloud services is solved using Linear Programming (LP) model. This project considers quantifiable attributes such as processor speed, cost, etc. and some non-quantifiable attributes like feedback to rank various cloud services according to the requirements of cloud service consumer using Linear Programming (LP) technique. © 2020 Elsevier B.V.

Author keywords

Cloud computing | Cloud service ranking | Linear programming | QoS | Service selection

Indexed keywords

Engineering controlled terms: Cloud computing | Linear programming | Quality of service | Web services

Engineering uncontrolled terms: Cloud services | Internet based computing | Linear programming models | QoS requirements | Qualitative approach

Document details - Synthesis, crystal structure, spectroscopic investigations, physicochemical properties of third-order NLO single crystal for optical applications

Journal of Molecular Structure

Volume 1203, 5 March 2020, Article number 127400

Synthesis, crystal structure, spectroscopic investigations, physicochemical properties of third-order NLO single crystal for optical applications(Article)

Anandhan, A., Sivasankari, C., Saravanabhavan, M., Siva, V., Senthil, K.

[a]Department of Chemistry, Government College of Technology, Coimbatore, Tamilnadu 641013, India
[b]Department of Chemistry, Sri Ramakrishna Mission Vidyalaya College of Arts and Science, Coimbatore, Tamilnadu 641020, India
[c]Department of Physics, School of Advanced Sciences, Kalasalingam Academy of Research and Education, Krishnankoil, Tamilnadu 626126, India

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Abstract

A new proton transfer salt, Glycinium-2-Mesitylenesulphonate ($C_{11}H_{17}NO_5S$) has been synthesized and its corresponding structure was predicted by Single crystal X-ray diffraction. From SCXRD, crystallised in monoclinic crystal system with the space group of $P2_1/c$ with the unit cell dimensions: a = 13.2596(9) Å, b = 10.6363(7) Å, c = 9.5362(6) Å, V = 1343.98(15) $Å^3$, Z = 4. The grown crystal was studied by FTIR, NMR, TG-DTA, CHN analysis, UV Visible and Z-Scan measurements. The thermal stability was determined by TG/DTA analysis. Vickers microhardness test was carried out to identify the mechanical strength of the material. Third-order non-linear optical response of G2MS crystal was determined by the Z-scan technique. © 2019 Elsevier B.V.

Author keywords

Microhardness | Nonlinear optics | Organic material | Photoluminescence | SCXRD | Thermal stability

Indexed keywords

Engineering controlled terms: Microhardness | Nonlinear optics | Photoluminescence | Physicochemical properties | Single crystals | Thermodynamic stability

Document details - FPGA implementation of highly scalable AES algorithm using modified mix column with gate replacement technique for security application in TCP/IP

Microprocessors and Microsystems

Volume 73, March 2020, Article number 102972

FPGA implementation of highly scalable AES algorithm using modified mix column with gate replacement technique for security application in TCP/IP(Article)

Madhavapandian, S., MaruthuPandi, P.

[a]Department of Electronics and Communication Engineering, AAA College of Engineering and Technology, Sivakasi, India
[b]Department of Electrical Engineering, Government College of Technology, Coimbatore, India

Abstract

Field Programmable Gate Arrays (FPGA) offers a faster, increasingly adjustable arrangement. Earlier Data Encryption Standard (DES) algorithms have been developed, however it could not keep up with advancement in a technology and it is no longer appropriate for security. With this motivation, this work developed an efficient FPGA implementation of Advanced Encryption Standard (AES) targets to investigate a huge number of security processes followed in the TCP/IP protocol suite and to suggest a novel new architecture for the existing version. The first contribution of the studies turned into to provide the safety for packages of the utility layer protocols. The AES cryptographic encryption, decryption and key management set of rules to for the safety of transmission control protocol/internet protocol (TCP/IP) protocol suite turned into carried out. AES is one of the maximum famous cryptographic algorithms used for records safety. The cost and consumption of power in the AES can be decreased substantially by way of optimizing the structure of AES. This research article projects an implementation based on modification in Mix column in AES techniques which gives a compact structure with efficient mix column Boolean expression the usage of resource sharing architecture and gate replacement method. The ON-chip power utilization and area overhead of the proposed hardware implementation outperforms the preceding work performed in this area. The proposed architecture have been carried out on the most latest virtex 6 lower power Field programmable gate array (FPGA), whereas overhead and on-chip utilization of power are compared with the previous works and it is proved that proposed method has lower area utilization and ON-Chip utilization of power. © 2019

Author keywords

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Document details - Isolation enhanced MIMO antenna for software defined networking (SDN) adapted ultrawide band (UBW) radio tech applications

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Microprocessors and Microsystems

Volume 73, March 2020, Article number 102965

Isolation enhanced MIMO antenna for software defined networking (SDN) adapted ultrawide band (UBW) radio tech applications(Article)

V, I.N., P, D.

ECE Department, Government College of Technology, Coimbatore, Tamilnadu 641013, India

Abstract

In this paper four element, four-port "enhanced bandwidth reduced radius single stub annular ring slot" (EBRRSS-ARS) Multiple Input Multiple Output (MIMO) antenna with isolation enhancement structure is proposed. The prospective antenna with stub in annular slot reduces the mutual coupling has simple and compact structure. The EBRRSS-ARSA resonates at 4.4 GHz with a bandwidth of 0.9 GHz with minimum isolation of 10 dB between its elements. The parametric study for the proposed fabricated antenna agrees well with the measurements. © 2019 Elsevier B.V.

Author keywords

4-element | 4-port | Better isolation | Effective reduction in mutual conductance | MIMO

Indexed keywords

Engineering controlled terms: Application programs | Bandwidth | Microwave antennas | MIMO systems | Software defined networking

Engineering uncontrolled terms: 4-element | 4-port | Better isolation | Compact structures | Enhanced bandwidths | Isolation enhancement | Multiple input multiple output antennas | Software defined networking (SDN)

Engineering main heading: Slot antennas

Cited by 1 document

Kırış, S., Alkurt, F.Ö., Karaaslan, M.

Pattern Shaping by Utilizing EBG Phase Response and Its Use in MIMO Radio Altimeter Antenna Design for Aircraft

(2023) Electronics (Switzerland)

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Document details - HSI Model-Based Image Dehazing for Remote Sensing Images

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Journal of the Indian Society of Remote Sensing

Volume 48, Issue 3, 1 March 2020, Pages 373-383

HSI Model-Based Image Dehazing for Remote Sensing Images(Article)

Bibi, N.A., Vasanthanayaki, C.

[a]Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, 641013, India

[b]Department of Electronics and Communication Engineering, Government College of Engineering, Salem, 636011, India

Abstract

Remote sensing images taken under hazy conditions have poor quality of the scene. Therefore, haze removal or dehazing is recommended. Due to the presence of haze, there is a resultant decay in the colour and the contrast of the captured image. Dehazing of an image is highly required to improve the quality of the scene. Algorithms based on dark channel prior combined with the haze imaging model were proposed by many researchers in recent years. Dark channel prior has been developed originally according to the statistics of outdoor haze-free images. When the dark channel prior is applied to remote sensing images, it often causes a colour drift phenomenon. This proposed work focuses on hue, saturation, and intensity colour model-based image dehazing, and this is a non-dark channel prior-based method. In this firstly, the atmospheric light is estimated from the hue of the hazy image as haze does not affect the hue. Then, the transmission medium is estimated from the saturation component. Finally, the haze is removed using two estimated parameters. The proposed work performs dehazing at a higher speed and makes it more sufficiently fast for a large-scale application which needs haze removal in the computer vision area. The experimental result shows that the proposed algorithm can achieve haze-free results while preserving the edges and it can improve the contrast of the image. © 2019, Indian Society of Remote Sensing.

Author keywords

Atmospheric light | Dehazing | Haze imaging model | Transmission medium

Indexed keywords

GEOBASE Subject Index: algorithm | computer vision | numerical model | remote sensing | satellite imagery | saturation

Cited by 3 documents

Cui, Y., Zhi, S., Liu, W.

An improved dark channel defogging algorithm based on the HSI colour space

(2022) IET Image Processing

Huang, Y., Chen, X.

SINGLE REMOTE SENSING IMAGE DEHAZING USING A DUAL-STEP CASCADED RESIDUAL DENSE NETWORK

(2021) Proceedings - International Conference on Image Processing, ICIP

Yu, D., Yang, R.

Gradient Information-Orientated Colour-Line Priori Knowledge for Remote Sensing Images Dehazing

(2020) Sensing and Imaging

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Document details - Dynamic handover algorithm with interference cancellation in 5G networks for emergency communication

International Journal of Communication Systems

Volume 33, Issue 4, 1 March 2020, Article number e4227

Dynamic handover algorithm with interference cancellation in 5G networks for emergency communication(Article)

Kiruthika, V., Vembu, S.

Department of ECE, Government College of Technology, Coimbatore, India

Abstract

The integration of 5G networks with cognitive radio (CR) technology enables the software-defined networking (SDN) infrastructure to support emergency applications. In future, CR can be integrated with 5G and many wireless networks like Wi-Fi, WSN, and MANET for efficient spectrum utilization with higher data rate and lower latency. This CR technology allows unlicensed users to access the licensed spectrum, whenever it is free. In this paper, an efficient SDN architecture with cognitive ability for emergency network is proposed in which the SDN controller prolong communication between disaster victims and first responders and so the first responders can arrive at the spot directly and rescue the victims. The SDN controller has cognitive ability so that the victims can utilize the vacant licensed band to communicate with the first responders, thereby improving the spectrum utilization of the network. Another two main challenges during emergency are the occurrence of interference and link failure. The proposed dynamic handover algorithm with interference cancellation (DHAIC) cancels the interference between the nodes inside the network and performs dynamic handoff, whenever link failure occurs between the cluster head (CH) and the controller. An optimum throughput and minimal delay is achieved to ensure the network performance. © 2019 John Wiley & Sons, Ltd.

Author keywords

cognitive radio (CR) | emergency communication networks (ECN) | interference cancellation | mobility management | software-defined networking (SDN)

Indexed keywords

Engineering controlled terms: Application programs | Cognitive radio | Controllers | Interoperability | Mobile ad hoc networks | Queueing networks | Software defined networking | Wi-Fi

Document details - A novel method of utilizing waste Printed Circuit Board for the preparation of Fibre Reinforced Polymer

Journal of Cleaner Production

Volume 246, 10 February 2020, Article number 119063

A novel method of utilizing waste Printed Circuit Board for the preparation of Fibre Reinforced Polymer(Article)

Senophiyah-Mary, J., Loganath, R.

[a]Department of Environmental Engineering, Government College of Technology, Coimbatore, Tamil Nadu 641 013, India
[b]Department of Civil Engineering, Indian Institute of Engineering Science and Technology, Shibpur, Howrah, India

Abstract

This study highlights the reuse of the by-products of waste PCB (WPCB) after the metal extraction by pyrometallurgy and bioleaching. In this study the carbonaceous slag obtained was used as a reinforcement to increase the strength of a synthesized nano fibre membrane which could be used for the treatment of wastewater. The synthesized membrane has nano fibres with an average size of 90–110 nm which was produced using an electrospinning machine. The Raman spectroscopy results proved that the carbonaceous slag is rich in carbon and few amounts of graphite was also present in it. The FESEM results proved that the nano fibres were spun perfect which would increase the strength of membrane, thereby increasing the workability towards wastewater treatment. The FTIR results also proved that there is change in the molecular groups of the carbon incorporated fibres. The 3D image of the membrane captured by the Atomic Force Microscope proved that the sample has nano fibre woven on the surface along with the carbon which increases the stability and also as a mere amount of metal is present on the carbon the chance of fouling by the microbes would be limited. Thus, the recycled Fibre Reinforced Polymer (rFRP) is an efficient membrane for the treatment of domestic or industrial wastewater. © 2019 Elsevier Ltd

Author keywords

Electrospinning | Nano fibres | Recycled Fibre Reinforced Polymers (rFRP) | Waste Printed Circuit Board (WPCB) | Wastewater treatment

Indexed keywords

Engineering controlled terms: Atomic force microscopy | Bridge decks | Carbon | Electrospinning | Fiber reinforced plastics | Fibers

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Document details - GIS based assessment of water quality in periyakulam lake of Coimbatore City

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Indian Journal of Environmental Protection

Volume 40, Issue 2, February 2020, Pages 161-167

GIS based assessment of water quality in periyakulam lake of Coimbatore City(Article)

Sadheesh, S., Joshi, N.N., Prasath, S.K.A.

[a]Sri Krishna College of Engineering and Technology, Department of Civil Engineering, Coimbatore, India
[b]Government College of Technology, Department of Environmental Engineering, Coimbatore, India

Abstract

Periyakulam lake is the largest water body having a complete built-up catchment area with the developed area with packets of vegetal cover, open land and inlet nala from Noyyal river. It falls under core corporation limits of Coimbatore city and main bunds of the lake are attached to Palakad main road from north-eastern portion of the lake to the south-western portion of the lake. The study area is facing surface water contamination by the discharge of sewage and industrial effluent. In this study, the quality of water for its suitability for living organisms and domestic purpose was assessed by its hydrochemical parameters. The flow measurements and sampling were done in the inlets of the lake. The samples were tested for physical and chemical parameters. Geographic information system (GIS) based analysis has been carried out to find out the quality of water for its suitability for living organisms and domestic purposes. Chloride concentration was found to be exceeding the permissible limit in samples near to the first inlet. Based on the study, it was found that most of the samples are suitable for irrigation purpose. © 2020 - Kalpana Corporation

Author keywords

Coimbatore district | Hydrochemical | Irrigation | Surface water

ISSN: 02537141
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Original language: English

Document Type: Article
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Document details - Fenalan Yellow G adsorption using surface-functionalized green nanoceria: An insight into mechanism and statistical modelling

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Environmental Research

Volume 181, February 2020, Article number 108920

Fenalan Yellow G adsorption using surface-functionalized green nanoceria: An insight into mechanism and statistical modelling(Article)

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[c]SASTRA University, Thanjavur, India

Abstract

In the present study, green nanoceria (gNC) was synthesized and surface-functionalized (sf-gNC) with amine moieties through chemical means and used as an adsorbent for the removal of Fenalan Yellow G (FYG) from the aqueous solution. Prior to the adsorption process, the optical, structural and textural characteristics of the nanomaterial ensured the presence of highly crystalline and monodisperse nanoceria with the functionalized amine group on their surfaces. The effects of the independent variables of the FYG removal process including initial solution pH, adsorbent dose, initial adsorbate concentration and time were examined for the percent removal. The maximum removal of 93.67% was observed at the pH of 2.0 with the adsorbent dose of 0.1 g for 10 mg/L of FYG dye concentration in 210 min. The equilibrium studies revealed that the maximum adsorption capacity was 25.58 mg/g by monolayer Langmuir model at 303 K and the chemical kinetics results followed pseudo-second-order and chemisorptive Elovich model. The magnitude of the energy variables from the thermodynamic analysis exposed the feasibility and spontaneity of endothermic adsorption. Furthermore, the interactive effects of the screened process variables investigated and optimized through response surface methodology (RSM). Besides, the FYG adsorption behavior was well predicted using artificial neural network (ANN) model with good accuracy (Mean Squared Error < 0.5; Coefficient of determination > 0.99) using 3 input layers, 3 hidden layers and 1 output layer. The study proposed the intrinsic mechanism of adsorbent-adsorbate interactions as either of electrostatic interaction or through surface complexation. Moreover, the prepared amine-modified nanoceria was found to have a minimum of 75% regenerative potential for five adsorption-desorption cycles. © 2019 Elsevier Inc.

Author keywords

Adsorption | FYG dye | Prosopis juliflora | Surface-functionalized green nanoceria

Cited by 34 documents

Nithya, R., Thirunavukkarasu, A., Sivasankari, C.
Comparative profile of green and chemically synthesized nanomaterials from bio-hydrometallurgical leachate of e-waste on crystal violet adsorption kinetics, thermodynamics, and mass transfer and statistical models
(2023) Biomass Conversion and Biorefinery

Guo, X., Liu, L., Guo, H.
An integrated strategy for ultra-efficient recovery and sustainable reuse of Congo red from wastewater
(2023) Journal of Molecular Liquids

Mondal, P., Nandan, A., Ajithkumar, S.
Sustainable application of nanoparticles in wastewater treatment: Fate, current trend & paradigm shift
(2023) Environmental Research

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Document details - Design of approximate adders and multipliers for error tolerant image processing

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Microprocessors and Microsystems

Volume 72, February 2020, Article number 102940

Design of approximate adders and multipliers for error tolerant image processing(Article)

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Abstract

An adder is the basic computational circuit in digital Very Large Scale Integration (VLSI) design. To improve the design metrics of an adder, Approximate Adders (AAs) have been proposed. These adders have been applied and analyzed on 8 x 8 Dadda multipliers (DMs). The design metrics of proposed AAs, Approximate Dadda Multipliers (ADMs) are synthesized in Cadence Register-Transfer Level (RTL) compiler and compares the design metrics with three different technology nodes. The quantitative characterization such as Error Distance (ED), Error Rate (ER), Pass Rate (PR), Mean Error Distance (MED), Normalised Error Distance (NED) of AAs, and ADMs are computed. Image blending and sharpening approaches have been applied using AAs, and approximate multipliers respectively to analyse the image quality metric using the proposed approximate framework. © 2019 Elsevier B.V.

Author keywords

Approximate adders, Dadda multiplier, Image processing, Low power, Wallace tree multiplier

Indexed keywords

Engineering controlled terms: Errors, Image processing, Image quality, VLSI circuits

Engineering uncontrolled terms: Computational circuits, Dadda multipliers, Image quality metrics, Low Power, Quantitative characterization, Register transfer level, Very large scale integration designs, Wallace tree

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Document details - Adsorptive Removal of Recalcitrant Auramine-O Dye by Sodium Dodecyl Sulfate Functionalized Magnetite Nanoparticles: Isotherm, Kinetics, and Fixed-Bed Column Studies

1 of 1

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International Journal of Nanoscience

Volume 19, Issue 1, 1 February 2020, Article number 1950004

Adsorptive Removal of Recalcitrant Auramine-O Dye by Sodium Dodecyl Sulfate Functionalized Magnetite Nanoparticles: Isotherm, Kinetics, and Fixed-Bed Column Studies(Article)

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[b]Department of Chemical Engineering, Coimbatore Institute of Technology, Coimbatore, Tamilnadu, 641014, India
[c]Department of Environmental Engineering, Universiti Tunku Abdul Rahman, Bandar Barat, Kampar, 31900, Malaysia

Abstract

Presently, the treatment of dye-polluted water is a challenging task worldwide. In this study, the adsorptive removal of Auramine-O (AO) dye by magnetite nanoparticles (MNs) and sodium dodecyl sulfate (SDS) functionalized MNs (SFMNs) were investigated. FESEM, HRTEM, EDX, and XRD were employed to characterize the MNs. In batch optimization, dye removal efficiency of 74% was obtained at contact time (40min), pH 6.5, sorbent dosage (20mg), and initial dye concentration (20mg/L). The maximum adsorption capacity of 55.56mg/g was estimated from Langmuir model and the isotherm data were fitted with Freundlich model (R2=0.994) for SFMNs. Pseudo-second-order kinetics was followed by both MNs and SFMNs for the adsorption of AO dye. The continuous AO dye adsorption was studied in fixed-bed column and the effects of bed height, influent flow rate, and initial dye concentration were investigated. The column performance was evaluated by breakthrough kinetic modeling and Yoon-Nelson model was fitted with the data. The results of this study showed that the surface modification of MNs using SDS enhanced the AO dye removal efficiency and SFMNs can be employed as an efficient nanoadsorbent for AO dye removal in batch and continuous mode of operation. © 2020 World Scientific Publishing Company.

Author keywords

Adsorption, Auramine-O dye, fixed bed, magnetite nanoparticles, SDS

Document details - Characterization of eco-friendly steel fiber-reinforced concrete containing waste coconut shell as coarse aggregates and fly ash as partial cement replacement

Structural Concrete

Volume 21, Issue 1, 1 February 2020, Pages 437-447

Characterization of eco-friendly steel fiber-reinforced concrete containing waste coconut shell as coarse aggregates and fly ash as partial cement replacement(Article)(Open Access)

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[b]Department of Civil Engineering, Government College of Technology, Coimbatore, India
[c]Centre for Innovative Architecture and Built Environment (SErAMBI), Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia, Bangi, Malaysia

Abstract

This study investigates the effect of steel fiber addition into eco-concrete made with fly ash, an industrial by product, as partial cement replacement material, and coconut shell, an agricultural waste, as coarse aggregates, on the mechanical properties. Two different mixes were developed, one with coconut shell only as coarse aggregates, and the other with both conventional aggregates and coconut shell as coarse aggregates. The cement content was replaced with class F fly ash at 10% by weight. Steel fibers of 0.25, 0.5, 0.75, and 1.0% by volume of concrete were used. The properties investigated were slump, density, ultrasonic pulse velocity, compressive strength, split tensile strength, flexural strength, and modulus of elasticity (MOE). The findings indicated that the addition of steel fibers resulted in a reduced slump and slightly increased density in the fresh concrete mixes. Meanwhile, enhancements of up to 39% compressive strength and 17% MOE were also obtained. A substantial improvement in split tensile strength and flexural strength were also observed. Steel fiber addition also significantly reduced the brittleness of concrete containing coconut shell. The outcomes of the experiment revealed that steel fiber addition yielded a positive result on the mechanical properties of coconut shell concrete. © 2019 fib. International Federation for Structural Concrete

Author keywords

coconut shell aggregate | compressive strength | flexural strength | modulus of elasticity, brittleness ratio | split tensile strength | steel fiber

Document details - Priority and interference aware multipath routing based communications for extreme surveillance systems

Computer Communications

Volume 150, 15 January 2020, Pages 537-546

Priority and interference aware multipath routing based communications for extreme surveillance systems(Article)

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[b]Department of Computer Science Engineering, Government College of Technology, CoimbatoreTamilnadu, 641013, India

Abstract

Increased natural disaster in various urban and rural areas requires immediate attention to avoid the major causes. In real world, immediate recovery to the disaster areas is ensured by adapting the unmanned aerial vehicles that enable people to reach the disaster areas immediately. Here specific task in the disaster area can be completed efficiently by working with multi Unmanned Aerial Vehicle (UAV) instead of single UAV. Here data communication between the UAV needs to be very reliable to ensure the proper disaster management outcome. It is more complex to provide the required services to the users when there is situation arise to switch between the heterogeneous networks. The QoS-Oriented Distributed routing protocol (QOD) is used in the existing methods to give solution to this problem. The data is transfered between hybrid networks with required QoS. In the existing work, routing is done by considering the QoS consideration thus the efficient and reliable distributed routing is guaranteed. However the existing work lacks from the following issues: It avoids the data transfer through the path in which data transmission is going already to avoid the interference problems which might reduce the throughput rate. Priority of the data transferred from multiple sources are not considered in the previous work and also existing work focused on reducing delay alone as QoS factor. Priority and Interference aware Multipath Routing Protocol (PIMRP) is introduced to rectify this issue in the proposed method. In this method, interference aware and priority routing is ensured by introducing the following research methods. Here, Multipath interference based routing method is used allow transmission of data from multiple path that resides within interference range with guaranteed interference avoidance and increased throughput. Here route path nodes are selected with multiple objectives such as delay, bandwidth, and energy consumption. To provide more preference to the prioritized data transmission nodes with more resource availability is provided to the prioritized data packets which are tiny segmented. The performance of the proposed method is evaluated using NS2 simulation tool. The simulation results confirm the efficiency of the proposed method. © 2019 Elsevier B.V.

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Document details - Production of biodiesel from tannery waste using a stable and recyclable nano-catalyst: An optimization and kinetic study

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Fuel

Volume 260, 15 January 2020, Article number 116373

Production of biodiesel from tannery waste using a stable and recyclable nano-catalyst: An optimization and kinetic study(Article)

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[b]Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India
[c]Department of Physical Sciences, Institute of Advanced Research, Gandhinagar, 382426, India

View additional affiliations

Abstract

Biodiesel is produced from tannery waste by transesterification reaction in the presence of Cs_2O loaded onto a nano-magnetic core. The catalyst was prepared by co-precipitation followed by thermal oxidation method. The prepared catalyst was characterized using different analytical techniques. Further, the effectiveness of the prepared catalyst was determined by subjecting the fat from tannery waste to transesterification. Investigations were undertaken to determine the effect of the various process parameters influencing the process. Optimum conditions of 21:1 methanol-to-oil molar ratio, 7 wt% catalyst loading at 65 °C for 300 min with a constant stirring rate of 500 rpm produced a maximum yield of 97.1 wt%. The fuel properties of the biodiesel were analyzed as per ASTM test methods and compared with ASTM D6751 standard. Further, kinetic studies were conducted to know the rate of the reaction and its activation energy and frequency factors were identified as 43.8 kJ mol^{-1} and 7.5×10^{4} min^{-1} respectively. © 2019 Elsevier Ltd

Author keywords

(Biodiesel) (Kinetics) (Nano-catalyst) (Optimization) (Transesterification)

Indexed keywords

Engineering controlled terms: (Activation energy) (Biodiesel) (Cesium compounds) (Enzyme kinetics) (Kinetic theory) (Kinetics) (Molar ratio)

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Document details - Room temperature LPG sensing properties of tin substituted copper ferrite (Sn–CuFe₂O₄) thin film

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Materials Chemistry and Physics

Volume 240, 15 January 2020, Article number 122265

Room temperature LPG sensing properties of tin substituted copper ferrite (Sn–$CuFe_2O_4$) thin film(Article)

Manikandan, V., Singh, M., Yadav, B.C., Mane, R.S., Vigneselvan, S., Mirzael, A., Chandrasekaran, J.

[a]Department of Physics, Kongunadu Arts and Science College, Coimbatore, 641029, India
[b]Nanomaterials and Sensors Research Laboratory, Department of Applied Physics, Babasaheb Bhimrao University, UP-226025, India
[c]Center for Nanomaterial & Energy Devices, Swami Ramanand Teerth Marathwada University, Dnyanteerth, Vishnupuri, Nanded, 431606, India

View additional affiliations

Abstract

Nanocrystalline tin-substituted copper ferrite ($Sn_{0.2}Cu_{0.8}Fe_2O_4$) liquefied petroleum gas (LPG) sensors with a surface area of 3.92 m^2/g were synthesized by a co-precipitation method. Structural studies confirmed the crystalline nature of Sn0.2Cu0.8Fe2O4 with an average crystallite size of 37 nm. Also, microscopic studies confirmed formation of cuboids and spherical nanoparticles. The gas sensing results toward LPG at room temperature demonstrated promising effects of the incorporation of tin in copper ferrite. As-developed $Sn_{0.2}Cu_{0.8}Fe_2O_4$ gas sensor showed a response of 78.78% to 2 vol % LPG with 90% reproducibility and high stability, suggesting its potential for the detection of LPG in real applications. Also, the gas sensor showed fast response time and recovery time. © 2019 Elsevier B.V.

Author keywords

(Copper ferrite) (Gas sensor) (LPG) (Nanoparticle) (Sensing mechanism)

Indexed keywords

Engineering controlled terms: (Chemical sensors) (Copper) (Copper alloys) (Copper compounds) (Crystallite size) (Ferrite) (Gas detectors) (Gases) (Iron compounds) (Magnetic materials) (Nanocrystals) (Nanoparticles) (Precipitation (chemical)) (Tin) (Tin compounds)

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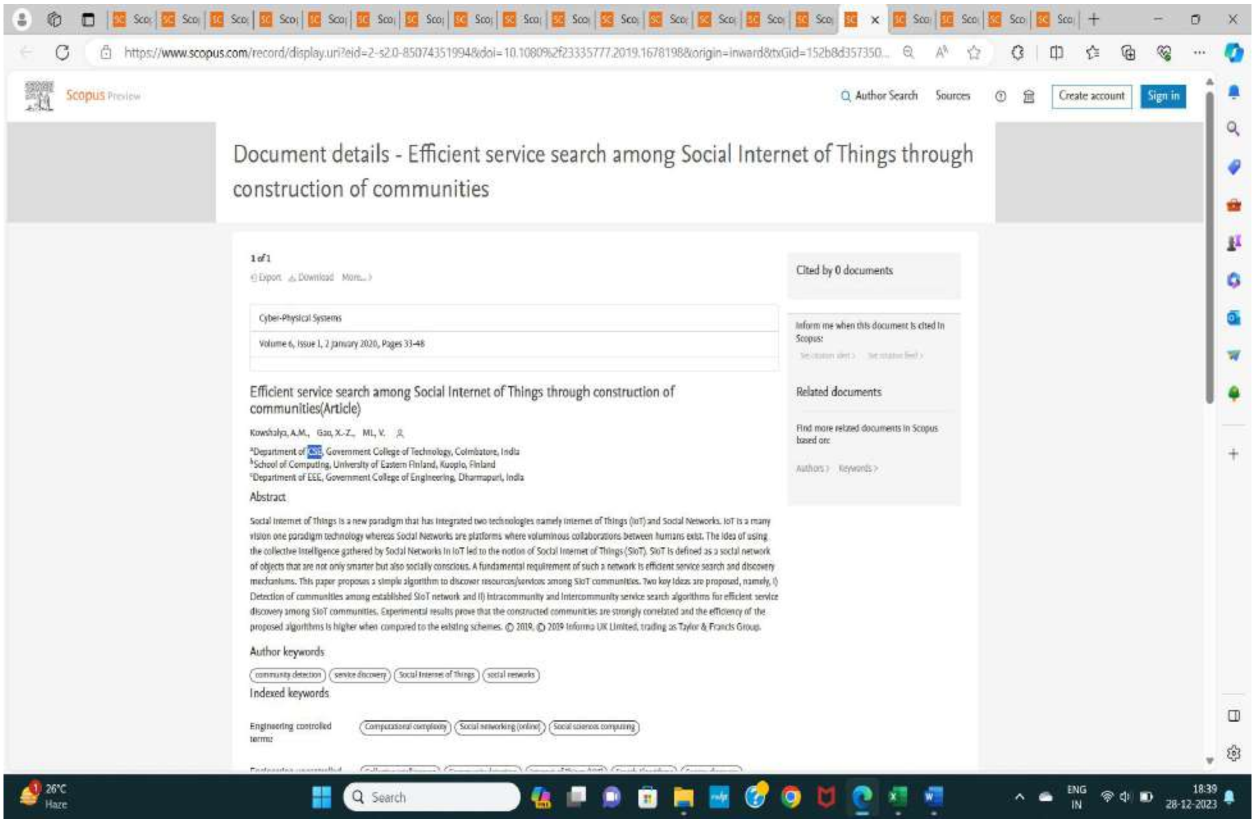

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Document details - Efficient service search among Social Internet of Things through construction of communities

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Cyber-Physical Systems

Volume 6, Issue 1, 2 January 2020, Pages 33-48

Efficient service search among Social Internet of Things through construction of communities(Article)

Kowshalya, A.M., Gao, X.-Z., ML, V.

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[b]School of Computing, University of Eastern Finland, Kuopio, Finland
[c]Department of EEE, Government College of Engineering, Dharmapuri, India

Abstract

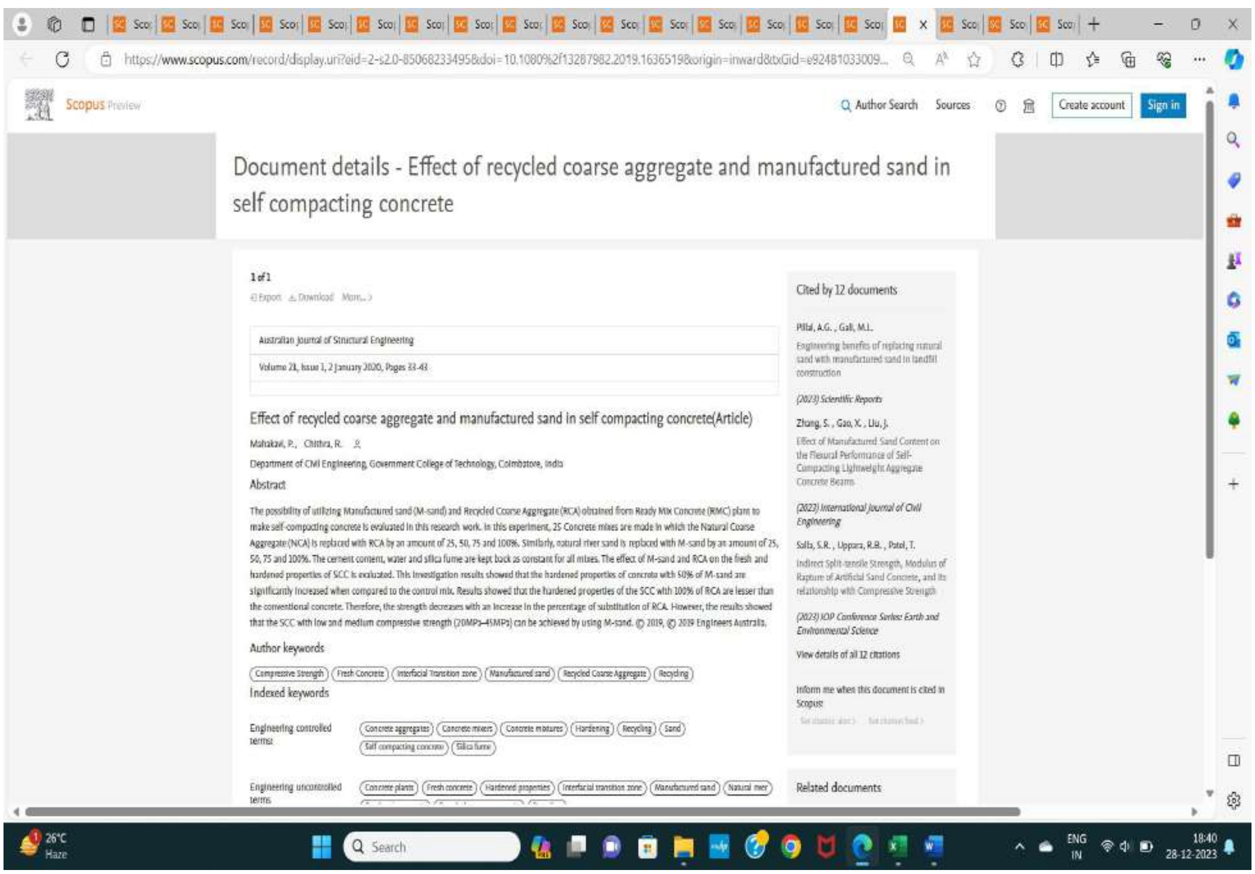
Social Internet of Things is a new paradigm that has integrated two technologies namely Internet of Things (IoT) and Social Networks. IoT is a many vision one paradigm technology whereas Social Networks are platforms where voluminous collaborations between humans exist. The idea of using the collective intelligence gathered by Social Networks in IoT led to the notion of Social Internet of Things (SIoT). SIoT is defined as a social network of objects that are not only smarter but also socially conscious. A fundamental requirement of such a network is efficient service search and discovery mechanisms. This paper proposes a simple algorithm to discover resources/services among SIoT communities. Two key ideas are proposed, namely, i) Detection of communities among established SIoT network and ii) Intracommunity and Intercommunity service search algorithms for efficient service discovery among SIoT communities. Experimental results prove that the constructed communities are strongly correlated and the efficiency of the proposed algorithms is higher when compared to the existing schemes. © 2019, © 2019 Informa UK Limited, trading as Taylor & Francis Group.

Author keywords

community detection | service discovery | Social Internet of Things | social networks

Indexed keywords

Engineering controlled terms: Computational complexity | Social networking (online) | Social sciences computing



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Document details - Effect of recycled coarse aggregate and manufactured sand in self compacting concrete

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Australian Journal of Structural Engineering

Volume 21, Issue 1, 2 January 2020, Pages 33-43

Effect of recycled coarse aggregate and manufactured sand in self compacting concrete(Article)

Mahakavi, P., Chithra, R.

Department of Civil Engineering, Government College of Technology, Coimbatore, India

Abstract

The possibility of utilizing Manufactured sand (M-sand) and Recycled Coarse Aggregate (RCA) obtained from Ready Mix Concrete (RMC) plant to make self-compacting concrete is evaluated in this research work. In this experiment, 25 Concrete mixes are made in which the Natural Coarse Aggregate (NCA) is replaced with RCA by an amount of 25, 50, 75 and 100%. Similarly, natural river sand is replaced with M-sand by an amount of 25, 50, 75 and 100%. The cement content, water and silica fume are kept back as constant for all mixes. The effect of M-sand and RCA on the fresh and hardened properties of SCC is evaluated. This investigation results showed that the hardened properties of concrete with 50% of M-sand are significantly increased when compared to the control mix. Results showed that the hardened properties of the SCC with 100% of RCA are lesser than the conventional concrete. Therefore, the strength decreases with an increase in the percentage of substitution of RCA. However, the results showed that the SCC with low and medium compressive strength (20MPa–45MPa) can be achieved by using M-sand. © 2019, © 2019 Engineers Australia.

Author keywords

Compressive Strength | Fresh Concrete | Interfacial Transition zone | Manufactured sand | Recycled Coarse Aggregate | Recycling

Indexed keywords

Engineering controlled terms: Concrete aggregates | Concrete mixers | Concrete mixtures | Hardening | Recycling | Sand | Self compacting concrete | Silica fume

Engineering uncontrolled terms: Concrete plants | Fresh concrete | Hardened properties | Interfacial transition zone | Manufactured sand | Natural river

Document details - Induction assisted friction stir welding: a review

Australian Journal of Mechanical Engineering

Volume 18, Issue 1, 2 January 2020, Pages 119-123

Induction assisted friction stir welding: a review(Review)

Mohan, D.G., Gopi, S.

Department of Production Engineering, Government College of Technology, Coimbatore, India

Abstract

Friction stir welding (FSW) is limited to use in metals having high melting point due to the inadequate tool life. Tool life is decreasing due to the high wear rate. Welding high melting point metals reduces the tool life. The alternative changing of tool may cost too high. The best way to increase the tool life for friction stir welding of high melting point alloy is to preheat the metal. Preheating reduces the tool wear rate and increases the tool life. One of the best methods to heat ferromagnetic metal is using induction heating process. This chapter aims to review on induction-assisted FSW process. To study the effect of additional heating on FSW in hard metals and to determine its influence on the strength of joining. © 2018, © 2018 Engineers Australia.

Author keywords

alloys · heating · Induction · laser · tool profile

Indexed keywords

Engineering controlled terms: Alloying · Friction · Heating · Induction heating · Lasers · Melting point · Metals · Research laboratories · Wear of materials

Engineering uncontrolled terms: Additional heating · Friction stir welding(FSW) · Hard metals · High melting point · High melting point metals · Induction · Tool profile · Tool wear rate

Engineering main heading: Friction stir welding

Document details - Experimental Study on Material Removal Rate and Over-Cut in Electrochemical Machining of Monel 400 Alloys with Coated Tools

Lecture Notes on Multidisciplinary Industrial Engineering

Volume Part F165, 2020, Pages 255-268

Experimental Study on Material Removal Rate and Over-Cut in Electrochemical Machining of Monel 400 Alloys with Coated Tools(Book Chapter)

Ayyappan, S., Vengatajalapathi, N.

Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

Electrochemical machining (ECM) is a promising non-traditional machining process used for machining difficult-to-machine materials. It finds the applications in the field of automotive, electronics, optics, medical, petroleum, nuclear and die industries. Improving an over-cut (OC) is still a tough task in ECM, though it is benefitted with better material removal rate (MRR). Therefore, different coated tools, that is, epoxy-coated tool (ECT) and abrasive-coated tool (ACT), were used in the direction to obtain better OC. It is observed that the ECT technique performs well for reducing the OC in comparison to the other tools under similar conditions and appears more electrochemically stable. The coating on tool avoids the contact of tool surfaces with the intermittent sparks produced in the inter-electrode gap (IEG), thereby ensuring the increase of tool life. © 2020, Springer Nature Singapore Pte Ltd.

Author keywords

Abrasive-coated tool · Electrochemical machining · Epoxy-coated tool · Material removal rate (MRR) · Over-cut (OC)

ISSN: 25225022
Source Type: Book Series
Original language: English

DOI: 10.1007/978-981-32-9471-4_21
Document Type: Book Chapter
Publisher: Springer Nature

Vengatalapathi, N.: Department of Mechanical Engineering, Government College of Technology, Coimbatore, India

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Document details - Optimization and Kinetic Modeling of Biodiesel Production

Encyclopedia of Renewable and Sustainable Materials: Volume 1-5

Volume 1-5, 1 January 2020, Pages 193-201

Optimization and Kinetic Modeling of Biodiesel Production (Book Chapter)

Muthukumaran, C., Sharmila, G., Manojkumar, N., Gnanaprakasam, A., Sivakumar, V.M.

[a]Government College of Technology, Coimbatore, India
[b]SRM Institute of Science and Technology, Kattankulathur, India
[c]Coimbatore Institute of Technology, Coimbatore, India

Abstract

Biodiesel is currently focused as an alternate eco-friendly and economical source of energy. Biodiesel is mainly produced by the transesterification reaction between oil and the alcohol in the presence of catalyst. Use of non-edible oils for biodiesel production is increased nowadays as compared to edible oils since it is not used for food applications. Biodiesel production is highly influenced by process variables like solvent concentration, oil concentration, type and concentration of catalyst employed and temperature etc. For efficient and effective production of biodiesel, optimization of the process variables is the key step. Statistical optimization method like response surface methodology (RSM) is widely used and successful for several optimization studies. RSM provides the details of optimal points and also synergistic effect of variables on the biodiesel synthesis. In this chapter, the application of RSM in biodiesel production using non-edible jatropha oil was reviewed. Process kinetics also gain importance since it is useful to determine the reactor design and rate controlling stage in the reaction. Various kinetic models for homogeneous and heterogeneous catalyzed biodiesel production were also discussed.

Author keywords

(Biodiesel) (Jatropha oil) (Kinetic model) (Optimization) (RSM) (Transesterification)

ISBN: 978-012813196-1;978-012813195-4
Source Type: Book
Original language: English

DOI: 10.1016/B978-0-12-803581-8.10578-8
Document Type: Book Chapter
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Document details - Experimental study on mechanical properties of hybrid metal matrix composites using stir casting process

Materials Today: Proceedings

Volume 47, 2020, Pages 6926-6933

2020 International Conference on Advances in Design, Materials and Manufacturing; ; Code 172915

Experimental study on mechanical properties of hybrid metal matrix composites using stir casting process (Conference Paper)

Chithambaram, S., Divakar, S., Thalaieswaran, S.

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[b]Department of Mechanical Engineering, NIT, Trichy, 620015, India
[c]Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

A widespread consent of particulate MMC for manufacturing process was because of the high production cost of components for conventional materials. The current study is targeted to explore the mechanical properties, corrosive behaviour and tribological property of LM13 reinforced with Aluminium Oxide (Al_2O_3) and Boron Carbide (B_4C) with a varying weight percentage of reinforcement particles. The otcome discloses that the strength of hybrid MMC has increased up to 21.3% by increasing the percentage of Alumina by addition of boron carbide (B_4C) the hardness increases by 15.65% and the wear rate decreases by 28.63% the stir casting process parameters were varied and the optimal stir casting process parameters was obtained by Taguchi quality design concept.

Author keywords

(Abbreviations: MMC metal matrix composite) (Al Aluminum) (CFRP carbon fibre reinforced polymers) (CMC ceramic reinforced composites) (Cu copper) (DPH diamond pyramid hardness) (FRP fibre reinforced polymers) (GFRP glass fibre-reinforced polymers) (HV vickers pyramid number) (Mg magnesium) (SiC silicon carbide) (SS stainless steel) (Ti Titanium) (TiC titanium carbide) (UTS ultimate tensile strength) (W tungsten) (Zn zinc) (Zr zirconium)

Indexed keywords

Engineering controlled terms (Alumina) (Aluminum) (Aluminum oxide) (Boron) (Boron carbide) (Carbon fiber reinforced plastics) (Carbon fibers)

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Document details - Effect of RCA, foundry sand on strength and toughness of fibre reinforced self-compacting concrete

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Materials Today: Proceedings

Volume 47, 2020, Pages 6976-6981

2020 International Conference on Advances in Design, Materials and Manufacturing; ; Code 172915

Effect of RCA, foundry sand on strength and toughness of fibre reinforced self-compacting concrete(Conference Paper)

Mahakavi, P., Chithra, R.

[a]Department of Civil Engineering, Amity School of Engineering and Technology, Amity University, Madhya Pradesh, Gwalior, 474020, India
[b]Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract

The current study is aimed at investigating effects of hooked end and also crimped steel fibres on efficiency of fibre reinforced self-compacting concrete with RCA and also foundry sand also (FR-SCC). Study's findings show that combining fibres with RCA and also foundry sand also in right proportions can significantly boost mechanical properties of FR-SCC. Tests for hardened properties (compressive, break tensile, flexural forces, and also toughness) were carried out in this analysis. There were 20 different mixes of RCA of 0, 25, 50, and also 75 percent Natural Coarse Aggregate (NCA), three different blends of reinforcing hooked end and also crimped steel fibres, and also 35% optimum replacement of foundry sand also. Self-compacting concrete and also fibre reinforced concrete have been shown to be more suitable and also reliable in concrete technology in previous studies.

Author keywords

Crimped fibres | Foundry sand | Hooked end fibres | Interfacial transition zone | Recycled course aggregate | Self-compacting concrete

Indexed keywords

Engineering controlled terms: Concrete aggregates | Foundries | Foundry sand | Self compacting concrete | Shotcreting

Engineering uncontrolled terms: current | Crimped fiber | Crimped steel fibers | Fibre-reinforced | Hardened properties | Hooked-end fibers

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Document details - Investigation on the effects of Aspergillus nigerin sustainable bio-micromachining of copper

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Materials Today: Proceedings

Volume 46, 2020, Pages 3735-3738

2020 International Conference on Materials, Manufacturing and Mechanical Engineering for Sustainable Developments, ICMSD 2020; Sri Sai Ram Institute of TechnologyChennai; India; 19 December 2020 through 20 December 2020; Code 170457

Investigation on the effects of Aspergillus nigerin sustainable bio-micromachining of copper(Conference Paper)

Sekar, T., Hemalatha, B., Rajeswari, B., Surendran, R., Vijay, M.

Department of Mechanical Engineering, Government College of Technology, Coimbatore, India

Abstract

Generally, the components of Micro and Nano electromechanical systems (MEMS and NEMS) are fabricated by conventional and environmental hazardous machining techniques like Chemical/Photochemical, Electric Discharge, Laser beam etc. This work attempts to investigate the effects of Aspergillus niger, a fungus on micro-machining of pure copper without any heat affected zone and environmental hazardous free. Aspergillus niger spores was acquired from Tamil Nadu Agriculture University, Coimbatore and its culture was developed at the laboratory. The major influencing parameters of shaking speed, temperature, time and pH are considered to evaluate the performance of bio-micromachining in terms of micro hardness and specific metal removal rate at 15th day. The result was analysed using SEM images and this research novelty revealed that the reduction of micro hardness of bio-micro machined copper from 103.53 $HV_{0.5}$ to 97.5 $HV_{0.5}$ i.e. reduction of 5.82% was achieved by Aspergillus niger fungus. Also, the specific material removal rate was found as 0.0197mg/h.cm^2 which prove the potential ability of this process in fabricating MEMS and NEMS components.

Author keywords

Aspergillus niger | Bio-micromachining | Copper | Micro hardness | Specific material removal rate

Indexed keywords

Engineering controlled terms: Aspergillus | Copper | Electric discharges | Hazards | Heat affected zone | Laser beams | MEMS | Micromachining

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Document details - Effect of welding parameters on joint strength of rotary friction welded UNS S31803 tubes

Materials Today: Proceedings

Volume 39, 2020, Pages 1265-1269

2nd International Conference on Recent Trends in Metallurgy, Materials Science and Manufacturing, IMME 2019; Tamil Nadu; India; 27 December 2019 through 28 December 2019; Code 167916

Effect of welding parameters on joint strength of rotary friction welded UNS S31803 tubes(Conference Paper)

Kumar, M.D., Palani, P.K., Karthik, V.

[a]Government College of Engineering, Salem, 636 011, India
[b]Government College of Technology, Coimbatore, 641013, India
[c]Metallurgical and Materials Engineering, National Institute of Technology, Trichy, 620 015, India

Abstract

Rotary friction welding (RFW) is a type of solid state joining which is used majorly in the recent years due to its advantages such as low heat input, efficiency of production, ease of manufacture and environment friendliness. Friction welding can be used to join different types of ferrous metals and non-ferrous metals that cannot be welded by conventional fusion welding processes. The concept of design of experiments (DOE) has been used to perform and analyze the experiments, and it is found that heating time has the greater influence on the joint strength. The increase in joint strength with increasing upset load and heating time is observed. The maximum joint strength of 610 MPa achieved at upset load of 1200 kg and heating time of 20 sec. Effect of parameter for various interactions were analysed and it shows that heating time, upset load are the effective parameters. Scanning electron microscope (SEM) analysis reveals ductile and brittle fracture patterns for the high and low tensile strength values of weld specimens.

Author keywords

Design of experiments, Duplex stainless steel, Rotary friction welding, Tube welding

Indexed keywords

Engineering controlled: Friction, Friction welding, Heating, Manufacture, Scanning electron microscopy, Stainless steel, Tensile strength

Document details - A Matignon's theorem based stability analysis of hybrid power system for automatic load frequency control using atom search optimized FOPID controller

IEEE Access

Volume 8, 2020, Pages 168751-168772

A Matignon's theorem based stability analysis of hybrid power system for automatic load frequency control using atom search optimized FOPID controller(Article)(Open Access)

Irudayaraj, A.X.R., Wahab, N.I.A., Umamaheswari, M.G., Radzi, M.A.M., Sulaiman, N.B., Veerasamy, V., Prasanna, S.C., Ramachandran, R.

[a]Advanced Lightning Power and Energy Research (ALPER), Department of Electrical and Electronics Engineering, Universiti Putra Malaysia (UPM), Seri Kembangan, 43400, Malaysia
[b]Department of Electrical and Electronics Engineering, Rajalakshmi Engineering College, Chennai, 602105, India
[c]Department of Medical Electronics Engineering, SRM Valliammai Engineering College, Chennai, 603203, India

View additional affiliations

Abstract

The large-scale penetration of Intermittent Renewable Energy (RE) sources such as wind and solar power generation may cause a problem of frequency aberration of interconnected Hybrid Power System (HPS). This occurs when the load frequency control of interconnected system is unable to compensate the power balance between generation and load demand. Also owing to the enhancement of future transport, the Plug-in Electric Vehicle (PEV) plays a significant role to customer at demand side. Thus, the PEV can act as a power control to compensate the power balance in Renewable Energy integrated power system. This paper presents a physics inspired Atom Search Optimization (ASO) algorithm for tuning the parameters of Fractional Order Proportional-Integral-Derivative (FOPID) controller for Automatic Load Frequency control of HPS. In this proposed work, an attempt has been made to analyze the frequency stability of HPS using Matignon's theorem. The interconnected HPS consists of reheat thermal power system, RE sources such as wind and solar thermal power generation associated with energy storage devices namely aqua electrolyzer, fuel cell and electric vehicle. The gain and fractional terms of the controller were obtained by minimizing the Integral Time Absolute Error of interconnected system. The robustness of ASO-tuned FOPID controller is tested on two-area HPS that was modelled using MATLAB/Simulink. The results obtained were then compared with other fractional order and classical integer order controllers. From the simulation results, it is inferred that

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Document details - Synthesis and characerization of Zro₂ nanoparticle by leaf extract bioreduction process for its biological studies

1 of 1

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Materials Today: Proceedings

Volume 33, 2020, Pages 5317-5323

2th International Conference on Processing and Characterization of Materials, ICMPC 2020; Indore; India; 15 December 2020 through 17 December 2020; Code 144828

Synthesis and characerization of Zro_2 nanoparticle by leaf extract bioreduction process for its biological studies(Conference Paper)

Annu, A., Sivasankari, C., Krupasankar, U.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, Tamil Nadu, 641013, India
[b]Department of Chemistry, Government College of Technology, Coimbatore, Tamil Nadu, 641013, India
[c]Department of Computer Science and Engineering, Sri Ramakrishna Engineering College, Coimbatore, Tamil Nadu, 641022, India

Abstract

The aim of the present work is to produce zirconium oxide nano particles by the aqueous extract of plant leaves as a powerful capping and reducing agent. The prominent feature of this research is, it provides an alternate approach to conventional chemical synthesis and thus minimizes its adverse effects on the environment. The synthesized nanoparticles were subjected to various characterization techniques using UV-Visible spectrophotometer, FTIR Spectroscopy, SEM with EDAX and X-ray diffraction analysis. The preliminary confirmation of the synthesized nano zirconia was done by observing its absorbance maxima from UV-Visible Spectroscopy which was further justified from the characteristic peaks of FTIR analysis. SEM micrograph potrayed that the prepared nano zirconia was slightly spherical in shape with smooth and fused surface. The purity of the manufactured nano material was affirmed from the EDAX peaks without any unidentified signal. The sharp and narrower peaks from XRD exemplified the significant enhancement in the crystalline nature of the prepared nano zirconia. Biological studies such as antibacterial, and antioxidant activities were evaluated for the green synthesised nano zirconia. The manufactured nanoparticles expressed higher antibacterial activity towards both gram negative bacteria and gram positive bacteria. It also exhibited 69% radical scavenging activity which was determined by DPPH assay. To the best of our knowledge, this is one of the very few studies on the preparation of ZrO_2 nanoparticles by bio-based method using plant extract for its antibacterial and in vitro antioxidant studies. The future work is focussed on the investigation of anti cancerous activity for the same nanoparticle.

Author keywords

Cited by 15 documents

Muthulakshmi, N., Kathirvel, A., Senthil, M.
Green synthesis of zirconia nanoparticles and their characterization, anticancer activity and corrosion inhibition properties
(2023) Journal of the Indian Chemical Society

Bannunah, A.M.
Biomedical Applications of Zirconia-Based Nanomaterials: Challenges and Future Perspectives
(2023) Molecules

Selvam, K., Sudhakar, C., Selvankumar, T.
Photocatalytic degradation of malachite green and antibacterial potential of biomimetic-synthesized zirconium oxide nanoparticles using Annona reticulata leaf extract
(2023) Applied Nanoscience (Switzerland)

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Control Engineering and Applied Informatics

Volume 22, Issue 3, 2020, Pages 62-73

Non-linear Model-based Stochastic Fault Diagnosis of 2 DoF Helicopter(Article)

Raghappriya, M., Kanthalakshmi, S.

[a]Government College of Technology, Coimbatore, India
[b]PSG College of Technology, Coimbatore, India

Abstract

Fault diagnosis of non-linear helicopter systems are affected by inherent characteristics such as non-linear behaviour, high cross coupling effects, external disturbances such as atmospheric turbulence and wind effects. Fault diagnosis in non-linear systems gains importance due to its high complexity and this work focuses on fault detection of helicopter system with the consideration of the inherent non-linearity effects. This paper deals with the detection, identification and classification of sensor, actuator and component faults in nonlinear helicopter systems using model-based state estimation approaches. Approaches include Interacting Multiple Model based Extended Kalman Filter and Interacting Multiple Model based Unscented Kalman Filter. To address problem of fault detection, statistical measures of residual analysis, stochastic likelihood ratio and model probability is proposed. A Comparison of these approaches is presented based on the ability to detect, identify and classify faults in spite of system non-linearity. Algorithm is applied to 2 degrees of freedom helicopter and the results for various fault cases are presented. The results yield better fault detection performance using Interacting Multiple Model based Unscented Kalman Filter.

Author keywords

Aerospace | Fault detection and diagnosis | FDI for non-linear systems | Model-based estimation and filtering | Non-linear | Sensor and actuator faults

ISSN: 14548658
Source Type: Journal
Original language: English
Document Type: Article
Publisher: Control Engineering and Applied Informatics Journal

Cited by 1 document

Nasri, B., Guessoum, A., Adnane, A.
Fault Tolerant Attitude Estimation Strategy for a Quadrotor UAV under Total Sensor Failure
(2023) Control Engineering and Applied Informatics

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Document details - Diabetic retinopathy detection using local ternary pattern

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International Journal of Biomedical Engineering and Technology

Volume 34, Issue 4, 2020, Pages 334-353

Diabetic retinopathy detection using local ternary pattern(Article)

Anitha, A., Uma Maheswari, S.

[a]Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, 641013, India
[b]Department of Electronics and Communication Engineering, Coimbatore Institute of Technology, Coimbatore, 641014, India

Abstract

An intelligent way of diabetic retinopathy detection (DR) at an early stage is required to prevent blindness. DR is detected by analysing the retinal background without segmenting the lesions. This work focuses on local ternary pattern (LTP) for analysing texture of the fundus image. As local binary pattern (LBP) is more sensitive to noise and illumination variation, LTP is employed and its discriminative power is explored. LTP is obtained for all three colour components, red (R), green (G) and blue (B) for different radius considering eight neighbours. The histogram of LTP and variance form a feature set for the classifiers KNN and random forest with ten-fold cross validation. Random forest provides a sensitivity and specificity of 100%. The average sensitivity and specificity of nearly 91% are achieved. The proposed algorithm is very fast and can be used as a screening test for retinal abnormalities detection. Copyright © 2020 Inderscience Enterprises Ltd.

Author keywords

Computer aided diagnosis | Diabetic retinopathy | Fundus images | K-nearest neighbourhood | KNN | LBP | Local binary pattern | Local ternary pattern | LTP | Random forest

Indexed keywords

Engineering controlled terms: Decision trees | Image segmentation | Nearest neighbor search | Ophthalmology | Random forests | Textures

Engineering uncontrolled terms: Average sensitivities | Diabetic retinopathy | Discriminative power | Illumination variation | Local binary patterns | Local ternary patterns | Local ternary patterns (LTP) | Sensitivity and specificity

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Advances in Mechanical Engineering

Volume 12, Issue 11, 2020

Fatigue life prediction of heavy vehicle suspension system under varying load conditions(Article) (Open Access)

Thilikkani, S., Nataraj, M.

[a]Department of Mechanical Engineering, JCT College of Engineering and Technology, Coimbatore, Tamil Nadu, India
[b]Department of Mechanical Engineering, Government College of Technology, Coimbatore, Tamil Nadu, India

Abstract

Leaf spring experiences frequent cyclic loading during working conditions. When design stage itself it is very essential to assess the fatigue life of the suspension system. It is important to consider and evaluate the key aspects of fatigue failure and life by using Finite Element Analysis (FEA) techniques to overcome these failures. This paper serves to stimulate the premature failure of the existing and proposed bracket model with generalized force elements under dynamic load conditions. Scanning Electron Microscope (SEM) was used to identify the bracket failure prone areas which indicate that the cyclic load in the suspension system is caused by rural area road-induced vibrations and bumps. This contributes to the increase of the fatigue fracture, which ends up with a bracket failure. The results indicated that the fatigue life of existing bracket is low for rough road conditions; the modified bracket has been optimized for the safe load conditions of the heavy vehicle suspension system. © The Author(s) 2020.

Author keywords

bracket | Fatigue failure | finite element analysis | SEM | suspension system

ISSN: 16878132
Source Type: Journal
Original language: English

DOI: 10.1177/1687814020968325
Document Type: Article
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Document details - Comparative and Equilibrium Studies on Anionic and Cationic Dyes Removal by Nano-Alumina-Doped Catechol Formaldehyde Composite

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Journal of Chemistry

Volume 2020, 2020, Article number 7617989

Comparative and Equilibrium Studies on Anionic and Cationic Dyes Removal by Nano-Alumina-Doped Catechol Formaldehyde Composite(Article)(Open Access)

Karthik, V., Selvakumar, P., Sivarajasekar, N., Megavarshini, P., Brinda, N., Kiruthika, J., Balasubramani, K., Ahamad, T., Naushad, M.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, TN, India
[b]Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia
[c]Laboratory for Bioremediation Research, Unit Operations Laboratory, Department of Biotechnology, Kumaraguru College of Technology, Coimbatore, TN, India

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Abstract

Nano-alumina-doped catechol formaldehyde polymeric composite was prepared, characterized, and applied as an adsorbent for the removal of an anionic dye Congo red (CR) and a cationic dye SafraninO (SF), by adsorption process especially from aqueous solutions. Characterizations such as particle size distribution, zeta potential, BET, FTIR, and FESEM-EDAX were carried out for the adsorbent prepared. All experiments were conducted at the batch condition to study the effects of initial dye concentration (CR: 30-90 mg/L and SF: 10-50 mg/L), pH (2-11), temperature (25-55°C), and adsorbent dosage (0.05-0.3 g) on dye removal. The isotherm models (Langmuir, Freundlich, and Temkin) were analyzed for this adsorption work. The kinetic data obtained were analyzed by the pseudo-first-order, pseudo-second-order, Bangham, and Chien-Clayton equations. Dyes adsorption data were well fitted with the Freundlich isotherm equilibrium model and the pseudo-second-order kinetic model. Study results suggested that the nano-alumina-polymeric composite could be an effective adsorbent for anionic dye rather than cationic dye. © 2020 V. Karthik et al.

ISSN: 20909063 DOI: 10.1155/2020/7617989

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Journal of Chemistry

Volume 2020, 2020, Article number 7617989

Comparative and Equilibrium Studies on Anionic and Cationic Dyes Removal by Nano-Alumina-Doped Catechol Formaldehyde Composite(Article)(Open Access)

Karthik, V., Selvakumar, P., Sivarajasekar, N., Megavarshini, P., Brinda, N., Kiruthika, J., Balasubramani, K., Ahamad, T., Naushad, M.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, TN, India
[b]Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia
[c]Laboratory for Bioremediation Research, Unit Operations Laboratory, Department of Biotechnology, Kumaraguru College of Technology, Coimbatore, TN, India

View additional affiliations

Abstract

Nano-alumina-doped catechol formaldehyde polymeric composite was prepared, characterized, and applied as an adsorbent for the removal of an anionic dye Congo red (CR) and a cationic dye SafraninO (SF), by adsorption process especially from aqueous solutions. Characterizations such as particle size distribution, zeta potential, BET, FTIR, and FESEM-EDAX were carried out for the adsorbent prepared. All experiments were conducted at the batch condition to study the effects of initial dye concentration (CR: 30-90 mg/L and SF: 10-50 mg/L), pH (2-11), temperature (25-55°C), and adsorbent dosage (0.05-0.3 g) on dye removal. The isotherm models (Langmuir, Freundlich, and Temkin) were analyzed for this adsorption work. The kinetic data obtained were analyzed by the pseudo-first-order, pseudo-second-order, Bangham, and Chien-Clayton equations. Dyes adsorption data were well fitted with the Freundlich isotherm equilibrium model and the pseudo-second-order kinetic model. Study results suggested that the nano-alumina-polymeric composite could be an effective adsorbent for anionic dye rather than cationic dye. © 2020 V. Karthik et al.

ISSN: 20909063 DOI: 10.1155/2020/7617989
CODEN: JCOHD Document Type: Article

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Journal of the Balkan Tribological Association

Volume 26, Issue 2, 2020, Pages 359-374

An investigation on sound analyzer effects in whirling of shaft apparatus(Article)

Navaneethakannan, N., Sharondi, P., Natarajan, V.M., Thangachalam, M.

Government College of Technology, Coimbatore, Tamil Nadu, India

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Abstract

Signal processing technology represents a new technique for analysing sounds in mechanical structures. The sound analyser converts an information into signals for making the process effective. Current research has focused on comparing the performance of sound analyser with accelerometer for analysing the rotating machinery, which integrates norm of residuals and damping ratio through power spectral density behaviour to enhance an accuracy of predicting the vibration. The aim of this investigation is to determine a method to extract vibrational fea-tures with increased performance. Sound analyser technology is to be processed by using MATLAB in this project. © 2020, Scibulcom Ltd.. All rights reserved.

Author keywords

(Accelerometer) (Damping ratio) (MATLAB) (Norm of residuals) (Power spectral density) (Signal processing)

ISSN: 13104772
Source Type: Journal
Original language: English

Document Type: Article
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Navaneethakannan, N.; Government College of Technology, Coimbatore, Tamil Nadu, India;

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Document details - Statistical descriptors-based image classification of textural images

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Lecture Notes in Electrical Engineering

Volume 672, 2020, Pages 937-944

1st International Conference on Advances in Electrical and Computer Technologies, ICAECT 2019; Coimbatore; India; 26 April 2019 through 27 April 2019; Code 244989

Statistical descriptors-based image classification of textural images(Conference Paper)

Bagavathi, C., Saranya, O.

Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, Tamil Nadu 641013, India

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Abstract

Texture investigation is a broad field of study with applications extending from remote sensing, satellite communication and autonomous systems to advanced systems such as robotics and machine learning. Textural images define the pattern of pixels spatially arranged, where a specific order can be used to identify and classify images. Human level analysis and classification of textural images have been challenged by current technical advancements with similar level of accuracy. Machines learn better when the images are more distorted and can even spot minute differences in parameters. Efficient classification of images is ensured if the parameter governing the decision is robust and exclusive. Statistical features extracted from textural images are learned through support vector machines, and the learned database is used with testing images to obtain the accuracy of image classification. © Springer Nature Singapore Pte Ltd 2020.

Author keywords

(Gray level co-occurrence matrix) (Gray tone difference matrix) (Image classification) (Support vector machine) (Texture images)

Indexed keywords

Engineering controlled terms: (Classification (of information)) (Remote sensing) (Satellite communication systems) (Support vector machines) (Textures)

Engineering uncontrolled terms: (Advanced systems) (Autonomous systems) (Satellite communications) (Specific ordering) (Statistical descriptors) (Statistical features) (Technical advancement) (Textural images)

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Document details - Sum modified laplacian-based image fusion in dct domain with super resolution

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Lecture Notes in Electrical Engineering

Volume 672, 2020, Pages 945-953

1st International Conference on Advances in Electrical and Computer Technologies, ICAECT 2019; Coimbatore; India; 26 April 2019 through 27 April 2019; Code 244989

Sum modified laplacian-based image fusion in dct domain with super resolution(Conference Paper)

Sreeja, G., Saranya, O.

Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, Tamil Nadu, India

Abstract

Multi-focus image fusion in DCT domain are useful for Visual Sensor Network where the images have to be stored and transmitted in the encoded format. The drawbacks of existing DCT-based fusion methods are blurriness and blocking artifacts. In this paper, a novel multi-focus image fusion method is proposed by combining super resolution (SR) technique with the DCT. Single frame super resolution method is applied to the input images to avoid blocking artifacts. The contrast is chosen as a activity level measurement, and it is measured with SML. Based on the largest SML value, fusion is performed. The results obtained verify the efficiency of proposed scheme in terms of both subjective and quantitative analysis. © Springer Nature Singapore Pte Ltd 2020.

Author keywords

Bicubic | Consistency verification | Discrete cosine transform | Multi-focus fusion | Sum modified laplacian

Indexed keywords

Engineering controlled terms: Image compression | Optical resolving power | Sensor networks

Engineering uncontrolled terms: Blocking artifacts | Fusion methods | Input image | Multifocus image fusion | Single frame super resolutions | Sum-Modified-Laplacian | Super resolution | Visual sensor networks

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Document details - Analysis of rician noise restoration using fuzzy membership function with median and trilateral filter in mri

1 of 1

Lecture Notes in Electrical Engineering

Volume 672, 2020, Pages 803-816

1st International Conference on Advances in Electrical and Computer Technologies, ICAECT 2019; Coimbatore; India; 26 April 2019 through 27 April 2019; Code 244989

Analysis of rician noise restoration using fuzzy membership function with median and trilateral filter in mri(Conference Paper)

Kala, R., Deepa, P.

Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, Tamilnadu 641 013, India

Abstract

Magnetic Resonance (MR) images are exaggerated with noise leads to the limitations in achieving better restoration results. So there is a need for developing efficient restoration algorithms in the medical images to avoid crucial problems for diagnosis and treatment of diseases. In this present work, a trilateral based fuzzy filter is developed for better restoration results. To preserve the structural information, edges trilateral based fuzzy trapezoidal membership function along with median filter has been used. The weights are obtained for the trilateral filter and median filter using fuzzy trapezoidal membership function. The weights are convoluted with the filtered image of the trilateral and median filter. The results obtained using this method are improved and it is analyzed with the simulated images and real images. The results are compared with the median, wiener, trilateral, fuzzy NLM with trapezoidal. © Springer Nature Singapore Pte Ltd 2020.

Author keywords

Fuzzy trapezoidal membership function | Magnetic resonance imaging | Restoration | Rician noise | Trilateral filter

Indexed keywords

Engineering controlled terms: Diagnosis | Image enhancement | Image reconstruction | Magnetic resonance | Median filters | Medical imaging | Medical problems | Membership functions | Restoration

Engineering uncontrolled: Efficient restoration | Filtered images | Fuzzy membership function | Real images | Simulated images

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Document details - Enhanced adsorption of lead (II) ions from aqueous solution by a chemically modified polyurethane

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Acta Chimica Slovenica

Volume 67, Issue 2, 2020, Pages 602-608

Enhanced adsorption of lead (II) ions from aqueous solution by a chemically modified polyurethane(Article)(Open Access)

Lakshmipathy, M., Chandrasekaran, M., Kulanthasamy, R.

[a]Department of Civil Engineering, Government College of Technology, Coimbatore, Tamilnadu, 641013, India
[b]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, Tamilnadu, 641013, India
[c]Department of Civil Engineering, Coimbatore Institute of Technology, Coimbatore, Tamilnadu, 641014, India

Abstract

Heavy metal pollution is a major threat to living systems due to increase in the industrial development worldwide. In this study, the adsorption of lead (II) ions by chemically modified polyurethane was reported. Polyurethane (PU) was chemically modified by sulphonation and chlorination to obtain sulphonated PU (SPU) and chlorinated PU (CPU). The adsorption parameters such as pH, contact time, adsorbent loading and initial metal ion concentration were optimized in batch experiments for both the adsorbents. Maximum Pb (II) ion adsorption of 90 and 85% was observed for SPU and CPU respectively at optimal conditions. Isotherms results showed that the equilibrium data was fitted with Freundlich isotherm and followed multilayer adsorption mechanism. Adsorption of Pb (II) ions by both SPU and CPU followed pseudo second order kinetics. The outcome of this study showed that chemical modification of PU is effective for efficient removal of Pb (II) ions from effluent.

Author keywords

Chemical modification, Isotherm, Kinetics, Lead, Polyurethane

ISSN: 13180207 DOI: 10.17344/ACSI.2019.5616

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Ma, J., Gao, M., Shi, H.
Progress in research and development of particle electrodes for three-dimensional electrochemical treatment of wastewater: a review
(2021) Environmental Science and Pollution Research

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Document details - Conversion of vegetable waste to lipid feedstock for biodiesel production aided with nano catalyst using rsm software

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Polish Journal of Environmental Studies

Volume 29, Issue 6, 2020, Pages 4313-4320

Conversion of vegetable waste to lipid feedstock for biodiesel production aided with nano catalyst using rsm software(Article)(Open Access)

Sithan, M., Singaram, J.

[a]Department of Civil Engineering, GCT, Coimbatore, Tamil Nadu, India
[b]Government College of Engineering, Theni, Bodi, Tamil Nadu, India

Abstract

Progress in economy leads to increases in society's energy requirement. Fossil fuel is the major source of fulfilling energy requirements. Biodiesel is an alternative for liquid fossil fuel. In this study, biodiesel was produced from lipid obtained from vegetable waste using oleaginous yeast. The pre-treated waste hydrolysate was used for the growth of oleaginous yeast, Lipomyces starkeyi which was able to yield a biomass concentration of 20 g/L. Obtained biomass was transesterified directly in the presence of Nanocatalysts calcium hydroxide and Aluminum oxide. The transesterification process was optimized by RSM software. The optimum ratio of Methanol to lipid was obtained as 6:1and catalyst concentration of 0.5%. Optimum temperature for biodiesel production was obtained as 60°C. Maximum amount of biodiesel obtained as 8g/L which is worked out to be 40 % of the biomass used in this process. The oxidative stability of the obtained biodiesel was found out to be 1.84 years using biodiesel rancimat. Hence optimisation of process has yielded highly stable oil from microbial biomass grown from waste organic solids. The results of this study concluded that biodiesel can be obtained from biomass containing lipid by direct transesterification.

Author keywords

Biodiesel, Lipid, RSM, Transesterification, Vegetable waste

ISSN: 12301485 DOI: 10.15244/pjoes/113649

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Ahmed, M., Abdullah, A., Patle, D.S.
Feedstocks, catalysts, process variables and techniques for biodiesel production by one-pot extraction-transesterification: a review
(2022) Environmental Chemistry Letters

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Current Signal Transduction Therapy

Volume 15, Issue 2, 2020, Pages 94-108

Segmentation of brain magnetic resonance images using deep learning classification and multi-modal composition(Article)

Kala, R., Deepa, P.

Electronics and Communication Engineering, Government College of Technology, Coimbatore, Tamilnadu 641 013, India

Abstract

Background: Accurate detection of brain tumor and its severity is a challenging task in the medical field. So there is a need for developing brain tumor detecting algorithms and it is an emerging one for diagnosis, planning the treatment and outcome evaluation. Materials and Methods: Brain tumor segmentation method using deep learning classification and multi-modal composition has been developed using the deep convolutional neural networks. The different modalities of MRI such as T1, flair, T1C and T2 are given as input for the proposed method. The MR images from the different modalities are used in proportion to the information contents in the particular modality. The weights for the different modalities are calculated block-wise and the standard deviation of the block is taken as a proxy for the information content of the block. Then the convolution is performed between the input image of the T1, flair, T1C and T2 MR images and corresponding to the weight of the T1, flair, T1C, and T2 images. The convolution is summed between the different modalities of the MR images and its corresponding weight of the different modalities of the MR images to obtain a new composite image which is given as an input image to the deep convolutional neural network. The deep convolutional neural network performs segmentation through the different layers of CNN and different filter operations are performed in each layer to obtain the enhanced classification and segmented spatial consistency re-sults. The analysis of the proposed method shows that the discriminatory information from the different modalities is effectively combined to increase the overall accuracy of segmentation. Results: The proposed deep convolutional neural network for brain tumor segmentation method has been analysed by using the Brain Tumor Segmentation Challenge 2013 database (BRATS 2013). The complete, core and enhancing regions are validated with Dice Similarity Coefficient and Jaccard similarity index metric for the Challenge, Leaderboard, and Synthetic data set. To evaluate the classification rates, the metrics such as accuracy, precision, sensitivity, specificity, under-segmentation, incorrect segmentation and over segmentation also evaluated and compared with the existing methods. Experimental results exhibit a higher degree of precision in the segmentation compared to existing methods. Conclusion: In this work, deep convolution neural network with different modalities of MR image are used to detect the brain tumor. The new input image was created by convoluting the input image of the

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Tirupal, T. , Chandra Mohan, B. , Srinivas Kumar, S.

Multimodal medical image fusion techniques – a review

(2021) Current Signal Transduction Therapy

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Current Developments in Biotechnology and Bioengineering: Resource Recovery from Wastes

1 January 2020, Pages 233-249

Food waste valorization for biopolymer production (Book Chapter)

Sharmila, G., Muthukumaran, C., Kumar, N.M., Sivakumar, V.M., Thirumarimurugan, M.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, Tamilnadu 641013, India
[b]Department of Genetic Engineering, School of Bioengineering, SRM Institute of Science and Technology, Kattankulathur, Tamilnadu 603203, India
[c]Department of Chemical Engineering, Coimbatore Institute of Technology, Coimbatore, Tamilnadu 641014, India

Abstract

Food wastage has become a growing crisis and contributes to the threatening food demand globally. According to the Food and Agriculture Organization (FAO) of the United Nations reported in the year 2013, one-third of the food produced around the world turned into waste, approximately around 1.6 billion tons annually. The improper production, preparation, and consumption of food are the main causes of food waste and because of that there is a rise in pollution problem in the environment and additionally a tremendous loss of vital nutrients and biomass. As food wastage is an alarming problem all over the world, there is increasing attention from environmental conservationists to turn food waste into useful renewable and recyclable products such as biofuels, biopolymers, and other energy sources. The majority of the food waste source comprises vegetable and fruits, as they are perishable and more prone to putrefaction and contamination. Hence, carbohydrates, sugars, hemicelluloses, lignin, and cellulose are the major components available abundantly in food waste. Cellulose, starch, hemicelluloses, and lignin possess a strong fibrous structure and are more applicable in the biosynthesis of biopolymers. Biopolymers are the polymers that are synthesized from biological substances modified by living organisms. As biopolymers are biodegradable and recyclable, they possess tremendous application in the field of biomedical, surgical sutures and materials, food packing, medicine and pharmaceutical preparations. This chapter explains the importance of biopolymers and methodologies carried out so far in turning food waste into biodegradable and recyclable biopolymer production.

Author keywords

Biodegradable Biopolymers Food waste Valorization

Chapters in this book

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24 chapters found in Scopus

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Document details - Experimental Investigation of Thermal Barrier (8YSZ-MGO-TIO₂) Coated Piston used in Diesel Engine

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Journal of Applied Fluid Mechanics

Volume 13, Issue 4, 2020, Pages 1157-1165

Experimental Investigation of Thermal Barrier (8YSZ-MGO-TIO_2) Coated Piston used in Diesel Engine(Article)(Open Access)

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[b]Department of Mechanical Engineering, Government College of Technology, Coimbatore, Tamilnadu 641013, India

Abstract

A single cylinder diesel engine was tested under different loading conditions with its piston crown coated with the Thermal Barrier Coating (TBC). The main objective of this work is to investigate the effect of the TBC on performance and emission characteristics in the diesel engine. The top surface of the piston was coated with 100 μm thick NiCrAl as lining layer by plasma spray method. A mixture of 88% Yttria stabilized Zirconia, 4% MgO and 8% TiO_2 of 150 μm thick were coated over the lining layer. Exhaust emission (HC, NOx, CO and CO2) parameters were investigated using AVL exhaust gas analyzer. The results showed that the brake thermal efficiency was increased by 10% and brake specific fuel consumption was decreased by 9.8% for coated piston in comparison with the uncoated piston engine. It was also observed that, smoke, CO and HC emissions were decreased in the TBC engine as compared with the baseline engine. In addition carbon di oxide (CO2) and nitrogen oxide (NOx) emissions were partially increased.

Author keywords

Emission | Yttria stabilized zirconia Thermal barrier coating Diesel engine Piston crown Plasma spray

Funding details

Funding text

I thank Sri Ramakrishna Engineering College which gave full support in conducting research work in the VCR IC Engine.

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Document details - A Comparative Study on Prediction Models for Strength Properties of LWA Concrete Using Artificial Neural Network

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Revista de la Construccion

Volume 19, Issue 1, 2020, Pages 103-111

A Comparative Study on Prediction Models for Strength Properties of LWA Concrete Using Artificial Neural Network(Article)(Open Access)

Nagarajan, D., Rajagopal, T., Meyappan, N.

[a]Government College of Technology, Department of Civil Engineering, Coimbatore, India
[b]Easwari Engineering College, Department of Civil Engineering, Chennai, India

Abstract

In this study, Artificial Neural Network (ANN) model is constructed to predict the compressive strength, split tensile strength and flexural strength of lightweight aggregate concrete made of sintered fly ash aggregate. An empirical relationship between the compressive strength, split tensile strength, and flexural strength was developed and compared with that of experimental results. The models were formulated based on results obtained from laboratory experiments. The variables considered in the study are the quantity of cement and water-cement ratio. Feed forward neural network and Levenberg-Marquardt back propagation algorithm were used for training algorithm in ANN. Amongst the total data, approximately 70% of the data was considered for training, 15% for testing and the remaining 15% has been considered for validation. The developed models had more accuracy with minimum error and had a higher correlation with the correlation coefficients of 0.916 and 0.955 were obtained for the training and testing data of compressive strength prediction, 0.949 and 0.937 respectively for split tensile strength prediction, 0.926 and 0.928 respectively for prediction of flexural strength. The models were compared with the experimental data's, and the results were discussed.

Author keywords

algorithm | ANN | regression | Sintered Fly ash aggregate | variables

ISSN: 07177925 DOI: 10.7764/RDLC.19.1.103-111

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Document details - Strength properties and durability aspects of sintered-fly-ash lightweight aggregate concrete

Materiali in Tehnologije

Volume 54, Issue 3, 2020, Pages 301-310

Strength properties and durability aspects of sintered-fly-ash lightweight aggregate concrete(Article)(Open Access)

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[a]Department of Civil Engineering, Government College of Technology, Coimbatore, Tamil Nadu, 641013, India
[b]Department of Civil Engineering, Easwari Engineering College, Chennai, 600089, India

Abstract

The effect of basalt fibre on concrete made with sintered-fly-ash aggregates as coarse aggregates, a by-product of the processing of fly ash is studied in detail with respect to its strength, durability and cost effectiveness and compared with normal aggregate concrete. Four different mixes were developed for the M25, M30 and M40 grades of concrete with 0.25 % of basalt fibre in each mix. The rebound hammer test, ultrasonic pulse velocity, compressive strength, split tensile strength, flexural strength, Young's modulus, sorptivity and ponding test were investigated and a stress-strain curve was plotted. A linear-regression analysis was carried out to find the relationship between the mechanical properties of the concrete. A cost analysis worked to find the cost effectives of using the sintered-fly-ash aggregate. The findings indicated that the addition of basalt fibre showed a marginal increase in the compressive strength and a substantial increase in the split tensile strength and flexural strength was observed. The Young's modulus of the sintered-fly-ash aggregate concrete was low when compared with the conventional mix. The sorptivity test and the ponding test revealed that the sintered-fly-ash aggregate concrete showed a considerable decrease in durability. The outcome of the cost analysis showed that the use of sintered-fly-ash aggregate concrete reduced the cost by 12 % when compared with conventional route. The experimental test results throw light on the use of sintered-fly-ash aggreagte in concrete and basalt fibre proves the effectiveness of the lightweight concrete developed. © 2020 Institute of Metals Technology.

Author keywords

(Durability) (Empirical equations) (Non-destructive testing) (Stress-strain)

Funding details

Document details - Multiwavelet Based Unmanned Aerial Vehicle Thermal Image Fusion for Surveillance and Target Location

Communications in Computer and Information Science
Volume 1244 CCIS, 2020, Pages 352-361
4th International Conference on Advances in Computing and Data Sciences, ICACDS 2020; Msida; Malta; 24 April 2020 through 25 April 2020; Code 242649

Multiwavelet Based Unmanned Aerial Vehicle Thermal Image Fusion for Surveillance and Target Location(Conference Paper)

Bharathidasan, B., Thirugnanam, G.
[a]Department of Electronics and Instrumentation Engineering, Annamalai University, Chidambaram, India
[b]Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, India

Abstract

A novel image fusion method in multiwavelet domain is proposed in this paper. The special frequency band and property of image in multiwavelet domain are employed for the image fusion algorithm. Due to the widespread use of digital media applications, multimedia refuge and the fusing has grown incredible important. Here in this research work, a low resolution multispectral and high resolution RGB image fused here is he new method to fuse that is proposed, to find out the armed person behind deep forest with surrounding trees. The picture is acquired from a wing which is new unmanned aerial vehicle (UAV) at 90 to 100 m distance in dark light surroundings. The combined effect of the texture resolution by a heavy decree RGB image and the thermal image taken by Dual Sensor Night Vision Goggle (DSNVG), to retrieve a fused IR RGB-thermal good image of the armed person. Inside this research work, The DSNVG is in construction to offer fusion of thermal imagery, to afford the profit of larger positional alertness due to developed risk discovery underneath nearly all battlefield outsides, like-minded with established bludgeon structure ranges, prolonged performance potential from high-light circumstances to sum dusk and through battlefield obstacles, increasing ability for municipal work. Here, Multiwavelet transform is being compared with wavelet packet for aerial vehicle fusion. In this work concludes that multiwavelet performs better than wavelet packet. © 2020, Springer Nature Singapore Pte Ltd.

Author keywords

Image fusion · Multiwavelet transform · Wavelet packet transform

Indexed keywords

Document details - Predictive sliding mode controller for continuous bio-fermenter systems

Control Engineering and Applied Informatics
Volume 22, Issue 2, 2020, Pages 33-42

Predictive sliding mode controller for continuous bio-fermenter systems(Article)

Kanthalakshmi, S., Annal, A.S.W.P.
[a]PSG college of Technology, Coimbatore, Tamilnadu, 641004, India
[b]Government College of Technology, Coimbatore, Tamilnadu, 641013, India

Abstract

Model predictive controller predicts the system performance and accordingly improves the controller performance. So it works well for time delayed systems. But the problem is that, it is not robust under certain cases. Sliding mode controller is robust but with a very slow response rate. Its limitation is its delay handling capacity. In this paper, a predictive controller with good delay handling capability is combined with robust sliding mode controller. It is found to have a quick rise time and settling time with minimum overshoot. It is more robust and produced no offset, or oscillation. In this work, predictive sliding mode control is designed for cylindrical, conical and cylindroconical bio-fermenter systems and their performances are analysed. The controller is implemented in real time for a cylindrical system and a conical system and it is found that the controller could handle delays and is also robust to parameter variations. © 2020 Control Engineering and Applied Informatics Journal.

Author keywords

Lyapunov stability · Non minimum phase system · Predictive Control · Robustness · Sliding mode control

ISSN: 14548658
Source Type: Journal
Original language: English
Document Type: Article
Publisher: Control Engineering and Applied Informatics Journal

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Journal of Advanced Research in Dynamical and Control Systems

Volume 12, Issue 7, 2020, Pages 114-124

Enhancement of voltage profile of power line by the placement of multi-line FACTS devices(Article)

Jaganathan, S., Ranjithkumar, K., Sathiyanathan, M., Sasikumar, C.

[a]Dept. of Electrical Electronics Engineering, Dr.N.G.P. Institute of Technology, Coimbatore, Tamilnadu, India
[b]Dept. of Electrical, Electronics Engineering, Government College of Technology, Coimbatore, Tamilnadu, India
[c]Dept. of Electrical Electronics Engineering, PSG Institute of Technology, Applied Research, Coimbatore, Tamilnadu, India

View additional affiliations

Abstract

The Recent changes in power system networks are the introduction of deregulation, expansion planning, restructuring and optimal placement of Compensating devices. The enhancement of voltage profile and compensation is provided with FACTS devices in Transmission and Distributed Generation (DG) units at the sub-transmission and distribution levels. The Multiline FACTS devices are protagonist in maintaining the stability and reliability of power system networks, by providing compensation support and enhancing the voltage profile. However, the compensation is not appropriate, because of lag of identification of weak buses in transmission lines of power system. In this, the improvement of voltage profile can be achieved with placement of multiline FACTS devices. This proposed work, identify the suitable location and optimizes the capacity of multiline FACTS devices, which is implemented in simulation environment. In addition, the multiline FACTS devices results are compared with incorporating the placement of Unified Power flow Control method (UPFC) and validated. The proposed work is tested with IEEE 30 bus systems.

Author keywords

Multiline Facts Devices | UPFC and Voltage Profile Enhancement

ISSN: 1943023X
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DOI: 10.5373/JARDCS/V12I7/20201991
Document Type: Article

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Document details - Adsorptive behaviour of surface tailored fungal biomass for the elimination of toxic dye from wastewater

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International Journal of Environmental Analytical Chemistry

2020, Pages 1-16

Adsorptive behaviour of surface tailored fungal biomass for the elimination of toxic dye from wastewater(Article)

Karthik, V., Kumar, P.S., Harsha Vardhan, K., Saravanan, K., Nithyakala, N.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India
[b]Department of Chemical Engineering, SSN College of Engineering, Chennai, India
[c]Department of Chemical Engineering, Kongu Engineering College, Perundurai, India

Abstract

In the present research, adsorptive separation of Reactive Red-3 (RR3) from aqueous solution has been studied using surface tailored fungal biomass (Trichoderma harzianum). SEM with EDAX, XRD, FTIR and TG-DTA of the adsorbent had been discussed to verify the quality and efficiency of the adsorbent. The dye solution pH of 4, biosorbent dosage (0.5 g/L), contact time (150 min) and incubation temperature (40°C) for an initial dye concentration of 100 mg/L were predicted as an optimum condition for the highest removal of dye from aqueous solution. Among various kinetic models analysed, pseudo-second order model explains well the adsorptive cycle with a comprehensive relationship between experimental and measured biosorption capacity. Removal data was also analysed by using Langmuir, Dubinin–Radushkevich, Freundlich and Temkin isotherms. The process of biosorption was well described by Freundlich isotherm because of the higher correlation coefficient. The results of the models have been used to determine the ideal mechanism of the biosorption process. Langmuir sorption capacity was estimated as 172.63 mg/g at an optimum condition. Thermodynamic studies were also analysed to evaluate the parameters such as change in enthalpy (28.982 kJ/mol), change in Gibbs free energy and change in entropy (116.56 J/mol K), which indicates that the biosorption process was spontaneous at all temperatures and endothermic in nature. The prepared material can be an alternative to the existing biosorbents. © 2020, © 2020 Informa UK Limited, trading as Taylor & Francis Group.

Author keywords

biosorption isotherm kinetics thermodynamics Toxic dye Trichoderma harzianum

Indexed keywords

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Utilization of brown seaweed adsorbent for effective removal of Pb(II) from wastewater: biosorption and column studies
(2023) Global Nest Journal

Sze, G.K. , Ahmad, A.A. , Khasri, A.
Valorization of face mask waste as an adsorbent for cationic dye adsorption
(2023) Desalination and Water Treatment

Rahman, D.Z. , Vijayaraghavan, J. , Thivya, J.
A comprehensive review on zinc(II) sequestration from wastewater using various natural/modified low-cost agro-waste sorbents
(2023) Biomass Conversion and Biorefinery

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Document details - Prediction of cutting forces during end milling using 3d fem based simulation analysis

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International Journal of Vehicle Structures and Systems

Volume 12, Issue 1, 2020, Pages 26-30

Prediction of cutting forces during end milling using 3d fem based simulation analysis(Article)

Mugilan, T., Alwarsamy, T.

Dept. of Engg. Design., Government College of Tech., Coimbatore, Tamil Nadu, India

Abstract

Material removal process for dies, moulds and additionally diverse aircraft parts can be made possible by the high-speed end milling operation. Devious cutting forces are created by the impact of various cutting parameters in course with high speed milling process. Due to this phenomenon the wear and chatter of tool can occur. Cutting force prediction is useful method to reduce the chatter occurrence during the machining of hardest materials. DEFORM 3D is an important simulation software which is used for the analysis of complicated metal removal processes. In this work, the tool insert was designed by Solid Works modelling software. The FEM simulation of high-speed end milling of Titanium-Vanadium based alloy was carried out in Deform 3D simulation software to obtain the cutting forces. The material behaviour was modelled with a classical constitutive material equation and was applied in the FEM code to predict the effective stress, strain, temperature and cutting forces towards the impact of cutting parameters. Analysis of variance is achieved to determine the impact of cutting forces with help of Taguchi method in Minitab-17. L36 orthogonal array was used to conduct the analysis of high speed end milling. © 2020. MechAero Foundation for Technical Research & Education Excellence.

Author keywords

ANOVA Cutting forces Deform 3D High speed end milling Ti-6Al-4V

Indexed keywords

Engineering controlled terms: Comminution Computer software Cutting Cutting tools Forecasting Taguchi methods Titanium alloys Turning Vanadium alloys

Engineering uncontrolled

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Storchak, M. , Stehle, T. , Möhring, H.-C.
Numerical Modeling of Titanium Alloy Ti6V2Fe3Al Milling Process
(2023) Journal of Manufacturing and Materials Processing

Mugilan, T. , Sridhar, N. , Santhosh, S.
Optimization of DEFORM-3D simulated drilling of UNSS31603-steel by integrated MOORA coupled PCA technique
(2023) Materials Today: Proceedings

Sridhar, N. , Aezhisai Vallavi, M.S. , Mugilan, T.
An integrated approach of FEM analysis using DEFORM 3D and experimental investigation of forces developed in Al-Si7Mg
(2023) Materials Today: Proceedings

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Document details - Feature extraction for diseased leaf image classification using machine learning

2020 International Conference on Computer Communication and Informatics, ICCCI 2020

January 2020, Article number 9104203

10th International Conference on Computer Communication and Informatics, ICCCI 2020; Coimbatore; India; 22 January 2020 through 24 January 2020; Category numberCFP2008R-PRT; Code 160541

Feature extraction for diseased leaf image classification using machine learning(Conference Paper)

Nandhini, N., Bhavani, R.

Government College of Technology, Department of Computer Science and Engineering, Coimbatore, India

Abstract

Recognition algorithms for crop disease are based on the extraction from diseased plant leaf images of different types of features. Leaf diseases are important factors as they can lead to a significant reduction in agricultural crop quality and quantity. Therefore, detecting and understanding diseases is an important task. The approach to leaf image-based disease recognition consists of two steps: I extracting color and shape characteristics from lesion images; (II) classifying diseased leaf images using machine learning approaches. This paper analyzes the efficiency of the classification performed using Support Vector Machine, K- Nearest Neighbor and Decision trees based on the extracted characteristics. © 2020 IEEE.

Author keywords

Feature extraction, K-means clustering, Region segmentation

Indexed keywords

Engineering controlled terms: Agricultural robots, Crops, Decision trees, Extraction, Learning systems, Nearest neighbor search, Optical character recognition, Support vector machines

Engineering uncontrolled terms: Agricultural crops, K-nearest neighbors, Leaf disease, Lesion image, Machine learning approaches, Plant leaf images, Recognition algorithm, Shape characteristics

Document details - A survey on Deep learning techniques for human action recognition

2020 International Conference on Computer Communication and Informatics, ICCCI 2020

January 2020, Article number 9104135

10th International Conference on Computer Communication and Informatics, ICCCI 2020; Coimbatore; India; 22 January 2020 through 24 January 2020; Category numberCFP2008R-PRT; Code 160541

A survey on Deep learning techniques for human action recognition(Conference Paper)

Karthickkumar, S., Kumar, K.

Government College of Technology, Department of Computer Science and Engineering, Coimbatore, India

Abstract

Throughout recent years, deep learning with human action recognition has become one of the most popular research studies. It has a variety of applications such as automation, surveillance, health care tracking and study of consumer behaviour. Human behavior detection includes many difficulties in videos, including occlusions, camera movements, cluttered backgrounds, speed of execution, etc. In analyzes such as single point of view, multiple point of view, and RGB-Depth images, often three types of datasets are used. This paper presents a report on the three types of data sets for the identification of human action based on deep learning techniques. © 2020 IEEE.

Indexed keywords

Engineering controlled terms: Behavioral research, Learning algorithms, Learning systems

Engineering uncontrolled terms: Camera movement, Cluttered backgrounds, Human actions, Human behavior detection, Human-action recognition, Learning techniques, Multiple points, Research studies

Engineering main heading: Deep learning

Document details - Enhanced detection of internet water army based on supernetwork theory

2020 International Conference on Computer Communication and Informatics, ICCCI 2020
January 2020, Article number 9104079
30th International Conference on Computer Communication and Informatics, ICCCI 2020; Coimbatore; India; 22 January 2020 through 24 January 2020; Category numberCFP2008R-PRT; Code 160541

Enhanced detection of internet water army based on supernetwork theory(Conference Paper)

Jothi, D.H., Rajasenbagam, T.M.E.
Government College of Technology, Computer Science and Engineering, Coimbatore, India

Abstract

The hierarchy and the correct nature of the Internet has been strongly contaminated by the advent of the Internet water armies in recent years. The minute and Intense identification and detection of such Internet water armies is an important task. On the basis of the Supernetwork theory, a new model is proposed in this paper that will be employed in the detection of water armies. In this model, a Supernetwork consisting of five layers including User subnetwork, Content subnetwork, Psychological subnetwork, Negative keyword subnetwork and Repeated keywords subnetwork. Literature survey is carried out on the evolution of such spammers over years. The performance of the model is tested with the dataset obtained from the online communication platform, Reddit. A comparative analysis is presented from five existing models of internet water army detection that were introduced in previous studies. © 2020 IEEE.

Author keywords

Astroturfers identification | Feature measurement | Internet water armies detection | Machine learning classification | Social media | Supernetwork theory

Indexed keywords

Engineering controlled terms: Computers

Engineering uncontrolled terms: Comparative analysis | Literature survey | On-line communication | Spammers | Sub-network | Super-network

Document details - Survey on applying GAN for anomaly detection

2020 International Conference on Computer Communication and Informatics, ICCCI 2020
January 2020, Article number 9104046
30th International Conference on Computer Communication and Informatics, ICCCI 2020; Coimbatore; India; 22 January 2020 through 24 January 2020; Category numberCFP2008R-PRT; Code 160541

Survey on applying GAN for anomaly detection(Conference Paper)

Beula Rani, B.J., Sumathi, L.M.E.
Government College of Technology, Computer Science and Engineering, Coimbatore, India

Abstract

In the current days, most prominent research in machine learning was focused on the generative models. Generative Adversarial Networks (GANs) is one of the generative models used to model the complex high dimensional distribution of real-world data. GANs have two structures, generator to create new data instances resembling our training data, and discriminator to distinguish real data from the data created by the generator. As predicting abnormal data is one of the most important problems across a range of domains. Our Literature survey was conducted on applications of GAN in the field of anomaly detection and a simple experiment is conducted illustrating the usage of GAN in anomaly detection using MNIST dataset. © 2020 IEEE.

Author keywords

Anomaly detection | GAN | Neural Network

Indexed keywords

Engineering controlled terms: Surveys

Engineering uncontrolled terms: Abnormal data | Adversarial networks | Generative model | High-dimensional | Literature survey | Real-world | Training data

Engineering main heading: Anomaly detection

Document details - Experimental Analysis of Hevea Brasiliensis Methyl Ester Diesel Blend with Antioxidant Additive in a Di-diesel Engine

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Lecture Notes in Mechanical Engineering

2020, Pages 91-100

International Conference on Design, Materials, Cryogenics and Constructions, ICDMC 2019; Chennai; India; 28 March 2019 through 29 March 2019; Code 240639

Experimental Analysis of Hevea Brasiliensis Methyl Ester Diesel Blend with Antioxidant Additive in a Di-diesel Engine(Conference Paper)

Muhammad Irfan, A.A., Periyasamy, S., Gurusamy, A.

[a]Department of Mechanical Engineering, Mohamed Sathak A J College of Engineering, Chennai, India
[b]Department of Mechanical Engineering, Government College of Technology, Coimbatore, India
[c]Department of Automobile Engineering, Pace Institute of Technology and Sciences, Ongole, India

Abstract

To replacing diesel fuel non-edible feedstock is a probable resource for the alternative fuel creation with takes into account of ecological and food versus fuel demand. Biodiesel is a capable replacement to diesel fuel, due to renewable, non-hazardous, transportable, widely existing, recyclable, ecological, and free from sulfur and aromatic matter. The experimental investigation was carried out, to investigate the response of Hevea brasiliensis methyl ester diesel blend with antioxidant additive in a di-diesel engine. The performance and emission characteristics were determined for the diesel engine powered with Hevea brasiliensis biodiesel blend. With an aid of ASTM standards, tert-butylhydroquinone (TBHQ) antioxidant added in biodiesel blend. The performance and emission distinctiveness were resolute for antioxidant additive added blend. The outcome of antioxidant additive on the performance and emission of diesel engine were analyzed and concluded with base fuel. The addition of antioxidant increased 8.9% average brake thermal efficiency, increased 4.98% average mechanical efficiency, and reduced 8.9% average brake specific fuel consumption. The addition of antioxidant reduced oxides of nitrogen (NO_x) emission, but increased carbon monoxide (CO), carbon dioxide (CO_2), and hydrocarbon (HC) emissions compared to Hevea brasiliensis biodiesel blend. © 2020, Springer Nature Singapore Pte Ltd.

Author keywords

(Antioxidant) (Brake specific fuel consumption) (Brake thermal efficiency) (Emission characteristics) (Hevea brasiliensis) (Tert-butylhydroquinone) (Transesterified)

Indexed keywords

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Document details - Support vector machine-based proactive fault-tolerant scheduling for grid computing environment

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International Journal of Advanced Intelligence Paradigms

Volume 16, Issue 3-4, 2020, Pages 381-403

Support vector machine-based proactive fault-tolerant scheduling for grid computing environment(Article)

Shamila Ebenezer, A., Rajsingh, E.B., Kaliaperumal, B.

[a]Department of Computer Sciences Technology, Karunya University, Coimbatore, 641114, India
[b]Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

To classify the reliable resources accurately and perform a proactive fault tolerant scheduling in grid computing environment, a combination of support vector machine (SVM) with the quantum-behaved particle swarm optimization using Gaussian distributed local attractor point (GAQPSO) is proposed in this paper. When tuned with appropriate kernel parameters, the SVM classifier provides high accuracy in reliable resource prediction. The higher diversity of GAQPSO compared to other variants of QPSO, reduces the makespan of the schedule significantly. The performance of the SVM-GAQPSO scheduler is analysed in terms of the makespan, reliability, and accuracy. The empirical result shows that the reliability of the SVM-GAQPSO scheduler is 14% higher than the average reliability of the compared algorithms. Also, the accuracy of prediction using the SVM classifier is 92.55% and it is 37.2% high compared to classification and regression trees (CART), linear discriminant analysis (LDA), K-nearest neighbourhood (K-NN), and random forest (RF) algorithm. Copyright © 2020 Inderscience Enterprises Ltd.

Author keywords

(Failure data analytics) (Grid computing) (Particle swarm optimisation) (Proactive fault tolerance) (PSO) (SVM classification algorithm)

ISSN: 17550386
Source Type: Journal
Original language: English

DOI: 10.1504/IJAIP.2020.107539
Document Type: Article
Publisher: Inderscience Publishers

Cited by 1 document

Al-Najjar, H., Alhady, S.S.N., Mohamad-Saleh, J.
Scheduling of workflow jobs based on twostep clustering and lowest job weight
(2021) Concurrency and Computation: Practice and Experience
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Document details - Experimental and numerical analysis of battened built-up lightweight concrete encased composite columns subjected to axial cyclic loading

Latin American Journal of Solids and Structures

Volume 17, Issue 3, 2020, Article number e259

Experimental and numerical analysis of battened built-up lightweight concrete encased composite columns subjected to axial cyclic loading(Article)(Open Access)

Divyah, N., Thenmozhi, R., Neelamegam, M.

[a]Government College of Technology, Coimbatore, India
[b]Easwari Engineering College, Chennai, India

Abstract

In the recent era, built-up columns have been continuously used by the engineers in the design and analysis of tall buildings and bridges. Vibration analysis of these types of columns is essential to understand the failure modes of such columns. In that aspect, this study aims to analyze a concrete-encased built-up column made by configuring cold-formed steel angle sections connected by means of battens encased by normal weight and lightweight concrete with and without the inclusion of basalt fibre. Eight columns with battens were simulated, and it is encased with four different types of concrete and subjected to axial cyclic loading. The experimental results were correlated with the numerical investigation performed using FEA. The results indicated that the type of concrete dramatically influences the behaviour of columns. Higher ultimate strength and ductility was observed for all specimens, which is due to lower shear capacity of the battens. It was observed that the intensity of the axial cyclic load has a significant effect on the ultimate strength and deflection of columns, but it is less influential on the yield strength. It was concluded the results of experimental and FEA shows good compatibility between each other and depicts an error of 7.48%. © 2020.

Author keywords

(Basalt Fibre) (Battened built-up Column) (Deformation) (FEA) (Sintered Fly ash lightweight concrete) (Strain Behaviour)

Indexed keywords

Engineering controlled terms: (Bridges) (Columns (structural)) (Cyclic loads) (Steel fibers) (Tall buildings) (Vibration analysis)

Document details - A Hankel Matrix Based Reduced Order Model for Stability Analysis of Hybrid Power System Using PSO-GSA Optimized Cascade PI-PD Controller for Automatic Load Frequency Control

IEEE Access

Volume 8, 2020, Article number 9064500, Pages 71422-71446

A Hankel Matrix Based Reduced Order Model for Stability Analysis of Hybrid Power System Using PSO-GSA Optimized Cascade PI-PD Controller for Automatic Load Frequency Control(Article) (Open Access)

Veerasamy, V., Wahab, N.I.A., Ramachandran, R., Othman, M.L., Hizam, H., Irudayaraj, A.X.R., Guerrero, J.M., Kumar, J.S.

[a]Department of Electrical and Electronics Engineering, Center for Advanced Lightning Power and Energy Research (ALPER), University Putra Malaysia (UPM), Seri Kembangan, 43400, Malaysia
[b]Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, 641013, India
[c]Department of Energy Technology, Center for Research on Microgrids (CROM), Aalborg University, Aalborg, 9220, Denmark

Abstract

This paper presents the automatic load frequency control (ALFC) of two-area multisource hybrid power system (HPS). The interconnected HPS model consists of conventional and renewable energy sources operating in disparate combinations to balance the generation and load demand of the system. In the proffered work, the stability analysis of nonlinear dynamic HPS model was analyzed using the Hankel method of model order reduction. Also, an attempt was made to apply cascade proportional integral-proportional derivative (PI-PD) control for HPS. The gains of the controller were optimized by minimizing the integral absolute error (IAE) of area control error using particle swarm optimization-gravitational search algorithm (PSO-GSA) optimization technique. The performance of cascade control was compared with other classical controllers and the efficiency of this approach was studied for various cases of HPS model. The result shows that the cascade control produced better transient and steady state performances than those of the other classical controllers. The robustness analysis also reveals that the system overshoots/undershoots in frequency response pertaining to random change in wind power generation and load perturbations were significantly reduced by the proposed cascade control. In addition, the sensitivity analysis of the system was performed, with the variation in step load perturbation (SLP) of 1% to 5%, system loading and inertia of the system by ±25% of nominal values to prove the efficiency of the controller. Furthermore, to prove the efficiency of PSO-GSA tuned cascade control, the results were compared with other artificial intelligence (AI) methods presented in the literature. Further, the stability of the

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Document details - Batch removal of Pb (II) from aqueous solution using activated carbon prepared from mangosteen shell activated with H₂SO₄

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Chiang Mai Journal of Science

Volume 47, Issue 3, 2020, Pages 554-566

Batch removal of Pb (II) from aqueous solution using activated carbon prepared from mangosteen shell activated with H_2SO_4(Article)

Devasahayam, A., Ramanujam, R.A., Ramasamy, S.

[a]Department of Chemistry, Karpagam Institute of Technology, Coimbatore, 641105, India
[b]Department of Chemistry, Government College of Technology, Coimbatore, 641013, India
[c]Department of Electronics & Communication Engineering, CEG Campus, Anna University, Chennai, 600025, India

Abstract

Lead is a toxic pollutant which has serious effects on the environment and human health. In this work, an activated carbon was produced from Mangosteen shell (BTMC) and used in the elimination of Pb(II) from aqueous solution. The adsorbent was characterized by FT-IR, SEM and XRD studies. Batch experiments indicated that the quantitative removal Pb (II) occurs at an optimum experimental condition at pH 5 and carbon dose of 40 mg/100 mL. The maximum removal of Pb (II) was obtained at 27° C. Langmuir isotherm found to be applicable with Q_0 value of 58.48 mg g^{-1}. The results of the adsorption kinetics are described better with the pseudo-second-order model (R^2= 1). The practical utility of the produced carbon was tested using lead battery wastewater. The recovery of the Pb (II) from mangosteen shell is found to be 86% using 0.1 M HCl after five cycles. The results were compared with commercial activated carbon and BTMC is observed to be an efficient and economical adsorbent for the removal of Pb (II) ions from aqueous solution.

Author keywords

Adsorption Desorption Isotherm Lead Mangosteen shell

Funding details

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Sudha, R., Latha, K., Jayalakshmi, R.

Isotherm studies on removal of lead ions from wastewater by magnetic ... synthesised from Euphorbia hirta leaf extract

(2023) Indian Journal of Chemical Technology

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Document details - Investigation on Electrochemical Performance of New Flexible Nanocomposite Poly(Vinylidene Fluoride-co-Hexafluoropropylene) Polymer Electrolytes

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International Journal of Polymer Science

Volume 2020, 2020, Article number 3583806

Investigation on Electrochemical Performance of New Flexible Nanocomposite Poly(Vinylidene Fluoride-co-Hexafluoropropylene) Polymer Electrolytes(Article)(Open Access)

Vijayakumar, G., Maruthadurai, A., Paramasivam, R., Tamilselvan, V.

[a]Department of Chemistry, Sree Sakthi Engineering College, Accredited by Naac, Affiliated to Anna University, Coimbatore, 641 104, India
[b]Department of Chemistry, Government College of Technology, Affiliated to Anna University, Coimbatore, 641013, India
[c]Department of Chemistry, School of Science and Language, VIT-AP University, Amaravathi, Andhra Pradesh, 522237, India

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Abstract

This research paper as an article investigates electrochemical performance of poly(vinylidene fluoride-co-hexafluoropropylene) (PVdF-co-HFP) flexible nanocomposite polymer electrolytes which have been prepared successfully with incorporation of zinc oxide (ZnO) nanofiller. First, nanofillers are incorporated in a polymer matrix to form the flexible nanocomposite PVdF-co-HFP polymer membranes (PI-CMPM), and it is obtained by phase inversion technique. Contact angles of PI-CMPM have achieved a maximum of 136°. After this procedure, it has been activated by using a 1.0 M $LiClO_4$ containing of DMC/EC (1:1 v/v ratio) electrolyte solution to get flexible nanocomposite polymer electrolytes (PI-CMPE). The optimized PI-CMPM has increased the electrolyte uptake by 150%. It reaches the maximum ionic conductivity value of 2.47x10-3 S cm^{-1} at room temperature. Optimized PI-CMPE achieved a maximum transference number of 0.61, which may be further evidence for the ability to fabricate high-performance lithium ion polymer batteries.

Indexed keywords

Engineering controlled terms: Chlorine compounds Chlorine containing polymers Fluorine compounds II-VI semiconductors Lithium compounds Lithium-ion batteries Nanocomposites Oxide minerals Polymer matrix composites Zinc oxide

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Sarmah, H., Boruah, B., Borah, M.

High ionic conductivity upon low electrolyte uptake in TiO2 nanofiber-filled guar gum gel electrolytes

(2023) Materials Chemistry and Physics

Borah, S., Saikia, L., Guha, A.K.

SiO2 nanofiber reinforced P(VdF-HFP) based microporous polymer electrolytes for advanced energy storage applications

(2023) Colloids and Surfaces A: Physicochemical and Engineering Aspects

Suen, J.W., Elumalai, N.K., Debnath, S.

The Role of Interfaces in Ionic Liquid-Based Hybrid Materials (Ionogels) for Sensing and Energy Applications

(2022) Advanced Materials Interfaces

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Document details - Characterisation and utilisation of sugarcane bagasse ash as pozzolanic material and its effect on mechanical strength of concrete

Journal of Environmental Protection and Ecology
Volume 21, Issue 1, 2020, Pages 268-279

Characterisation and utilisation of sugarcane bagasse ash as pozzolanic material and its effect on mechanical strength of concrete(Article)

Rekha, K., Thenmozhi, R.
Department of Civil Engineering, Government College of Technology, Coimbatore, India

Abstract

This research paper studies the utilisation of the pozzolanic properties of Sugarcane bagasse ash (SCBA) which is imperative in achieving its effective usage as replacement material for cement instead of disposing agro waste in landfills. Bagasse ash (BA) was prepared by undergone heat treatment process for 1 h under the combustion temperature of 600–700°C to achieve silica in amorphous phase.To characterise the material properties (physical and chemical) of BA and BA added concrete, EDAX, XRD, SEM, slump-cone, setting time and hardened properties were widely investigated. BA was added to concrete at various percentages as 0, 5, 10, 15 and 20 by cement weight. The compressive strength, split tensile strength, flexural strength and elastic modulus of concrete with adding 0.5% polycarboxylate ether-based super plasticiser were studied. The results obtained on 28th day were compared with reference samples and they revealed that the samples made of 15% pulverised SCBA showed an increased effect on strength properties and thereby it is promising that for civil engineering applications Sugarcane bagasse ash can be applied as a pozzolanic material with an acceptable strength.

Author keywords
Mineral admixture | Physical and chemical properties | Strength characteristics | Sugarcane bagasse ash

Indexed keywords
GEOBASE Subject Index: amorphous medium | concrete structure | dynamic response | elastic modulus | landfill | structural analysis | structural response | sugar cane

Document details - Synergy of waste glass powder and waste rubber: A research on loading, perseverance and morphological features of unburnt fly-ash-based masonry units

Materiali in Tehnologije
Volume 54, Issue 1, 2020, Pages 99-106

Synergy of waste glass powder and waste rubber: A research on loading, perseverance and morphological features of unburnt fly-ash-based masonry units(Article)(Open Access)

Praburanganathan, S., Chithra, S.
Department of Civil Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

In the current context of the construction sector, the prospect and promotion of diverse industry and municipal waste-based materials are affianced to advance eco-friendly and more sustainable products. With this motto, the study aimed to investigate the synergistic effects of utilizing the crumb rubber from discarded waste tyres and finely ground glass powder from municipal waste glass in the production of unburnt bricks engaging a uniaxial pressing technique. The experiments conducted by mixing the rubber aggregates at 0-25 % with the stone dust and glass powders were blended with 0-25 % with the fly ash. The fly ash and stone dust volumes were fixed as 60 % and 25 %. The elemental composition of the raw materials and the morphology were studied using EDS and SEM. The physio-mechanical properties such as dry density, compressive strength, split tensile, modulus of rupture and perseverance studies such as water absorption, initial rate of absorption, capillary water-absorption coefficients using sorptivity study, efflorescence and direct UPV measurements evaluated and the results presented. In contrast to the earlier studies reported in the literature for the usage of rubber aggregates, the results of the current study reveal that the usage of rubber aggregates synergistic with glass powder enhance the compressive strength, split tensile and modulus of rupture of 2 %,11 % and 16 % for the substitute level of 10 % of both the waste materials. The better correlation observed in direct UPV Measurements with compressive strength. The density of the final developed products shows an 11 % reduced density for the optimum addition of both the materials leads to lightweight brick production. Saturated water absorption of the developed mixes were within the limits prescribed by Indian thresholds. The developed materials fulfill the requirement of Indian specifications to use as masonry units.

Author keywords

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Document details - Theoretical investigation of molecular structure, homo-lumo, hyperpolarizability, nbo analysis and density of states calculation of butenafine

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Digest Journal of Nanomaterials and Biostructures

Volume 15, Issue 1, January 2020, Pages 123-131

Theoretical investigation of molecular structure, homo-lumo, hyperpolarizability, nbo analysis and density of states calculation of butenafine(Article)

Sangeetha, R.K., Ayyappan, S.

[a]Department of Physics, Sri Eshwar College of Engineering, Coimbatore, India
[b]Department of Physics, Government College of Technology, Coimbatore, India

Abstract

Molecular geometry vibrational wave number of butenafine was investigated using HartreeFock and DFT method with HF and B3LYP(6-31+G(d,p) basis set. The potential energy distribution of the vibrational wave number is found to be in good agreement with experimental values. A detailed NBO analysis of butenafine was done with B3LYP method. U-V visible absorption spectra of the titled molecule is calculated by PCM model using water as solvent. The U-V visible spectra of the titled molecule dissolved in water were recorded in the range of 200-900 nm. The calculated values of U-V spectra are the most reproduced experimental data. The density of states, Homo-lumo and electrostatic potentials were calculated and analyzed. The dipole moment and hyperpolarizability result shows the butenafine has non linear optical properties. The natural bonding analysis was calculated by HF and B3LYP method.

Author keywords

DFT, HOMO-LUMO, Hyperpolarizability, MESP, NBO, UV-Visible

ISSN: 18423582
Source Type: Journal
Original language: English

Document Type: Article
Publisher: S.C. Virtual Company of Phisics S.R.L.

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Yogeswari, B. , Dehanayaki, S. , Banu, A.S.
Quantum Chemical Studies on Structural, Spectral and Frontier Molecular Orbital Analysis of Indomatacin in Aqueous Phases
(2023) Asian Journal of Chemistry

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Document details - Effect of coconut coir pith as partial substitute for river sand in eco-friendly concrete

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Materials Today: Proceedings

Volume 21, 2020, Pages 488-491

2019 International Conference on Recent Trends in Nanomaterials for Energy, Environmental and Engineering Applications, ICONEEEA 2019; K Ramakrishnan College of TechnologyTiruchirappalli; India; 14 March 2019 through 15 March 2019; Code 157771

Effect of coconut coir pith as partial substitute for river sand in eco-friendly concrete(Conference Paper)

Oorkalan, A., Chithra, S.

[a]Department of Civil Engineering, K. Ramakrishnan College of Technology, Trichy, Tamilnadu, 621112, India
[b]Department of Civil Engineering, Government College of Technology, Coimbatore, Tamilnadu, 641013, India

Abstract

India is one of the largest producers of coconut crop in the world. Coconut coir pith is an organic tiny particle obtained from coconut based industry and is of lignocellulosic nature. Disposal of coir pith by land filling poses severe environmental issues. On the other hand, limited availability of natural resources, namely, river sand and potable water is a major problem that cannot cater the increasing demands of construction industry. The present investigation explores the possible utilization of an agro waste, namely, raw and untreated coconut coir pith as partial substitute for natural sand in concrete under normal curing and self curing conditions. Tests were performed to determine the compressive strength, split tensile strength and flexural strength at various ages. SEM images were used to study the morphology of formed hydrates. High water absorption and retention capacity of coconut coir pith limits their use in concrete. Usage of coconut coir pith as sand replacement material can be a solution to maintain sustainable environment by the way of reduction in energy and non renewable resources.

Author keywords

Coconut coir pith, Fly ash, Mechanical properties, Self-curing, SEM analysis

Indexed keywords

Engineering controlled terms: Compressive strength, Concretes, Construction industry, Curing, Environmental protection, Potable water, Sand

Cited by 4 documents

Sathiparan, N. , Anburuvel, A. , Muralitharan, M.
Sustainable use of coco pith in cement-sand mortar for masonry block production: Mechanical characteristics, durability and environmental benefit
(2022) Journal of Cleaner Production

Oorkalan, A. , Chithra, S.
Investigation on the Properties of Sustainable Steel Fiber Reinforced Reactive Powder Concrete by Utilization of Coir Pith Aggregates and Pyrogenic Silica
(2022) Silicon

Hasan, K.M.F. , Horváth, P.G. , Alpár, T.
Lignocellulosic Fiber Cement Compatibility: A State of the Art Review
(2022) Journal of Natural Fibers

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Document details - Experimental study on high volume fly ash concrete made with coir pith and quarry dust

Materials Today: Proceedings

Volume 21, 2020, Pages 833-836

2019 International Conference on Recent Trends in Nanomaterials for Energy, Environmental and Engineering Applications, ICONEEEA 2019; K Ramakrishnan College of TechnologyTiruchirappalli; India; 14 March 2019 through 15 March 2019; Code 157771

Experimental study on high volume fly ash concrete made with coir pith and quarry dust(Conference Paper)

Oorkalan, A., Chithra, S., Babji, R., Ganesh Kumar, S., Kishore Kumar, J., Kishore Kumar, T.

[a]Department of Civil Engineering, K. Ramakrishnan College of Technology, Trichy, Tamilnadu, 621112, India
[b]Department of Civil Engineering, Government College of Technology, Coimbatore, Tamilnadu, 641013, India

Abstract

In India, construction industry plays a major role in building up nation's economy. For all the construction projects, approximately 60%-70% of cost has been spent on concrete. The annual consumption of concrete is about ten million tones. At the same time, abundant of fly ash has been thrown out as wastage. Fly ash, a by-product from the power plants, is effectively being used in the construction industry as an ecofriendly product. Concrete grade considered for this experimental study is M30 with 53 grade of Ordinary Portland Cement. About 50% and 75% cement was replaced by fly ash. Sand is replaced by the 5% of coir pith and 25%, 50% and 75% of quarry dust. IS method of mix design was adopted for obtaining required strength of concrete. Cubes (90), cylinders (90) and prism (60) were cast and cured. The cubes were tested for compressive strength on 7, 28 and 56 days. The cylinders were tested for split tensile strength on 7, 28 and 56 days. The prisms were tested for flexural strength on 28 and 56 days. The maximum strength is achieved in 5% coir pith and 75% quarry dust as replaced by the sand. © 2019 Elsevier Ltd. All rights reserved.

Author keywords

Coconut coir pith, Fly ash, Mechanical properties, Quarry dust, Workability

Indexed keywords

Engineering controlled terms: Compressive strength, Concretes, Cylinders (shapes), Dust, Fly ash, Portland cement, Prisms, Quarries, Tensile strength

Document details - Modified mangosteen shell in the removal of Hg (II) from aqueous solution-isotherm and kinetic studies

Chiang Mai Journal of Science

Volume 47, Issue 1, January 2020, Pages 127-136

Modified mangosteen shell in the removal of Hg (II) from aqueous solution-isotherm and kinetic studies(Article)

Devasahayam, A., Ramanujam, R.A., Ramasamy, S.

[a]Department of Chemistry, Karpagam Institute of Technology, Coimbatore, 641013, India
[b]Department of Chemistry, Government College of Technology, Coimbatore, 641013, India
[c]Department of Electronics & Communication Engineering, CEG Campus, Anna University, Chennai, 600025, India

Abstract

An activated carbon was prepared from an agricultural waste mangosteen shell by chemical modification (BTMC) and removal efficiency was tested using aqueous solution of Hg (II). The functional groups and surface morphology of BTMC were analyzed using FT-IR and SEM studies. Commercial activated carbon (CAC) was used to compare the efficiency of BTMC in Hg (II) removal. Batch mode studies were conducted to evaluate the parameters like contact time, pH, carbon dose on the removal efficiency of Hg (II) from aqueous solution. Removal of mercury occurs at optimal contact time of 120 min at pH 5 and carbon dosage of 120 mg for BTMC. Adsorption isotherm was studied using Freundlich, Langmuir, and Temkin isotherm models. Equilibrium data fitted well with Langmuir isotherm. The maximum adsorption capacity of Hg (II) was found to be 49.75 mg g^{-1} for BTMC. The pseudo second-order kinetic model fits well with the experimental data. Wastewater analysis was also performed to evaluate the practical applicability of the carbon. © 2020, Chiang Mai University. All rights reserved.

Author keywords

Adsorption, Isotherm, Kinetics, Mangosteen shell, Mercury

Funding details

Funding text

The authors thank the management of Karpagam Institute of Technology,Government College of Technology and Anna University for allowing us to utilize and carry out the research work in the research lab.

Document details - A reliable chemiresistive sensor of nickel-doped tin oxide (Ni-SnO₂) for sensing carbon dioxide gas and humidity

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RSC Advances

Volume 10, Issue 7, 2020, Pages 3796-3804

A reliable chemiresistive sensor of nickel-doped tin oxide (Ni-SnO_2) for sensing carbon dioxide gas and humidity(Article)(Open Access)

Manikandan, V., Petrila, I., Vigneselvan, S., Mane, R.S., Vasile, B., Dharmavarapu, R., Lundgaard, S., Juodkazis, S., Chandrasekaran, J.

[a]Department of Physics, Kongunadu Arts and Science College, Coimbatore, 641 029, India
[b]Faculty of Automatic Control and Computer Engineering, Gheorghe Asachi Technical University, Iasi Str. Dimitrie Mangeron, Nr. 27, Iasi, 700050, Romania
[c]Department of Physics, Government College of Technology, Coimbatore, 641 013, India

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Abstract

Herein, we report the chemiresistive gas and humidity sensing properties of pristine and nickel-doped tin oxide (Ni-SnO_2) gas sensors prepared by a microwave-assisted wet chemical method. The structural and optical properties are characterised using X-ray diffraction, scanning electron microscopy, scanning transmission electron microscopy, ultraviolet spectroscopy, Fourier transform infrared spectroscopy, and X-ray photoelectron spectroscopy. The structural elucidation and morphology analyses confirm a particle size of 32-46 nm, tetragonal rutile crystal structure and small cauliflower-type surface appearance. Nickel doping can tune the structure of NPs and morphology. The tested carbon dioxide gas and humidity sensing properties reveal a rapid sensing performance with high-to-moderate sensitivity. Also, the materials favour gas sensing because their sensitivity is enhanced with the increase in nickel concentration. The sensing results suggest that nickel is a vibrant metal additive to increase the gas sensitivity of the sensor. However, nickel doping decreases the electron density and increases the oxygen vacancies. Ultimately, the gas sensor produces highly rapid sensing with a response time of 4 s. © 2020 The Royal Society of Chemistry.

Indexed keywords

Engineering controlled terms: Carbon dioxide | Chemical sensors | Crystal structure | Fourier transform infrared spectroscopy | Gas detectors

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Kirthi, S. , Marjorie, S.R.
Performance Analysis of the Conductivity of Pure and Doped Stannous Oxide Thin Films Using a Low Cost Technique
(2023) AIP Conference Proceedings

Otgonbayar, Z. , Joo, Y.J. , Cho, K.Y.
Mesoporous effects on SiC fiber matrix combined with active metal oxides for atmospheric gas sensing under high temperature conditions
(2023) Sensors and Actuators A: Physical

Filatova, D. , Rumyantseva, M.
Additives in Nanocrystalline Tin Dioxide: Recent Progress in the Characterization of Materials for Gas Sensor Applications
(2023) Materials

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International Journal of Heavy Vehicle Systems

Volume 27, Issue 1-2, 2020, Pages 1-17

Failure analysis of leaf spring suspension system for heavy load truck vehicle(Article)

Nataraj, M., Thillikkani, S.

[a]Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India
[b]Department of Mechanical Engineering, Rathinam Technical Campus, Coimbatore, 641021, India

Abstract

The failure of leaf spring suspension system used in heavy load truck vehicle TATA LPT 1613TCIC model was investigated in the research reported in this paper. In order to analyse the variations in the chemical composition, micro-structural analysis along with material specification has been performed. The failed leaf spring fractured part was analysed by using a visual inspection technique and scanning electron microscope (SEM) analysis. Based on the fractography study, it was inferred that the failure of the fractured part was due to the cyclic load. This load lead to fatigue growth on leaf spring of the model truck vehicle. Then finite element analysis of leaf spring was carried out to find out the root cause of the leaf spring suspension system. The failure parameters were also optimised for the truck vehicle during safe operation on the road. The fatigue life of the proposed leaf spring has increased in comparison with the existing model lifecycles. Copyright © 2020 Inderscience Enterprises Ltd.

Author keywords

Fatigue life | Finite element analysis | Leaf spring | Scanning electron microscope | SEM

Indexed keywords

Engineering controlled terms: Automobile suspensions | Chemical analysis | Failure (mechanical) | Fatigue of materials | Finite element method | Fracture mechanics | Leaf springs | Scanning electron microscopy | Trucks

Engineering uncontrolled terms: Chemical compositions | Failure parameters | Heavy loads | Material specification | Root cause | Safe operation | Spring suspensions | Visual inspection

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Ranjan, A. , Mutra, R.R. , Kirty, Y.
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(2023) International Journal of Heavy Vehicle Systems

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Advances in Intelligent Systems and Computing

Volume 1048, 2020, Pages 341-351

8th International Conference on Soft Computing for Problem Solving, SocProS 2018; Vellore; India; 17 December 2018 through 19 December 2018; Code 234799

ASIC Implementation of Fixed-Point Iterative, Parallel, and Pipeline CORDIC Algorithm(Conference Paper)

Naga Jyothi, G., Debanjan, K., Anusha, G.

[a]VIT University, Vellore, India
[b]GCT Coimbatore, Coimbatore, TamilNadu, India

Abstract

In this paper, we proposed a Coordinate Rotation Digital Computer (CORDIC) algorithm for efficient hardware implementation of mathematical functions which can be carried out in a wide variety of ways for many digital signal processing applications. The CORDIC is a single unified algorithm for calculating many elementary functions such as trigonometric, hyperbolic, logarithmic function, exponential functions, multiplication, division, and so on. In this paper, a novel low power, low area, and high throughput fixed-point CORDIC algorithms are proposed. The standard CORDIC is also implemented for comparing the synthesis results. The proposed architecture scaling has been done using low area and low-power Scale Factor Correction Unit (SFCU). A low ADP SQRT-CSLA based ADD/SUB unit is proposed to overcomed the disadvantages of the basic ADD/SUB unit used in the standard CORDIC. The ROM lookup table size is also reduced to half. Extensive simulations are performed to verify the functionality. The standard and proposed CORDIC architectures are simulated in cadence NC launch and synthesized in cadence RC tool using TSMC GPDK 45 nm technology and area, power, and delay are calculated. The area and power consumption of the proposed CORDIC architecture are less when compared with standard CORDIC design. © 2020, Springer Nature Singapore Pte Ltd.

Author keywords

CORDIC algorithm, Digital signal processing, Parallel, Pipeline

Indexed keywords

Document details - Texture-Based Fuzzy Connectedness Algorithm for Fetal Ultrasound Image Segmentation for Biometric Measurements

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Advances in Intelligent Systems and Computing

Volume 1048, 2020, Pages 91-103

8th International Conference on Soft Computing for Problem Solving, SocProS 2018; Vellore; India; 17 December 2018 through 19 December 2018; Code 234799

Texture-Based Fuzzy Connectedness Algorithm for Fetal Ultrasound Image Segmentation for Biometric Measurements(Conference Paper)

Jayanthi Sree, S., Vasanthanayaki, C.

[a]Government College of Technology, Coimbatore, 641013, India
[b]Government College of Engineering, Salem, 636011, India

Abstract

Fuzzy connectedness segmentation approach guided by texture properties of the image is proposed for segmenting fetal organs such as femur, cranial bones, and abdomen from ultrasound images. This semiautomatic segmentation technique is proposed for fetal biometric measurements of biparietal diameter, head circumference, occipital diameter, femur length, and abdominal circumference. The texture information in the ultrasound images guides the fuzzy connectedness algorithm for efficient segmentation of fetal structures and thereby accurate biometric measurements. The proposed algorithm is compared with the manual segmentation of an expert and evaluation is performed with respect to region-based and distance-based metrics. The performance evaluation indicates that the proposed technique is comparable to manual segmentation results across all gestational ages. © 2020, Springer Nature Singapore Pte Ltd.

Author keywords

Biometric measurements, Fetal, Fuzzy connectedness, Segmentation, Texture, Ultrasound

Indexed keywords

Engineering controlled terms: Biometrics, Fuzzy systems, Image texture, Soft computing, Textures, Ultrasonic applications, Ultrasonics

Engineering uncontrolled terms: Biometric measurements, Biparietal diameters, Fetal, Fetal ultrasound images, Fuzzy connectedness

Document details - Elaeocarpus tectorius derived phosphorus-doped carbon as an electrode material for an asymmetric supercapacitor

New Journal of Chemistry

Volume 44, Issue 1, 2020, Pages 181-193

Elaeocarpus tectorius derived phosphorus-doped carbon as an electrode material for an asymmetric supercapacitor(Article)

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[b]Centre of Excellence for Environmental Studies (COE-ES), Government College of Technology, Coimbatore, 641013, India
[c]Department of Chemistry, KPR Institute of Engineering and Technology, Coimbatore, 641407, India

Abstract

Phosphorus-doped porous carbon is prepared from a new biomass (Elaeocarpus tectorius) at three different temperatures using a facile H_3PO_4 activation approach. The physicochemical characterisation of the as-prepared carbons by X-ray diffraction, Raman spectroscopy, thermal analysis, scanning electron microscopy, N_2 adsorption-desorption isotherms and X-ray photoelectron spectroscopy indicates that the carbon obtained at 900 °C possesses a high phosphorus content, 2.5% (by mass), and a large interlayer distance of the porous carbon with more expanded channels facilitating the penetration of ions into the interlayers and a rapid adsorption of ions suitable for ultra-high volumetric capacitance. The optimized carbon (900 °C) delivers high gravimetric capacitance (385 F g^{-1} at 0.2 A g^{-1}) and volumetric capacitance (543 F cm^{-3} at 0.2 A g^{-1}) in 1 M H_2SO_4. In 1 M Na_2SO_4 electrolyte, it still exhibits a gravimetric capacitance of 203 F g^{-1} at 0.3 A g^{-1} and a volumetric capacitance of 286 F cm^{-3} at 0.3 A g^{-1}. Additionally, a coin cell asymmetric device fabricated using this carbon works in a wide potential window from 0 to 1.5 V with 96% capacitance retention in 1 M H_2SO_4 aqueous electrolyte for 1000 cycles and yields a high energy density of 27 W h kg^{-1}, showing the utility for the development of wearable electronic devices. © 2019 The Royal Society of Chemistry and the Centre National de la Recherche Scientifique.

Indexed keywords

EMTREE drug terms: (carbon) (electrolyte) (phosphorus)

EMTREE medical terms: (Article) (current density) (cyclic potentiometry) (Elaeocarpus tectorius) (electric conductivity) (electrochemical analysis)

Document details - Structural, morphological and magnetic properties of algae/CoFe₂O₄ and algae/Ag-Fe-O nanocomposites and their biomedical applications

Inorganic Chemistry Communications

Volume 111, January 2020, Article number 107578

Structural, morphological and magnetic properties of algae/$CoFe_2O_4$ and algae/Ag-Fe-O nanocomposites and their biomedical applications(Article)

Satheeshkumar, M.K., Kumar, E.R., Indhumathi, P., Srinivas, C., Deepty, M., Sathiyaraj, S., Suriyanarayanan, N., Sastry, D.L.

[a]Department of Physics, SriGuru Institute of Technology, Coimbatore, Tamil Nadu 641110, India
[b]Department of Physics, Dr. N.G.P. Institute of Technology, Coimbatore, Tamil Nadu 641048, India
[c]Department of Chemistry, Shri Nehru Maha Vidyalaya College of Arts and Science, Coimbatore, Tamil Nadu 641050, India
View additional affiliations

Abstract

Algae-assisted auto-combustion method was adopted to prepare Algae/$CoFe_2O_4$ and Algae/Ag-Fe-O nanoparticles (NPs). Structural properties of the samples were investigated using XRD (X-ray Diffraction) FTIR (Fourier Transform Infra-red Spectroscopy), SEM (Scanning Electron Microscopy), and EDX (Energy Dispersive X-ray Analysis) and magnetic properties using VSM (Vibrating Sample Magnetometer). EDX spectra revealed the presence of expected stoichiometry in Algae/$CoFe_2O_4$ system but not in Algae/Ag-Fe-O. XRD patterns indicate the cubic phases of nanoparticles en-capsulated in the algae matrix. The sizes of the particles are found to be in the range of 15–21 nm. The room-temperature magnetic behaviour of the composites depends on the nature of dopant as Algae/$CoFe_2O_4$ NPs show ferromagnetic nature with significant coercivity whereas Algae/Ag-Fe-O NPs are super-paramagnetic. In-vitro anti-proliferative effect of Co-NPs and Ag-NPs at different concentrations (10, 25, 50, 75, 100 μg/ml) was evaluated against IMR 32 cell-line after 24 h incubation. The result of MTT assay affirmed that the cell-line deteriorates showing higher toxicity caused by Ag-NPs as compared to the results observed with the Co-NPs. © 2019 Elsevier B.V.

Author keywords

(Biomedical applications) (FE-SEM) (Nanoparticles) (Structural analysis)

Document details - Fibre reinforced concrete containing waste coconut shell aggregate, fly ash and polypropylene fibre

Revista Facultad de Ingeniería

Issue 94, 2020, Pages 33-42

Fibre reinforced concrete containing waste coconut shell aggregate, fly ash and polypropylene fibre(Article)

Prakash, R., Thenmozhi, R., Raman, S.N., Subramanian, C.

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[b]Department of Civil Engineering, Government College of Technology, Thadagam Road, Coimbatore, Tamil Nadu, C. P. 641013, India
[c]Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia UKM, Bangi, Selangor, C. P. 43600, Malaysia

Abstract

The aim of this study is to investigate the effect of polypropylene fibre addition into eco-concrete made with fly ash, an industrial by product, as partial cement replacement material, and coconut shell, an agricultural waste, as coarse aggregates, on the mechanical properties of the concrete. Two different mixes were developed, one with coconut shell only as coarse aggregates, and the other with the combination of both conventional aggregates and coconut shell as coarse aggregates. The cement content was replaced with class F fly ash at 10% by weight in the concrete mixes. The volume fractions of polypropylene fibres used in this study were 0.25%, 0.5%, 0.75% and 1.0%. The addition of polypropylene fibres slightly reduces the slump and density of coconut shell concrete. As the volume fraction of fibres increases, the compressive strength and modulus of elasticity of coconut shell concrete also increases by up to 0.5% of fibre volume fraction. The split tensile strength and flexural strength of coconut shell concrete were also enhanced with fibre addition. The addition of 0.75% and 1.0% volume fractions of polypropylene fibres slightly reduces compressive strength. Results of this study show that polypropylene fibres may be used in coconut shell concrete to improve the mechanical properties of the composite. © 2018 Revista Facultad de Ingeniería -redin.

Author keywords

Agricultural wastes; Building materials; Concrete; Fibre; Sustainable development

Funding details

Document details - Effect of copper substitution on structural, optical and humidity-sensing characteristics of cerium oxide nanoparticles

Journal of Physics and Chemistry of Solids

Volume 136, January 2020, Article number 109173

Effect of copper substitution on structural, optical and humidity-sensing characteristics of cerium oxide nanoparticles(Article)

Vigneselvan, S., Manikandan, V., Petrila, I., Vanitha, A., Chandrasekaran, J.

[a]Department of Physics, Government College of Technology, Coimbatore, 641013, India
[b]Department of Physics, Kongunadu Arts and Science College, Coimbatore, 641 029, India
[c]Faculty of Automatic Control and Computer Engineering, Gheorghe Asachi Technical University of Iasi, Str. Dimitrie Mangeron, Nr. 27, Iasi, 700050, Romania

View additional affiliations

Abstract

Cerium (pure) and copper-substituted cerium oxide nanoparticles were synthesized by microwave oven method. Powder X-ray diffraction showed that particle size was reduced with increases in copper content, termed the "particle size effect". Scanning electron microscopy and transmission electron microscopy (TEM) images showed that particle formation was spherical. Miniature sizes of nanoparticles were in the range ~4–10 nm and were identified from typical TEM microstructures. Absorption peaks were reduced as result of copper content and binding energy was also reduced, which decreased the particle size. The particle size effect produced significant changes in humidity sensing, copper-substituted cerium oxide nanoparticles had better humidity-sensing behavior than pure cerium oxide. Reproducibility of the sensor produced notable sensing characteristics. © 2019 Elsevier Ltd

Author keywords

Ceria nanoparticles; Humidity sensor; Optical properties; XRD

Indexed keywords

Engineering controlled terms: Binding energy; Copper oxides; High resolution transmission electron microscopy; Humidity sensors; Nanoparticles; Optical properties; Particle size; Scanning electron microscopy; Synthesis (chemical)

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Document details - A comparative analysis of pretrained and transfer-learning model for automatic diagnosis of glaucoma

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Proceedings of the 11th International Conference on Advanced Computing, ICoAC 2019

December 2019, Article number 9087297, Pages 167-172

11th International Conference on Advanced Computing, ICoAC 2019; Conference Hall, Department of Computer TechnologyChennai; India; 18 December 2019 through 20 December 2019; Category numberCFP1963H-CDR; Code 159712

A comparative analysis of pretrained and transfer-learning model for automatic diagnosis of glaucoma(Conference Paper)

Elakkiya, B., Saraniya, O.

Government College of Technology (Anna University), Electronics and Communication Engineering, Coimbatore, India

Abstract

In the recent years, glaucoma is the most generally spotted eye disease in the human that suddenly leads to loss of vision. The glaucoma occurs due to the intraocular pressure in the optic nerve, which averts the transmission of information from the optic nerve to brain. In the current scenario, the medical field has achieved the rapid changes due to the advancement of Artificial Intelligence (AI) technology. Deep Learning (DL) is one of the subfamily of AI, which assists to diagnose the disease in the short interval of time with better accuracy results. The Computer Aided Diagnosis (CAD) is a very effective tool, which helps the physician to diagnose and analyze the disease in an easier manner. In the proposed work, a transfer-learning model designed to diagnose the intra ocular pressure in the optic nerve. This model provides the better validation accuracy of 91.2% with minimized loss function. The training data are obtained from publicly available datasets such as DRIVE, ORIGA and RIM ONE. Using the transfer learning model, the overall training time has been reduced considerably because they are already trained in the millions of images and the inter observability error is minimized. © 2019 IEEE.

Author keywords

Convolutional Neural Networks (CNN) | Deep Learning (DL) | Glaucoma | Pretrained network | Transfer learning model

Indexed keywords

Engineering controlled terms: Deep learning | Digital storage | Eye protection | Learning systems | Ophthalmology | Transfer learning

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(2023) SN Computer Science

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(2023) Applied Sciences (Switzerland)

Khan, I.A., Sajeeb, A., Fattah, S.A.
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(2020) Proceedings of 2020 11th International Conference on Electrical and Computer Engineering, ICECE 2020

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Document details - Microgeometry Optimization of Spur Gear for Electric and Hybrid Vehicle Applications

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2019 IEEE Transportation Electrification Conference, ITEC-India 2019

December 2019, Article number 9080790

2019 IEEE Transportation Electrification Conference, ITEC-India 2019; Bengaluru; India; 17 December 2019 through 19 December 2019; Category numberCFP1981Y-ART; Code 159576

Microgeometry Optimization of Spur Gear for Electric and Hybrid Vehicle Applications(Conference Paper)

Akash Pavan, S., Periyasamy, S., Vikram Karthik, S.S., Gopalakrishnan, A.

Government College of Technology, Department of Mechanical Engineering, Coimbatore, India

Abstract

A new spur gear design providing less transmission error and increased life for electric and hybrid Vehicles, adaptable to high initial torque and reverse loads due to regenerative braking. The teeth of the spur gear profile have specific micro-geometry modifications for the mentioned application. The paper includes contact analysis for designing the profile modified spur gears having preferred running characteristics and optimization through design of experiments. © 2019 IEEE.

Author keywords

Contact Analysis | Electric Vehicles | Microgeometry | Spur Gear Optimization

Indexed keywords

Engineering controlled terms: Design of experiments | Electric utilities | Regenerative braking | Spur gears | Vehicle transmissions

Engineering uncontrolled terms: Contact analysis | Electric and hybrid vehicles | Gear design | Gear profiles | Micro geometry | Running characteristic | Transmission error

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Tang, Z., Wang, M., Chen, Z.
Design of Multi-Stage Gear Modification for New Energy Vehicle Based on Optimized BP Neural Network
(2020) IEEE Access

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Document details - Automatic load frequency control of a multi-area dynamic interconnected power system using a hybrid PSO-GSA-Tuned PID controller

Sustainability (Switzerland)

Volume 11, Issue 24, 1 December 2019, Article number 6908

Automatic load frequency control of a multi-area dynamic interconnected power system using a hybrid PSO-GSA-Tuned PID controller(Article)(Open Access)

Veerasamy, V., Abdul Wahab, N.I., Ramachandran, R., Vinayagam, A., Othman, M.L., Hizam, H., Satheeshkumar, J.

[a]Department of Electrical and Electronics Engineering, Advanced Lightning and Power Energy System(ALPER), Universiti Putra Malaysia (UPM), Selangor, 43400, Malaysia
[b]Department of Electrical Engineering, Government College of Technology, Coimbatore, 641013, India
[c]Department of Electrical Engineering, Sri Shakthi Institute of Engineering and Technology, Coimbatore, 641062, India

Abstract

This paper proposes a new population-based hybrid particle swarm optimized-gravitational search algorithm (PSO-GSA) for tuning the parameters of the proportional-integral-derivative (PID) controller of a two-area interconnected dynamic power system with the presence of nonlinearities such as generator rate constraints (GRC) and governor dead-band (GDB). The tuning of controller parameters such as K_p, K_i, and K_d are obtained by minimizing the objective function formulated using the steady-state performance indices like integral absolute error (IAE) of tie-line power and frequency deviation of interconnected system. To test the robustness of the propounded controller, the system is studied with system uncertainties, such as change in load demand, synchronizing power coefficient and inertia constant. The two-area interconnected power system (TAIPS) is modeled and simulated using Matlab/Simulink. The results exhibit that the steady-state and transient performance indices such as IAE, settling time, and control effort are impressively enhanced by an amount of 87.65%, 15.39%, and 91.17% in area-1 and 86.46%, 41.35%, and 91.04% in area-2, respectively, by the proposed method compared to other techniques presented. The minimum control effort of PSO-GSA-tuned PID controller depicts the robust performance of the controller compared to other non-meta-heuristic and meta-heuristic methods presented. The proffered method is also validated using the hardware-in-the-loop (HIL) real-time digital simulation to study the effectiveness of the controller. © 2019 by the authors.

Author keywords

Automatic load frequency control (ALFC) | Particle swarm optimized-gravitational search algorithm (PSO-GSA) | Proportional-integral-derivative (PID) controller | Two-area interconnected power system (TAIPS)

Document details - Analogy of the losses in surface and interior permanent magnet synchronous wind turbine generators

International Journal of Scientific and Technology Research

Volume 8, Issue 12, December 2019, Pages 2507-2515

Analogy of the losses in surface and interior permanent magnet synchronous wind turbine generators(Article)

Samraj, D.B., Perumal, M.P.

Department of Electrical and Electronics Engineering, Govt. College of Technology, Coimbatore, India

Abstract

This paper presents a Wind turbine (WT) system based on Permanent magnet synchronous generator (PMSG) using Surface mounted synchronous generator (SPMSG) and Interior magnet synchronous Generator (IPMSG). The analysis is compared between IPMSG and SPMSG. The same amount of copper and iron were used in both generators. In order to broaden the investigation two different appropriate motors have been used. This paper shows the analysis between both SPMSG and IPMSG technique. The copper and iron losses were utilized with machine and inverter loss in SPMSG and IPMSG technique. The SPMSG and IPMSG are compared based on density of power, electrical efficiencies, losses and torque. The angle of voltage, current and power were contributed in both IPMSG and SPMSG technique. In this technique the Back to back converter was utilized in the PMSG system it is utilized to change the power into dc-link. Simulation result shows the comparison of SPMSG and IPMSG technique with WT system and experimental results are obtained based on the power input at the shaft of the generator. © IJSTR 2019.

Author keywords

Back to Back converter | IPMSG | PMSG | SPMSG | Stator current | WT

Funding details

Funding sponsor	Funding number	Acronym
Ministry of Human Resource Development		MHRD

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Document details - Design of Approximate Subtractors and Dividers for Error Tolerant Image Processing Applications

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Journal of Electronic Testing: Theory and Applications (JETTA)

Volume 35, Issue 6, 1 December 2019, Pages 901-907

Design of Approximate Subtractors and Dividers for Error Tolerant Image Processing Applications(Article)

Gorantla, A., Deepa, P.

[a]Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, India
[b]Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, India

Abstract

Approximate computing is a promising technique for energy-efficient Very Large Scale Integration (VLSI) system design and best suited for error resilient applications, such as signal processing and multimedia. Approximate computing reduces accuracy, but still provides significant and faster results with low power consumption. It is attractive for arithmetic circuits. Four approximate subtractors are proposed based on the approximate computing at logic level using Karnaugh map (K-map) simplification. This paper deals with the design approach of various approximate subtractors and dividers for image processing to tolerate the minimal loss of quality. The proposed designs offer better error tolerant capabilities for image processing. © 2019, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Approximate Computing; Low Power · Approximate Subtractor · Image Processing

Indexed keywords

Engineering controlled terms: Computation theory · Energy efficiency · Errors · Green computing · VLSI circuits

Engineering uncontrolled terms: Arithmetic circuit · Design approaches · Energy efficient · Error-resilient · Image processing applications · Low Power · Low-power consumption · Subtractor

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Document details - Conversion of a low value industrial waste into biodiesel using a catalyst derived from brewery waste: An activation and deactivation kinetic study

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Waste Management

Volume 100, December 2019, Pages 318-326

Conversion of a low value industrial waste into biodiesel using a catalyst derived from brewery waste: An activation and deactivation kinetic study(Article)

Saravanan Arumugamurthy, S., Sivanandi, P., Pandian, S., Choksi, H., Subramanian, D.

[a]Department of Chemical Engineering, Nandha Engineering College, Erode, 638052, India
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[c]School of Petroleum Technology, Pandit Deendayal Petroleum University, Gandhinagar, 382007, India

View additional affiliations

Abstract

In this study, biodiesel was produced by using a heterogeneous acid catalyst made from brewer's spent yeast (BSY). BSY was initially activated by phosphoric acid followed by carbonization in inert atmosphere and sulfonation process to prepare the catalyst. It is completely characterized using sophisticated instruments to determine its physical and chemical properties. Subsequently, the effectiveness of the catalyst was analyzed by subjecting it to sonochemical esterification of an industrial low value waste product, palm fatty acid distillate (PFAD). The reactions were performed in the presence of ultrasound at a constant frequency of 25 kHz. An optimum methyl ester conversion of 87.8% was achieved at 8 wt% of catalyst, 21:1 methanol to PFAD molar ratio, 65 °C and 180 min of reaction time. The catalyst displayed a high catalytic stability up to four cycles due to firm [sbnd]SO_3H functional group attached onto the surface. Furthermore, a novel sonochemical kinetic model was proposed for surface esterification reaction on the catalyst. The reaction rate was found and it followed a pseudo-first-order reaction mechanism. Furthermore, a deactivation model was also proposed to account for the loss of activity upon catalyst reuse during sonochemical reaction. © 2019 Elsevier Ltd

Author keywords

Activation kinetics · Biodiesel · Deactivation kinetics · Esterification · Heterogeneous catalyst

Indexed keywords

Engineering controlled: Biodiesel · Carbonization · Catalyst activity · Chemical activation · Esterification · Esters · Fatty acids

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Document details - Structural, morphological, optical, dielectric and magnetic field sensing characteristics of Bi_{1-x}K_xMnO₃ and BiMn_{1-y}Co_yO₃ nanopowders: A comparative study

Materials Letters

Volume 256, 1 December 2019, Article number 126655

Structural, morphological, optical, dielectric and magnetic field sensing characteristics of $Bi_{1-x}K_xMnO_3$ and $BiMn_{1-y}Co_yO_3$ nanopowders: A comparative study(Article)

Revathi, B., Balakrishnan, L., Chandar, N.K.

[a]Department of Physics, School of Advanced Sciences, Vellore Institute of Technology, Vellore, 632 014, India
[b]Department of Physics, Government College of Technology, Coimbatore, 641 013, India

Abstract

Composites of $BiMnO_3$ such as $Bi_{1-x}K_xMnO_3$ and $BiMn_{1-y}Co_yO_3$ ($x = y = 0.05, 1.0, 1.5$) based fiber optic magnetic field sensors were fabricated and sensitivity analysis was performed at room temperature. The properties of nanosized particles synthesized using hydrothermal method were studied using X-ray diffraction, scanning electron microscope, ultraviolet-visible spectrometer and Dielectric measurement. The results reveal the formation of nanocrystallite of size ~ 50 nm with rice like morphology in the bandgap range between 1.2 eV and 1.5 eV. The 5% K doped BMO has better magnetic field sensitivity at a source wavelength of 693 nm and pristine BMO has better sensitivity at 772 nm. © 2019 Elsevier B.V.

Author keywords

Co doped $BiMnO_3$ · Dielectrics · Fiber optic sensor · K doped $BiMnO_3$ · Magnetic field sensor · Nanocrystalline materials

Indexed keywords

Engineering controlled terms: Cobalt compounds · Dielectric materials · Fiber optic sensors · Fiber optics · Magnetic fields · Magnetic sensors

Document details - High-impedance fault detection in medium-voltage distribution network using computational intelligence-based classifiers

Neural Computing and Applications

Volume 31, Issue 12, 1 December 2019, Pages 9127-9143

High-impedance fault detection in medium-voltage distribution network using computational intelligence-based classifiers(Article)(Open Access)

Veerasamy, V., Abdul Wahab, N.I., Ramachandran, R., Thirumeni, M., Subramanian, C., Othman, M.L., Hizam, H.

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[b]Department of Electrical Engineering, Rajalakshmi Engineering College, Chennai, 602105, India
[c]Department of Electrical Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract

This paper presents the high-impedance fault (HIF) detection and identification in medium-voltage distribution network of 13.8 kV using discrete wavelet transform (DWT) and intelligence classifiers such as adaptive neuro-fuzzy inference system (ANFIS) and support vector machine (SVM). The three-phase feeder network is modelled in MATLAB/Simulink to obtain the fault current signal of the feeder. The acquired fault current signal for various types of faults such as three-phase fault, line to line, line to ground, double line to ground and HIF is sampled using 1st, 2nd, 3rd, 4th and 5th level of detailed coefficients and approximated by DWT analysis to extract the feature, namely standard deviation (SD) values, considering the time-varying fault impedance. The SD values drawn by DWT technique have been used to train the computational intelligence-based classifiers such as fuzzy, Bayes, multi-layer perceptron neural network, ANFIS and SVM. The performance indices such as mean absolute error, root mean square error, kappa statistic, success rate and discrimination rate are compared for various classifiers presented. The results showed that the proffered ANFIS and SVM classifiers are more effective and their performance is substantially superior than other classifiers. © 2019, Springer-Verlag London Ltd., part of Springer Nature.

Author keywords

Adaptive neuro-fuzzy inference system · Bayes and fuzzy classifier · Discrete wavelet transform · High-impedance fault · Multi-layer perceptron neural network (MLP) · Support vector machine

Indexed keywords

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Document details - A new processing method for signal and image analysis using discrete wavelet transform

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Applied Mathematics and Information Sciences

Volume 13, Issue 6, 1 November 2019, Pages 945-953

A new processing method for signal and image analysis using discrete wavelet transform(Article)

Kesavan, S.P., Rajeswari, R.

[a]Department of Electronics and Communication Engineering, Nandha College of Technology, Erode, Tamil Nadu, India
[b]Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, Tamil Nadu, India

Abstract

In this paper, we develop a new method for the analysis of signal and image data using DiscreteWavelet Transform (DWT). The new method reduces the size of the computing devices and consumes less energy. Out of different transformation techniques, the most famous and dominant architecture is the discrete wavelet transform. The discrete wavelet transform design optimization has done on power and leakage current reduction. New adders are proposed which are based on power gating and reversible logic. It is shown that the proposed adders reduce the dynamic power by about 30%. The proposed design in 45 nm and 32 nm CMOS technology is efficient when compared to other methods. © 2019 NSP.

Author keywords

Adder, CMOS, DWT architecture, Leakage reduction, Low power, MAC, Multiplier

ISSN: 19350090
Source Type: Journal
Original language: English

DOI: 10.18576/amis/130607
Document Type: Article
Publisher: Natural Sciences Publishing

Kesavan, S.P.; Department of Electronics and Communication Engineering, Nandha College of Technology, Erode, Tamil Nadu, India;

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Document details - Effect of Tin Element on the Structural, Optical and Humidity Sensing Properties of Cerium Oxide Nanoparticles

1 of 1

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Journal of Electronic Materials

Volume 48, Issue 11, 1 November 2019, Pages 7495-7506

Effect of Tin Element on the Structural, Optical and Humidity Sensing Properties of Cerium Oxide Nanoparticles(Article)

Vigneselvan, S., Manikandan, V., Petrila, I., Vanitha, A., Chandrasekaran, J.

[a]Department of Physics, Government College of Technology, Coimbatore, 641 013, India
[b]Department of Physics, Kongunadu Arts and Science College, Coimbatore, 641 029, India
[c]Faculty of Automatic Control and Computer Engineering, Gheorghe Asachi Technical University of Iasi, Str. Dimitrie Mangeron, Nr. 27, Iasi, 700050, Romania

View additional affiliations

Abstract

In this work, pristine and tin substituted cerium oxide nanoparticles (NPs) namely $Ce_{1-x}Sn_xO_2$, x = 0.0, 0.2, 0.4, 0.6, were prepared by a simple microwave synthesis method for humidity sensing studies. Different characterization methods such as scanning electron microscopy, transmission electron microscopy and energy-dispersive x-ray spectroscopy analysis demonstrated the formation of spherical NPs with an approximate crystalline size of 5–10 nm, desirable chemical composition and presence of oxygen defects. Also, optical measurements results demonstrated the increase of the band gap energy in tin substituted NPs due to formation of intermediate energy levels as a result of tin substitution. Furthermore, humidity sensing studies showed a high response of the fabricated sensors to humidity as a result of very small particle sizes along with the presence of tin in cerium oxide NPs. Finally, the fabricated humidity sensors showed a very good reproducibility of 95%. The results of this study confirm the possibility of realization of highly sensitive humidity sensors based on tin substituted cerium oxide NPs for application in real environments. © 2019, The Minerals, Metals & Materials Society.

Author keywords

humidity sensor, optical properties, structural properties, Tin substituted cerium oxides

Indexed keywords

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Document details - Compatibility of electrical generators for harvesting extended power from wind energy conversion system

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Measurement and Control (United Kingdom)

Volume 52, Issue 9-10, 1 November 2019, Pages 1240-1251

Compatibility of electrical generators for harvesting extended power from wind energy conversion system(Article)(Open Access)

Samraj, D.B., Perumal, M.P.

Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, Coimbatore, India

Abstract

In this paper, a comparative study between the two generator types with wind energy conversion system is proposed. The two generator types are doubly fed induction generators and permanent magnet synchronous generators. As in the wind turbine context, doubly fed induction generators and permanent magnet synchronous generators seem to be attractive solutions to be used to harness the wind energy. Wind turbine generators compatibility is anticipated in view of the stochastic nature of wind profile in the particular location in correlation with the Electro-Magnetic Torque profile of the wind generator which is acquired by simulating wind energy conversion system for the available wind speeds with high efficient generators. To validate the advantage of the proposed system, the torque profile of doubly fed induction generators and permanent magnet synchronous generators with an hourly average wind speed for 24-h time period is analysed. The real and reactive power of permanent magnet synchronous generators at wind speed of 13 m/s and permanent magnet synchronous generators increased pole pairs at wind speed of 13 m/s are also analysed. Furthermore, the power delivered by doubly fed induction generators and permanent magnet synchronous generators is analysed and compared. The comparison results demonstrate that the superiority of the permanent magnet synchronous generators over doubly fed induction generators and confirm its potential to extract the maximum energy from the wind. © The Author(s) 2019.

Author keywords

DFIG PMSG Wind profile

Indexed keywords

Engineering controlled Electric generators Energy conversion Permanent magnets Stochastic systems Synchronous generators Torque

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(2023) Frontiers in Energy Research

Das, U., Nandi, C.
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(2022) Sustainable Energy Technologies and Assessments

Gianto, R., Rajagukguk, M.
Integration of PMSG-Based Wind Turbine Into Electric Power Distribution System Load Flow Analysis
(2022) WSEAS Transactions on Power Systems

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Document details - Removal of COD, oil and grease from automobile wash water effluent using electrocoagulation technique.

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Microchemical Journal

Volume 150, November 2019, Article number 104070

Removal of COD, oil and grease from automobile wash water effluent using electrocoagulation technique.(Article)

Priya, M., Jeyanthi, J.

[a]Research scholar, Department Civil Engineering, Government College of Technology, Coimbatore, India
[b]Professor, Department of Civil Engineering, Government College of Technology, Coimbatore, India

Abstract

This present study investigates the removal of COD, oil and grease from the automobile wash water effluent using electrocoagulation technique (ECT). The performance of ECT was examined by varying the position of the sacrificial electrode materials (Al, Fe, St, and Cu) for the removal of COD from the automobile wastewater. For an efficient and economic treatment the influence of distance among the electrodes (10 cm, 5 cm, and 2.5 cm), current density (5 A/m^2 to 30 A/m^2),the reaction time (10 to 60 min), and pH of the wastewater (4 to 10) was monitored. The possible mechanisms associated with electrocoagulation and the performances of influencing operational variables of electrocoagulation were discussed. The effect of aeration also observed (with and without). The maximum COD reduction attained with a Cu (anode)—Al (cathode) electrode at the original pH of wastewater 6.5. The higher percentage of 95.1%, 92.5% and 99% of COD, oil & grease and turbidity removal was attained with an optimized distance among the electrodes of 5 cm, current density of 25 A/m^2, the reaction time of 40 min and pH of 6. The cost of the ECT estimated as INR 386.01/m^3 for the treatment of automobile wash water effluent with optimized operating variables and the natural pH of the wastewater. For a cost-effective treatment, the ECT was improved with the addition of chitosan modified fly ash cenosphere and its performance for the removal of COD was observed. Thus, the ECT with Cu—Al electrode configuration was proposed for the removal of COD and oil and grease from the automobile wastewater in an efficient and economic aspect. © 2019 Elsevier B.V.

Author keywords

COD removal Cost analysis Electrocoagulation Electrode arrangement Oil & grease removal

Cited by 61 documents

Oburu, D., Akamushabo, O., Khaldi, A.
Determination and implementation of an onsite management system for motor-vehicle wash effluents: A field-scale commercial application toward sector sustainability
(2023) Journal of Water Process Engineering

Nisa, T.U., Khokhar, W.A., Imran, U.
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(2023) Chemosphere

Karmankar, S.B., Sharma, A., Ahirwar, R.C.
Cost cutting approach of distillery effluent treatment using solar photovoltaic cell driven electrocoagulation: Comparison with conventional electrocoagulation
(2023) Journal of Water Process Engineering

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Document details - Biosorption of Acid Yellow 12 from simulated wastewater by non-viable T. harzianum: kinetics, isotherm and thermodynamic studies

1 of 1

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International Journal of Environmental Science and Technology

Volume 16, Issue 11, 1 November 2019, Pages 6895-6906

Biosorption of Acid Yellow 12 from simulated wastewater by non-viable T. harzianum: kinetics, isotherm and thermodynamic studies(Article)

Karthik, V., Saravanan, K., Patra, C., Ushadevi, B., Vairam, S., Selvaraju, N.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, India
[b]Department of Chemical Engineering, Kongu Engineering College, Perundurai, Erode, 638060, India
[c]Department of Biosciences and Bioengineering, Indian Institute of Technology, Guwahati, Assam 781039, India

View additional affiliations

Abstract

The current study deals with the biosorption of Acid Yellow 12 (AY 12) dye using dead fungal biomass Trichoderma harzianum. The dead fungal biomass was characterized using FTIR, XRD, TG–DTA and SEM–EDAX. Effect of various parameters on the efficiency of biosorption like pH, biosorbent dosage and temperature has also been analysed. The adsorption capacity was found to be higher at pH 4, with an initial dye concentration of 100 mg/L and biosorbent dosage of 0.4 g/L. The adsorption kinetics, isotherms and thermodynamic studies of dye adsorption onto the biomass were also investigated. The biosorption between the dye and biomass followed Freundlich adsorption isotherm. The biosorption followed pseudo-second-order kinetics. Negative value of $\Delta G°$ shows the spontaneous nature of biosorption process, and positive $\Delta H°$ reveals adsorption as an endothermic process. Since T. harzianum is a low-cost industrial by-product, it can be used as an effective novel biosorbent for the removal of textile dyes. It also acts as one of the cheap sources of biosorbent for the removal of dye Acid Yellow 12. © 2018, Islamic Azad University (IAU).

Author keywords

Acid Yellow 12 dye · Adsorption isotherm · Adsorption kinetics · Biosorption · T. harzianum

Indexed keywords

Engineering controlled: Adsorption · Adsorption isotherms · Biomass · Costs · Dyes · Kinetics · Solutions · Stripping (dyes) · ...ic properties

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Document details - High performance decoding aware FPGA bit-stream compression using RG codes

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Cluster Computing

Volume 22, 1 November 2019, Pages 15007-15013

High performance decoding aware FPGA bit-stream compression using RG codes(Article)

Satheesh Kumar, J., Saravana Kumar, G., Ahilan, A.

[a]Hindusthan College of Engineering and Technology, Coimbatore, India
[b]Tamil Nadu College of Engineering, Coimbatore, India
[c]GCT, Coimbatore, India

Abstract

FPGA design for complex applications need high capacity of configuration memory. To fulfil the large memory requirement, higher end FPGAs are required and it leads to higher cost. In order to reduce the cost constraint, bit-stream compression is prominently involved to reduce the bit-stream size and the memory requirement of FPGA configuration. In this paper new code compression techniques are proposed with minimum cost. The proposed code compression techniques RG-1 and RG-2 codes are designed based on the combination of run length and Golomb coding. The proposed RG codes overcome the limitation of both run length and Golomb coding techniques. The main contribution of this work is to analyze the proposed work in terms of number of 1's, number of transitions and size of compressed bits. The comparison result shows that the RG code is more robust when compared to other traditional code compression techniques. The results shows that CR improvement of 9 and 5% compare with RLE for the RG-1 and RG-2 respectively and CR improvement of 7 and 2% compare with golomb for the RG-1 and RG-2 respectively. © 2018, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

CR (compression ratio) · FPGA (field programmable gate array) · Golomb code · Run length code

Indexed keywords

Engineering controlled terms: Binary sequences · Codes (symbols) · Compression ratio (machinery) · Costs

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Document details - ZnO nanorods based fiber optic hexane sensor

AIP Conference Proceedings

Volume 2162, 29 October 2019, Article number 020105

International Conference on Advanced Materials, ICAM 2019; Nirmalagiri CollegeKuthuparamba, Kannur, Kerala; India; 12 June 2019 through 14 June 2019; Code 153457

ZnO nanorods based fiber optic hexane sensor(Conference Paper)

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Abstract

Fabrication and characterization of fiber optic hexane sensor using pristine ZnO nanorods have been reported. ZnO nanorods were synthesized by hydrothermal method. The structural, morphological and elemental properties of the nanorods were analyzed using X-ray diffraction (XRD), scanning electron microscope (SEM), energy dispersive spectrometer (EDS). The XRD results indicate that the nanorods were crystallized in hexagonal wurzite structure. The SEM analysis shows the rod like shape of the synthesized nanopowders. The fiber optic sensor probe was fabricated via clad modification technology. Further, the probe was subjected to different VOC gases at room temperature. Test VOC gas vapors such as ethanol, methanol and hexane were chosen to investigate the response behaviour of the ZnO nanorods. Noticeably, the sensor showed higher selectivity towards hexane along with the sensitivity of ~6.5%. The plausible gas sensing mechanism is also discussed in detail. The splendid sensing properties advocate that the ZnO nanorods are promising candidate for hexane sensor. © 2019 Author(s).

Funding details

Funding sponsor	Funding number	Acronym
	09/844(0054)/2018-EMR-I	
	SR/FST/ETI-015/2011	
Department of Science and Technology, Ministry of Science and Technology, India		डीएसटी

Document details - Fabrication and characterization of TiO₂ particulate filled agave Americana fiber-reinforced polyester resin composites

Pigment and Resin Technology

Volume 48, Issue 6, 18 Oct 2019, Pages 533-539

Fabrication and characterization of TiO_2 particulate filled agave Americana fiber-reinforced polyester resin composites(Article)

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[b]Department of Production Engineering, Government College of Technology, Coimbatore, India
[c]Department of Mechanical Engineering, Vels Institute of Science Technology and Advanced Studies, Pallavaram, India

Abstract

Purpose: In this study, TiO2 is used to enhance the mechanical properties of the composite material containing agave Americana fiber and polyester resin. Design/methodology/approach: Agave Americana fiber was first treated with 5% of NaOH, and the composition of treated and untreated fiber was kept constant, whereas the particulate and resin were alternatively used. The handlay method is used to fabricate the composite plates. The morphology of the composites was studied using scanning electron microscopy (SEM). Findings: The composite was composed of 30% treated agave Americana, 10% of TiO_2 particulates and 60% of a polyester resin for better and enhanced mechanical properties. Practical implications: The composite can be used for aero-structural components, automobile components and other areas where light-weight components are required. Originality/value: A new type of agave Americana fiber with TiO_2 and polyester resin composite was fabricated and investigated. © 2019, Emerald Publishing Limited.

Author keywords

Agave Americana; Mechanical properties; Natural fibre composite; Polyester resin; TiO_2

Indexed keywords

Engineering controlled terms: Automobile manufacture; Fabrication; Fibers; Mechanical properties; Oxide minerals; Particle reinforced composites; Polyesters; Scanning electron microscopy; Sodium hydroxide; Titanium dioxide

Document details - Multi-attribute decision-making approach for Aegle marmelos pyrolysis process using TOPSIS and Grey Relational Analysis: Assessment of engine emissions through novel Infrared thermography

Journal of Cleaner Production

Volume 234, 10 October 2019, Pages 315-328

Multi-attribute decision-making approach for Aegle marmelos pyrolysis process using TOPSIS and Grey Relational Analysis: Assessment of engine emissions through novel Infrared thermography(Article)

Baranitharan, P., Ramesh, K., Sakthivel, R.

[a]Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India
[b]Department of Mechanical Engineering, Amrita School of Engineering, Amrita Vishwa Vidyapeetham, Coimbatore, India

Abstract

This research focuses on the selection of the optimum process parameters for Aegel marmelos (AM) pyrolysis experiment based on multi-objective decision-making techniques. This investigation presents the optimization report for obtaining maximum pyrolysis oil from AM de-oiled seed cake through thermochemical conversion (pyrolysis) process. The pyrolysis process has been conducted according to L_{27} orthogonal array with chosen input control factors such as pyrolysis temperature (°C), heating rate (°C/min) and biomass particle size (mm). The output response parameters measured are the bio-oil yield, bio-char yield and biogas yield. The multi-objective decision-making approach namely Technique for order preference by similarity to ideal solution (TOPSIS) and Grey relational analysis (GRA) techniques are employed to determine the optimum pyrolysis process parameters to maximize the yield of AM bio-oil. The optimized values of pyrolysis temperature (PT), heating rate (HR) and feedstock particle size (PS) are 600 °C, 10 °C/min and 0.6 mm. At peak engine loading condition, 20% AM bio-oil + 80% diesel fuel blend (AM20) emit lower carbon dioxide (CO_2 = 8.68%) and oxides of nitrogen (NOx = 1401 ppm) emissions as compared with diesel (D) CO_2 (10.33%) and NOx (1511 ppm) emissions. The association between exhaust gas temperature and NOx emission was inferred using a novel approach of thermal imager by sensing the infrared rays from the hot surface of the exhaust port. Infrared thermal images are captured during the engine operations fuelled with bio-oil at the optimum pyrolysis conditions concluded by TOPSIS and GRA results (PT = 600 °C, HR = 10 °C/min and PS = 0.6 mm). According to the thermal imaging result, AM20 blend produces the lower amount of NOx emissions compared with neat diesel and it is suggested that AM bio-oil can be used as engine fuel instead in order to preserve the eco-system stability and biodiversity. © 2019 Elsevier Ltd

Author keywords

Document details - Bicarbonate treated mangosteen shell carbon in removal of ni (Ii) from aqueous solution-isotherm and kinetic studies

Digest Journal of Nanomaterials and Biostructures

Volume 14, Issue 4, October-December 2019, Pages 1049-1060

Bicarbonate treated mangosteen shell carbon in removal of ni (Ii) from aqueous solution-isotherm and kinetic studies(Article)

Anitha, D., Ramadevi, A.

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[b]Department of Chemistry, Government College of Technology, Coimbatore, India

Abstract

The adsorption of heavy metal Ni (II) from aqueous solution using bicarbonate treated mangosteen shell was studied. The effects of adsorbent dose, contact time, pH, on the removal efficiency of Ni (II) were evaluated by batch mode studies. Adsorption isotherm was studied using Langmuir, Freundlich and Temkin isotherm models. The pseudo-second order kinetic model fits well for the experimental data. The surface morphology and functional groups were analyzed using SEM, EDX, XRD and FT-IR data. All the parameters were compared with CAC. The recovery of the Ni (II) from BTMC is found to be good using 0.1 M HCl. © 2019, S.C. Virtual Company of Phisics S.R.L. All rights reserved.

Author keywords

(Adsorption) (Desorption) (Kinetics) (Mangosteen shell) (Nickel)

ISSN: 18423582
Source Type: Journal
Original language: English

Document Type: Article
Publisher: S.C. Virtual Company of Phisics S.R.L

Anitha, D.; Department of Chemistry, Karpagam Institute of Technology, Coimbatore, India;

Document details - Green fabrication, characterization of Pisonia alba leaf extract derived MgO nanoparticles and its biological applications

Nano-Structures and Nano-Objects

Volume 20, October 2019, Article number 100380

Green fabrication, characterization of Pisonia alba leaf extract derived MgO nanoparticles and its biological applications(Article)

Sharmila, G., Muthukumaran, C., Sangeetha, E., Saraswathi, H., Soundarya, S., Kumar, N.M.

[a]Department of Industrial Biotechnology, Government College of Technology, Coimbatore, Tamil Nadu 641013, India
[b]Department of Genetic Engineering, SRM Institute of Science & Technology, Kattankulathur, Tamil Nadu 603203, India

Abstract

A facile, eco-friendly green synthesis of magnesium oxide nanoparticles (MONPs) using Pisonia alba leaf extract was reported. The MONPs were characterized by UV-Vis, TEM, EDX, XRD and FTIR. A good antioxidant activity was exhibited by P. alba leaf extract derived MONPs assessed by DPPH and FRAP assays. Antifungal activity assay results revealed that Aspergillus flavus and Fusarium solani were highly inhibited by green synthesized MONPs. The results of this study demonstrated that P. alba leaf extract derived MONPs showed good antioxidant, antifungal properties and it can be utilized for biomedical and food applications. © 2019 Elsevier B.V.

Author keywords

Antifungal | Antioxidant | Magnesium oxide | Nanoparticles | Pisonia alba

ISSN: 2352507X
Source Type: Journal
Original language: English

DOI: 10.1016/j.nanoso.2019.100380
Document Type: Article
Publisher: Elsevier B.V.

Sharmila, G.; Department of Industrial Biotechnology, Government College of Technology, Coimbatore, Tamil Nadu, India;

Document details - Measurement of performance and emission distinctiveness of Aegle marmelos seed cake pyrolysis oil/diesel/TBHQ opus powered in a DI diesel engine using ANN and RSM

Measurement: Journal of the International Measurement Confederation

Volume 144, October 2019, Pages 366-380

Measurement of performance and emission distinctiveness of Aegle marmelos seed cake pyrolysis oil/diesel/TBHQ opus powered in a DI diesel engine using ANN and RSM(Article)

Baranitharan, P., Ramesh, K., Sakthivel, R.

[a]Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India
[b]Department of Mechanical Engineering, Amrita School of Engineering, Coimbatore, Amrita Vishwa Vidyapeetham, India

Abstract

The present investigation focuses on Artificial neural network (ANN) and Response surface methodology (RSM) modelling of a CI (Compression Ignition) engine powered by Aegle marmelos (AM) pyrolysis oil/diesel/Tert-butyl hydroxyl quinone antioxidant (TBHQ) blend as a test fuel to predict and optimize the engine behaviour. Bio-oil is derived from AM de-oiled seed cake in a fixed bed pyrolysis reactor at 600 °C under the heating rate of 30 °C/min. To obtain data for testing and training the suggested RSM and ANN models, a direct injection, single cylinder CI engine was fuelled with proposed test fuel 80% diesel + 20% AM bio-oil + 1000 ppm TBHQ (A20D80T). The A20D80T has been assessed for the combined effects of varying compression ratio (CR = 16:1–17.5:1) and engine load (W = 25%–100%) in variable compression ratio (VCR) diesel engine through experimental investigation and ANN prediction and RSM optimization techniques. Using the experimental data for training, an ANN replica was developed according to feed forward back propagation algorithm (FFBP). Multi-layer perception (MLP) network was used for non-linear mapping between the experimental and predicted values. Engine process parameters were accurately predicted by trained ANN. The optimal values of engine performance (brake specific fuel consumption (BSFC) = 0.33 kg/kWh and brake thermal efficiency (BTE) = 22.03%) and emission behaviour (carbon monoxide (CO) = 0.67%, hydro carbon (HC) = 244 ppm, carbon dioxide (CO_2) = 8.33% and oxides of nitrogen (NOx) = 351 ppm) were obtained by RSM optimization. The compression ratio of 17.5:1 at peak load condition was found to be superior engine characteristics through experimental assessment and ANN, RSM models. In the predicted ANN model the mean absolute average error (MAAE) was 0.552% and optimized RSM model MAAE was 1.231%. The ANN and RSM models gave the average correlation coefficient (R) of 0.998 and average coefficient of a determination (R^2) of 0.991 respectively. The

Document details - Correlation Based Feature Selection Algorithms for Varying Datasets of Different Dimensionality

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Volume 108, Issue 3, 1 October 2019, Pages 1977-1993

Correlation Based Feature Selection Algorithms for Varying Datasets of Different Dimensionality(Article)

Kowshalya, A.M., Madhumathi, R., Gopika, N.

[a]Department of CSE, Government College of Technology, Coimbatore, India
[b]Department of CSE, Sri Ramakrishna Engineering College, Coimbatore, India

Abstract

Curse of dimensionality problem needs to be addressed carefully when designing a classifier. Given a huge dimensional dataset, one interesting problem is the choice of optimal selection of features for classification. Feature selection is an interesting and most optimal solution to the curse of dimensionality problem. Numerous feature selection algorithms have been proposed in the recent past to solve the curse of dimensionality problem but no one stop solution prevails. This paper proposes two novel algorithms for feature selection namely Reverse Piece-wise Correlation Based Feature Selection (RPwCBFS) and Shuffled Piece-wise Correlation Based Feature Selection (SPwCBFS) that divides the feature space into pieces and computes the similarity of feature subsets in reverse order and in random shuffled manner respectively. The proposed algorithms are compared with Fast Correlation Based Feature selection (FCBF), Fast Correlation Based Feature selection # (FCBF#) and Fast Correlation Based Feature selection in Piece (FCBFiP). Standard medium and huge dimensional datasets are used for experimentation purpose. Experimental results prove that the Reverse Piece-wise Correlation Based Feature Selection algorithm (RPwCBFS) and Shuffled Piece-wise Correlation Based Feature Selection algorithm (SPwCBFS) are prominent solution for feature selection when the underlying dataset is medium sized. For huge dimensional datasets, Shuffled Piece-wise Correlation Based Feature Selection algorithm (SPwCBFS) proves to be an optimal choice. © 2019, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Correlation · Curse of dimensionality · Feature selection · Symmetric uncertainty

Indexed keywords

Document details - Impact resistance, microstructures and digital image processing on self-compacting concrete with hooked end and crimped steel fiber

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Construction and Building Materials

Volume 220, 30 September 2019, Pages 651-666

Impact resistance, microstructures and digital image processing on self-compacting concrete with hooked end and crimped steel fiber(Article)

Mahakavi, P., Chithra, R.

Department of Civil Engineering, Government College of Technology, Coimbatore, Tamilnadu 641013, India

Abstract

This research paper presents the results of extensive experimental investigations and analytical results on the fresh and hardened properties of self-compacting concrete reinforced with hybrid hooked end fiber (HF) and crimped steel fiber (CF) in different fiber volume fractions. In this present investigation, the mixes were reinforced with different fiber combinations of hooked end fiber (0.25, 0.5 and 0.75%) and crimped fiber (0.25 and 0.5%). The fresh state properties of the mixes were characterized by using slump flow diameter, T_{50cm} and V-funnel test. The hardened properties of self-compacting concrete (SCC) mixes were assessed by using compressive strength, flexural strength and impact resistance test. Regression analysis was carried out in order to correlate the fresh and hardened state on the extensively large volume of collected experimental data. The results reported that adding hybrid hooked end-crimped steel fiber significantly improves the compressive strength, flexural strength and impact resistance. Addition of hooked end steel fiber led to improve the compressive strength when compared to crimped end fiber. Moreover, increasing the crimped fiber content decreased the effect of hooked end steel fiber in flexural strength improvement. © 2019 Elsevier Ltd

Author keywords

Compressive strength · Crimped fiber · Fresh properties · Hooked end fiber · Impact resistance · Microscopic analysis · Self compacting concrete · Toughness

Indexed keywords

Engineering controlled terms: Bending strength · Compressive strength · Hardening · Image processing · Impact resistance · Impact strength · Regression analysis · Reinforcement · Steel fibers · Toughness

Document details - A novel proactive Health Aware Fault Tolerant (HAFT) scheduler for computational grid based on resource failure data analytics

1 of 1

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International Journal of Computers and Applications

Volume 41, Issue 5, 3 September 2019, Pages 367-377

A novel proactive Health Aware Fault Tolerant (HAFT) scheduler for computational grid based on resource failure data analytics(Article)

Ebenezer, A.S., Rajsingh, E.B., Kallaperumal, B.

[a]Department of Computer Sciences Technology, Karunya Institute of Technology and Sciences, Coimbatore, India
[b]Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India

Abstract

In a heterogeneous distributed computing environment, developing a fault tolerance mechanism is a key research issue. Most of the existing fault tolerance approaches for distributed computing environment are post-active. These post-active approaches, predominantly involve the heartbeat strategy for fault detection and the checkpointing mechanism for fault recovery. In this proposed work, a proactive Health Aware Fault Tolerant (HAFT) scheduler using the Cox Proportional Hazard survival probability model is developed. The survival probability of the resource is estimated using resource failure data analytics and termed as health coefficient of the resource. For the job distribution classes jclass1, jclass2, and jclass3, the average improvement for makespan in HAFT algorithm over the compared algorithms are 44, 59.6, and 26.4%. In a heterogeneous environment, the job failure rate of the HAFT scheduler is ranging between 15 and 20% and it is stable for all the three jclasses. In a homogenous environment, the job failure rate of HAFT algorithm in comparison to IRP, REP and MJSP algorithm is considerably reduced by 58.6, 26.4, and 11.6%, respectively. For a failure probability higher than 0.4, the resource efficiency of HAFT algorithm on an average is 26% more than MJSP and 53% more than REP. © 2018, © 2018 Informa UK Limited, trading as Taylor & Francis Group.

Author keywords

computational grid · Failure data analytics · failure prediction · failure probability · job failure rate · makespan · proactive fault tolerant scheduler

Indexed keywords

Engineering controlled terms: Electric fault currents · Failure (mechanical) · Failure analysis · Fault detection · Grid computing · Health · Probability

Cited by 3 documents

Mrugalski, M.
Identification and health-aware economic control of production systems: A fuzzy logic max plus algebraic approach
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Document details - Chitosan capped ZnO nanoparticles with cell specific apoptosis induction through P53 activation and G2/M arrest in breast cancer cells – In vitro approaches

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International Journal of Biological Macromolecules

Volume 136, 1 September 2019, Pages 686-696

Chitosan capped ZnO nanoparticles with cell specific apoptosis induction through P53 activation and G2/M arrest in breast cancer cells – In vitro approaches(Article)

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[b]Government College of Technology, Department of Chemistry, Coimbatore, Tamil Nadu 641 013, India

Abstract

Now a days the well-organized strategy to induce apoptosis in cancer chemotherapy is to produce anti-cancer agent without any side effects is in needy. Hence the present investigation was aimed to explore the anticancer potentials of Amorphophallus paeoniifolius reduced zinc nanoparticles capped with chitosan against MCF 7 cell line (breast cancer cells)and studied for its optical and surface charge properties. The size, shape, dispersion and uniform distribution of biosynthesized zincoxide nanoparticle was examined using Field emission scanning electron microscope (FESEM) and Transmission electron microscope (TEM) respectively. The spherical and cubic nanocrystals were found to be lethal against MCF 7 cells on MTT assay at dose dependant manner (20–80 μg/ml) whose IC_{50} value 42 μg/ml. Bright field light microscopic study showed the apoptotic morphology of treated and control MCF-7 cells. Fluorescence staining A/O:EB and DAPI methods further cleared the chromosome condensation, nuclear fragmentation and confirms the apoptosis induced by Ch-Ap-ZnONPS within IC_{50} concentrations. Significant cell cycle arrest at particular stage of G2/M was achieved with the nanocomplex treatment at dose dependant manner. Finally, it was observed that the apoptotic gens and protein expressions of MCF-7 cell line were up and down regulation with the treatment of Ch-Ap-ZnONPS when compared to normal cells. © 2019 Elsevier B.V.

Author keywords

FESEM · TEM · Western blot

Cited by 17 documents

Hannachi, E. , Khan, F.A. , Slimani, Y.
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(2023) Process Biochemistry

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Document details - Corrigendum to "Effects of doping concentration on structural, morphological, optical and electrical properties of tungsten doped V₂O₅ nanorods" [Ceram. Int. 44 (2018) 7098–7109] (S0272884218301640)(10.1016/j.ceramint.2018.01.149)

Ceramics International
Volume 45, Issue 13, September 2019, Page 16723

Corrigendum to "Effects of doping concentration on structural, morphological, optical and electrical properties of tungsten doped V_2O_5 nanorods" [Ceram. Int. 44 (2018) 7098–7109] (S0272884218301640)(10.1016/j.ceramint.2018.01.149)(Erratum)

Pradeep, I., Ranjith Kumar, E., Suriyanarayanan, N., Srinivas, C., Mehar, M.V.K., Senthil Kumar, N.
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Original document

Effects of doping concentration on structural, morphological, optical and electrical properties of tungsten doped V_2O_5 nanorods
(2018) Ceramics International, 44 (6), pp. 7098-7109

Abstract

The authors regret that in the original published version of this article the author N. Senthil Kumar was missing from the author list. The author is added here. The authors would like to apologise for any inconvenience caused. Mr. I. Pradeep and Mr. N. Senthil Kumar worked jointly in the same system up to basic preparation work. Then, they extended their work for different applications. Mr. N. Senthil Kumar is now included as a co-author for his contribution to this paper. © 2018 Elsevier Ltd and Techna Group S.r.l.

Document details - Model transformation using logical prediction from sequence diagram: an experimental approach

Cluster Computing
Volume 22, 1 September 2019, Pages 12351-12362

Model transformation using logical prediction from sequence diagram: an experimental approach(Article)

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[b]Department of Computer Science and Information Technology, Government College of Technology, Coimbatore, India
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Abstract

Recent trends on software development life cycle (SDLC) deal much on automatic processes that leads to time and cost reduction. In the era of model driven architecture (MDA), unified modeling language (UML) models are the backbone of any developing software. A minimum of 5 models out of 14 models need to be designed to completely visualize any software. The proposed logical prediction model transformation automates the transformation of two models from the sequence diagram. Each model carries same information of the other models in different aspects to visualize the requirement constraints in different dimensions. In order to take the advantage of this, sequence diagram has been considered as a pioneer from MDA approach to generate other models automatically. Information such as elements, attributes, relationships, etc., of the sequence diagram are extracted using XML object model parser. The extracted information from sequence diagram combined with the pre-defined logical prediction rules, generates the elements and relationships of other models. The outcome of transformed information is rendered by PlantUML structure to produce the desired model. The experiment undertaken has been focused to generate class diagram and activity diagram based on the pre-defined logical prediction rules. It also confirms the transformation process proposed, generates suitable and appropriate class and activity diagrams. This transformation process has a scalability to generate any model from the other model based on proper logical prediction rules. This automation proposal eases the task of designer in design engineering phase of the SDLC. © 2018, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Logical prediction, Model transformation, UML models, XMI

Indexed keywords

Engineering controlled terms: Computer software, Cost reduction, Forecasting, Life cycle, Software architecture, Systems analysis, Unified Modeling Language

Document details - Structural and magnetic properties of CuFe ₂ O ₄ ferrite nanoparticles synthesized by cow urine assisted combustion method

Journal of Magnetism and Magnetic Materials

Volume 484, 15 August 2019, Pages 120-125

Structural and magnetic properties of $CuFe_2O_4$ ferrite nanoparticles synthesized by cow urine assisted combustion method(Article)

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View additional affiliations

Abstract

Copper ferrite ($CuFe_2O_4$) nanoparticles were synthesized by sol-gel auto combustion method using cow-urine as a chelating agent. The obtained ferrite nanoparticles are heat treated at different temperatures (450 °C and 750 °C) in order to study their size dependent structural and magnetic properties. Energy Dispersive X-ray (EDX) spectra showed the maintenance of stoichiometry of elemental composition of ferrite system. Secondary phases of CuO and α-Fe_2O_3 are identified from the X-ray diffraction (XRD) patterns and these phases seem to be reducing with the heat treatment improving the ferrite phase of the sample. A systematic variation of structural parameters that is decrease of lattice parameter (8.379–8.369 Å) and increase in average crystallite size (13.7–18.2 nm) have been found with the heat treatment. The average particle size estimated from Field Emission Scanning Electron Microscopy (FE-SEM) micrographs (14.5–22.3 nm) is slightly bigger than the average crystallite size estimated from XRD is due to the coalescence of crystallites which can be identified in FE-SEM micrographs. The obtained vibrational frequencies in the range of 550–450 cm^{-1} confirm the ferrite phase of copper ferrite. The splitting observed at the octahedral vibrational band is assigned to the secondary phase of α-Fe_2O_3. The saturation magnetization (Ms) is increasing with the heat treatment and highest value of Ms = 35.4 emu/g was reported. The results are discussed in terms of variation of particle sizes presuming the core–shell interactions. © 2019 Elsevier B.V.

Author keywords

Magnetic properties | Nanoparticles | Secondary phases | XRD

Document details - Importance of cesium carbonate additives in the nucleation and growth of α- and γ-glycine single crystals

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Molecular Crystals and Liquid Crystals

Volume 689, Issue 1, 13 August 2019, Pages 48-59

Importance of cesium carbonate additives in the nucleation and growth of α- and γ-glycine single crystals(Article)

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Abstract

In the present work, successful growth of α- and γ-glycine single crystals using cesium carbonate (Cs2CO3) as an additive has been reported. The powder XRD study confirms that the grown 0.2 M cesium carbonate added glycine crystal has α-glycine crystal morphology and it crystallized in a monoclinic crystal structure with a space group of P21/n. In a similar manner, the PXRD patterns recorded for 0.4, 0.6, 0.8 and 1 M concentrations of cesium carbonate added glycine crystals and the obtained PXRD patterns authenticated that the harvested grown crystals belong to hexagonal crystal system with space group P31. The variation of dielectric constant and dielectric loss for the γ-glycine single crystal was carried out as a function of frequency and the results were discussed in detail. The transmittance spectrum shows that the grown α- and γ-glycine crystals had an extensive optical transparency window in the entire spectrum especially in visible region. The band gap varies from 4.59 to 6.01eV. The positive photoconducting nature of the grown γ-glycine single crystal in the presence of cesium carbonate was studied by the photoconductivity study. The second harmonic generation (SHG) for the prepared γ-glycine single crystals was studied by using Kurtz and Perry powder technique with Nd-YAG laser. The result shows that the prepared γ-glycine single crystals exhibit enhanced second harmonic conversion efficiency and it proves that these crystals are an alternate to KDP crystal in optoelectronic devices and NLO applications. © 2019, © 2019 Taylor & Francis Group, LLC.

Author keywords

Cesium carbonate | dielectric materials | glycine | nonlinear optical materials

Indexed keywords

Engineering controlled terms: Additives | Amino acids | Carbonation | Conversion efficiency | Crystal structure | Dielectric losses

Document details - FPGA implementation of cost-effective robust Canny edge detection algorithm

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Journal of Real-Time Image Processing

Volume 16, Issue 4, 13 August 2019, Pages 957-970

FPGA implementation of cost-effective robust Canny edge detection algorithm(Article)

Sangeetha, D., Deepa, P.

Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, Tamil Nadu 641 013, India

Abstract

Implementation of Canny edge detection algorithm significantly outperforms the existing edge detection techniques in many computer vision algorithms. However, Canny edge detection algorithm is complex, time-consuming process with high hardware cost. To overcome these issues, a novel Canny edge detection algorithm is proposed in block level to detect edges without any loss. It uses sobel operator, approximation methods to compute gradient magnitude and orientation for replacing complex operations with reduced hardware cost, existing non-maximum suppression, block classification for adaptive thresholding and existing hysteresis thresholding. Pipelining is introduced to reduce latency. The proposed algorithm is implemented on Xilinx Virtex-5 FPGA and it provides better performance compared to frame-level Canny edge detection algorithm. The synthesized architecture reduces execution time by 6.8 % and utilizes less resource to detect edges of 512 x 512 image compared to existing distributed Canny edge detection algorithm. © 2016, Springer-Verlag Berlin Heidelberg.

Author keywords

Canny edge detection algorithm | FPGA | Hardware-cost | Image processing | VLSI architecture

Indexed keywords

Engineering controlled terms: Computer hardware | Cost effectiveness | Costs | Field programmable gate arrays (FPGA) | Hardware | Image processing | Signal detection

Engineering uncontrolled terms: Approximation methods | Canny edge detection | Computer vision algorithms | Hardware cost | Hysteresis thresholding | Non-maximum suppression | Synthesized architecture | VLSI architectures

Document details - Microbial fuel cell–based self-powered biosensor for environment monitoring in IoT cloud framework

1 of 1

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Concurrency and Computation: Practice and Experience

Volume 31, Issue 15, 10 August 2019, Article number e5165

Microbial fuel cell–based self-powered biosensor for environment monitoring in IoT cloud framework(Article)

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Abstract

Renewable energy sources are useful for sustainable monitoring, but still very limited today due to various implementation constraints. Microbial fuel cells (MFCs) are considered a promising renewable power source for remote monitoring applications. They are used as wireless temperature sensors and biosensors due to their ability in powering environmental sensors. MFCs can provide ultralow and dynamic power, and hence, energy improvement is crucial for self-powered biosensors. Cloud computing–based IoT framework is proposed for environment monitoring using MFC-based biosensors. This paper presents the electric energy harvesting from Oryza Sativa plants with bacteria as the catalyst. It adopts the technology of MFC in the plants to extract the maximum energy. An effective power management with IoT cloud framework is presented in this work to independently operate multiple MFCs to generate maximum power. Independently operated MFCs with electrically isolated electrodes have been utilized in the design of a suitable power management system. Cloud computing is utilized in this work to process the data generated in continuous monitoring of environment. Experimental results show that the proposed framework can achieve sustainable power for sensor nodes and achieves maximum performance in environment monitoring using cloud-based IoT platform. © 2019 John Wiley & Sons, Ltd.

Author keywords

cloud computing | environment monitoring | Internet of Things | microbial fuel cell | power management system | remote monitoring

Indexed keywords

Engineering controlled terms: Biosensors | Cloud computing | Electric power measurement | Energy harvesting | Microbial fuel cells | Monitoring

Document details - Enhanced Pb (II) ions removal by using magnetic NiO/Biochar composite

Materials Research Express

Volume 6, Issue 10, 7 August 2019, Article number 105504

Enhanced Pb (II) ions removal by using magnetic NIO/Biochar composite(Article)

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Abstract

The core objective of this work is to establish the performance and characterization of carbon nanocomposite which is derived from agricultural invasive waste and its application on the removal of Pb(II) ions. Biochar was prepared from Prosopis juliflora wood by commercial thermal activation process and mesoporous NiO/Biochar (PJONC) composite synthesized by novel precipitation approach. The activated carbon and PJONC composite were characterised by x-ray diffraction (XRD), pHpzc, BET surface area (BET), scanning electron microscopy (SEM), FTIR and VSM studies. The efficiency sorption parameters such as; pH study, equilibration time, the dosage of adsorbents, feed concentration and kinetic behaviours were studied. At the optimized conditions, the four different isotherms such as Langmuir, Freundlich, Temkin and Dubinin-Radushkevich studies were carried out for each of the adsorbents. It revealed that multi-layer Freundlich isotherm is more reasonable and the Pb(II) ions removal capacity (q_e) (mg g^{-1}) was 28 mg g^{-1} for activated carbon, 43.0 mg g^{-1} for nanocomposite. Thermodynamic parameter values (ΔS, ΔH, ΔG) were calculated and it was indicated that this adsorption process depended on the temperature and it was spontaneous and exothermic nature. The PJONC is a soft magnetic material, so it can be used in the environmental remediation field and also this adsorbent can be efficiently separated from treated water by using magnetic field. © 2019 IOP Publishing Ltd.

Author keywords

adsorption, nanocomposite, NiO/Biochar, Pb (II) ions, precipitation method, prosopis juliflora

Indexed keywords

Engineering controlled terms: Activated carbon, Adsorption, Ions, Isotherms, Magnetic materials, Magnetism, Nanocomposites

Document details - An Effective Pseudonym-based Privacy Preservation Mechanism for Securing Services in Cloud Computing Environment

Applied Mathematics and Information Sciences

Volume 13, August 2019, Pages 221-229

An Effective Pseudonym-based Privacy Preservation Mechanism for Securing Services in Cloud Computing Environment(Article)

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Abstract

The cloud computing environment facilitates diversified number of potential services to its users such as the utilization-based pricing that is, every cloud provider has its own pricing scheme, on-demand service utilization and risk transference during the process of resource sharing. However, the security to cloud services during the event of data sharing is considered as the crucial task. In this paper, an Effective Pseudonym-based Privacy Preservation Mechanism (EP-PPM) is proposed for facilitating significant data sharing using the method of erasable data hiding. This EP-PPM approach utilizes the benefits of the P-Gene for hiding the data in order to prevent the overhead occuring during the process of data exchange provisioned between the cloud servers and its users. This EP-PPM scheme ensures secureness to the cloud services by periodic updating of pseudonym based on bilinear maps, that is shared between the interacting entities of the cloud environment. The simulation experiments and investigations of the proposed EP-PPM scheme evaluated, using the pseudonym generation and verification cost occuring in the process of securing cloud services, confirm a predominant improvement over the benchmarked security approaches of the literature. The percentage of privacy-preservation is calculated based on number of cloud service. As compared to the proposed EP-PPM scheme with existing IPN-PPM, P2E-CDSS and RDIC-PPM methods, the proposed method achieves the best results. © 2019. NSP Natural Sciences Publishing Cor.

Author keywords

Cloud computing, cloud services, privacy preservation mechanism

Document details - Relationship Based Heuristic for Selecting Friends in Social Internet of Things

Wireless Personal Communications

Volume 107, Issue 4, 1 August 2019, Pages 1537-1547

Relationship Based Heuristic for Selecting Friends in Social Internet of Things(Article)

Arjunasamy, A., Rathi, S.

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Abstract

Internet of Things is the future era of computing, where every conventional object are equipped with sensing and communicating capabilities to co-ordinate with each other autonomously to achieve a common goal. Social Internet of Things is the recent enhancement of Internet of Things where the communication between objects employs theories and observations from human social behavior with various types of relationships. The number of objects directly communicating with a device needs to be managed intelligently to cope with the memory and computational capacity of each object. Heuristic which are developed earlier uses graphical property of the device; this is the first work to the best of our knowledge to adopt the type of relationship in relationship management heuristic. An analysis is also presented after applying the heuristic in an Social Internet of Things environment. © 2019, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Internet of Things · Relationship management heuristic · Social Internet of Things

Indexed keywords

Engineering controlled terms: Behavioral research · Computation theory

Engineering uncontrolled terms: Computational capacity · Relationship management · Social behavior

Document details - Production of medium strength self compacting concrete using silica fume and quarry dust

International Journal of Engineering and Advanced Technology

Volume 8, Issue 6 Special Issue, August 2019, Pages 65-72

Production of medium strength self compacting concrete using silica fume and quarry dust(Article) (Open Access)

Chithra, R., Ramadevi, K., Chithra, S., Ravindranath Chandra, R., Mangaleshwaran, L.

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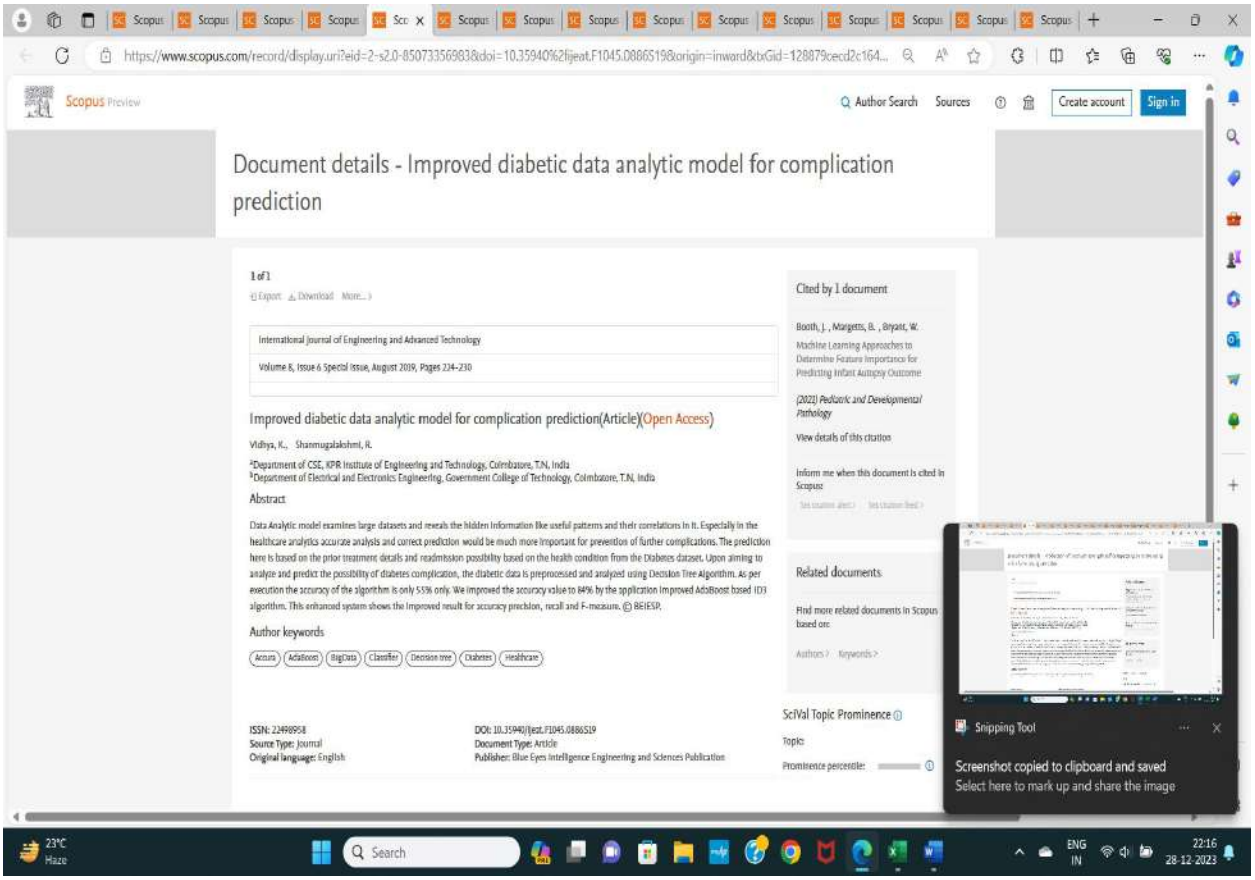
Abstract

Self Compacting Concrete (SCC) is able to compact under its own mass in thin sections and in congested reinforced zones due to its high fluidity and cohesiveness. In order to produce an eco-friendly self compacting concrete with characteristic compressive strength of 40MPa, a fine industrial by-product silica fume is used as a partial substitutefor cement by weight (5%, 7.5% and 10%) and in addition to that quarry dust is partially replaced for natural fine aggregate from 5 to 15% with an increment of 5%. To study the effect of silica fume and quarry dust in fresh and hardened properties of medium strength self compacting concrete, 10 different SCC mixes were designed using Japanese method. From the experimental studyit was observed that the SCC mix containing 7.5% silica fume and 5% quarry dust exhibits the equivalent properties as that of SCC mix made with conventional materials and found to be optimum. Also, analytical expressions are proposed to predict the indirect tensile strength and flexural strength of SCC in terms of compressive strength and the results are compared with the existing codal provisions. © BEIESP.

Author keywords

Eco-friendly · Fresh Properties · Mechanical properties · Quarry Dust · Self Compacting Concrete · Silica Fume

ISSN: 22498958 · DOI: 10.35940/ijeat.F1013.0886S19



Document details - Improved diabetic data analytic model for complication prediction

1 of 1

International Journal of Engineering and Advanced Technology
Volume 8, Issue 6 Special Issue, August 2019, Pages 224-230

Improved diabetic data analytic model for complication prediction(Article)(Open Access)

Vidhya, K., Shanmugalakshmi, R.
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[b]Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, T.N, India

Abstract

Data Analytic model examines large datasets and reveals the hidden information like useful patterns and their correlations in it. Especially in the healthcare analytics accurate analysis and correct prediction would be much more important for prevention of further complications. The prediction here is based on the prior treatment details and readmission possibility based on the health condition from the Diabetes dataset. Upon aiming to analyze and predict the possibility of diabetes complication, the diabetic data is preprocessed and analyzed using Decision Tree Algorithm. As per execution the accuracy of the algorithm is only 55% only. We improved the accuracy value to 84% by the application Improved AdaBoost based ID3 algorithm. This enhanced system shows the improved result for accuracy precision, recall and F-measure. © BEIESP.

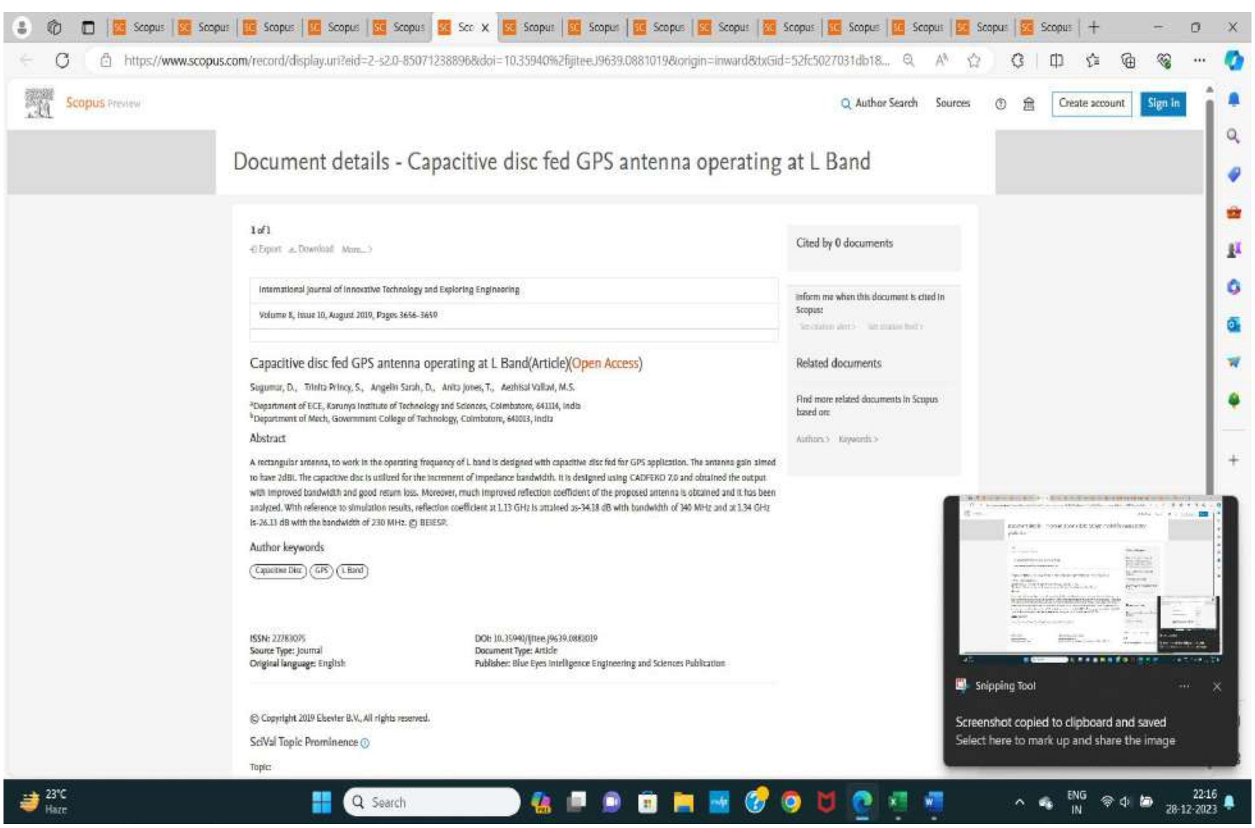
Author keywords

Accura, AdaBoost, BigData, Classifier, Decision tree, Diabetes, Healthcare

ISSN: 22498958
Source Type: Journal
Original language: English
DOI: 10.35940/ijeat.F1045.0886S19
Document Type: Article
Publisher: Blue Eyes Intelligence Engineering and Sciences Publication

Cited by 1 document

Booth, J., Margetts, B., Bryant, W.
Machine Learning Approaches to Determine Feature Importance for Predicting Infant Autopsy Outcome
(2021) Pediatric and Developmental Pathology



Document details - Capacitive disc fed GPS antenna operating at L Band

1 of 1

International Journal of Innovative Technology and Exploring Engineering
Volume 8, Issue 10, August 2019, Pages 3656-3659

Capacitive disc fed GPS antenna operating at L Band(Article)(Open Access)

Sugumar, D., Trinita Princy, S., Angelin Sarah, D., Anita Jones, T., Aezhisai Vallavi, M.S.
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Abstract

A rectangular antenna, to work in the operating frequency of L band is designed with capacitive disc fed for GPS application. The antenna gain aimed to have 2dBi. The capacitive disc is utilized for the increment of impedance bandwidth. It is designed using CADFEKO 7.0 and obtained the output with improved bandwidth and good return loss. Moreover, much improved reflection coefficient of the proposed antenna is obtained and it has been analyzed. With reference to simulation results, reflection coefficient at 1.13 GHz is attained as-34.18 dB with bandwidth of 340 MHz and at 1.34 GHz is-26.11 dB with the bandwidth of 230 MHz. © BEIESP.

Author keywords

Capacitive Disc, GPS, L Band

ISSN: 22783075
Source Type: Journal
Original language: English
DOI: 10.35940/ijitee.J9639.0881019
Document Type: Article
Publisher: Blue Eyes Intelligence Engineering and Sciences Publication

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Document details - Citrus classification and grading using machine learning algorithms

International Journal of Innovative Technology and Exploring Engineering

Volume 8, Issue 10, August 2019, Pages 2616-2621

Citrus classification and grading using machine learning algorithms(Article)(Open Access)

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Abstract

Sorting of fruit into different grade is essential to fetch high price in the market. The fruits are graded based on height, size, area and weight. Each and every fruit changes the skin's color in their life span. Hence, it is appropriate to grade them by processing color images of them and then applying estimation or recognition techniques on those images. Citrus (plant) grows even in temperature lands and it does not penetrate its root too deep. It is a precious commodity and used for various day to day activities. In this paper, Machine vision technique is used to sort citrus based on variety and quality. Primarily, the image is captured by a camera, placed at a particular distance. Then captured citrus image is classified into different categories, based on their color, size and quality. During the processing, the attributes are determined based on their defects in the surface of the citrus. Finally, the quality and breed are determined based on the three-color planes of color image and gray scale image respectively. ©BEIESP.

Author keywords

Citrus Classification Machine learning Machine vision Unsupervised algorithm

ISSN: 22783075
Source Type: Journal
Original language: English

DOI: 10.35940/ijitee.J9349.0881019
Document Type: Article
Publisher: Blue Eyes Intelligence Engineering and Sciences Publication

Document details - New barium, strontium and strontium-doped barium squarates: Synthesis, crystal structures and DNA/BSA binding, antioxidant and in vitro cytotoxicity studies

Acta Crystallographica Section C: Structural Chemistry

Volume 75, 1 August 2019, Pages 1091-1101

New barium, strontium and strontium-doped barium squarates: Synthesis, crystal structures and DNA/BSA binding, antioxidant and in vitro cytotoxicity studies(Article)

Vadivana, K.T.P., Parveen, S., Ushadevi, B., Selvakumar, R., Sangeetha, S., Vairam, S.

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View additional affiliations

Abstract

A new set of differently hydrated barium and strontium squarates, namely poly[[triaqua(-1,2-dioxocyclobut-3-ene-1,2-diolato)barium] monohydrate], {[Ba-(C4O4)(H2O)3]-H2O}n (1), poly[[diaqua(-1,2-dioxocyclobut-3-ene-1,2-diolato)-strontium] monohydrate], {[Sr(C4O4)(H2O)2]-H2O}n (2), and poly[[triaqua(-1,2-dioxocyclobut-3-ene-1,2-diolato)barium/strontium(0.85/0.15)] monohydrate], {[Ba0.85Sr0.15(C4O4)(H2O)3]-H2O}n (3), is reported. The study of their crystal structures indicates that all the complexes crystallize in the triclinic space group P1. Complexes 1 and 3 have a rare combination of squarate units coordinated through monodentate O atoms to two different metal atoms and through two bidentate O atoms to three different metal atoms. Furthermore, they have three coordinated water molecules to give a coordination number of nine. The squarate ligands in complex 2 exhibit two different coordination modes: (i) monodentate O atoms coordinated to four different Sr atoms and (ii) two monodentate O atoms coordinated to two different metal atoms with the other two O atoms bidentate to four different Sr atoms. All the compounds decompose to give the respective carbonates when heated to 800-C, as evidenced by thermogravimetry/differential thermal analysis (TG-DTA), which are clusters of nanoparticles. Complexes 1 and 3 show additional endothermic peaks at 811 and 820-C, respectively, indicating the phase transition of BaCO3 from an orthorhombic (-Pmcn) to a trigonal phase (-R3m). All three complexes have significant DNA-binding constants, ranging from 2.45-104 to 9.41-104 M-1 against EB-CT (ethidium bromide-calf thymus) DNA and protein binding constants ranging from 1.1-105 to 8.6-105 with bovine serum albumin. The in vitro cytotoxicity of the complexes is indicated by the IC50 values, which range from 128.8 to 261.3 mg ml-1. Complex 3 shows better BSA

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Document details - The influence of ceramic-coated piston crown, exhaust gas recirculation, compression ratio and engine load on the performance and emission behavior of kapok oil–diesel blend operated diesel engine in comparison with thermal analysis

Environmental Science and Pollution Research

Volume 26, Issue 24, 1 August 2019, Pages 24772-24794

The influence of ceramic-coated piston crown, exhaust gas recirculation, compression ratio and engine load on the performance and emission behavior of kapok oil–diesel blend operated diesel engine in comparison with thermal analysis(Article)

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Abstract

In this work, the development and usability of kapok oil in diesel engine was intended. With this purpose, the piston crowns are coated with mullite-lanthanum (ML) ceramic composite at varying compositions in order to reduce the heat rejection during combustion process. The kapok oil is blended with diesel fuel consisting of (20% kapok oil–80% diesel) volumetrically named B fuel. The B and diesel (D) fuels are taken for the engine performance test with different coated piston (ML1, ML2, and ML3) and exhaust gas recirculation (EGR—10%, 20%, and 30%), compression ratio (CR—16, 17, and 18) and engine load (50%, 75%, and 100%). Also, the engine performance study on brake thermal efficiency (BTE), brake-specific fuel consumption (BSFC), hydrocarbons (HCs), oxides of nitrogen (NOx), carbon monoxide (CO), smoke opacity, and numerical study using ANSYS software is carried out. When operated with ML2-coated pistons with B fuel, maximum BTE value of 29.2%, minimum BSFC value of 0.224 kg/kW-h, CO emission of 0.2%, and smoke opacity of 39 ppm were observed. The results showed that ML2-coated piston considerably improved the performance of the test engines when compared with ML1 and ML3 coatings. Except for NOx emission, all other pollutant emission values were reduced. The numerical analysis using ANSYS software for ML2-coated pistons showed better retention of in-cylinder chamber temperature. © 2019,

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Experimental analysis of diesel/biodiesel blends with a nano additive for the performance and emission characteristics of CI Engine
(2023) International Journal of Engine Research

Putrawan, I.D.G.A. , Azharuddin, A. , Jumrawati, J.
Preparing epoxidized vegetable oil from waste generated by the kapok fiber industry and assessing its thermal stabilization effect as a co-stabilizer for polyvinyl chloride
(2023) Heliyon

Chidambaranathan, B. , Kumarasami, D.P. , Raghavan, S.
Thermal and chemical exhaust gas recirculation potential of punnai oil biodiesel-fuelled diesel engine for environmental sustainability
(2023) Environmental Science and Pollution Research

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Trilateral Filter

Journal of Circuits, Systems and Computers

Volume 28, Issue 9, 1 August 2019, Article number 1950150

De-Speckling of Ultrasound Images Using Local Statistics-Based Trilateral Filter(Article)

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Department of ECE, Government College of Technology, Coimbatore, 641013, India

Abstract

Speckle noise in ultrasound images is a major hindrance for the automation of segmentation, detection, classification and measurements of region of interest, to assist clinician for diagnosing pathologies. Speckle noise occurs due to constructive and destructive interference of the echo signals reflected from the target and has a granular appearance. Various techniques have been devised for speckle reduction. Most of these techniques are based on adaptive filters, wavelet transform and anisotropic diffusion filters. In this paper, a new speckle reduction technique based on the trilateral filter and local statistics of the image has been developed. The local speckle content of the image influences the trilateral filtering. The trilateral filter is a robust edge preserving filter which considers the similarity of neighboring regions in terms of adjacency, intensity and edge details. Hence, the new method preserves the finer details of the ultrasound images in the process of filtering speckle noise. The proposed technique is validated using synthetic, simulated and real-time clinical ultrasound images. Comparison of the proposed technique with the existing speckle removal algorithms in terms of quality metrics such as MSE, PSNR, UQI, SSI, FoM has been made and best results are obtained for the proposed technique. © 2019 World Scientific Publishing Company.

Author keywords

adaptive filters | De-noising | local statistics | medical ultrasound images | speckle | trilateral filter

Indexed keywords

Engineering controlled terms: Adaptive filters | Diagnosis | Image segmentation | Medical imaging | Speckle | Ultrasonic applications | Wavelet transforms

Engineering uncontrolled terms: Anisotropic diffusion filters | De-noising | Destructive interference | Edge-preserving filter | Local statistics | Medical ultrasound images | Trilateral filter | Trilateral filtering

Engineering main heading: Adaptive filtering

Cited by 3 documents

Painam, R.K. , Manikandan, S.
BEMD based adaptive Lee filter for despeckling of SAR images
(2023) Advances in Space Research

Kuladhilake, K.A.S.H. , Abdullah, N.A. , Sabri, A.Q.M.
A review on self-adaptation approaches and techniques in medical image denoising algorithms
(2022) Multimedia Tools and Applications

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Document details - A Complete Analytical Characterization of Products Obtained from Pyrolysis of Wood Barks of Calophyllum inophyllum

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Waste and Biomass Valorization

Volume 10, Issue 8, 1 August 2019, Pages 2319-2333

A Complete Analytical Characterization of Products Obtained from Pyrolysis of Wood Barks of Calophyllum inophyllum(Article)

Sakthivel, R., Ramesh, K., Shameer, P.M., Purnachandran, R.

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[b]Thanjavur, India
[c]Department of Mechanical Engineering, Faculty of Engineering, Government College of Technology, Coimbatore, 641013, India

View additional affiliations

Abstract

This research article aims to analyze the properties and characteristics of the products obtained from slow pyrolysis of wood barks of matured Calophyllum inophyllum (CI) tree. The bio-oil, gas and biochar obtained from the slow pyrolysis carried out at 550 °C in a fixed bed batch type reactor at a heating rate of 30 °C min^{-1} were characterized by different analytical techniques. Owing to the lofty volatile content of CI biomass (72.61%), it was chosen as the raw material in this current experimental investigation. FT-IR and GC–MS results of bio-oil showed the existence of elevated amount phenol derivatives, oxygenated compounds, acids, esters and furans. The physicochemical properties of the bio-oil sample were tested in accordance with ASTM standards which clearly showed that bio-oil is a highly viscous liquid with lower heating value as compared to that of diesel fuel. The chemical composition of pyrolytic gas was analyzed by using Gas Chromatography which revealed the presence of combustible organic components. The FT-IR results of biochar showed the presence of aromatic and aliphatic hydrocarbons whereas the increased amount of carbon in biochar reveals its potential to be used as solid fuel for commercial purposes. © 2018, Springer Science+Business Media B.V., part of Springer Nature.

Author keywords

Calophyllum inophyllum | FT-IR | GC-MS | Pyrolysis | Wood bark

Indexed keywords

Engineering controlled: Aromatic hydrocarbons | ASTM standards | Biofuels | Calorific value | Diesel fuels | Gas chromatography

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ACS Omega

Volume 4, Issue 7, 31 July 2019, Pages 12919-12926

Role of ruthenium in the dielectric, magnetic properties of nickel ferrite (Ru-$NiFe_2O_4$) nanoparticles and their application in hydrogen sensors(Article)(Open Access)

Manikandan, V., Mirzaei, A., Vigneselvan, S., Kavita, S., Mane, R.S., Kim, S.S., Chandrasekaran, J.

[a]Department of Physics, Kongunadu Arts and Science College, Coimbatore, 641-029, India
[b]Department of Materials Science and Engineering, Shiraz University of Technology, Shiraz, 71557-13876, Iran
[c]Department of Physics, Government College of Technology, Coimbatore, 641013, India

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Abstract

In this work, Ru-doped nickel ferrites ($NiFe_2O_4$) were synthesized by a chemical co-precipitation method. Subsequently, they were annealed at different temperatures. The crystallinity of the samples was evaluated using X-ray diffraction and the morphology of the samples was investigated by scanning electron microscopy and transmission electron microscopy. Dielectric constants and dielectric loss were studied. Ru-doped nickel ferrite samples showed relatively low dielectric constant and loss. Also, the dielectric constant and loss decreased with increasing annealing temperature. Vibrational sample magnetometer analysis shows the hysteresis loop of a soft magnetic nature and the relevant parameters (M_r, M_s and H_c) have low values that confirmed the nature of the material. Subsequently, gas sensors were fabricated to study hydrogen-sensing properties. The gas sensors showed a response to hydrogen gas at a low temperature (100 °C) with selective response in the presence of NH_3 and C_2H_5OH gases. The reasons for electrical, magnetic, and sensing behavior of the samples were discussed in detail. © 2019 American Chemical Society.

ISSN: 24701343 DOI: 10.1021/acsomega.9b01562

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Volume 6, Issue 9, 10 July 2019, Article number 095101

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Solution growth of γ-glycine from cadmium sulphate as solvent for frequency doubling applications(Article)

Anbu Chudar Azhagan, S., Sathiya Priya, N.

[a]Department of Physics, Govt. College of Technology, Coimbatore, 641013, India

[b]Department of Physics, Nehru Institute of Engineering and Technology, Coimbatore, 641105, India

Abstract

Monocrystal nonlinear optical material γ-glycine was synthesized from glycine and cadmium sulphate in 3:1 mol ratio at ambient temperature by using the slow solvent evaporation experiment. Monocrystal γ-glycine crystallized in trigonal crystal structure with non-centrosymmetric space group $P3_2$. The signature peak of γ-glycine was confirmed by x-ray powder diffraction examination. Chemical shift and infrared studies exhibited the presence of chemical group species, resonance signal chemical shifts and functional groups present in the gamma glycine powdered samples. The existence of cadmium Cd element concentration in gamma glycine solution was quantified by inductively coupled plasma optical emission spectrometry (ICP-OES) instrument. Optical information and other parameters of γ-glycine such as crystal transparency, energy band gap, refractive index, electrical susceptibility, extinction coefficient, optical conductivity, electrical conductivity, optical reflectance, transmittance and absorbance was determined using UV-visible-NIR spectrophotometer. Thermal information such as weight-loss profile, thermal stability, decomposition temperature point, melting point and phase transition temperature were determined from TG-DTG and TG-DSC thermograms. The improved phase transition temperature in the TG-DSC thermogram established that suitability of the grown γ-glycine crystal for optoelectronic device fabrication applications. Green colour fluorescence emission was emitted from the crystal. The existence of frequency doubling in the grown γ-glycine crystal was examined.

Author keywords

characterization Crystal structure nucleation optical properties thermal analysis x-ray diffraction

Indexed keywords

Document details - Experimental investigation on wire-electro discharge machining of tungsten carbide (WC) using Response Surface Methodology (RSM)

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Journal of New Materials for Electrochemical Systems

Volume 22, Issue 3, July 2019, Pages 155-158

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Zhao, Y., Dong, Y.

Seismic response of reinforced concrete frame-shear wall structure with metal rubber-based damper in coupling beam

(2020) Annales de Chimie: Science des Materiaux

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Experimental investigation on wire-electro discharge machining of tungsten carbide (WC) using Response Surface Methodology (RSM)(Article)(Open Access)

Srinivasan, V.P., Palani, P.K.

[a]Sri Krishna College of Engineering and Technology, Coimbatore, Tamil Nadu, India

[b]Government College of Technology, Coimbatore, Tamil Nadu, India

Abstract

In this work, Wire-Electro Discharge Machining (WEDM) of Tungsten Carbide (WC) was carried out using copper wire-electrode of diameter 0.25 mm. Diatomite powder mixed with distilled water is used as the dielectric fluid to increase the working fluid conductivity. Selection of appro-priate machining parameters in WEDM is one of the most important aspects taken into consideration as these conditions to determine the im-portant characteristics such as Material Removal Rate (MRR) and surface roughness (Ra) among others. The main machining parameters such as voltage (V), pulse-on time (Ton) and wire tension (WT) were chosen to determine listed technological characteristics. The characteristic features of the WEDM process are explored through Response Surface Methodology (RSM) based on Design of Experiments (DOE). From the results, it is evident that the pulse-on time is the most significant factor followed by the voltage and wire tension.

Author keywords

DOE Material Removal Rate RSM Surface roughness Tungsten Carbide WEDM

Indexed keywords

Engineering controlled terms: Design of experiments Machining centers Surface properties Surface roughness Tungsten carbide

Engineering uncontrolled terms: Experimental investigations Fluid conductivity Machining parameters Material removal rate

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Document details - Optimization of culture conditions for cellulase production from indigenous soil isolates of Aspergillus fumigatus

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Research Journal of Chemistry and Environment

Volume 23, Issue 7, 1 July 2019, Pages 75-80

Optimization of culture conditions for cellulase production from indigenous soil isolates of Aspergillus fumigatus(Article)

Rengaraju, B., Vidhyadevi, U., Selvapriya, K., Ranganathan, B.V., Sneha, R.K., Vinothini, M.

[a]Department of Biotechnology, Bannari Amman Institute of Technology, Erode, India
[b]Department of Biotechnology, Government College of Technology, Coimbatore, India

Abstract

To appraise the utility and potential of wood pulp, present study was carried out to produce cellulase enzyme from soil isolated Aspergillus fumigatus. Lignocellulosic wood pulp is highly intricate in degrading. It was pre-treated with varying concentrations of alkali and detergents. Out of the varying concentrations of alkali and detergent carried out, it was found that 6 % NaOH yielded cellulase with 6.15 (µmol / (ml x min)) activities. Optimization of pH and temperature were carried out and the results revealed pH 10 and 70°C having higher cellulase activities. Further to purify the cellulase enzyme, culture broth was subjected to multi-phase extraction that involves a combination of ammonium sulphate salt and t-butanol solvent to purify proteins from crude culture filtrate. The purified cellulase enzyme isolated from aqueous phase was subjected to enzyme assay and showed 8.95 µmol/ min/ g specific enzyme activity. Thus, this study demonstrates the potential utilization of wood pulp for the production of cellulase enzyme using low cost substrates. © 2019 World Research Association. All rights reserved.

Author keywords

Aspergillus fumigatus | Cellulase | Lignocellulosic waste

Indexed keywords

GEOBASE Subject Index: cellulose | concentration (composition) | enzyme | enzyme activity | fungus | optimization | oxide group | protein | solvent | sulfate | wood

Species Index: Aspergillus fumigatus

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Document details - Low power design of 2–4 and 4–16 line decoders

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International Journal of Innovative Technology and Exploring Engineering

Volume 8, Issue 9, July 2019, Pages 1220-1224

Low power design of 2–4 and 4–16 line decoders(Article)(Open Access)

Naga jyothi, G., Anusha, G., Debanjan, K.

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[b]Department of electronics, GCT of Coimbatore, Coimbatore, Tamil Nadu, India

Abstract

Here, we are proposing a novel design of 2:4 decoder and 4:16 decoders which are designed by using line decoder concept. By using proposed design, the area and power consumption of 2:4 decoder and 4:16 decoder can be reduced. In the existing work they have used DVL (Dual Value Logic) and Transmission gate Logic to implement a 14-Transistor 2:4 decoder for minimizing the transistor count. By using 2:4 pre-decoders and post-decoders they implemented 4:16 decoders. Mixed logic is also used for this purpose. Here we have implemented a single 2:4 decoder with minimum transistor count and low power consumption which is used to design a 4:16 decoder. We implement the proposed design in Cadence Virtuoso simulation at 90nm technology and calculated the power and area. © BEIESP.

Author keywords

Decoder | Inverter | Mixed logic | Transmission logic

ISSN: 22783075
Source Type: Journal
Original language: English

DOI: 10.35940/ijitee.I7509.078919
Document Type: Article
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Document details - A hybrid framework for TCP incast congestion control in data center networks

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International Journal of Recent Technology and Engineering

Volume 8, Issue 2, July 2019, Pages 798-806

A hybrid framework for TCP incast congestion control in data center networks(Article)(Open Access)

Arun Selvi, K., Kumar, K., Ramalakshmi, K., Sathiya, A.

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Abstract

Cloud data centers with large bandwidth and low latency networks experiences many-to-one traffic pattern called TCP-Incast. It occurs in the partition-aggregate architecture and causes emergence congestion at the network wharfconnected to the parent server, overcoming the port emergence buffer. The ending packet loss requires nodes to encounter loss, retransmit data and slowly rise up throughput per definitive TCP behavior. This paper proposes Receiver-oriented Congestion Control with Edge computing approach (RCCE) for enhancing the speed, nature and firmness of traffic performance. Receiver-oriented Congestion Control (RCC) combines both closed and open loop congestion controls at receiverwhereas edge computing involves localization of traffic management in the middle-tier aggregator for reducing Flow Completion Times (FCT) and latency for the entire application processing deployments. In addition, the centralized controller at the edge balances the load during incast by using spanning trees in a well-made manner by implementing multi-stage Clos networks. The entire prototype is implemented in ns3 and simulation results demonstrates that RCCE has an average decrease of 60.2 % in the 99^{th}percentage latency and 50.4 % of mean queue size in the heavy traffic over TCP. © BEIESP.

Author keywords

Data Center Networks | Edge Computing | Incast | Receiver-oriented Congestion Control | TCP

ISSN: 22773878
Source Type: Journal
Original language: English
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Microchemical Journal

Volume 148, July 2019, Pages 364-373

Lanthanum-iron binary oxide nanoparticles: As cost-effective fluoride adsorbent and oxygen gas sensor(Article)

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[b]School of Chemical and Biotechnology, SASTRA University, Thanjavur, Tamil Nadu 613 401, India

Abstract

In the present work, novel lanthanum-iron binary oxide nanoparticles are used as adsorbents for fluoride removal from aqueous solution and oxygen gas sensor. The lanthanum-iron binary oxide nanoparticles were synthesized using co-precipitation method and sintered at a temperature of 100 °C, 450 °C, and 900 °C for 2 h. The material, optical and electrical properties of the nanoparticles were investigated by the instrumental characterization of high-resolution scanning electron microscope and high-resolution transition electron microscope to determine the structure, vibrating sample magnetometer which confirmed the superparamagnetic behavior, BET surface area analysis to affirm the mesoporous nature, X-ray photoelectron spectroscopy to confirm the oxidation states, X-ray diffraction, Fourier transform infrared spectroscopy, and I-V analysis, respectively. The adsorption of fluoride carried out in batch system, the experimental data were analyzed using isotherm and regeneration studies. The results demonstrated that the LIBONs sintered at 100 °C showed exceptional fluoride removal with maximum adsorption of 14.49 mg g^{-1} at pH 6.5 ± 0.5. The regeneration percentage of 80% was obtained after fifth cycle. The nanoparticles sintered at 900 °C rendered good sensitivity and response/recovery characteristics towards 50% of oxygen at operating temperature of 350 °C. © 2019 Elsevier B.V.

Author keywords

Adsorption | Co-precipitation | Fluoride | Lanthanum-iron binary oxide nanoparticles | Oxygen gas sensor

ISSN: 0026265X
DOI: 10.1016/j.microc.2019.05.003

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Document details - Analytical characterization of the Aegle marmelos pyrolysis products and investigation on the suitability of bio-oil as a third generation bio-fuel for C.I engine

Environmental Progress and Sustainable Energy
Volume 38, Issue 4, July/August 2019, Article number 13116

Analytical characterization of the Aegle marmelos pyrolysis products and investigation on the suitability of bio-oil as a third generation bio-fuel for C.I engine(Article)

Baranitharan, P., Ramesh, K., Sakthivel, R.
[a] Department of Mechanical engineering, Government College of Technology, Coimbatore, 641013, India
[b] Department of Mechanical engineering, Amrita School of Engineering, Coimbatore, Amrita Vishwa Vidyapeetham, India

Abstract

The present investigation emphasis on characteristics of pyrolysis products was obtained by intermediate pyrolysis of Aegle marmelos (AM) deoiled seed cake and appropriateness of engine adaptation. The superior volatile matter (73.69%) contented AM biomass was elected as the feed stock in this study. Pyrolysis experiment was done by a fixed bed reactor at 600°C and obtained 42–55% bio-oil yield. Investigation of bio-oil by GC/MS and FTIR established the occurrence of methyl, ester, alkanes, ketones and oxygenated chemicals have been alternates for fossil fuels. SEM and EDX analysis of bio-char exposes activated carbon and ensured that biochar can be used in the waste water treatment plant, solid fuel, organic fertilizer, and natural mosquito destroyer. According to GC analysis, the presence of CH_4, H_2, and C_2H_4 evolved syngas in AM pyrolysis process can be used C.I engines at dual fuel mode operation. An engine test reveals that adding of the pyrolysis oil diminished BTE (%) and increasing BSEC (Mj/kWhr). However, increasing bio-oil ratio blend with diesel reduces hazardous emissions like CO, HC, NOx, and smoke in the exhaust. Based on engine results, it was proposed that equal to 20% of AM bio-oil can be used as a fuel substitute for diesel engines. © 2018 American Institute of Chemical Engineers Environ Prog, 38:e13116, 2019. © 2018 American Institute of Chemical Engineers

Author keywords

AM seed cake; EDX; engine test; FTIR; GC/MS

Indexed keywords

Document details - Biosorption of xenobiotic Reactive Black B onto metabolically inactive T. harzianum biomass: optimization and equilibrium studies

International Journal of Environmental Science and Technology
Volume 16, Issue 7, 1 July 2019, Pages 3625-3636

Biosorption of xenobiotic Reactive Black B onto metabolically inactive T. harzianum biomass: optimization and equilibrium studies(Article)(Open Access)

Karthik, V., Sivarajasekar, N., Padmanaban, V.C., Nakkeeran, E., Selvaraju, N.
[a] Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, India
[b] Laboratory for Bioremediation Research, Unit Operations Laboratory, Department of Biotechnology, Kumaraguru College of Technology, Coimbatore, 641049, India
[c] Department of Biotechnology, Kamaraj College of Engineering and Technology, Virudhunagar, 625701, India
View additional affiliations

Abstract

Biosorptive removal of Reactive Black B (RBB) from aqueous solution by metabolically inactive Trichoderma harzianum (T. harzianum) was examined in this study. The individual and interactive effects of pH (2.0–10.0), temperature (25–45 °C), initial dye concentration (100–300 mg/L) and adsorbent dosage (0.1–0.5 mg/L) on the biosorption of RBB were evaluated using central composite design (CCD), and the mathematical model describing the biosorption process was developed. Maximum removal percentage (97.42 ± 1.3%) of RBB was attained at pH 5.75, temperature 37.12 °C, initial dye concentration 210.92 mg/L and biosorbent dosage 0.28 g/L. Suitability of the isotherms were determined using Langmuir, Freundlich and Temkin in this study, among which Freundlich isotherm was found suitable to equilibrium data. Kinetic analysis revealed that the adsorption data correlated well with pseudo-second-order kinetic model. The obtained thermodynamic data revealed that the RBB adsorption onto T. harzianum was exothermic and spontaneous nature during the process. © 2018, Islamic Azad University (IAU).

Author keywords

Adsorption; Central-composite design; Isotherm; Kinetic; Thermodynamic

Indexed keywords

Engineering controlled: Biosorption; Isotherms; Kinetics; Solutions; Thermodynamics

Document details - Optimization and kinetic studies on biodiesel production from microalgae (Euglena sanguinea) using calcium methoxide as catalyst

Energy Sources, Part A: Recovery, Utilization and Environmental Effects

Volume 41, Issue 12, 18 June 2019, Pages 1497-1507

Optimization and kinetic studies on biodiesel production from microalgae (Euglena sanguinea) using calcium methoxide as catalyst(Article)

Arunachalam Sivagurulingam, A.P., Sivanandi, P., Pandian, S., Arumugamurthi, S.S., Sircar, A.

[a]Department of Petrochemical Engineering, RVS College of Engineering and Technology, Coimbatore, India
[b]Department of Mechanical Engineering, Government college of Technology, Coimbatore, India
[c]School of Petroleum Technology, Pandit Deendayal Petroleum University, Gandhinagar, India

Abstract

The present work investigates the production of biodiesel from Euglena sanguinea microalgal bio-oil using calcium methoxide as a heterogeneous catalyst. The catalyst was synthesized and characterized by Fourier Transform Infra-red (FTIR) spectroscopy, Scanning Electron Microscopy (SEM), X-ray Diffraction (XRD), Brunauer-Emmett-Teller (BET), basicity, and basic site strength analysis. Initially, bio-oil was extracted from mass-cultivated biomass obtained from Euglena sanguinea algae. It was further pretreated and transesterified using calcium methoxide catalyst at various experimental conditions by which an optimum yield of 94.83% was achieved. The catalyst yielded above 90% up to 5 cycles of recovery and recycling. The kinetic studies were investigated at various reaction temperatures to find the rate of reaction. The activation energy and pre-exponential factor for the transesterification reaction were found to be 99.33 kJ mol^{-1} and 1.07×10^{14} min^{-1} respectively. The properties of the produced biodiesel were within the limits of ASTM D6751 standard. © 2019, © 2019 Taylor & Francis Group, LLC.

Author keywords

biodiesel, calcium methoxide, Euglena sanguinea, kinetics, transesterification

Indexed keywords

Engineering controlled terms: Activation energy, Algae, Biodiesel, Catalysts, Enzyme kinetics, Fourier transform infrared spectroscopy, Kinetic theory, Kinetics, Scanning electron microscopy, Transesterification

An FPGA implementation of novel smart antenna algorithm in tracking systems for smart cities☆

C. Thiripurasundari [a,*], V. Sumathy [b], C. Thiruvengadam [c]

[a] Assistant Professor, ECE Department, Madha Engineering college, Anna university, Chennai, Tamil Nadu, India
[b] Associate Professor, ECE Department, Government College of Technology, Coimbatore, Tamil Nadu, India.
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ARTICLE INFO

Article history:
Received 28 December 2016
Revised 6 June 2017
Accepted 7 June 2017
Available online xxx

Keywords:
Beamforming
MUSIC
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DOA

ABSTRACT

The area of digital signal processing (DSP) faces a great challenge in suppressing the noise and interference in the transmitting signal. A huge number of applications are in need of such control methods for good audio communication, etc., and the most widespread method for achieving this is through COordinate Rotation DIgital Computer (CORDIC) based on QRD-RLS. However, this method requires several iterations for its calculations, and therefore in order to reduce the complexity of the calculations and for faster calculation with a minimum number of iterations, a modified CORDIC based on the QRD-RLS algorithm for the purpose of beamforming is proposed in this paper and named mixed scaling rotation coordinate rotation digital computer (MSR-CORDIC). In this work, beamforming and direction of arrival (DOA) estimation will be achieved using the MSR-CORDIC and MUSIC algorithms respectively. The proposed algorithm is developed using Verilog HDL and implemented using the Xilinx field-programmable gate array (FPGA). In all cases, the proposed algorithm shows remarkable improvement compared with the conventional SCC (space code correlator) beamforming algorithm.

Assessment on the consequences of injection timing and injection pressure on combustion characteristics of sustainable biodiesel fuelled engine

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ARTICLE INFO

Keywords:
Engine
Biodiesel
Injection timing
Injection pressure
Combustion

ABSTRACT

In the rapidly growing global energy consumption, diesel engines play the key role. Usage of diesel fuel contributes to harmful air pollution exhausted from combustion chamber. To overcome these serious issues, the biodiesel extracted from many feedstocks have been studied and implemented for the past few decades. The combustion characteristics of diesel are not same as the biodiesel blends due to the discrepancy in physio-chemical properties of biodiesel. Enormous studies have been focused on inadequate combustion profiles of biodiesel in compression ignition engines. This review paper analyzes the previous researches concerning the consequences of proposed effective strategies including the variation in engine operating parameters like fuel injection timing and injection pressure for enhancing combustion characteristics of biodiesel implementation. This study focuses its light on the advancement and retardation methods of injection timing and injection pressure to treat the engine combustion indicators such as in-cylinder pressure, peak cylinder pressure, heat release rate, ignition delay period and combustion duration, finally a comparative evaluation has been developed and the relevant reasons for the variation of combustion characteristics have been conversed. The review concludes that the advancement in injection timing and higher injection pressure are best in amplifying the combustion phenomena of biodiesel fuelling.

RPF-DTT: Register Pre-allocation based Folded Discrete Tchebichef Transform (DTT) Architecture for Image compression

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Abstract— Recently, the large size data, power and real-time processing abilities are major issues in Digital Signal Processing/multimedia applications which require an adaptable architecture. The tool used for computing data decorrelation in the image processing applications refers Discrete Tchebichef Transform (DTT) which offers better performance than the DCT due to its bitstream coding capabilities. This paper proposes a novel model of Discrete Tchebichef Transform (DTT) architecture with Register Pre-allocation based Folded architecture (RPFA) for image compression. Through the cross-connection of folded architecture, the number of register usage is reduced. A Partial Cross Split Vedic Multiplier (PCSVM) method is introduced in the proposed DTT architecture. This multiplier design involves the cross function of the Vedic multiplier with the split pattern of multiplication binary stream. The optimal design of DTT architecture yields a minimum amount of FlipFlop (FF) counts, a latency and power consumption. The proposed PCSVM achieves higher Peak Signal to Noise Ratio (PSNR), better Structural Similarity Index (SSIM), lower delay, area, power consumption, Power-Delay Product (PDP), Mean Square Error (MSE) than the existing multiplier architectures. The proposed RPF-DTT architecture achieves a significant reduction in the resource consumption than the exact and approximate DTT architectures.

Multi-area Thermal Power System with Proportional-Integral-Derivative and Ant Colony Optimization Technique

K. Jagatheesan, B. Anand, K. Baskaran, N. Dey, A.S. Ashour and V.E. Balas

Abstract This work presents the automatic generation control (AGC) of a multiarea interconnected power system. The investigated multiarea power system is prepared with three equal reheat thermal power systems with suitable governor unit, turbine unit, generator unit, speed regulator unit, tie-line in each unit, and secondary proportional-integral-derivative (PID) controller. During nominal loading conditions, the power generating unit offers good quality of power to consumers. Nevertheless, the occurrence of sudden load disturbance in the interconnected power generating unit affects the entire performance (consistency in system frequency and voltage) and system stability. In order to moderate this big pose, the PID controller is introduced as a secondary controller. Jointly with the proper selection of the controller parameters (proportional gain (KP), integral gain (KI), and derivative gain (KD)) a good quality

IEEE Sensors Journal

Volume 18, Issue 1, 1 January 2018, Pages 201-208

Fiber-optic ammonia sensor based on amine functionalized ZnO nanoflakes(Article)

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Abstract

Pristine and amine functionalized ZnO nanoflakesbased fiber-optic sensors were investigated towards different volatile compounds (VCs) for environmental monitoring applications. The ZnO nanoflakes synthesized through co-precipitation method was subjected to X-ray diffraction, scanning electron microscope, energy dispersive X-ray spectrometer, and optical absorption studies to examine the structural, morphological, elemental, and optical properties. The analysis confirms the formation of ZnO nanoflakes with wurtzite structure. The spectral response of the ZnO and amine functionalized ZnO nanoflakes-based fiber-optic gas sensors were studied at ambient temperature for various concentrations (0C300 ppm) of acetone, ammonia, ethanol, methanol, hexane, and chloroform in clad modification technology. The analysis revealed that the pristine ZnO nanoflakes have selectivity towards acetone and amine functionalized nanoflakes have enhanced sensitivity towards all VCs and high selectivity (~ four times) toward ammonia with fast response and recovery. Further, the pristine ZnO-based sensor shows selectivity towards acetone above 150 ppm with the response and recovery time of 19 s and 23 s, whereas the sensor based on amine functionalized ZnO shows enhanced selectivity towards ammonia above 50 ppm with fast response and recovery time of 14 s and 17 s, respectively. © 2017 IEEE.

Author keywords

Co-precipitation | Fiber-optic sensor | Functionalization | Nanostructure | VC sensing | ZnO

Indexed keywords

Journal of the Brazilian Society of Mechanical Sciences and Engineering

Volume 40, Issue 1, 1 January 2018, Article number 2

Parametric optimization for improving impact strength of squeeze cast of hybrid metal matrix (LM24–SiC_p–coconut shell ash) composite(Article)(Open Access)

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Abstract

This paper mainly focuses on parametric optimization of squeeze cast hybrid (LM24–SiC_p–coconut shell ash) composite through Taguchi method and genetic algorithm. The composite samples have been cast through squeeze casting for each experimental trial based on $L_9(3)^4$ orthogonal array. From analysis of variance, it has been found that reinforcement and squeeze pressure were the casting parameters making significant improvement in the impact strength. A mathematical model representing the process was developed using nonlinear regression analysis. The optimum casting conditions were obtained through Taguchi method and genetic algorithm and checked through the confirmation experiments. In this study, it was confirmed that the castings obtained for the optimum squeeze casting conditions exhibited nearly 20% improvement in impact strength compared to the gravity die casting condition. © 2017, The Brazilian Society of Mechanical Sciences and Engineering.

Author keywords

Coconut shell ash | Genetic algorithm | LM24 aluminum alloy | Silicon carbide | Squeeze casting | Taguchi method

Indexed keywords

Engineering controlled terms: Aluminum alloys | Aluminum compounds | Die casting | Genetic algorithms | Metallic matrix composites | Optimization | Regression analysis | Silicon carbide | Squeeze casting | Taguchi methods

Lecture Notes in Electrical Engineering

Volume 446, 2018, Pages 35-45

2nd International Conference on Intelligent and Efficient Electrical Systems, ICIEES 2017; Coimbatore; India; 20 January 2017 through 21 January 2017; Code 209129

Block-random access memory-based digital pulse modulator architecture for DC–DC converters(Conference Paper)

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Abstract

This paper proposes a new digital pulse-width modulation (DPWM) and digital frequency modulation (DPFM) architecture using block RAM (BRAM) present in the field-programmable gate arrays (FPGAs). In Xilinx FPGAs, Block RAM (BRAM) elements are available only with a synchronous reset. As the synchronous reset is used in this code, the synthesis tool implemented the code in a single BRAM element. This minimizes the decoding logic and reduces the area. Block RAM available in FPGA is used to store the desired pattern to derive the variable duty cycle and variable-frequency pulses. This DPWM/DPFM architecture can be used with switching type of DC–DC converters under both light- and heavy-load conditions. Architecture is developed with Verilog hardware language for three different control bits (4 bit, 5 bit, and 6 bit), synthesized, and implemented with Xilinx PlanAhead 14.2 tool. This proposed architecture provides higher resolution without any requirement for higher clock frequency and larger logic resources which ultimately wits the small change in output voltage produced at the output of power converter. Maximum operating frequency of 306 MHz can be achieved for 4-bit control input. For the 6-bit control input, 4096 different bit patterns are stored to derive the more precise pulses to control the DC–DC converters. © Springer Nature Singapore Pte Ltd. 2018.

Author keywords

BRAM | DPFM | DPWM | Higher resolution | Spartan 3A FPGA

Indexed keywords

Materials Performance

Volume 57, Issue 1, January 2018, Pages 53-56

Mechanical and corrosion-resistant properties of hybrid-welded stainless steel(Article)

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Abstract

AISI Type 410 stainless steel (SS) (UNS S41000) plate, 3-mm thick, is typically welded by using the induction heated-friction stir welding method. The tool used for welding Type 410 SS is made with tungsten carbide (CW), with a 2-mm pin length, 3-mm pin diameter, and a 12-mm shoulder diameter with a hexagonal profle. A sound joint is fabricated at a spindle speed of 1,200 rpm, welding speed of 45 mm/min, plunge depth of 0.05 mm, and an additional heat input of ~1,000 °C at 50 W power through an induction heating coil.

Indexed keywords

Engineering controlled terms: Corrosion resistance | Friction stir welding | Induction heating | Tungsten carbide | Welding

Engineering uncontrolled terms: Corrosion resistant properties | Heat input | Induction heating coils | Pin diameters | Pin length | Spindle speed | Type 410 stainless steels | Welding speed

Engineering main heading: Stainless steel

Funding details

Digest Journal of Nanomaterials and Biostructures

Volume 13, Issue 1, January-March 2018, Pages 97-105

Molecular structure, NBO and HOMO-LUMO analysis of quercetin on single layer graphene by density functional theory(Article)

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Abstract

Quercetin (3,5,7,3',4'-pentahydroxyflavone) is a member of flavonoids. Density functional theory has been employed to study the adsorption of quercetin on single layer graphene (QCT-SLG) was investigated with the basis set of 6-21G. The total density of states and partial density states of the titled molecules were performed at density functional theory method. The molecular electrostatic potential (MEP) mapping shows the binding interactions of quercetin with single graphene layer. Dipole moment, hyperpolarizability and quantum chemical parameters have been calculated by Hartree Fock (HF) approximation approach. The natural bonding orbital analyses (NBO) calculation confined that the occurrence of intramolecular charge transfer takes place within the molecules. From DFT, highest occupied molecular orbital (HOMO) and lowest unoccupied molecular orbital (LUMO) energy levels of frontier orbital were obtained.

Author keywords

Density functional theory | Hartree fock | HOMO-LUMO | Molecular electrostatic potential | Natural bonding orbital | QCT-SLG

ISSN: 18423582
Source Type: Journal
Original language: English

Document Type: Article
Publisher: Inst Materials Physics

New Journal of Chemistry

Volume 42, Issue 6, 2018, Pages 4278-4288

Effect of Al doping concentration on the structural, optical, morphological and electrical properties of V_2O_5 nanostructures(Article)

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View additional affiliations

Abstract

Study on the optoelectronic characteristics of a cation-substituted nanostructure is a specific area of recent interest for a wide range of photonic applications. In the present work, $Al_xV_2O_5$ (where x = 0, 5, 10 and 15%) nanoparticles were synthesized by a wet chemical-calcination process. X-ray diffraction study revealed the orthorhombic phase of 600 °C heat-treated pure and Al^{3+} substituted samples. The shifting of the XRD lines with the substitution of V_2O_5 suggests that Al^{3+} was successfully introduced into the V_2O_5 host lattice. The SEM and TEM images show that the pure and Al^{3+} doped V_2O_5 hierarchical architectures are formed of one-dimensional nanorods. Photoluminescence spectra demonstrated the increment in deformities revealed by the immensely enhanced green emission. DC conductivity studies were performed in the temperature range 30-130 °C and it was found that the activation energy (E_a) is higher for $Al_xV_2O_5$ than for the undoped sample. The inherent current (I)-voltage (V) characteristics of pure V_2O_5 and $Al_xV_2O_5$ junction diodes showed a nonlinear diode-like behavior. The transient photocurrent under illumination is higher than the dark current, indicating that the fabricated diodes behave as a photodiode.

Indexed keywords

EMTREE drug terms: aluminum | nanoparticle | vanadic acid | vanadium pentoxide

Digest Journal of Nanomaterials and Biostructures

Volume 13, Issue 1, January-March 2018, Pages 201-213

Decolourisation of emerging textile dyes from aqueous solution using PNS -nanocomposite(Article)

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Abstract

The objective of this work is to establish the performance of a potential adsorbent from palm-nut shell (PNS), an agricultural low-cost precursor for the removal of acidic dyes- Reactive red 195A (RR195A) and Reactive blue 160 (RB160). The modification of PNS-activated carbon was exhibited by precipitating the magnetite nanoparticles using co-precipitation method resulting in enriched PNS-nanocomposite. The structural morphology of PNS-nanocomposite were characterised by using BET surface area (BET), X-ray diffraction analysis (XRD), Raman spectroscopy (RS), VSM data, High Resolution TEM (TEM) with SAED pattern. TEM pictures showed that the prepared nanocomposite was in pseudo-ball shaped. The microporous and mesoporous pore structures of the adsorbent were known to be obtained by t-plot and BJH respectively. The low retentive force value and saturation magnetisation (0.84 emu) value justify the magnetic separation from the aqueous solution. The best fit of pseudo-second order kinetics model with the high coefficient value better describe the process of adsorption of Reactive red 195A and Reactive blue 160 onto the adsorbent. The monolayer Langmuir isotherm (23.8 mg/g - RR195A & 62.5 mg/g - RB160) pictured the better fit. Thermodynamic parameter values (ΔS_1, ΔH_1, ΔG_1) confirm the dependency of temperature by the adsorption reaction process between adsorbent and adsorbate and their spontaneous and endothermic nature was also justified. The result of this work will be useful for future studies in the degradation of azo dyes using affordable precursor PNS. These studies confirm the eligibility of the adsorbents indicating their valuable application such as high adsorption capacity, excellent separation nature in the field of adsorption process for the clean-up of wastewater.

Author keywords

Microporous & mesoporous structures | Nanocomposite | Palm nut-shell | Reactive dyes | TEM analysis

Funding details

Optoelectronics and Advanced Materials, Rapid Communications

Volume 12, Issue 1-2, January-February 2018, Pages 90-94

Chemically grown Zinc Bismuth Sulfide ($ZnBi_2S_3$) thin films for optoelectronic applications(Article)

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Abstract

Zinc Bismuth Sulfide ($ZnBi_2S_3$) thin films are successfully deposited on a glass substrate by chemical bath deposition technique at different bath temperatures (60°C, 70°C, 80°C). The basic chemical bath contains bismuth nitrate, zinc nitrate and sodium thiosulphate as chemical reagents. The deposited films are characterized by XRD, FESEM, EDAX, UV Spectroscopy and PL for structural, morphological and optical properties. The formation of $ZnBi_2S_3$ is evidenced by the peaks in X-ray diffraction pattern. FESEM observation indicates the spherical grain shape of films at different temperatures. EDAX confirms the composition of ZnBi2S3. The bandgap energy obtained for deposited films is in the order of 2.31eV and depends on the film thickness. The PL spectrum reveals the green emission in the visible region.The Present work indicates the feasibility of $ZnBi_2S_3$ as a solar material.

Author keywords

Bandgap | Chemical bath deposition | Semiconductors | Solar energy material | Ternary compounds | Thinfilms

Indexed keywords

Engineering controlled terms: Deposition | Energy gap | Layered semiconductors | Nitrates | Optical properties | Semiconductor materials | Sodium compounds | Solar energy | Substrates | Sulfur compounds | Thin films | Ultraviolet spectroscopy | Uranium metallography | Vanadium metallography | Zinc sulfide

Engineering uncontrolled terms: Bath temperatures | Chemical bath deposition technique | Chemical reagents | Chemical-bath deposition | Optoelectronic applications | Sodium thiosulphate | Solar energy materials | Ternary compounds

Materials Today: Proceedings

Volume 5, Issue 2, 2018, Pages 7577-7585

2017 International Conference on Emerging Trends in Materials and Manufacturing Engineering, IMME 2017; Breeze ResidencyTiruchirappalli; India; 10 March 2017 through 12 March 2017; Code 135872

Investigation on Single, Four and Five Holes Fuel Injector Nozzle on Performance and Emission Characteristic of Diesel on A VCR Engine by Using Ceramic Coating Material on the Piston Crown(Conference Paper)

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Abstract

The Research Experimental Investigation is carried out under different loading conditions during a one Cylinder VCR CI engine with its piston crown coated by thermal barrier ceramic coating (TBC) with used different injector nozzle holes on performance and emission characteristics. This ceramic material is preferred because the nominee material for coating the piston crown as a result of its fascinating properties like high constant of thermal enlargement, low thermal conductivity, high Poisson's ratio and stable part structure at higher Temperature conditions as well as this experimental study was conducted on a VCR Engine at single, four and five holes nozzle injectors to check its impact on performance and emission by diesel fuel at 9kg load.

Author keywords

Ceramic Coating | Injector Holes | Piston

Indexed keywords

Engineering controlled terms: Ceramic materials | Diesel engines | Diesel fuels | Engine cylinders | Engine pistons | Spray nozzles | Thermal barrier coatings | Thermal conductivity

Materials Today: Proceedings

Volume 5, Issue 2, 2018, Pages 6770-6779

2017 International Conference on Emerging Trends in Materials and Manufacturing Engineering, IMME 2017; Breeze ResidencyTiruchirappalli; India; 10 March 2017 through 12 March 2017; Code 135872

EFFECT of FUEL INJECTION TIMING on PERFORMANCE and EMISSION CHARACTERISTICS of CEIBA PENTANDRA BIODIESEL(Conference Paper)

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Abstract

Alternative fuels have received abundant attention thanks to the depletion of world fossil fuel reserves and magnified environmental issues. Within the gift paper experimental study is allotted on I.C. engine laboratory single cylinder, four-stroke tape recorder, direct injection internal-combustion engine to analyse the performance and emission characteristics of pure diesel and white silk-cotton tree blending fuels with varied blending rates. For internal-combustion engine, injection timing order arrangement is one altogether the foremost parameters that have a control on the engine performance and emissions. The measurements area unit recorded for the Injection timing order of 0°,3°,6°,9°,12°and 18°bTDC varied the load from idle to rated load of 3.5 kW. For this study, alkyl esters of Ceibapentandra Oil were intercalary to diesel by volume of 10% (B10), 20% (B20), 30% (B30) and 40% (B40). Engine performance parameters specifically specific fuel consumption, brake thermal, Indicated thermal efficiency and exhaust emissions of CO, HC, CO_2, No_x were determined. The brake thermal efficiency at 100 percent load for white silk-cotton tree alkyl organic compound blends and diesel has been calculated and also the blend B10 is found to relinquish most thermal efficiency. The blends once used as fuel ends up in reduction of monoxide, organic compound and increase in chemical element oxides emissions. The engine performance and Emission parameters was found to be optimum once victimization B10 as fuel at Injection timing order 12°bTDC throughout full load condition. © 2017 Elsevier Ltd.

Author keywords

Ceibapentandra | CO | CO_2emission | Diesel engines | HC | Injection timing | NO_x | performance | SFC

International Journal of Engineering and Technology(UAE)

Volume 7, Issue 2, 2018, Pages 376-380

Automatic material segregation using PLC(Article)(Open Access)

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Abstract

At the present timeunusedghettoizationindications a vivaciousstarring protagonist in discardedsupervision system. The inappropriateapartheid of variegatedsurplus that split ends up in landfills sort out not fadingas it ought to be. This red-top grants knowledge of ghettoizing the substantial inevitably concluded the assistance of programmable logic controller (PLC). This treasure troveobliging to moderate the manual maneuver in the progression of reconditioning the alienatedquantifiable such in place ofpewter, cut-glass, malleable and supplementary devises crumpled consuming the air-filled piston. The dissimilar capacitive, proximity sensors etc. devours engaged in the process. The reprocessed product which partakes per received mutable byproduct. The sensible stirring on a conveyer belt intuited by the relevant sensors segregated into poles apartcontainers using a gearing contrivance. The entire component partakes organized by a programmable logic controller (PLC) staysencodedthroughPLC language by means of ladder logic. © 2018 Authors.

Author keywords

Capacitive | Inductive | Photoelectric | PLC | Proximity Sensors

ISSN: 2227524X
Source Type: Journal

DOI: 10.14419/ijet.v7i2.24.12088
Document Type: Article

Journal of Vibroengineering

Volume 20, Issue 3, 2018, Pages 1544-1553

FPGA based quasi Z-source cascaded multilevel inverter using multicarrier PWM techniques(Article)(Open Access)

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Abstract

FPGA based Quasi Z-Source Cascaded Multilevel Inverter (Quasi Zs-CMLI) using multicarrier PluseWidth Modulation (PWM) techniques are presented in this paper. Multicarrier based PWM techniques have been proposed for seven level Quasi Zs-CMLI and implemented using Field Programmable Gate Array (FPGA). For generating gating pulses to the inverter switches, Phase Disposition (PD), Inverted Phase Disposition (IPD), Phase Opposition Disposition (POD) and Alternative Phase Opposition Disposition (APOD) techniques are programmed on FPGA. In the proposed system, three solar PV emulator modules are used. These are acting as input source to the inverter. Finally, THD comparison made between different carrier based modulation with shoot through and non-shoot through the states. The proposed quasi Zs-CMLI and PWM techniques are verified through MATLAB/Simulink. For confirmation of simulation results, A laboratory prototype model have been implemented using FPGA. The capture hardware results are matched with simulation results. © 2018 Ranjith Kumar Kalilasam, et al.

Author keywords

(Multicarrier PWM techniques) (Quasi Z-source MLI) (Shoot through control and FPGA control) (Solar PV emulator)

Indexed keywords

Engineering controlled terms: (Field programmable gate arrays (FPGA)) (MATLAB) (Pulse width modulation)

Malaysian Journal of Computer Science

Volume 31, Issue 2, 2018, Pages 155-174

An optimized architecture for dynamic reconfigurable fir filter in speech processing(Article)(Open Access)

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Abstract

In this paper, we have proposed a Dynamic Reconfiguration Scheme (DRS) for the FIR filter in which the existing multiplier of the FIR filter is replaced by the proposed Estimation Distribution Multiplier Blocks (EDMB). The important aspect of the proposed DRS is that it provides an efficient area and power optimization while implementing in hardware. To ensure the versatility of the proposed method and to further evaluate the performance and correctness of the structure in terms of area and power consumption, we have implemented the hardware in Xilinx Virtex 7 Field Programmable Gate Array (FPGA) device and synthesized with Cadence RTL Compiler using TSMC 180 nm standard cell library. The experimental analysis of the proposed reconfigurable design approach takes speech signal as the benchmark input. The analysis shows that the proposed technique is better when compared to the existing reconfiguration techniques with 43.60% power savings and 6.34% area reduction. © 2018, Faculty of Computer Science and Information Technology.

Author keywords

(Area optimization) (Digital signal processing) (Finite impulse response filter) (Low power design) (Reconfigurable design) (Speech signal processing)

ISSN: 01279084
Source Type: Journal
Original language: English

DOI: 10.22452/mjcs.vol31no2.5
Document Type: Article
Publisher: Faculty of Computer Science and Information Technology

RSC Advances

Volume 8, Issue 33, 2018, Pages 18243-18251

Fiber optic magnetic field sensor using Co doped ZnO nanorods as cladding(Article)(Open Access)

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Abstract

A fiber optic magnetic field sensor is proposed and experimentally demonstrated. Pristine and Co doped ZnO nanorods of different Co concentrations (5, 10, 15 and 20 at%) were synthesized using a hydrothermal method. The synthesized nanorods were subjected to various characterization methods like X-ray diffraction (XRD), optical absorption, scanning electron microscopy, energy dispersive X-ray spectroscopy, Fourier transform infrared spectroscopy, vibrating sample magnetometry and X-ray photoelectron spectroscopy (XPS). XRD and XPS analysis confirms that the Co ions were successfully incorporated into the Zn site of the wurtzite ZnO lattice without altering the structure. The pristine and Co doped ZnO nanorods showed remarkable changes in the M-H loop where the diamagnetic behavior of ZnO changes to paramagnetic when doped with Co. The sensor structure is composed of cladding modified fiber coated with Co doped ZnO nanorods as a sensing material. The modified cladding is proportionally sensitive to the ambient magnetic field because of the magneto-optic effect. Experimental results revealed that the sensor has an operating magnetic field range from 17 mT to 180 mT and shows a maximum sensitivity of ~18% for 15 at% Co doped ZnO nanorods. The proposed magnetic field sensor would be attractive due to its low cost fabrication, simplicity of the sensor head preparation, high sensitivity and reproducibility.

Indexed keywords

Engineering controlled terms: Energy dispersive spectroscopy; Fiber optics; Fourier transform infrared spectroscopy; II-VI semiconductors; Light absorption; Magnetic fields; Magnetic sensors; Magnetometers; Magnetometry; Nanorods; Scanning electron microscopy; X ray diffraction; X ray photoelectron spectroscopy; Zinc oxide; Zinc sulfide

Archives of Civil Engineering

Volume 64, Issue 1, 2018, Pages 73-85

An investigation of the mechanical properties of Sintered Fly Ash Lightweight Aggregate Concrete (SFLWAC) with steel fibers(Article)(Open Access)

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Abstract

this study investigates the fresh and mechanical performance of concrete incorporating sintered fly ash lightweight aggregates (SFLWA) both with and without steel fibers. Comparative assessments of natural aggregates with sintered fly ash aggregates were evaluated. Mix design was obtained by the IS method for M30 grade concrete, and within the natural aggregates were replaced with 20%, 40%, and 60% amounts of SFLWA. The addition of SFLWA shows an increase in the workability of the concrete. Replacement with SFLWA increases with an increase in slump value, and decreases in strength parameters. Compressive strength of 42.6 MPa was achieved with a 40% replacement of SFLWA with steel fibers. The mechanical properties such as compressive strength, split tensile strength, flexural strength, elastic modulus, and structural efficiency of SFLWAC were examined, both with and without fibers. The incorporation of fibers drastically improved the mechanical properties of the mix.

Author keywords

compressive strength; elastic modulus; flexural strength; Sintered fly ash aggregates; slump; split tensile strength; structural efficiency

Indexed keywords

Engineering controlled terms: Aggregates; Bending strength; Concrete aggregates; Efficiency; Elastic moduli; Fly ash; Light weight concrete; Mechanical properties; Sintering; Steel fibers; Tensile strength

Indian Journal of Environmental Protection

Volume 38, Issue 1, January 2018, Pages 29-35

Stabilization of expansive subgrade soil with bagasse ash and geosynthetic reinforcement(Article)

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Abstract

Expansive soil deposits are problematic to structures built over them because of their tendency to swell on wetting and shrink on drying. To overcome this, properties of soil must be improved by artificial means known as 'soil stabilization'. Soil stabilization with the objective of improving or controlling its volume stability, strength and durability is needed. The project is proceeded with an objective to study the effect on replacement of clay with bagasse ash as stabilizing agent in varying proportions and to determine the optimum content of the same. In this phase, the engineering properties of clay, such as particle size distribution, Atterberg's limits, optimum moisture content, maximum dry density, unconfined compressive strength and California bearing ratio are determined. Based on the results, the clay is classified as clay of high compressibility (CH) as per BIS. Bagasse ash was added to clay in varying proportions from 0% to 20% and all the geotechnical properties are studied. The study highlights the significant increase in properties of clay obtained at 10% replacement of bagasse ash. © 2018 Kalpana Corporation.

Author keywords

Atterbergs limit | California bearing ratio. | Expansive subgrade | Maximum dry density | Optimum moisture content | Unconfined compressive strength | Waste bagasse ash

ISSN: 02537141
CODEN: IJEPD

Document Type: Article
Publisher: Scientific Publishers

International Journal of Computational Materials Science and Surface Engineering

Volume 7, Issue 2, 2018, Pages 104-115

Experimental investigation on electrical discharge machining of ceramic composites (Si_3N_4-TiN) using RSM(Article)

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Abstract

In this work, electrical discharge machining (EDM) of silicon nitride-titanium nitride (Si_3N_4-TiN) composites which have wide application in heat exchangers, wear-resistant parts, and gas turbines were carried out. Si_3N_4-TiN composites are fabricated by hot pressing and spark plasma sintering (SPS) process. Selection of appropriate machining parameters in EDM is one of the most important aspects taken into consideration as these conditions to determine the important characteristics such as material removal rate (MRR) and electrode wear rate (EWR) among others. The main machining parameters such as gap voltage (V), current (I) and pulse-on time (T_{on}) were chosen to determine listed technological characteristics. The characteristic features of the EDM process are explored through response surface methodology (RSM) based on design of experiments (DOE). Moreover, L_{18} orthogonal array based on DOE to conduct of series of experiments has been adopted. From the results, it is evident that the current is the most significant factor as it influences both MRR and EWR. The high current increases the MRR and the less gap voltage reduces the EWR. The square profile machined with the voltage - 50 volts, current - 5 amps and pulse-on time - 500 μsec exhibits high MRR. Copyright © 2018 Inderscience Enterprises Ltd.

Author keywords

Design of experiments | DOE | EDM | Electrical discharge machining | Electrode wear rate | EWR | Material removal rate | MRR | Response surface methodology | RSM | Si3N4-TiN | Silicon nitride-titanium nitride

Indexed keywords

ICAFM-2017

Influence of Process Parameters on CNC Turning of Aluminium Hybrid Metal Matrix Composites

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Abstract

An effort has been made in this investigation to find the influence of turning process parameters on the machinability of hybrid metal matrix composite comprising alumina (Al_2O_3) and molybdenum disulphide (MoS_2) particulates dispersed on aluminium casting alloy LM6 in turning process. Design of Experiments approach was used to plan the experiments and the acquired data were analysed using design expert software associated with response surface method (RSM). In this paper work cutting speed, feed and depth of cut were considered as input process parameters and the resultant force of cutting forces in three directions, Specific Cutting Pressure (SCP) and surface roughness R_a were considered as responses. Statistical analyses were carried out to estimate the performance of machining parameters. The influence of input parameters on machining-force, SCP and the surface roughness R_a were analysed using surface response graphs. The experimental study revealed that cutting speed and feed were the most influencing parameter that affects the machining force and SCP.

International Journal of Operational Research

Volume 32, Issue 3, 2018, Pages 329-349

Production inventory model with reworking of imperfect items and integrates cost reduction delivery policy(Article)

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Abstract

The classical EPQ model assumes that all items manufactured are of perfect quality. However, in real life production systems, due to various controllable and/or uncontrollable factors, the generation of defective items during a production run seems to be inevitable they should be reworked. A portion of non-conforming items produced is considered to be scrap, while the rest reworked in each cycle. This paper integrates cost reduction delivery policy into production inventory model with defective items with scrap and rework and finished items can only be delivered to customers at a fixed interval of time during production downtime with the purpose of reducing holding cost. A suitable mathematical model is developed and the optimal production lot size which minimises the total cost is derived. An illustrative example is provided and numerically verified. The validation of result in this model was coded in Microsoft Visual Basic 6.0. Copyright © 2018 Inderscience Enterprises Ltd.

Author keywords

Defective items | Delivery policy | Demand | Inventory | Production | Rework | Scrap

ISSN: 17457645
Source Type: Journal
Original language: English

DOI: 10.1504/IJOR.2018.092738
Document Type: Article
Publisher: Inderscience Publishers

Optimization of Machining Parameters for CNC Turning of Al/Al_2O_3 MMC Using RSM Approach

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Abstract

This paper discusses the influence of cutting variables such as feed, cutting speed and depth of cut at work-tool interface zone temperature and surface finish while machining aluminium alloy LM6 reinforced with Al_2O_3 metal matrix composites. Response surface methodology with central composite rotatable design matrix was employed to optimise and analyse the cutting variables. Second order regression models were developed for predicting the output responses and the adequacy of the developed model was tested using analysis of variance (ANOVA). ANOVA results revealed that the feed and depth of cut were the major influencing parameters for the work-tool interface temperature and cutting speed and feed were prominent influential parameters in surface roughness. The optimal parameters for multiple responses were arrived for the specified range of input parameters using overall desirability index.

Selection and/or Peer-review under responsibility of ICAFM'17.

Keywords: Work-Tool interface temperature; Design of Experiments; RSM; desirability index; LM6; metal matrix composites;

Canadian Journal of Civil Engineering

Volume 45, Issue 8, 2018, Pages 605-622

Member distortional buckling behaviour of hybrid double-i-box beams(Article)

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Abstract

This paper compiles the experimental and finite-element parametric study on member distortional buckling behaviour of new built-up metal hybrid double-I-box beams (HDIBBs). The cross-section of this built-up beam is unique and looks similar to the shape of a double-I-box fabricated using four channel sections. The flange plates were provided with an intermediate stiffener. In these built-up beams there is more material in the flange portions far away from the horizontal centroidal axis of their cross-section. Hence, there is an increase in the flexural rigidity that enhances the moment capacity of the beam, under major axis bending. The geometry consists of torsionally rigid closed-box web portion that provides high resistance to minor axis lateral-buckling. The varying parameters considered were the ratio of yield stresses of the flange to the web steel plates, the ratio of breadth to the depth of the section, and the flange plate thickness. In the experimental programme, all the HDIBB members failed due to kinds of distortional buckling which was identified by web buckling and flange twist along edges. The results revealed that when flange plate slenderness increases there is a drop in the moment resistance capacity of the beams. The numerical study was performed using ABAQUS software. In comparison, there was good agreement between experimental and numerical results. The validated finite element models were further extended to perform parametric studies on ideal HDIBB models. Both the experimental and parametric study results were compared with the predicted strengths using effective width method equations specified in the Euro code standards EN 3-1-3. It was found that the current Euro code design rules slightly over-estimate the distortional buckling resistance capacity of closed form built-up cold-formed steel members. A new design equation was formulated and recommended for estimating the reduction in distortional buckling moment resistance capacity for HDIBBs. © 2018, Canadian Science Publishing. All rights reserved.

Author keywords

Built-up | Cold-formed steel | Distortional buckling behaviour | Effective width method | Flange plate slenderness | Metal hybrid

Materials Today: Proceedings

Volume 5, Issue 8, 2018, Pages 16585-16591

2016 International Conference on Advanced Materials, SCICON 2016; Amrita Vishwa Vidyapeetham UniversityCoimbatore; India; 19 December 2016 through 21 December 2016; Code 138807

Fabrication of PLLA nanofibers as synthetic grafts for anterior cruciate ligament reconstruction(Conference Paper)

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Abstract

Hypertension and flexion in knee will cause anterior cruciate ligament (ACL) injury resulting in rotational instability of the knee. Synthetic grafts made from Polylactice acid are efficient in terms of biomechanical compatibility and easy manufacturing method makes PLLA suitable for ACL replacement. PLLA nanofibre is synthesized by mixing the polymer with chloroform in 8:100 proportions and the fibres are drawn using electro spinning technique. Mechanical and Characterization testing's such as AFM, XRD and FTIR where done on the fibre. Polymer concentrations of 5- 10 wt% are the appropriate range to produce bead free fibres. The Needle-to-collector tip distance of 12.5cm, electro spinning voltage of 18kV and the concentration 8wt% should be maintained to synthesis fibres with desired characteristics. Tensile strength (40.68 ± 2.99MPa)and flexion strength (91 ± 3.55 MPa) of the PLLA nanofibre closely matches the natural ACL. Atomic Force Microscopy examination of the fibre shows smooth morphology with no bead formation and the length obtained is in the range of 3.4μm-3.8μm. XRD results shows 2 degree intensity drop which dictates that the fibre is devoid of crystals which is necessary for tissue engineering applications. the absorbance peaks in the FTIR shows the wavelength corresponding to of three main functional groups namely Carbonyl group (C=O), Alkenes (C=C), Hydroxyl group (-OH). The PLLA polymer when mixed with chloroform, the hydroxyl group gets added to the ring structure of the polymer. The integrity of the fiber also depends on the interatomic bonding between the solvent and the PLLA polymer.

Author keywords

(AFM) (Anterior Cruciate Ligament(ACL)) (Electro spinning) (XRD)

Advances in Intelligent Systems and Computing

Volume 758, 2018, Pages 547-555

Fuzzy logic-based decision making for selection of optimized liquid insulation blend(Book Chapter)

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Abstract

The introduction of ester oils replaces existing liquid insulation system (mineral oil) in transformers. Since ester oils are eco-friendly and biodegradable in nature. In this work, mineral oil and rapeseed oil are used as base fluids. Further, MO and RO are blended together at various ratios from 10 to 90%. The important characteristics like breakdown voltage, acidity, and dielectric loss of the oil samples are analyzed. Using fuzzy logic method, best optimistic liquid insulation sample is identified.

Author keywords

(Ester oil) (Fuzzy logic) (Liquid insulation) (Mixed insulating liquids) (Optimistic sample) (Transformer)

Indexed keywords

Engineering controlled terms: (Computer circuits) (Decision making) (Dielectric losses) (Esters) (Insulation) (Liquids) (Mineral oils) (Oil filled transformers)

Engineering uncontrolled terms (Eco-friendly) (Fuzzy logic method) (Insulating liquids) (Liquid insulation) (Oil samples) (Rapeseed oil) (Transformer)

Engineering main heading: (Fuzzy logic)

IOP Conference Series: Materials Science and Engineering

Volume 402, Issue 1, 2018, Article number 012147

2nd International Conference on Advances in Mechanical Engineering, ICAME 2018; SRM Institute of Science and TechnologyKattankulathur; India; 22 March 2018 through 24 March 2018; Code 139910

Optimization of process parameters of Al-B_4C hybrid composites using response surface methodology(Conference Paper)(Open Access)

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Abstract

In this contemporary work, particulates of coconut shell ash and boron carbide were reinforced with an atomized aluminium powder hybrid composites was prepared by the powder metallurgy process. The process parameters in powder metallurgy influence the various material properties. Compaction pressure, sintering temperature and weight percentage of coconut shell ash were selected as influencing parameters. An empirical relationship has been formulated using response surface methodology. The properties such as hardness, relative density and percentage of porosity are considered a response. Variance of analysis was employed to determine the significance of process parameters on the responses and to determine the optimal combination of parameters. High harness value of 165.1 HV, maximum density of 0.819 g/cc and minimal porosity of 8.15 % was obtained for the optimum condition. © Published under licence by IOP Publishing Ltd.

Author keywords

Coconut shell ash | Powder metallurgy | Response surface methodology

Indexed keywords

Engineering controlled terms: Aluminum compounds | Boron carbide | Porosity | Powder metallurgy | Sintering | Surface properties

IOP Conference Series: Materials Science and Engineering

Volume 402, Issue 1, 2018, Article number 012118

2nd International Conference on Advances in Mechanical Engineering, ICAME 2018; SRM Institute of Science and TechnologyKattankulathur; India; 22 March 2018 through 24 March 2018; Code 139910

Assessment of contact characteristics of soft fingertip applied for multi-profile grasping(Conference Paper)(Open Access)

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Abstract

This paper presents experimental study of contact parameters for soft hemispherical fingertip pressed against target profiles. In design and development of soft robotic fingertips, in-depth knowledge of realistic contact parameter is required. Soft fingers are easily conformed to the geometry of the target profiles like human finger. In this work, fingertip is pressed against convex, concave and flat profiles experimentally with numerical validation. The magnitude of contact radius is calculated and compared for different profiles. From close observation it is observed that contact radius is higher for curved profiles when compared with a flat profile for a particular combination. © Published under licence by IOP Publishing Ltd.

Author keywords

Conformal contact | Contact mechanics | Grasping | Soft finger

Indexed keywords

Engineering controlled terms: Deformation

Energies

Volume 11, Issue 1, 2018, Article number 183

Real-power rescheduling of generators for congestion management using a novel satin bowerbird optimization algorithm(Article)(Open Access)

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Abstract

In this paper, an efficient meta-heuristic satin bowerbird optimization (SBO) algorithm is presented for congestion management (CM) in the deregulated power system. The main objective of CM is to relieve congestion in the transmission lines using a generation rescheduling-based approach, while satisfying all the constraints with minimum congestion cost. The SBO is a nature-inspired algorithm, developed based on the 'male-Attracts-The-female for breeding' principle of the specialized stick structure mechanism of satin birds. The proposed approach is effectively tested on small and large test systems, namely, modified IEEE 30-bus, modified IEEE 57-bus, and IEEE 118-bus test systems. The constraints like line loading, line limits, generator limits, and bus voltage impact, etc., are incorporated into this study. The proposed technique gives superior results with regards to congestion cost and losses compared with various recent optimization algorithms.

Author keywords

Congestion management | Deregulation | Generator rescheduling | Optimal power flow | Satin bowerbird optimizer

Indexed keywords

Engineering controlled terms: Deregulation | Electric load flow | Electric power transmission | Silk | Traffic congestion

Engineering uncontrolled terms: Congestion management | Deregulated power systems | Generation rescheduling | Generator re-scheduling | Nature inspired algorithms | Optimal power flows | Optimization algorithms | Optimizers

IOP Conference Series: Materials Science and Engineering

Volume 360, Issue 1, 2018, Article number 012062

2nd International Conference on Materials Science and Technology, ICMST 2016; Kerala; India; 5 June 2016 through 8 June 2016; Code 141812

Ammonia, acetone and ethanol gas sensing characteristics of CuO thin films grown by sputtering(Conference Paper)(Open Access)

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View additional affiliations

Abstract

Here, we have reported the sensing characteristics of CuO thin films towards volatile gases like ammonia, acetone and ethanol. The CuO films were deposited on glass substrate by RF magnetron sputtering at 350 °C and 400 °C. The characteristics of CuO thin films grown at both temperatures were analyzed using X-ray diffractometer (XRD), UV-Vis spectrometer, atomic force microscope (AFM), scanning electron microscope (SEM) and Fourier transform infrared spectrometer (FTIR). The thin films showed mesoporous morphology with average crystallite size of 78 nm and 36 nm for films grown at 350 °C and 400 °C, respectively. As the film grown at 400 °C showed better properties, it has been preferred for the gas sensing analysis. Gas sensing properties of the film towards different concentration (50-250 ppm) of ammonia, acetone and ethanol were studied in chemi-resistive mode. As expected, an increase in resistance with concentration of gases was observed due to the p-type nature of CuO thin films. Further, the film showed comparatively better sensitivity towards ethanol than other gases.

Author keywords

CuO | Ethanol sensing | Gas sensor | sputtering | Thin film

Indexed keywords

IOP Conference Series: Materials Science and Engineering

Volume 360, Issue 1, 2018, Article number 012055

2nd International Conference on Materials Science and Technology, ICMST 2016; Kerala; India; 5 June 2016 through 8 June 2016; Code 141812

Wavelength Dependent Ammonia Sensing Characteristics of SnO_2 based Fiber Optic Sensor(Conference Paper)(Open Access)

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Abstract

SnO_2 nanoparticles were synthesized by co-precipitation technique. The synthesized SnO_2 nanoparticles were characterized by X-ray diffraction (XRI scanning electron microscope (SEM) and UV-visible diffused reflectance spectrometer (DRS). The XRD results addressed that the SnO_2 nanoparticle was crystallized in rutile tetragonal structure. The SEM analysis confirms that the prepared nanopowder is composed of nanoparticles. Analysis of tl DRS UV-Vis spectrum showed that the band gap of the synthesized SnO_2 is to be ~3.4 eV. The small cladding portion of the optical fiber was replac with the synthesized nanoparticles. The ammonia sensing characteristics of the prepared SnO_2 nanoparticles were analyzed for different wavelengtl ranges (red, yellow and blue) using polymethyl methacrylate fiber. It has been found that the synthesized SnO_2 nanoparticles shows high sensitivity (~23) in yellow wavelength range compared with red and blue wavelength ranges at room temperature.

Author keywords

Ammonia sensing | Fiber optic sensor | Nanopowder | SnO_2 | Wavelength dependent sensing

Indexed keywords

Engineering controlled: Ammonia | Energy gap | Fiber optic sensors | Fiber optics | Nanoparticles | Nanostructured materials | Optical fibers

Ekoloji

Volume 27, Issue 106, 2018, Pages 223-231

Ecological study on phosphorylated amberlite IRA 400 resin for the removal of Cd (II) from aqueous solutions(Article)

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Abstract

According to aquatic ecology, the modified resin prepared from Amberlite IRA 400, acts as an adsorbent for the removal of cadmium(II) from aqueous solutions. In batch ecological studies, the optimization of pH, contact time and resin dose on removal of metal were studied. P=O functional groups that exist on the resin material were used to remove the metal in the aqueous solution environment. The isotherm patterns of Langmuir and Freundlich were analyzed from the experimental data. The feasible, spontaneous and exothermic nature of adsorption was confirmed in this ecological study. The adsorption kinetics study follows the pseudo-second-order model and film diffusion process.

Author keywords

Adsorption | Aquatic ecology | Cadmium (II) | Film diffusion process | Isotherm | pH optimization

Indexed keywords

GEOBASE Subject Index: adsorption | aqueous solution | cadmium | chemical compound | isotherm | optimization | pH | pollutant removal | reaction kinetics | resin

Studies in Informatics and Control

Volume 27, Issue 4, 2018, Pages 395-402

Real time implementation of adaptive sliding mode controller for a nonlinear system(Article) (Open Access)

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Abstract

The objective of this work is to design a controller that may maintain the level of a conical tank which has nonlinear dynamics. Because of the nonlinearity present in the dynamics of the plant, the controller parameters have to be dynamic as well, so that the performance of the system may be enhanced. Hence sliding mode controller which is robust is designed with an adaptive mechanism, so that it could cope up with the varying dynamics of the system. In this paper, three different algorithms were used to study the system behaviour by using simulation. These algorithms were also implemented in real time. When its performance was observed in real time, the adaptive sliding mode controller proved to outperform when compared to reaching law and super twisting algorithm based sliding mode controllers. © 2012-2018.

Author keywords

Adaptive control | Nonlinear systems | Pneumatic actuators | Robustness | Sliding mode control

ISSN: 12201766
Source Type: Journal
Original language: English

DOI: 10.24846/v27i4y201803
Document Type: Article
Publisher: National Institute for R and D in Informatics

Revista Romana de Materiale/ Romanian Journal of Materials

Volume 48, Issue 4, 2018, Pages 507-513

Influence of polymeric and non-polymeric fibers in hybrid engineered cementitious composites(Article)

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Abstract

In this study the mechanical performance of hybrid engineered cementitious composite using polymeric fibers and glass fibers are investigated. Nine different mixes are used in this study, in which three mixes with mono fiber and the remaining mixes are developed with hybrid fiber reinforcement. The hybridation with low and high modulus fibers are engaged to increase the mechanical performance of the engineered cementitious composite. This process has a notable achievement in the direct tensile strength and young's modulus of the ECC mix. The outcome revealed that, poly vinyl alcohol of volume fraction 0.65% and glass of volume fraction 1.35% displayed significant and reasonable characteristics than the other mixes. © 2018, Fundatia Serban Solacolu. All rights reserved.

Author keywords

ECC | Glass fiber | Mechanical properties | Micro structural studies | Polymeric fibers

Funding details

Funding sponsor	Funding number	Acronym
Paralyzed Veterans of America		PVA

Materials Today: Proceedings

Volume 5, Issue 11, 2018, Pages 23293-23301

5th International Conference on Advances in Energy Research, ICAER 2015; Mumbai; India; 15 December 2015 through 17 December 2015; Code 144441

Investigation on Synthesis of Biodiesel from Distillery Spent Wash using Oleaginous Yeast Metschnikowia Pulcherrima(Conference Paper)

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Abstract

The study was aimed at producing bio-diesel from lipids accumulated by micro-organisms grown in distillery wastewater. The raw waste was inoculated with Metschnikowia pulcherrima and was grown under varying conditions of pH, temperature, culture times etc. The raw wastewater had a COD of 86 g/l and total dissolved solids of 46.9 g/l. The conditions for maximum growth were analysed for the available C/N ratio of 11.4. The culture conditions for maximum growth were found to be pH 6.2, 300 C and 120 hours. The lipid extraction was done and lipids were used for Bio-diesel conversion. In-situ trans-esterification reaction was effected by base-catalysis using NaOH and methanol to form fatty acid methyl esters. The yield reached up to 1.4 g/l.

Author keywords

Bio-diesel | C/N ratio | Distillery spentwash | Microbial lipids

Indexed keywords

Engineering controlled terms: Biodiesel | Diesel engines | Esterification | Esters | Fatty acids | Sodium hydroxide

Engineering uncontrolled terms: Bio-diesel | C:N ratio | Condition | Culture time | Distillery spent washes | Distillery spentwash | Distillery wastewaters

Materials Science- Poland

Volume 36, Issue 3, 2018, Pages 483-493

Crystallization, habit modification and control of nucleation of glycine polymorphs from aqueous solutions doped with magnesium sulfate impurity(Article)(Open Access)

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Abstract

The influence of magnesium sulfate as an additive in the nucleation of α and γ-polymorphs of glycine crystallized from aqueous solutions has been explored for the first time. Based on crystallization experiments, it was concluded that lower concentration of magnesium sulfate, say less than 2 g/mL, favors α-nucleation sites, whereas the optimized concentration of magnesium sulfate impurity to yield γ-nucleation sites is 2 g/mL and above. The nucleation time span (in days), solubility and pH were measured for α- and γ-nucleation sites in the aqueous solutions doped with magnesium sulfate. The glycine polymorphs α- and γ-single crystals were grown by slow solvent evaporation technique at ambient temperature. Crystal habit of glycine polymorphs was investigated and analyzed using goniometry. The unit cell dimensions and space group of the as-grown crystal were identified by single crystal XRD analysis. Both α- and γ-polymorphs of glycine were characterized structurally by powder XRD studies. The percentage of magnesium present in the grown glycine crystals was estimated by inductively coupled plasma optical emission spectrometry elemental analysis (ICP-OES). The nonlinear optical properties of the γ-glycine crystals were examined by Q-switched high energy Nd:YAG laser. The second harmonic generation output efficiency of the as-grown gamma glycine single crystals was computed to be 1.31 times superior than that of the reference material potassium dihydrogen phosphate (KDP).

Author keywords

Crystal morphology | Nucleation | Single crystal growth | Solubility | Solvents | X-ray diffraction

Indexed keywords

International Journal of Engineering and Advanced Technology

Volume 8, Issue 2, 2018, Pages 79-83

Experimental study on piles with pile cap at varying position under different loading conditions(Article)

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Abstract

High rise buildings and offshore structures are usually constructed over foundation which comprises of several number of piles connected together using pile cap. These piles and pile caps frequently are subjected to a mixture of lateral, vertical as well as twisting forces. Conventional method tends to emphasis predominantly on foundation resistance under vertical loading. The piles are essential subjected to horizontal loads along with vertical loads. Resistance to the vertical and the lateral loading is generally provided by base and side friction, pile-soil-pile cap interaction between pile and surrounding soil, position of the pile cap, number of piles and piles arrangement with respect to the loading direction. In this study, the piles are placed in the sand with pile cap i) above the soil surface at a height of 35mm ii) pile cap bottom resting on surface of soil medium iii) pile cap top placed at the surface of soil and iv) pile cap placed below soil surface to a depth of about 35mm. Experimental analysis were carried out for all the above cases under vertical, lateral and combined loading conditions. Parameters like position of the pile cap, quantity of piles and their arrangements were varied and analysed. The test results reveal that the pile cap placed below the soil surface increases lateral resistance capacity of the piles in the range of 56% to 66% compared with pile cap placed above the soil surface under both independent and combined loading conditions in cohesionless soil.

Author keywords

Cohesion less soil | Lateral resistance capacity | Pile cap | Pile foundations | Pile-soil-pile cap interaction

Journal of Advanced Research in Dynamical and Control Systems

Volume 10, Issue 12, 2018, Pages 61-68

Smart control for low energy harvesting systems(Article)

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Abstract

In ever growing technology it has become an inevitable scenario of small gadgets usage for our daily needs. For such small applications the energy required for the gadgets can be generated form solar radiation, wind, vibration, etc., such generated energy have to be stored for an effective practise. This stored energy can be used for small devices garden lights, portable chargers, remote sensors, etc., Energy harvesting is becoming popular for low power electronic systems. Integrated Photovoltaic energy harvesting technology offers significant advantages over wired or solely battery-powered sensor solutions. Just like renewable sources, the associated power electronics circuits can also be controlled to achieve maximum power from these miniature systems. The main objective of this work is to develop a solar energy harvesting technique with an optimization scheme. An optimised energy harvesting scheme is proposed for the controlling the duty cycle of the converter according to varying maximum power point (MPP) to maximize the output power of the system.

Author keywords

Buck converter | Duty cycle | Low power | Solar energy harvesting system

ISSN: 1943023X
Source Type: Journal
Original language: English

Document Type: Article
Publisher: Institute of Advanced Scientific Research, Inc.

Energy, Environment, and Sustainability

2018, Pages 53-76

Genetically Modified Organisms and Its Impact on the Enhancement of Bioremediation(Book Chapter)

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Abstract

Bioremediation is a process of degrading the environmental contaminants, that are introduced accidentally or purposely which cause hazardous effect on earth and harm the normal life process. The conversion of these contaminants into less toxic forms is the goal of bioremediation process that can be achieved by the use of microorganisms. The bioremediation approaches have more advantages when compared with the traditional methods, as it can be directly implemented at the targeted contaminant site. Even though some bacteria and fungus were employed to decompose the chemical compounds, but they have only limited ratio to metabolize the hydrocarbons on their own. The genetically modified organisms are applied nowadays in bioremediation process for effective removal of contaminants, where the indigenous microbes cannot degrade. Genetically modified microorganisms (GMOs) play an important role in remediating the industrial waste, reduce the toxicity of some hazardous compounds, and also help in removal of pollution by hydrocarbons and petrol discharges. A variety of molecular tools such as molecular cloning, horizontal transfer of DNA in bacteria, electroporation, protoplast transformation, biolistic transformation, conjugation and transformation of competent cells are available for the successful construction of GMOs. Transfer of gene into the bacteria makes it as a novel strain, for eliminating the hydrocarbon contaminants from the environment in minimal time. Similarly, removal of compounds such as xylene, toluene, octane, naphthalene and salicylate is coded on bacterial plasmids for successful degradation of the environment. This chapter represents the applications of genetically modified organisms in bioremediation processes, molecular tools used for construction of GMOs, pros and cons, ethical issues and laws governing the application of GMOs.

Author keywords

Journal of Advanced Research in Dynamical and Control Systems

Volume 10, Issue 11 Special Issue, 2018, Pages 723-730

Memory efficient arbitrary tree architecture for wavelet packet transform(Article)

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Abstract

In this paper, a design strategy for obtaining memory efficient wavelet packet transform architecture has been derived. The proposed architecture has reduced the number of memory words, using convolution based architecture along with arbitrary tree structure. In traditional DWT architectures the hardware complexity was due to the use of frame buffer between levels which is replaced by line buffer in the proposed architecture thereby reducing the memory complexity of the design. The proposed architecture is best suited for image compression to achieve higher compression ratio by using pipelining between decomposition levels. A detailed description of all the modules used in the proposed architecture is provided in this paper. The synthesis result about the complexity of the architecture has been discussed.

Author keywords

Very Large Scale Integration (VLSI) | Wavelet Packets | Wavelet Tree

ISSN: 1943023X
Source Type: Journal
Original language: English

Document Type: Article
Publisher: Institute of Advanced Scientific Research, Inc.

Energy, Environment, and Sustainability

2018, Pages 301-330

Bioremediation of Volatile Organic Compounds in Biofilters(Book Chapter)

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Abstract

In India, 12 lakhs deaths per annum take place due to air pollution according to a report by Greenpeace organization. Volatile organic compounds are major air pollutants which are released into the environment through mobile sources, stationary sources, area sources, and natural sources. Stationary sources such as petrochemical and pharmaceutical industries release VOCs like toluene which is known to cause several health hazards including lung cancer. In addition to it, VOCs pollute air, soil, and water which are a growing environmental concern. Based on the concentration level of the VOCs, several removal techniques have been employed to combat VOCs. Non-biological methods such as ozonation, absorption, adsorption, incineration, catalytic oxidation, condensation, membrane separation are being employed. Several biological methods ranging from biotrickling filters to biofilters have been demonstrated, and they are found to be economical. The biofilters are simple to construct, easy to operate, and cost effective. Major advantage of this method is the pollutant is converted into biodegradable waste which can decompose within a moderate time frame, thus producing no secondary pollutants. In this chapter, biofilters, microorganisms, biofilter preparation and reaction mechanism are discussed. More emphasis was given on operation, processes, conditions, and stability of biofilters. The recent advancements in biofilters including application of foam for enhanced separation and the limitations of the biofiltration methods are also discussed. Future scope and summary of the chapter are given at the end of the chapter to provide an insight into biofilters research.

Author keywords

Biodegradation | Biofilters | Fungi | Lung cancer | Pollution | Reactors | Volatile organic compounds

International Journal of Environment and Sustainable Development

Volume 17, Issue 2-3, 2018, Pages 113-123

Production of biodiesel feedstock - Microbial lipid from slaughterhouse wastewater(Article)

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Abstract

Biodiesel is an alternative diesel fuel, which can be synthesised from renewable biological sources. Lipid production using carbon source in wastewater is an emerging process as it purely depends on waste source. In the present study, the ability of Yarrowia lipolytica to accumulate lipids using slaughterhouse wastewater as substrate was investigated. Using raw wastewater as substrate, maximum lipid content (0.43 g/L) and biomass (1.2 g/g) were obtained. Various pre-treatment methods like acid, alkaline, heat, activated carbon and sawdust treatment were performed and two-fold increase in C/N ratio was observed in combined pre-treatment of sawdust with KOH. Using pretreated wastewater, lipid accumulation was enhanced to 32% with lipid content of 0.64 g/L. Results of this study conclude that the pre-treated slaughterhouse wastewater can be employed as a better feedstock for lipid production using Yarrowia lipolytica.

Author keywords

C/N ratio | Oleaginous microorganisms | Pre-treatment | Slaughterhouse wastewater | Yarrowia lipolytica

Indexed keywords

Engineering controlled terms: Biodiesel | Feedstocks | Lipids | Potassium hydroxide | Wastewater treatment

Engineering uncontrolled terms: Alternative diesel fuel | Biodiesel feedstock | Biological sources | Combined pre treatments | Lipid accumulations | Pretreatment methods | Slaughterhouse wastewater | Yarrowia lipolytica

Archives of Civil Engineering

Volume 64, Issue 1, 2018, Pages 181-195

EXPERIMENTAL STUDY on SEDIMENTATION REMOVAL of PERVIOUS CONCRETE(Article)

[EKSPERYMENTALNE BADANIE DOTYCZĄCE USUWANIA BETONU JAMISTEGO NA DRODZE SEDYMENTACJI]

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Abstract

Pervious concrete is a unique and effective material used to tackle important environmental problems, to maintain green, sustainable growth, and to reduce storm water runoff and pollutants. Clogging of pervious concrete is an important potential issue in serviceability, considered one of the primary limitations of pervious concrete systems. The sediment deposition pattern of pervious concrete was determined using three clogging materials: clay, sand, and clayey silty sand. The clogged specimens were cleaned by pressure washing, vacuuming, and a combined method. In total, ten clogging and cleaning cycles were carried out on each sample to evaluate the draining capacity of the pervious concrete. The clogging test was assessed by measuring the infiltration rate during clogging and after cleaning, for each cycle. The experiment results showed that a reduction in permeability due to different types of sedimentation material as well as recovery in permeability was achieved after applying various cleaning methods.

Author keywords

Clogging | Permeability | Pervious concrete | Sedimentation | Storm water

Indexed keywords

Engineering controlled terms: Concretes | Infiltration | Storms | Sustainable development | Water pollution

International Journal of Environment and Sustainable Development

Volume 17, Issue 2-3, 2018, Pages 151-161

Detoxification of food-waste hydrolysate to enhance lipid production in M. Pulcherrima - An alternative feedstock for biodiesel(Article)

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Abstract

One of the alternative ways to produce biodiesel in a sustainable manner, without contending with food crops, is to use microbes. Microbial oil is a potential feedstock for the biodiesel industry. In this study, oleaginous yeast (Metschnikowia pulcherrima) was used to produce lipid from the carbon source obtained from food waste hydrolysate. Lime and activated charcoal were used to detoxify the hydrolysate and among these detoxifiers, activated charcoal increased the C/N ratio to 76. Fermentation was done in 5 L bioreactor and biomass yield of 12.8 g/L was derived after 96 hours of cultivation. The lipid content was 21.1% and lipid yield was 2.7 g/L with COD removal of 52%. The obtained lipid was analysed using Fourier transform infra-red (FTIR) and the result signifies that the lipid produced using the detoxified food waste hydrolysate could be used as an effective feedstock for biodiesel production.

Author keywords

C/N ratio | Detoxification | Food waste hydrolysate | FTIR | Lipid | Metschnikowia pulcherrima

Indexed keywords

Engineering controlled terms: Activated carbon | Detoxification | Feedstocks | Food waste | Fourier transform infrared spectroscopy | Lime | Oils and fats

Engineering uncontrolled: Alternative feedstocks | Biodiesel industry | Biodiesel production | Fourier transform infra reds | Lipid content

An identity attribute–based encryption using elliptic curve digital signature for patient health record maintenance(Article)

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Abstract

Providing security to the data that stored in personal health record (PHR) is an emerging and critical task in recent years. For this purpose, some of the encryption and key generation techniques are developed in the traditional works. But it has the drawbacks such as lacks in access control policies, reduced security, and ineffective. So this work implemented the efficient techniques, namely, elliptic curve Diffie-Hellman for the secret key generation and identity attribute–based encryption for improving the security of the cloud data. Initially, the cloud user can request the patient's data to the PHR admin, and then they can generate the secret by using the elliptic curve Diffie-Hellman algorithm. The key that used for encryption and decryption is generated by using the identity attribute–based encryption technique. Then, the access control is provided to the users based on their roles. The requested data are encrypted by applying the advanced encryption standard technique. After that, the elliptic curve digital signature algorithm is used to generate the digital signature for the encrypted data. Furthermore, it is verified with the user's digital signature; if it matches, the data can be accessed by the user with the help of advanced encryption standard decryption mechanism. Finally, the authenticated user can able to access the patient's data from PHR. In experiments, the performance of the proposed encryption and key generation technique is evaluated and compared with the existing techniques for proving the effectiveness of the implemented system.

Author keywords

cloud computing | decryption | Diffie-Hellman (DH) | elliptic curve cryptography (ECC) | encryption | key exchange | personal health record (PHR) | security

Indexed keywords

Engineering controlled terms: Access control | Authentication | Cloud computing | Data privacy | Electronic document identification systems | Geometry | Health | Public key cryptography

Renewable and Sustainable Energy Reviews

Volume 82, February 2018, Pages 2970-2992

A review on the properties, performance and emission aspects of the third generation biodiesels(Review)

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Abstract

In the effect of robust industrialization and rapid augmentation of a number of fleets, there has been a huge rise in the fossil fuel consumption. Tremendous increase in global warming threatens the ecological balance of the earth. Based on the recent sorts of hardship about the fuel, researchers are profoundly pondered over the field of renewability, environmentally friendly and economically doable. In recent decades biodiesel fuel becomes the center of attraction among researchers since it is renewable, bio degradable, non-noxious, eco-friendly and sustainable. This review paper highlights and reviews the properties of prosperous variety of the biodiesel fuels derived from non-edible feedstocks which are termed as third generation biodiesel and its effects on the performance and emissions of the diesel engines. It was observed that the physicochemical properties of the biodiesel differ based on the types of feedstocks and also have a considerable effect on the potential performance of engine and dynamic characteristics of emission level. Also, the usage of biodiesel commonly leads to a reduction in noxious pollutants like carbon monoxide, unburnt hydrocarbon and particulate matter with an obvious increase in fuel consumption and NOx emission. This review provides a prospective strategy for the researchers for enhancing the engine performance and emission characteristics by using the third generation biofuels and its blends with the productive marvelous outcomes.

Author keywords

Algae | Animal fat | Biodiesel | Emission | Fish oil | Waste cooking oil

Indexed keywords

Research Journal of Biotechnology

Volume 13, Issue 2, 1 February 2018, Pages 64-67

Computational and functional analysis of an alkaline serine kinase gene (aprN) from the genome of Bacillus subtilis NRRL B -14196(Article)

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Abstract

The incidence of cardiovascular disease has been increasing in recent years. Medications used for treatment of stroke include enzymes such as streptokinase and tissue plasminogen activators. Due to the high medication cost and their side effects, research has been aimed at the development of fibrinolytic enzymes from microbial sources. Most of the fibrinolytic enzymes are serine kinases and so far, Bacillus sp is the choices for microbial sources. The present study attempts to describe the bioinformatics and experimental validation of a Bacillus subtilis strain that produces alkaline serine kinase In this study, a combination of in silico analysis and experimental validation of an alkaline serine kinase from Bacillus subtilis NRRL B-14196 was performed. The results of bioinformatics analyses were validated using experimental and literature references. We have analysed the Bacillus subtilis NRRL B-14196 genome which harbours a putative gene that is annotated as alkaline serine proteases. Conserved domain analysis predicted it to be a member of the serine protease family of peptidases. The predicted theoretical pI and aliphatic index values suggested AprN as a stable protein.

Author keywords

Alkaline serine kinase | Bacillus subtilis | Conserved domain | Sequence alignment

ISSN: 09736263
Source Type: Journal

Document Type: Article
Publisher: World Research Association

ARPN Journal of Engineering and Applied Sciences

Volume 13, Issue 4, 1 February 2018, Pages 1381-1385

Compressive sensing based image encryption scheme(Article)

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Abstract

On the basis of a compressive sensing technique, an encryption scheme is proposed in order to improve security for the image. In the proposed algorithm, Discrete Wavelet Transform is applied to the plain image in order to transform it into many wavelet coefficients and then those coefficients are in turn confused using zigzag confusion. Finally they are converted into a cipher image by applying the proposed compressive sensing technique. Randomly generated 256 bit key is used to calculate the skew tent map, which further forms the basis for creating the measurement matrix used in compressive sensing. Simulation results show good performance for the proposed algorithm over the existing algorithms. © 2006-2018 Asian Research Publishing Network (ARPN).

Author keywords

Compressive sensing | Cryptography | Steganography

ISSN: 18196608
Source Type: Journal
Original language: English

Document Type: Article
Publisher: Asian Research Publishing Network

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Ecology, Environment and Conservation

Volume 24, February 2018, Pages S202-S209

Study on the remediation of textile effluent contaminated soil using electrokinetic and biological methods(Article)

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Abstract

Soil contamination is a major issue all around the globe due to improper disposal of wastes on the ground and the effluent discharged from the polluting industries. Controlling soil contamination or remediation of contaminated site has become a topic of interest of research in the recent past. In the present study, soil remediation by two different techniques namely Electrokinetic method and biological method were employed to remove the heavy metals from soil which was contaminated by the effluent discharged from a textile industry. In Electrokinetic method, three different electrolytic solutions were used namely tap water, EDTA and Citric acid for a selected retention time of 4 hours and 8 hours. Results showed that Citric acid is efficient in the removal of Cr, Cu and Pb whereas EDTA is effective in the removal of Zn. Use of Reactive peat moss barrier, a biological method was also used to study the mobility and sorption of heavy metals for varying periods such as 7 days, 14 days, 30 days and 60 days. Peat moss barrier due to its high organic content is capable of decontaminating the heavy metals. The barrier used in the experimental study removed 46% of Cr and 44% of Pb in a contact time of 60 days.

Author keywords

Biological method | Contaminated soil | Electrokinetic method | Heavy metals | Retention time

Indexed keywords

GEOBASE Subject Index: biological method | electrokinesis | experimental study | heavy metal | industrial waste | retention | soil pollution | soil remediation | textile industry | waste disposal

Wireless Personal Communications

Volume 99, Issue 2, 1 March 2018, Pages 965-984

Genetic Grey Wolf Optimizer Based Channel Estimation in Wireless Communication System(Article)

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Abstract

Various methods are available for channel estimation in the orthogonal frequency division multiplexing and orthogonal frequency and code division multiplexing (OFCDM) based wireless communication schemes. Along with this, the most utilized techniques are namely the minimum mean square error (MMSE) and least square (LS). The process of LS channel estimation method is simple but it occupies a very high mean square error. On the other hand, the performance of MMSE is better than LS in terms of SNR, though it shows high computational complexity. Compared to MMSE and LS based techniques, the combination of MMSE and LS techniques using evolutionary programming reduces the error significantly to receive exact signal. In this study, we propose a hybrid method namely GGWO that includes grey wolf optimization (GWO) and genetic algorithms (GA) for estimate the channel in MIMO–OFCDM schemes. At first, the best channel is estimated using GWO and afterwards, the MMSE and LS are hybridized through GA for calculating the best channel to decrease error. Overall, the GWO and GA contribute in fine tuning the obtained channel scheme so that the channel model is derived further to correlate with the ideal scheme. Our results demonstrate that the proposed scheme is superior to conventional MMSE and LS in terms of BER and SNR.

Author keywords

Channel estimation | Genetic algorithm | Grey wolf optimizer | LS | MMSE | MSE | OFCDM | OFDM | SNR

Indexed keywords

Engineering controlled terms: Code division multiple access | Computer programming | Errors | Frequency estimation | Genetic algorithms

Journal of Computational and Theoretical Nanoscience

Volume 15, Issue 3, March 2018, Pages 773-780

Enhanced energy saving tree based clustering with multiple input and multiple output(Article)

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Abstract

In Wireless sensor network is important factor in many applications, like robotics application. Sensor collects the data, transmitted to cluster head with suitable channel, transmitting data packet failure to receive because of overload occurred. For multiple input and multiple output with clustering perform multi task at same time, it cause many interference during communication time, each time data packets gets dropped. Propose Energy saving tree based clustering with multiple input and multiple output (ETCMIMO) algorithm, multi task is performed in efficient manner, to minimize node resource utilization in communication period. Cluster head node gather data packets from cluster member in tree format, all nodes enable to receive packets, so easy to receive data packets with different cluster nodes. It minimizes the packet loss and network overhead, because provide link between all communicating nodes in tree structure and enhance packet delivery ratio. Lot of energy is saved by using proposed energy saving method.

Author keywords

Channel Allocation | Clustering with Multiple Input and Multiple Output | Energy Saving Tree Based Clustering

ISSN: 15461955
Source Type: Journal
Original language: English

DOI: 10.1166/jctn.2018.7158
Document Type: Article
Publisher: American Scientific Publishers

Journal of Renewable and Sustainable Energy

Volume 10, Issue 2, 1 March 2018, Article number 023501

A novel control strategies to enhance the life cycle of the battery in a DC grid(Article)

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Abstract

This paper presents a unique control strategy for reducing the number of charge/discharge cycles of a battery in a standalone photovoltaic system with Direct Current (DC) loads. The fluctuation in both photovoltaic power and load power affects the DC bus voltage. Regulation of DC link voltage leads to a random and frequent charging/discharging profile for the battery, which in turn has a detrimental effect on the life of the battery. The proposed scheme involves a two layered voltage regulation for the DC voltage by incorporating a supercapacitor along with the battery. Two different control methods, namely, Integer order Proportional Integral Derivative (PID) and Fractional order PID, have been designed for the proposed system, and their performance has been discussed. Simulations of the proposed system with two different control methods are implemented in MATLAB for validating the proposed control algorithm, and its performance under various operating conditions of the load has been analyzed.

Indexed keywords

Engineering controlled terms:	Life cycle · MATLAB · Photovoltaic cells · Proportional control systems · Two term control systems · Voltage regulators
Engineering uncontrolled terms	Charge/discharge cycle · Charging/discharging · Control strategies · Fractional order pid · Operating condition · Photovoltaic power · Proportional integral derivatives · Stand alone photovoltaic system
Engineering main heading:	Secondary batteries

Indian Journal of Environmental Protection

Volume 38, Issue 3, March 2018, Pages 234-238

Characterization and effective utilization of coal ash with geosynthetics in pavement subgrade(Article)

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Abstract

Pavements on black cotton soils fail during adverse weather conditions due to swelling and shrinkage characteristics of such soils. Stabilization of black cotton soils, therefore, becomes mandatory. Geosynthetics are soil stabilization materials used to improve soil conditions in various applications. Coal ash is available at low cost and it is utilized for the stabilization of black cotton soils. The present study aims to utilize coal ash effectively in pavement subgrade. In phase I of the research, index and engineering properties of virgin soil is studied and the soil is classified under CH (clay of high compressibility) category. Coal ash is added to the soil by 10%, 20%, 30%, 40%, 50% replacements to the weight of soil. The shear strength of virgin soil is 90.60 kN/m^2 at an optimum moisture content of 21% and maximum dry density of 1.6807g/cc. The California bearing ratio (CBR) values of the virgin soil under unsoaked and soaked conditions are 5.33% and 2.84%, respectively. This study shows that the shear strength, optimum moisture content, maximum dry density is maximum at an optimum of 10% addition of coal ash to the soil. Atterbergs limits and plasticity index decreases with the addition of coal ash.

Author keywords

Black cotton soil | California bearing ratio (CBR) | Geosynthetics | Maximum dry density | Optimum moisture content | Unconfined compressive strength | Waste coal ash

Journal of Advanced Microscopy Research

Volume 13, Issue 1, March 2018, Pages 54-60

Mechanical characteristics of chitosan dispersed poly lactic acid/basalt fiber hybrid composites(Conference Paper)

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Abstract

This paper focus on mechanical characterization of Chitosan (CS) particles dispersed Poly lactic acid (PLA) reinforced basalt fiber (BF) hybrid composites. Hybrid composites with different weight percentage of PLA, BF and CS were prepared by solid state reaction blending (SSRB) in twin screw extruder and specimens were prepared by injection moulding technique. The properties of injected moulded composites were extensively examined by tensile test, flexural test, and impact test. It was found that the increased weight percentage of basalt fibers and chitosan particles in poly lactic acid exhibits good mechanical properties. It is demonstrated in this paper BF and CS were will incorporated and uniformly distributed using Scanning electron microscopy. The optimum weight percentage of BF and CS in PLA composites was found to be 25 wt% and 10 wt% respectively.

Author keywords

Injection Moulding | Mechanical Properties | PLA/Chitosan/Basalt Fiber Hybrid Composites | Scanning Electron Microscopy | Solid State Reaction Blending

ISSN: 21567573
Source Type: Journal

DOI: 10.1166/jamr.2018.1357
Document Type: Conference Paper

Journal of Advanced Microscopy Research

Volume 13, Issue 1, March 2018, Pages 65-71

Wear study on basalt, flax and hybrid fiber reinforced phenolic composites(Conference Paper)

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Abstract

Fiber reinforced polymer composites exhibits excellent mechanical and tribological properties. Due to this reason they are used in many engineering applications such as transmission and brake systems. In the present study, the wear mechanism of flax and basalt fibers reinforced phenolic composites were studied by using a pin on disc wear tester. The sliding conditions such as sliding velocity and normal force are varied from 0.1 to 0.5 m/s and 9.81 N to 49.04 N respectively. The wear map of worn out specimens were analyzed using wear mechanism map developed by using Fuzzy Clustering Method. Scanning Electron microscopy photographs were examined and wear map is correlated. Different wear mechanisms that dominated a particular wear regime were discussed in this paper.

Author keywords

Basalt and Flax Reinforced Composites | Brake Pad Material | Fuzzy Clustering Method | Phenolic Resin Composites | Wear Mechanism Maps

ISSN: 21567573
Source Type: Journal
Original language: English

DOI: 10.1166/jamr.2018.1359
Document Type: Conference Paper
Publisher: American Scientific Publishers

Neural Computing and Applications

Volume 29, Issue 8, 1 April 2018, Pages 237-249

Adaptive hexagonal fuzzy hybrid filter for Rician noise removal in MRI images(Article)

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Abstract

Magnetic resonance images (MRIs) are sensitive to redundant Rician noise. The proposed adaptive hexagonal fuzzy hybrid filtering technique adapts itself to remove Rician noise variances. The removal of noise variance is performed by constructing a hexagonal membership function along with local and nonlocal filters. The statistical feature such as local mean (μ_l) and global mean (μ_g) is determined to find fuzzy weights by constructing a hexagonal membership function for nonlocal filter to preserve the structural information and for local filter to preserve edges. The restoration is performed by multiplying its corresponding fuzzy weight with the restored image of local and nonlocal filter in order to improve the quality of an image. Detailed simulation is performed for Brain Web database and real MRI images at various noise levels using the proposed adaptive hexagonal fuzzy hybrid filtering algorithm and existing algorithms. The visual and diagnostic qualities of the denoised image are well preserved for the proposed adaptive hexagonal fuzzy hybrid filter both at low and high densities of Rician noise.

Author keywords

Fuzzy logic | Hybrid filter | Magnetic resonance imaging | Rician noise

Indexed keywords

Engineering controlled terms: Bandpass filters | Fuzzy filters | Fuzzy logic | Magnetic resonance imaging | Membership functions | Restoration | Spurious signal noise

Engineering uncontrolled: Diagnostic quality | Hybrid filtering | Hybrid filters | Noise variance | Non-local filters | Rician noise

Multimedia Tools and Applications

Volume 77, Issue 8, 1 April 2018, Pages 9365-9378

Efficient invariant interest point detector using Bilateral-Harris corner detector for object recognition application(Article)

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Abstract

Interest point detection plays a significant role in computer vision applications. The most commonly used interest point detector algorithm is scale invariant feature transform (SIFT). The use of Gaussian filter in the SIFT algorithm fails to match interest points on the edge and it also causes blur annoyance in the rescaling process. To overcome this failure Bilateral-Harris Corner Detector (BHCD) has been proposed in this paper. In the proposed BHCD, a Bilateral filter preserves edges by smoothening and removing noise in an image. Accuracy in localization of interest points are improved by using the proposed dynamic blur metric calculation. The Harris corner has been added to get stable and reliable interest point detection. The proposed BHCD has been simulated for the evaluation criteria such as repeatability and matching score. Extensive experimental results show that the proposed method is more robust to illumination, scaling, rotation, compression and viewpoint changes. The experimental evaluation for BHCD has been carried for the object recognition benchmark datasets COIL-100, ZuBud, Caltech-101. The proposed BHCD achieves highest recognition rate compared to the other state-of-the-art methods.

Author keywords

Bilateral filter | Bilateral-Harris corner interest point | Interest point detector | Scale invariant feature transform (SIFT)

Indexed keywords

Engineering controlled terms: Feature extraction | Object detection | Object recognition

Renewable Energy

Volume 119, April 2018, Pages 235-252

Availability analysis, performance, combustion and emission behavior of bael oil - diesel - diethyl ether blends in a variable compression ratio diesel engine(Article)

Krishnamoorthi, M., Malayalamurthi, R.

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Abstract

The aim of the present work is to experimentally investigate the effect of injection pressure (IP) and injection timing (IT) on the performance, combustion, and emissions of a compression ignition (CI) engine with aegle marmelos oil (bael oil) blends. This work includes the exergy analysis of diesel engine to maximize the work availability. The tests were conducted on a constant speed direct injection diesel engine fueled with ternary blends of bael oil, diethyl ether (DEE) and neat diesel (D) at various engine loads. When the engine was operated with B2 blend (60%D+30%bael oil+10%DEE), there was an increase in brake thermal efficiency of 3.5% accompanied by a declination in oxides of nitrogen emissions by 4.7% at full load with 250bar IP. The B2 blend showed lower hydrocarbon emission by 7% as compared to that of neat diesel at full engine load with fuel IT of 23° before top dead center. With Increase in engine load, augmentation exhaust gas and cooling water availabilities lead to amplification of exergy efficiency with increasing load. The exergy efficiency of B2 fuel has found as 62.17% of fuel input at 230bar IP with 100% load. From results, B2 fuel exhibits the best performance and combustion characteristics.

Author keywords

Bael oil | Diesel | Diethyl ether | Exergy | Injection pressure | Injection timing

Indexed keywords

Engineering controlled terms: Combustion | Compression ratio (machinery) | Cooling water | Diesel engines | Efficiency | Engines | Ethers | Exergy | Fuels | Ignition

Environmental Science and Pollution Research

Volume 25, Issue 10, 1 April 2018, Pages 9523-9538

Analytical characterization of products obtained from slow pyrolysis of Calophyllum inophyllum seed cake: study on performance and emission characteristics of direct injection diesel engine fuelled with bio-oil blends(Article)

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Abstract

This paper aims to analyse the characteristics and properties of the fractions obtained from slow pyrolysis of non-edible seed cake of Calophyllum inophyllum (CI). The gas, bio-oil and biochar obtained from the pyrolysis carried out at 500 °C in a fixed bed batch type reactor at a heating rate of 30 °C/min were characterized by various analytical techniques. Owing to the high volatile content of CI biomass (72.61%), it was selected as the raw material in this present investigation. GC-MS and FT-IR analysis of bio-oil showed the presence of higher amount of oxygenated compounds, phenol derivatives, esters, acid and furans. The physicochemical properties of the bio-oil were tested as per ASTM norms which imply that bio-oil is a highly viscous liquid with lower heating value as compared to that of diesel fuel. The chemical composition of evolved gas was analysed by using GC testing which revealed the presence of combustible components. The FT-IR characterization of biochar showed the presence of aliphatic and aromatic hydrocarbons whereas the elevated amount of carbon in biochar indicates its potential to be used as solid fuel. The performance and emission characteristics of CI engine were assessed with different CI bio-oil blends and compared with baseline diesel fuel. The results showed that addition of bio-oil leads to decreased brake thermal efficiency and increased brake specific energy consumption. Meanwhile, increase in blend ratio reduces harmful pollutants such as oxides of nitrogen and smoke in the exhaust. From the engine testing, it is suggested to employ 20% of CI bio-oil blends in CI engine to obtain better operation.

Author keywords

(Bio-oil) (Calophyllum inophyllum) (Emission) (Engine) (GC-MS) (Pyrolysis)

Journal of the Brazilian Society of Mechanical Sciences and Engineering

Volume 40, Issue 4, 1 April 2018, Article number 232

An experimental study on the rotational behaviour of a Savonius wind turbine for two-lane highway applications(Article)(Open Access)

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Abstract

The objective of this work is to understand the behaviour of a Savonius wind turbine (SWT) on two-lane highways located in Coimbatore district, India. Experiments were conducted by placing a Savonius wind turbine (SWT) on the sides of the highway during the south-west monsoon season in three different directional roads, i.e., south-west to north-east, south to north and west to east. Vehicles moving on the highway at varying speeds modify the velocity of air locally, which in turn results in varying the drag forces on the blades of SWT, setting it in motion. An economical SWT was designed, fabricated and tested in a wind tunnel and on the highways, and the angular rotational speeds were measured. Based on the data obtained, further analysis was done to understand the behavioural patterns of SWT. Data obtained from the experiments show a "negative drag force", which is created in two-way lanes by the vehicles moving in opposite direction, affecting the rotational speed of SWT by a significant proportion. These conditions have been studied and the results have been discussed.

Author keywords

(Highway applications) (Low-rise wind) (Monsoon) (Savonius wind turbine) (Wind behaviour)

Indexed keywords

Engineering controlled terms: (Air) (Atmospheric thermodynamics) (Drag) (Wind tunnels)

Journal of Mechanical Science and Technology

Volume 32, Issue 4, 1 April 2018, Pages 1835-1847

The influence of charge air temperature and exhaust gas recirculation on the availability analysis, performance and emission behavior of diesel - bael oil - diethyl ether blend operated diesel engine(Article)

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Abstract

In this work, the first and second laws of thermodynamic analyses were carried out on Kirloskar direct injection, variable compression ratio (VCR) engine at four different charge air temperatures (CAT) and exhaust gas recirculation (EGR) mode. Performance, emission and combustion characteristics along with exergy analysis of ternary test fuel of 60 % diesel + 30 % bael oil + 10 % diethyl ether (DEE) were performed. Various exergy components are identified and calculated individually with the percentage of engine load at 1500 rpm. When operating the diesel engine with 47 °C CAT, brake thermal efficiency (BTE) is improved to 29.33 %, carbon monoxide (CO), hydrocarbon (HC), and emissions have been reduced by 8.57 %, 4.28 % and 6.01 % at peak engine load. The oxides of nitrogen (NOx) have been reduced by 20.12 % at 100 % engine load for 30 % EGR mode. The maximum exergy efficiency of 54.61 % has been observed at full engine load for the 47 °C CAT.

Author keywords

Bael oil · Charge air temperature · Diethyl ether · EGR · Exergy

Indexed keywords

Engineering controlled terms: Atmospheric temperature · Carbon monoxide · Compression ratio (machinery) · Diesel engines · Direct injection · Efficiency · Ethers · Exergy · Gases · Thermoanalysis

Tehnicki Vjesnik

Volume 25, Issue 2, April 2018, Pages 358-367

DLWUC: Distance and load weight updated clustering-based clock distribution for SOC architecture(Article)(Open Access)

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Abstract

High-clock skew variations and degradation of driving ability of buffers lead to an additional power dissipation in Clock Distribution Network (CDN) that increases the dimensionality of buffers and coordination among flip-flops. The manual threshold level to predict the Region of Interest (ROI) is not applicable in clustering process due to the complexities of excessive wire length and critical delay. This paper proposes the Distance and Load Weight Updated Clustering (DLWUC) to determine the suitable position of logical components. Initially, the DLWUC utilizes the Hybrid Weighted Distance (HWD) to estimate the distance and construct the distance matrix. The weight value extracted from the sorted distance matrix facilitates the projection of buffers. The updated weight value serves as the base for clustering with labeled outputs. The placement of buffer at the suitable place from load weight updated clustering provides the necessary trade-off between clock provision and load balance. The DLWUC discussed in this paper reduces the size of buffers, skew, power and latency compared to the existing topologies.

Author keywords

Buffers placement · Clock Distribution Network (CDN) · Clock mesh · Clustering · Flip Flop (FF) · Tree based CDN

Indexed keywords

Engineering controlled terms: Clocks · Clustering algorithms · Economic and social effects · Flip flop circuits · Image segmentation

Engineering uncontrolled terms: Clock distribution · Clustering · Clustering process · Distance matrices · Driving abilities · The region of interest (ROI)

Journal of Environmental Chemical Engineering

Volume 6, Issue 2, April 2018, Pages 3111-3121

Removal and recovery of reactive yellow 84 dye from wastewater and regeneration of functionalised Borassus flabellifer activated carbon(Article)

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Abstract

This study demonstrates the performance and characterisation of Borassus Flabellifer shell derived Nano Composite (BNC) in the adsorption process for the removal of reactive diazo dyes. Borassus flabellifer shell, an agricultural waste material, is evaluated and subjected to activation under CO_2 atmosphere to obtain Borassus Flabellifer shell derived activated carbon (BAC). The resulted BAC is modified as BNC using magnetite nanoparticles by precipitation method. The texture and composition of BAC and BNC are observed by various analytical determinations like pH_{pZc}, FTIR, powder-XRD, BET surface area, FE-SEM, EDX and VSM analysis. The batch study is conducted by varying pH, dosage, initial concentration and equilibration time. The experimental studies are carried out using the optimised data and the maximum removal capacity of BNC for the adsorption of reactive yellow 84 (RY84) is found to be 40 mg/g. The Langmuir equation suits the best-fit equilibrium adsorption isotherm model, which predicts the monolayer adsorption of RY84. The reaction kinetics of the adsorption process is best expressed by pseudo-second order model equation. The thermodynamic parameters attribute the spontaneous and endothermic processes involved in the adsorption mechanism. The recovery of BAC and BNC are attempted and examined, while the regeneration of BNC is successful up to four cycles.

Author keywords

Adsorption isotherms | Borassus flabellifer shell | Diazo dye | Magnetite | Nanocomposite | Thermodynamic

Indexed keywords

Engineering controlled terms: Activated carbon | Adsorption isotherms | Agricultural wastes | Magnetite | Magnetite nanoparticles | Nanocomposites | Reaction kinetics | Shells (structures) | Stripping (dyes) | Thermodynamics

Journal of Environmental Chemical Engineering

Volume 6, Issue 2, April 2018, Pages 3185-3191

Deterioration of cross linked polymers of thermoset plastics of e-waste as a side part of bioleaching process(Article)

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Abstract

Bioleaching is a process of metal extraction which requires very low energy and less emission of toxic gases. The polymers that are left out after bioleaching were very hard to degrade as they are thermoset or cross linked polymers. But studies revealed that the polymers could be deteriorated with the help of various environmental factors like sunlight, UV etc. This characteristic feature was an important parameter for the construction of an electronic device. An attempt has been done to find out the ability of microbes to deteriorate plastics after metal recovery from WPCB. A. niger was used to leach out copper in this experiment as it holds nearly 75% of the metallic fraction present on the surface of WPCB and also according to the resource recovery efficiency copper was known to have larger profit than that of the rest of the metals present in it. A period of 21 days was given for bioleaching after which the bioleachate was drained. The set up was set aside for 45 days to know the strength of the microorganisms to degrade the cross linked polymers with the help of the enzymes they produce. Thus it was found that the microbes used for bioleaching turned to be potent to deteriorate plastics. It was confirmed with the help of SEM analysis. The degradation ability was tested before and after bioleaching with the help of Thermo-Gravimetric-Differential Thermal Analyser (TG-DTA) and the change in molecular group was studied with the help of Fourier Transform Infrared Spectrometer (FTIR).

Author keywords

Bioleaching | e-waste | Epoxy coating | FT-IR | Polymer deterioration | TG-DTA

Indexed keywords

Effects of doping concentration on structural, morphological, optical and electrical properties of tungsten doped V_2O_5 nanorods(Article)

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View additional affiliations

Update notice

Corrigendum to "Effects of doping concentration on structural, morphological, optical and electrical properties of tungsten doped V_2O_5 nanorods" [Ceram. Int. 44 (2018) 7098–7109](S0272884218301640)(10.1016/j.ceramint.2018.01.149)
(2019) Ceramics International, 45 (13), p. 16723.

Abstract

Pure and tungsten-doped V_2O_5 ($W_xV_2O_5$; x = 5%, 10% and 15%) nanorods were produced by the wet chemical method followed by annealing at 60 °C for 12 h and 600 °C for 1 h. The influence of dopant concentration on the structural, morphological, optical and electrical properties of V_2O_5 nanorods were investigated through XRD, SEM-EDS, TEM, PL and DC conductivity studies. XRD pattern analysis reveals that the pure and tungsten doped samples are annealed at 60 °C exhibits anorthic phase and annealed at 600 °C, the anorthic is phase disappeared and emerged as an orthorhombic phase. Also, structural analysis shows that the $W_xV_2O_5$ (x = 15%) lattice is found to be secondary phase. The gradual morphological transformation of nanostructures due to the incorporation of tungsten is depicted through SEM/TEM characterizations. The relative differential structure of tungsten-doped V_2O_5 nanorods is promptly registered by SEM analysis. EDS result confirms the presence of tungsten and also oxygen vacancies in doped V_2O_5. The PL quenching was observed with doping is due to the absorption of energy from the defect emission in the V^{5+} lattice by W^{6+} ions. DC conductivity of $W_xV_2O_5$ with respect to different temperatures is explained by the presence of defects. Further, the colloidal form of pure and n-$W_xV_2O_5$ is used to deposit on p-Si substrate for formation of p-n junction by the nebulizer spray technique and the properties of fabricated diodes are investigated under dark and illumination conditions. Also, the Norde's method is used to evaluate the series resistance and barrier height of the Schottky contact. Further, the transient photocurrent measurements were carried out to analyze the photoresponse of the developed diodes.

IET Generation, Transmission and Distribution

Volume 12, Issue 8, 30 April 2018, Pages 1765-1773

Load flow analysis using generalised Hopfield neural network(Article)

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Abstract

This study proposes a generalised Hopfield neural network (GHNN) for solving non-linear load flow equations. The proposed method was formulated with appropriate energy function for performing load flow analysis of n-bus system. The intended method has the advantages of simple to use, more general application, faster convergence and better optimal solution over the conventional method of load flow using Newton-Raphson (NR) technique. The proposed method of GHNN has been used to solve the power flow equation by calculating the power mismatches and this constraint is used to formulate the energy function of Hopfield neural network (HNN). This energy function is used to derive the weights and bias values of the network. The optimal solution can be found, based on the minimisation of the energy function of continuous HNN. The suggested method was tested in a typical 3-bus and 5-bus power system. The mathematical equation of the proposed method was coded using Matlab/R2014a software. The simulation results obtained have shown that the proposed method is more efficient than NR method in terms of reduction in computational complexity and convergence time with minimum number of iterations.

Indexed keywords

Engineering controlled terms: Hopfield neural networks; MATLAB; Optimal systems

Engineering uncontrolled terms: Conventional methods; General applications; Hopfield neural networks (HNN); Load flow analysis; Mathematical equations; Newton raphson (N R); Number of iterations; Power flow equations

Journal of Inorganic and Organometallic Polymers and Materials

Volume 28, Issue 3, 1 May 2018, Pages 1286-1293

Synthesis and Structural Characterization of Polymer-Based Cobalt Ferrite Nanocomposite with Core–Shell Structure(Article)

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Abstract

Polymer hybrids have become a major area of research and development owing to the remarkable properties and multifunctional behaviour deriving from their nanocomposite/nanohybrid structure. In this class, magnetic polymer nanocomposite are of special interest because of the combination of excellent magnetic properties, high specific area, surface active sites, high chemical stability and good biocompatibility. The present communication primarily concentrates on the investigation of structural characterization of alginate–cobalt ferrite nanocomposite ($CoFe_2O_4$–ANa NC) prepared by ex situ polymerization method. The structural and morphological properties of $CoFe_2O_4$–ANa NC were analysed using X-ray diffraction, scanning electron microscopy (SEM), transmission electron microscopy (TEM) and dynamic light scattering. The specific surface area of the nanocomposite was analysed using BET surface area analysis. The functional group and the thermal stability were examined using FTIR and TGA/DTA respectively. The characterization results have pointed out the successful role of sodium alginate in stabilizing cobalt ferrite nanoparticles ($CoFe_2O_4$ NP). The SEM and TEM images revealed the well interspersed state of cobalt ferrite with sodium alginate. It is obvious to note the increased size and the specific surface area for $CoFe_2O_4$ nanocomposite. © 2018, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Alginate–cobalt ferrite nanocomposite | BET | Core–shell structure | Polymer nanocomposite | SEM | TEM

Indexed keywords

Engineering controlled terms: Alginate | Biocompatibility | Characterization | Chemical stability | Cobalt | Electron microscopy | Ferrite | High resolution transmission electron microscopy | Iron compounds | Light scattering | Scanning electron microscopy

Circuits, Systems, and Signal Processing

Volume 37, Issue 5, 1 May 2018, Pages 1988-2000

Optimal Number of Cooperators in the Cooperative Spectrum Sensing Schemes(Article)

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Abstract

In this paper, considering a cognitive radio (CR) network, we propose a hard combining cooperative sensing scheme that embeds a solution of finding optimal number of users who can participate in user cooperation. The solution to our scheme includes two cases, one when single antenna is used at the CR receiver, and the other, when multiple antennas are employed. Moreover, we have derived the closed-form expression for Bayes risk, which is a measure of probability of error. Bayes risk constitutes false alarm and missed detection probabilities. We have found optimum number of users, who can participate in the fusion scheme, by minimising the probability of error. Our simulation results show the improvement in receiver operating characteristics curve, when optimum number of users are allowed to participate in the fusion scheme. © 2017, Springer Science+Business Media, LLC.

Author keywords

Cognitive radio | Energy detection | Fusion centre | Hard combining

Indexed keywords

Engineering controlled terms: Antennas | Probability | Risk assessment

Engineering uncontrolled terms: Closed-form expression | Co-operative spectrum sensing | Cognitive radio network | Energy detection | Fusion centres | Hard combining | Missed detection probabilities | Receiver operating characteristics

Environmental Science and Pollution Research

Volume 25, Issue 14, 1 May 2018, Pages 13731-13744

Assessment of n-pentanol/Calophyllum inophyllum/diesel blends on the performance, emission, and combustion characteristics of a constant-speed variable compression ratio direct injection diesel engine(Article)

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Abstract

Alcohol is used as an additive for a long time with the petroleum-based fuels. In this study, the higher alcohol, n-pentanol, was used as an additive to Calophyllum inophyllum (CI) biodiesel/diesel blends at 10, 15, and 20% by volume. In all blends, the ratio of CI was maintained at 20% by volume. The engine characteristics of the pentanol fuel blends were compared with the diesel and CI20 (Calophyllum inophyllum 20% and diesel 80%) biodiesel blend. The nitrogen oxide (NO) emission of the pentanol fuel blends showed an increased value than CI20 and neat diesel fuel. The carbon dioxide (CO_2) also increased with increase in pentanol addition with the fuel blends than CI20 fuel blend and diesel. The carbon monoxide (CO) and hydrocarbon (HC) emissions were decreased with increase in pentanol proportion in the blend than the CI20 fuel and diesel. The smoke emission was reduced and the combustion characteristics of the engine were also improved by using pentanol blended fuels. From this investigation, it is suggested that 20% pentanol addition with the biodiesel/diesel fuel is suitable for improved performance and combustion characteristics of a diesel engine without any engine modifications, whereas CO_2 and NO emissions increased with addition of pentanol due to effective combustion.

Author keywords

Calophyllum inophyllum | Combustion | Compression ratio | Emission | Pentanol | Performance

Indexed keywords

Energy and Environment

Volume 29, Issue 3, 1 May 2018, Pages 372-391

Effect of exhaust gas recirculation and charge inlet temperature on performance, combustion, and emission characteristics of diesel engine with bael oil blends(Article)

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Abstract

The threat of fossil fuel depletion and augmented environmental pollution caused by diesel fleets can be curbed by adopting suitable fuel and engine modifications. In the present work, effects of engine speed (r/min), injection timing, injection pressure and compression ratio on performance and emission characteristics of a compression ignition engine were investigated. The ternary test fuel of 65% diesel + 25% bael oil + 10% diethyl ether has been used, where the tests have been conducted at different charge inlet temperature and exhaust gas recirculation. All the experiments were conducted at the trade-off engine load that is 75% engine load. When the diesel engine operating with 320 K charge inlet temperature, brake thermal efficiency has been improved to 28.6%. Meanwhile reduced emission levels of carbon monoxide (0.025%) and hydrocarbon (12.3 ppm) were observed during the engine operation with 320 K charge inlet temperature and compression ratio of 18:1. The oxides of nitrogen have been reduced to 226 ppm at 16:1 compression ratio with 30% exhaust gas recirculation mode.

Author keywords

Charge inlet temperature | compression ratio | exhaust gas recirculation | injection system | speed

Indexed keywords

Engineering controlled terms: Carbon monoxide | Compression ratio (machinery) | Diesel engines | Economic and social effects | Fossil fuels | Gases | Ignition | Speed

Engineering uncontrolled Brake thermal efficiency | Compression ignition engine | Emission characteristics | Environmental pollutions

Materials Research Express

Volume 5, Issue 5, May 2018, Article number 056402

Investigation on growth, structural, optical, electrical and X-ray sensing properties of chemically deposited zinc bismuth sulfide ($Zn_xBi_{2-x}S_3$) thin films(Article)

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Abstract

In the present work, $Zn_xBi_{2-x}S_3$ films were synthesized (x =0.2 M) by a chemical bath deposition (CBD) technique at different bath temperatures (60 °C, 70 °C and 80 °C). The role of bath temperature on the formation of the films has been examined. The crystalline nature, structural parameters and surface morphology of the films were ascertained using x-ray diffraction (XRD), Raman spectroscopy and scanning electron microscope (SEM) and energy dispersive x-ray spectroscopy (EDS) respectively. These studies confirmed the formation of crystalline $Zn_{0.2}Bi_{1.8}S_3$ films with uniform distribution of homogenous grains. The characterization results revealed that the film deposited at 70 °C has the good crystalline quality than the films deposited at 60 and 80 °C. Further, the optical absorption spectra showed that the bandgap (E_g) of the film deposited at 70 °C was about 2.39 eV which was found to be less than the same film deposited at 60 and 80 °C. The Current-Voltage (I-V) characteristics of all the films were measured under dark condition. This showed that the electrical conductivity of the film deposited at 70 °C was 1.61×10^{-5} S cm^{-1} which is ten times higher than other films. Further, the I-V characteristics of the film deposited at 70 °C was studied under x-ray radiation. The current under the x-ray radiation was significantly higher compared to the dark current. The x-ray detection sensitivity of the film was found to be maximum at 0.7 V and gradually decreases with increase of bias voltage. This analysis reveals that the film deposited at 70 °C can be used as an x-ray sensor.

Author keywords

chemical bath deposition | sensor | thin film | x-ray

Indexed keywords

Journal of Computational and Theoretical Nanoscience

Volume 15, Issue 5, May 2018, Pages 1461-1470

Magnetotactic bacteria moment migration optimization algorithm for generators real-power rescheduling in deregulated power system(Article)

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Abstract

In deregulated competitive electricity scenario, the transmission network congestion is the most important challenging issue to control and operate the transmission network within reliable limits. This work introduces a novel approach to magnetotactic bacteria moment migration optimization algorithm (MBMMOA) for real-power rescheduling of generators with congestion management (CM). The MBMMOA is a kind of new bionic optimization algorithm with moments of magnetosomes along the magnetic field of lines of the earth as a base. The suggested algorithm effectively applied on small as well as large IEEE-bus Network Topologies. In this work, voltage, line and loading limits considered for transmission network safety. The proposed techniques give superior results compared than the other techniques such as SA, RSM, PSO, SA etc. for the optimal power flow issues.

Author keywords

Congestion Management | Deregulation | Generator Rescheduling | Magnetotactic Bacteria Moment Migration | Optimal Power Flow

ISSN: 15461955
Source Type: Journal
Original language: English

DOI: 10.1166/jctn.2018.7378
Document Type: Article
Publisher: American Scientific Publishers

Solar Energy

Volume 166, 15 May 2018, Pages 195-202

New heterojunction solar cells using copper oxide ingrained MWCNT: Fabrication and performance analysis(Article)

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Abstract

Despite the development of new technologies, cost and methods of fabricating the solar cells are complex. In this work, new heterojunction solar cells have been developed by facile methods using nano CuO/Cu_2O ingrained multi-walled carbon nanotubes as the active absorber layer and zinc oxide as the transparent window layer. Nano pastes were formulated by ball milling and casted on fluorine doped tin oxide substrates using spin coating process. Solar cells, having copper oxides as absorber layers, exhibited an efficiency of 0.03–0.19%, while the copper oxide ingrained multi-walled carbon nanotube layers boosted up the efficiency of solar cells to a maximum of 2.32% by synergistic action. Fine-tuning of the thickness of MWCNT nanocomposite layer further enhanced the efficiency of the champion solar cell to 4.08%. Even though more optimization of the fabrication parameters is required for achieving higher photon conversion efficiencies and meeting up the commercial standards, this work successfully demonstrated a simplistic approach for the fabrication of low cost solar cells. © 2018

Author keywords

Carbon nanotube nanocomposite | Heterojunction solar cells | Hole extraction

Indexed keywords

Engineering controlled terms: Ball milling | Copper oxides | Efficiency | Fabrication | Heterojunctions | II-VI semiconductors | Multiwalled carbon nanotubes (MWCN) | Nanocomposites | Tin oxides | Yarn | Zinc oxide

Fuel

Volume 221, 1 June 2018, Pages 283-297

RSM based optimization of performance and emission characteristics of DI compression ignition engine fuelled with diesel/aegle marmelos oil/diethyl ether blends at varying compression ratio, injection pressure and injection timing(Article)

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Abstract

In the support of developing a substitute for diesel fuel automobiles, the research in renewable energy has been focused due to the hurly-burly situation for petroleum combat and environmental causes. The present study has been carried out in a naturally aspirated light-duty variable compression ratio (VCR) multi-fuel research engine. As input amends, three significant input parameters as injection pressure (IP), compression ratio (CR) and injection timing (IT) have been taken. In this test, the input parameters are taken as 210 bar, 230 bar, 250 bar for IP and 16, 17, 18 for CR and 21°, 23°, 25° before top dead center (bTDC) for IT. To outline the resulting output parameters like performance and emissions, the statistical tool like the design of experiments (DoE) have been used for planning the experimental trials. The lesser exhaust pollution and better performance are the desirable output factors by optimizing the input parameters via factorial design. For validating the models developed using response surface methodology (RSM), the confirmatory tests have been carried out to portray the combined effects of CR, IP and IT on the engine characteristics using all test fuels. Maximum Brake thermal efficiency of 30.05% was found for F(1) fuel at 230 bar IP and 18 CR with 23 °bTDC IT. Minimum carbon monoxide of 0.41% was observed at IP of 230 bar and CR of 18 with 25 °bTDC IT and oxides of nitrogen of 205.7 ppm was found at 250 bar IP and 16 CR with 25 °bTDC IT for F(1) fuel. © 2018 Elsevier Ltd

Author keywords

Aegle marmelos oil | Compression ratio | Diethyl ether | Injection pressure | Injection timing | Optimization

Indexed keywords

Materials Letters

Volume 220, 1 June 2018, Pages 161-164

Characterization of CdS thin films and nanoparticles by a simple Chemical Bath Technique(Article)

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View additional affiliations

Abstract

Cadmium Sulfide (CdS) thin films and nanoparticles were prepared by using simple Chemical Bath Deposition technique. The thickness of the prepared thin films are in the range of 106–117 nm. Better transmittance behavior in the visible region along with an energy gap around 2.3 eV of as-prepared CdS thin films confirms the candidature for solar cell applications. The structural analysis of the prepared thin films and nanoparticles was carried out by Powder X-ray diffraction technique using CuKα radiation. The scanning electron micrographs reveal that all the compounds have uniform crystallite structure. The energy dispersive X-ray analysis confirms the formation of pure cadmium sulfide nanoparticles. The reverse magnetization behavior was identified in all the compounds which confirm the diamagnetic property of CdS nanoparticles. The resultant compounds confirm the competent candidature for solar cells, photodiodes, light emitting diodes, nonlinear optics and heterogeneous photo catalysis. © 2018 Elsevier B.V.

Author keywords

CBD technique | CdS thin films | Optical studies | Solar cell applications

Indexed keywords

Engineering controlled terms: Cadmium | Cadmium sulfide | Cadmium sulfide solar cells | Deposition | Energy dispersive X ray analysis | Film preparation | II-VI semiconductors | Nanoparticles | Nonlinear optics | Scanning electron microscopy | Solar cells | Sulfur compounds | X ray analysis | X ray diffraction

Materials Letters

Volume 220, 1 June 2018, Pages 249-252

Effect of metal oxide charge transfer layers on the photovoltaic performance of carbon nanotube heterojunction solar cells(Article)

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Abstract

Despite the prominence of silicon solar cells, various alternative solar cell technologies have attracted the attention of researchers. Several attempts have been made to bring down the cost and complexities involved in the fabrication of solar cells. In this work, solar cells with TiO_2 as absorber layer and Multi-Walled Carbon Nanotubes (MWCNT) as active charge generation layer have been fabricated by spin coating nano pastes of TiO_2 and MWCNT over transparent conducting substrates. An efficiency of 0.40% was observed for TiO_2-MWCNT solar cells, which was further enhanced to 1.03% and 1.27% by insertion of Co_3O_4 and Cu_2O layers respectively, in between the MWCNT and the carbon electrode. This significant increase in efficiency is attributed to the effective hole extraction by the metal oxide layers, which resolves the work function mismatch between the MWCNT and carbon electrode. These demonstrations reveal the advantages of using metal oxide interfacial layers for effective hole extraction in carbon nanotube based solar cells. © 2018 Elsevier B.V.

Author keywords

Carbon nanotube solar cells | Hole extraction | Metal oxide interfacial layers

Indexed keywords

Engineering controlled terms: Carbon nanotubes | Charge transfer | Copper oxides | Efficiency | Electrodes | Extraction | Heterojunctions | Metallic compounds | Metals | Nanotubes | Photovoltaic effects | Silicon solar cells | Solar cells

Wireless Personal Communications

Volume 100, Issue 3, 1 June 2018, Pages 1163-1199

Hybrid FGWO Based FLCs Modeling for Performance Enhancement in Wireless Body Area Networks(Article)

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Abstract

The progression over wireless technologies paves the way for the emergence of wireless body area networks (WBAN) towards several motivating applications. Specifically, in terms of health concern applications, both the performance and reliability is regarded as the essential elements of WBANs. Many of the soft computational methodologies employed the manual modeling of fuzzy logic controllers (FLCs) by evolutionary algorithms in WBAN. This existing model encodes the entire control parameters of "FLCs" membership functions. This leads to the degradation of network performance by maximizing the latency. In order to rectify this issue, here we propose a hybrid firefly grey wolf optimizer (hybrid FGWO) approach for the optimal modeling of "FLC". The major goal behind our proposed work relays on the optimal selection of control parameters from the "FLCs" with hybrid FGWO. The modeling of "FLCs" is carried out with CLFB (cross-layer fuzzy logic dependent back-off controller) mechanism to control the frequent access of channels. The efficiency of the "FLCs" model is enhanced by utilizing the coding technique known as unrestricted coding scheme. The performance of our hybrid FGWO approach is contrasted with three conventional "EAs". Two major modeling goals are established whereas, the initial goal aims for the modeling of "FLCs" on particular configuration of network and the second goal aims on the modeling of "FLCs" over multiple network configurations. The "FLCs" modeled by means of our proposed hybrid FGWO approach exhibits its performance in terms of throughput, latency and packet delivery ratio with some of the challenging algorithms.

Author keywords

CLFB | Evolutionary algorithms | Fuzzy logic controllers | Hybrid FGWO | URCS | Wireless body area networks

Journal of Materials Science: Materials in Electronics

Volume 29, Issue 12, 1 June 2018, Pages 9840-9853

Structural, optical and electrical properties of pure and Fe doped V_2O_5 nanoparticles for junction diode fabrications(Article)

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View additional affiliations

Abstract

Structural, optical and electrical studies of V_2O_5 and $Fe_xV_2O_5$ (x = 5%) nanostructures synthesized by a wet chemical method have been reported. The synthesized nanostructures were characterized by XRD, SEM–EDX, HRTEM, XPS, UV(DRS), FT-IR, PL, TG–DTA, AC and DC conductivity study's. The anorthic phase was observed in the XRD patterns of undoped and Fe doped samples which are prepared at low temperature. This anorthic phase was reduced with the heat treatment and gradually transformed into orthorhombic phase in the samples annealed at 600 °C for 1 h. The change in the surface morphology in the present samples from micro-rod to nanorods network seems to be dependent on the substitution of Fe. As observed from the PL analysis that the ultraviolet (UV) emission intensity was found to be decreased and exhibited a blue shift with the increase of Fe concentration. The analysis of AC and DC conductivity measurements recorded at room temperature in the temperature range of 303–403 K, revealed that the activation energy is high for Fe doped V_2O_5 compared to undoped V_2O_5. The junction diodes of n-V_2O_5/p-Si and V_2O_5:Fe/p-Si was successfully prepared by the nebulizer spray pyrolysis method. The (I–V) characteristics of nonlinear and asymmetric nature revealed the Schottky diode based behavior for pure and doped samples.

Indexed keywords

Engineering controlled terms: Activation analysis | Activation energy | Diodes | Nanorods | Schottky barrier diodes | Spray pyrolysis | Temperature | Vanadium pentoxide

Environmental Science and Pollution Research

Volume 25, Issue 18, 1 June 2018, Pages 17749-17767

Studies on the effects of storage stability of bio-oil obtained from pyrolysis of Calophyllum inophyllum deoiled seed cake on the performance and emission characteristics of a direct-injection diesel engine(Article)

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Abstract

The highly unbalanced nature of bio-oil composition poses a serious threat in terms of storage and utilization of bio-oil as a viable fuel in engines. So it becomes inevitable to study the variations in physicochemical properties of the bio-oil during storage to value its chemical instability, for designing stabilization methodologies. The present study aims to investigate the effects of storage stability of bio-oil extracted from pyrolyzing Calophyllum inophyllum (CI) deoiled seed cake on the engine operating characteristics. The bio-oil is produced in a fixed bed reactor at 500 °C under the constant heating rate of 30 °C/min. All the stability analysis methods involve an accelerated aging procedure based on standards established by ASTM (D5304 and E2009) and European standard (EN 14112). Gas chromatography-mass spectrometry was employed to analytically characterize the unaged and aged bio-oil samples. The results clearly depict that stabilizing Calophyllum inophyllum bio-oil with 10% (w/w) methanol improved its stability than that of the unstabilized sample thereby reducing the aging rate of bio-oil to 0.04 and 0.13 cst/h for thermal and oxidative aging respectively. Engine testing of the bio-oil sample revealed that aged bio-oil samples deteriorated engine performance and increased emission levels at the exhaust. The oxidatively aged sample showed the lowest BTE (24.41%), the highest BSEC (20.14 MJ/kWh), CO (1.51%), HC (132 ppm), NOx (1098 ppm) and smoke opacity (34.8%). © 2018, Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Calophyllum inophyllum | Emission | Methanol | Performance | Stability

Indexed keywords

Journal of Advanced Microscopy Research

Volume 13, Issue 2, June 2018, Pages 270-277

Optimization of wear parameters using the grey relational analysis(Conference Paper)

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Abstract

This paper presents an effective approach for the optimization of various injection molding parameters on wear properties of ultra high molecular weight polyethylene (UHMWPE) with multiple performance characteristics based on the grey relational analysis. The injection molding parameters are melt temperature, injection velocity and compaction time. The wear properties like coefficient of friction and wear rate and hardness were obtained from the experimental results. Thirty experimental runs based on the response surface design were performed to determine the best factor level condition. The response table and response graph for each level of the wear parameters were obtained from the grey relational grade. In this study bovine serum was used as a lubricant. In addition, the hardness of the specimen also investigated as well. The results show that contact loads and melt temperature influenced the wear behaviour of UHMWPE. From the grey relational grade, it is found that level 2 of injection molding parameters have more effect rather than level 1 and level 3. Scanning Electron Microscope (SEM) was employed to study the worn out morphologies of UHMWPE. The dominant wear mechanisms that are dominated through our study are ironing, scratching, ploughing, plastic deformation and fatigue wear. Copyright © 2018 American Scientific Publishers.

Author keywords

Grey Relational Analysis | Injection Molding Parameters | Optimization | UHMWPE | Wear | Wear Mechanism

ISSN: 21567573
Source Type: Journal
Original language: English

DOI: 10.1166/jamr.2018.1389
Document Type: Conference Paper
Publisher: American Scientific Publishers

Journal of Vibroengineering

Volume 20, Issue 4, 1 June 2018, Pages 1897-1906

Digital implementation of modified phase locked loop based harmonic extraction for shunt active filter(Article)(Open Access)

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Abstract

This paper presents a digital implementation of modified synchronous reference frame in which the Phase Locked Loop (PLL) is customized to get the angle for the reference frames from the supply voltage by Enhanced Phase Locked Loop (EPLL). The extracted harmonics currents are given to an Artificial Neural Network based Space Vector Pulse Width Modulation (ANNSVPWM) which has better switching control and reduced stress on the switches to cancel the distortions at the Point of Common Coupling (PCC). The algorithm was modelled and simulated by Matlab/Simulink to validate the results. The experimental verification is carried on Field Programmable Gate Array (FPGA) Spartan board to check the effectiveness of the control strategy being implemented and the results conclude that the Total Harmonic Distortion (THD) values are below the required levels of power quality standards. © 2018 C. S. Subash Kumar, et al.

Author keywords

ANNSVPWM EPLL FPGA spartan THD

Indexed keywords

Engineering controlled terms: Active filters Electric fault currents Field programmable gate arrays (FPGA) Harmonic analysis Locks (fasteners) MATLAB Phase locked loops Quality control Vector spaces Voltage control

Engineering uncontrolled Artificial neural network based space vector pulse width modulation Digital implementation Enhanced phase locked loop

Materials Research Express

Volume 5, Issue 6, June 2018, Article number 065319

Assessment of contact parameters of soft splined hemispherical finger-tip pressed against a concave profile(Article)

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View additional affiliations

Abstract

Soft material contact analysis plays an important role in the theory of non-linear contact mechanics on both macro and micro scales. Understanding the conforming nature of soft materials with various contact destinations is of considerable interest which involves design of mechanical components involving soft materials. This work presents a FEM based investigation on the contact parameters of a soft splined hemispherical finger-tip pressed against a rigid curved profile. The contact parameters viz., contact pressure, contact radius and vertical deformation for different loads are estimated by FEM based axis-symmetric model. The geometry of the splined portion on soft finger-tip is specified by the length, width and depth. The load-contact relationship for different splined profiles was completed and discussed. From the results, it is observed that the magnitude of vertical depression of splined fingertip is always greater than the normal rigid fingertip. The underlying physics behind this phenomenon is due to large lateral deformation in the splined profile. Then the magnitude of contact radius decreases with the increase in length of the spline. Also, the width of the spline plays an important role in the development of contact area. Moreover, additional grasping strength will be attained due to the vacuum generated in between the splines. © 2018 IOP Publishing Ltd.

Author keywords

anthropomorphic finger design FEA robotic gripper soft finger contact

Indexed keywords

Indian Journal of Engineering and Materials Sciences

Volume 25, Issue 3, June 2018, Pages 203-208

Effect of induction heated friction stir welding on corrosive behaviour, mechanical properties and microstructure of AISI 410 stainless steel(Article)

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Abstract

In the current scenario, the industry requires a joining or welding method, which does not produce any environmental hazards. Friction stir welding (FSW) is the future of all metal joining methods because FSW does not produce any harmful byproducts and it enhances the joining strength too. The main limitation of friction stir welding was the difficulty to weld hard metals. The tool damage is very high while welding hard metals. These problems happen while using FSW can be recovered by using an additional heating source such as induction heating, arc heating or resistance heating. The induction heating is the quickest heating method as well as an economic method compared to other heating methods. AISI 410 stainless steel (SS) plate is difficult to weld by conventional welding methods, due to the glassy surface and this glassy surface cause sputtering. AISI 410 SS is chosen for this work and welded by using induction heated friction stir welding method (IH-FSW). The tool used for welding AISI 410 SS is made by using tungsten carbide with a hexagonal profile. A sound joint is fabricated at a spindle speed of 1200 rpm, welding speed of 45 mm/min, plunge depth of 0.05 mm and an additional heat input by using the induction-heating coil is about 100°C at 50 W power respectively.

Author keywords

Friction stir welding; Hybrid welding; Induction heating; Stainless steel

Indexed keywords

Engineering controlled: Friction; Glass; Induction heating; Joining; Martensitic stainless steel; Research laboratories; Stainless steel

Journal of Structural Engineering (India)

Volume 45, Issue 2, June-July 2018, Pages 210-220

Comparison of behaviour between rebar and stud shear connectors under monotonic loading(Article)

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Abstract

In composite beams, shear connectors are commonly used to transfer longitudinal shear forces across the steel-concrete interface. The shear connectors also prevent relative displacement of concrete and steel elements at their interface and ensure composite action of the beam. Presently, the stud is the most widely used shear connector in composite constructions. However, the rebar can be used as a shear connector according to various international codes considering the fact that it can be fabricated to the required shape along with the reinforcement cage in the slab. This paper presents an experimental study of the behaviour of rebar shear connectors embedded in composite beam under monotonic load. Two different (8mm and 10mm) diameter rebar connectors of four different forms such as open link, closed stirrups, circular and rectangular spiral were used as shear connectors. Modified push-out tests were conducted to assess the ultimate strength, elastic stiffness, load-slip characteristics and failure pattern of the rebar shear connectors and the same are compared with conventional stud shear connectors. Rebar shear connector with circular spiral shows higher ultimate strength and superior ductile behaviour compared to conventional stud shear connector.

Author keywords

Circular spiral rebar connectors; Composite structures; Load-slip characteristics; Push-out test; Rebar shear connector; Shear resistance

Indexed keywords

Engineering controlled terms: Composite beams and girders; Composite structures; Concrete slabs; Studs (fasteners)

Silicon

Volume 10, Issue 4, 1 July 2018, Pages 1375-1383

Studies on Fractures of Friction Stir Welded Al Matrix SiC-B_4C Reinforced Metal Composites(Article)

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Abstract

Studies pertaining to joining of Al alloy metal matrix composites reinforced with B_4C and SiC by solid state friction stir welding (FSW) are presented in this paper. FSW tool dimensions are designed and fabricated to suit the weld sample dimensions and subsequently, the implications of the tool pin profile on the weldability is investigated. Through experimental recordings, the heat generated during the friction stir joining process of composites is estimated by developing relative equations. Maintaining the tool traverse speed constant, the rate of rotation and its effects on the tensile strength at the joints are investigated which reveals reduced ductility. The study emphasizes that when the speed is maintained between 100–400 mm/min, the tensile strength is at its optimal maximum while speeds higher or lower than the optimal range indicate detrimental effects on the tensile strength. This is followed by fracture studies on samples welding with varying traverse speed and rate of welding. Traverse speed appears to govern the fracture modes while brittle fracture is predominantly noticed indicating the importance of feeding optimal heat input during joining.

Author keywords

(B_4C) (Fractures) (Heat generation) (Metal matrix composites) (Tool pin profile)

Indexed keywords

Engineering controlled terms: (Aluminum alloys) (Boron carbide) (Brittle fracture) (Fracture) (Friction) (Heat generation) (Joining) (Metallic matrix composites) (Reinforcement) (Silicon alloys) (Silicon carbide) (Speed) (Tensile strength) (Tribology)

Heat and Mass Transfer/Waerme- und Stoffuebertragung

Volume 54, Issue 7, 1 July 2018, Pages 2023-2044

Experimental investigation on the availability, performance, combustion and emission distinctiveness of bael oil/ diesel/ diethyl ether blends powered in a variable compression ratio diesel engine(Article)

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Abstract

The present work aims at experimental investigation on the combined effect of injection timing (IT) and injection pressure (IP) on the performance and emissions characteristics, and exergy analysis of a compression-ignition (CI) engine powered with bael oil blends. The tests were conducted using ternary blends of bael oil, diethyl ether (DEE) and neat diesel (D) at various engine loads at a constant engine speed (1500 rpm). With B2 (60%D + 30%bael oil+10%DEE) fuel, the brake thermal efficiency (BTE) of the engine is augmented by 3.5%, reduction of 4.7% of oxides of nitrogen (NO_x) emission has been observed at 100% engine load with 250 bar IP. B2 fuel exhibits 7% lower scale of HC emissions compared to that of diesel fuel at 100% engine load in 23 °bTDC IT. The increment in both cooling water and exhaust gas availabilities lead to increasing exergy efficiency with increasing load. The exergy efficiency of about 62.17% has been recorded by B2 fuel at an injection pressure of 230 IP bar with 100% load. On the whole, B2 fuel displays the best performance and combustion characteristics. It also exhibits better characteristics of emissions level in terms of lower HC, smoke opacity and NOx.

Indexed keywords

Engineering controlled terms: (Compression ratio (machinery)) (Cooling water) (Diesel engines) (Diesel fuels) (Efficiency) (Ethers) (Exergy) (Ignition) (Nitrogen oxides)

Engineering uncontrolled terms: (Brake thermal efficiency) (Combustion characteristics) (Compression-ignition engines) (Diethyl ether blends)

Wireless Personal Communications

Volume 101, Issue 2, 1 July 2018, Pages 649-659

Evaluating Twitter Data to Discover User's Perception About Social Internet of Things(Article)

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Abstract

Social Internet of Things (SIoT) is a young paradigm that integrates Internet of Things and Social Networks. Social Internet of Things is defined as a social network of intelligent objects. SIoT has led to autonomous decision making and communication between object peers. SIoT has created and opened many research avenues in the recent years and it is vital to understand the impact of SIoT in the real world. In this paper, we have mined twitter to evaluate the user awareness and impact of SIoT among the public. We use R for mining twitter and perform extensive sentiment analysis using supervised and semi supervised algorithms to evaluate the user's perception about SIoT. Experimental results show that the proposed Fragment Vector model, a semi supervised classification algorithm is better when compared to supervised classification algorithms namely Improved Polarity Classifier (IPC) and SentiWordNet Classifier (SWNC). We also evaluate the combined performance of IPC and SWNC and propose a hybrid classifier (IPC + SWNC). Our analysis was challenged by limited number of tweets with respect to our study. Experimental results using R has produced evidences of its social influences.

Author keywords

Fragment Vector model | Improved Polarity Classifier | R | Sentiment analysis | SentiWordNet Classifier | Social Internet of Things

Indexed keywords

Engineering controlled terms: Data mining | Decision making | Internet of things | Natural language processing systems | Sentiment analysis | Supervised learning

Environmental Science and Pollution Research

Volume 25, Issue 19, 1 July 2018, Pages 19040-19053

TOPSIS-based parametric optimization of compression ignition engine performance and emission behavior with bael oil blends for different EGR and charge inlet temperature(Article)

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Abstract

The demand for higher fuel energy and lesser exhaust emissions of diesel engines can be achieved by fuel being used and engine operating parameters. In the present work, effects of engine speed (RPM), injection timing (IT), injection pressure (IP), and compression ratio (CR) on performance and emission characteristics of a compression ignition (CI) engine were investigated. The ternary test fuel of 65% diesel + 25% bael oil + 10% diethyl ether (DEE) was used in this work and test was conducted at different charge inlet temperature (CIT) and exhaust gas recirculation (EGR). All the experiments are conducted at the tradeoff engine load that is 75% engine load. When operating the diesel engine with 320 K CIT, brake thermal efficiency (BTE) is improved to 28.6%, and carbon monoxide (CO) and hydrocarbon (HC) emissions have been reduced to 0.025% and 12.5 ppm at 18 CR. The oxide of nitrogen (NOx) has been reduced to 240 ppm at 1500 rpm for 30% EGR mode. Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) method is frequently used in multi-factor selection and gray correlation analysis method is used to study uncertain of the systems.

Author keywords

Charge inlet temperature | Compression ratio | EGR | Injection system | Speed

Indexed keywords

GEOBASE Subject Index: compression | diesel engine | emission | operations technology | optimization | parameter estimation | performance assessment | temperature effect

Proceedings - 17th IEEE International Conference on Machine Learning and Applications, ICMLA 2018

2 July 2018, Article number 8614229, Pages 1255-1260

17th IEEE International Conference on Machine Learning and Applications, ICMLA 2018; Orlando; United States; 17 December 2018 through 20 December 2018; Category numberCFP18592-USB; Code 144456

Adaptive Regularized ELM and Improved VMD Method for Multi-step ahead Electricity Price Forecasting(Conference Paper)

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Abstract

This paper proposes a hybrid machine learning algorithm for multi-step ahead electricity price forecasting problem. The non-stationary time series data like electricity price, needs robust learning model for prediction of future market price to effective operation of the market based power system. In this research, an adaptive regularized extreme learning machine (ARELM) is proposed with adaptive weight updation in the hidden layers based on both structural risk minimization and empirical risk minimization. The Ant Colony Optimization (ACO) algorithm is applied for optimizing the initial weights and thresholds between input layer and hidden layer of ARELM model. To enhance the overall prediction accuracy of ARELM, a new improved Variational Mode Decomposition (IVMD) is employed to decompose the pricing data into several intermediate frequency modes thereby eradicate stochastic components. Two real-time electricity price series of Australia and India are adopted for multi-step ahead prediction and the results are compared with other learning models available in the literature. © 2018 IEEE.

Author keywords

(-Adaptive-Regularized-extreme-learning-machine-) (-price-forecasting) (Variational-mode-decomposition)

Indexed keywords

Proceedings of the 2018 International Conference on Recent Trends in Advanced Computing, ICRTAC-CPS 2018

2 July 2018, Article number 8679108, Pages 7-13

2018 International Conference on Recent Trends in Advanced Computing, ICRTAC-CPS 2018; VITChennai; India; 10 September 2018 through 11 September 2018; Category numberCFP18P35-ART; Code 146806

Trust model for cloud providers using Linear equations(Conference Paper)

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Department of IT, Government College of Technology, Anna University, Coimbatore, India

Abstract

Cloud computing is a vital environment for the real time business activities. Even though cloud booms up to high level in IT industries, still its back end processing are threatening the cloud customers. This paper specifies the importance of trust in cloud computing. The cloud customers are not aware of the processing techniques through which the cloud providers provide services. As well as they do not know how the customer data are handled confidentially by the cloud providers. In this paper the quantitative and qualitative measures of the service providers are analysed and based on that the trust model is created, which makes the cloud customer to believe service providers. © 2018 IEEE.

Author keywords

(Cloud computing) (Cloud customer) (Linear equation) (Service provider) (Trust model)

Indexed keywords

Engineering controlled terms: (Data acquisition) (Linear equations) (Sales) (Technology transfer) (Trusted computing)

Engineering uncontrolled terms (Back-end processing) (Business activities) (Cloud customer) (Cloud providers) (Cloud-computing) (IT industry) (Real-time business) (Service provider) (Trust in Cloud computing) (Trust models)

Journal of Electronic Testing: Theory and Applications (JETTA)

Volume 34, Issue 4, 1 August 2018, Pages 389-404

High Performance Static Segment On-Chip Memory for Image Processing Applications(Article)

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Abstract

The performance of the processor core depends on the configuration parameters and utilization of on-chip memory in multimedia applications such as image, video and audio processing. The design of the on-chip memory architecture is critical for power and area efficient design without compromising quality in data-intensive computing applications. This paper proposes a design of high speed, area, and energy efficient Static Segment On-Chip (SSOC) memory for error-tolerant applications. In this static segment method, n-bit data array is reduced by m-bit data array for significant value of input data to achieve balanced design metrics at the cost of accuracy. The proposed m-bit static segmentation algorithm is implemented and verified in Single Port Static Random Access Memory (SP SRAM) architecture for the approximate computing applications. From the overall simulation results, the proposed 4-bit SSOC SP SRAM design provides 49.02% area savings, 50.62% power reduction and 16.92% speed improvement at the cost of 0.64% Peak Signal to Noise Ratio (PSNR) and exhibits same visual quality in comparison with the existing 8-bit conventional on-chip SP SRAM design in the image processing applications. © 2018, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Approximate | Area-efficient | High speed | Image processing | Low power | On-chip memory | SP SRAM | Static segment

Indexed keywords

Engineering controlled terms: Cost reduction | Energy efficiency | Image coding | Image enhancement | Image processing | Image segmentation | Integrated circuit design | Logic design | Memory architecture | Signal to noise ratio

Journal of the Brazilian Society of Mechanical Sciences and Engineering

Volume 40, Issue 8, 1 August 2018, Article number 377

Study of machinability and parametric optimization of end milling on aluminium hybrid composites using multi-objective genetic algorithm(Article)

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Abstract

Metal matrix composites offer a substantial surety to meet the present and future demands spanning from automobiles to aerospace. Hybrid metal matrix composites are a new choice of materials involving several advantages over the single reinforcement. In this present study, three specimens possessing aluminium 7075 reinforced with particulates of silicon carbide (5, 10, 15% weight percentage) and alumina (5% weight percentage) were developed using stir casting. The purpose of the study was to investigate the effect of reinforcement particles of silicon carbide on the machinability of hybrid metal matrix composites. These materials are engineered to match the requirements of optimal output responses such as low surface roughness, less tool wear, a less cutting force with the high rate of material removal under a set of practical machining constraints. Multi-objective parametric optimization using genetic algorithm obtained optimal cutting responses. The spindle speed, feed rate, depth of cut and weight percentages of SiC were selected as the influencing parameters for meeting the output responses in end milling operation. Based on the Box–Behnken design in response surface methodology, 27 experimental runs were conducted and nonlinear regression models were developed to predict the objective function. The adequacy of the model was checked through ANOVA and was found to be significant. The optimum settings of the parameters were found using multi-objective genetic algorithm. The predicted optimal settings were verified through confirmatory experiments, and the results validated. © 2018, The Brazilian Society of Mechanical Sciences and Engineering.

Author keywords

Composites | End milling | Genetic algorithm | Interaction effects | Multi-objective

Indexed keywords

Advances in Structural Engineering

Volume 21, Issue 11, 1 August 2018, Pages 1676-1695

Section bending resistance of new Hybrid Double-I-Box Beams(Article)

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Abstract

This article contains original works of testing and numerical validation on section bending resistance of new innovative built-up thin-walled metal Hybrid Double-I-Box Beam sections when subjected to local buckling. The cross section of Hybrid Double-I-Box Beam section is distinctive, which has advantages of both an 'I' section and a closed-box section. A total of 24 sections in three series that includes 8 homogeneous sections and 16 hybrid sections were tested under four-point bending. The varying parameters considered in the test specimens were as follows: first, hybrid parameter ratio, that is, yield strengths of flange steel to web steel ($\Phi_h = f_{yf}/f_{yw}$); second, the ratio of breadth to the overall depth (B/D) of the section; and third, the flange thickness (t_f). The moment-resisting capacity of these built-up sections are high due to the presence of more material at the flanges. The closed box-web portion provides higher torsional rigidity. From the test results, it was found that the hybrid sections have higher bending resistance capacity than the homogeneous sections, so technically gains more strength to weight. The increase in B/D ratio gained the increase in both major and minor axis bending resistance. The intermediate flange stiffener which alters the flange plate slenderness (λ_{pf}) had a significant effect on the local buckling resistance of the flange plate. Verification of numerical models followed by a parametric study was undertaken using ABAQUS finite element analysis software. The test results obtained were compared with the predicted design moment of resistance ($M_{c,Rd}$) as per Eurocode design standards EN 1993-1-3: 2006-Design of Steel Structures for Cold-Formed Steel Members and Sheeting and the adequacy is confirmed. © The Author(s) 2018.

Author keywords

Double-I-Box Beams | flange plate slenderness | intermediate flange stiffener | local buckling | metal hybrid sections | section bending resistance

Indexed keywords

International Journal of Civil Engineering and Technology

Volume 9, Issue 9, August 2018, Pages 1335-1347

Adsorption of congo red dye using cobalt ferrite nanoparticles(Article)

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Abstract

The present study involves the applicability of cobalt ferrite Nanoparticles as an adsorbent for the removal of Congo red dye from the aqueous solution. The Nanoparticles were synthesized by co-precipitation method. X-Ray diffraction and Transmission electron microscope studies confirm the formation of single phase cobalt ferrite nanoparticle showing the size range of 16-60nm. The scanning electron microscope studies reveal that the structure were agglomerated. From the batch studies the removal was 99.9% at the optimum conditions. Further the results were subjected to isotherm and kinetic studies. © IAEME Publication.

Author keywords

Cobalt Ferrite Nanoparticles | Transmission Electron Microscope | X-Ray Diffraction

ISSN: 09766308
Source Type: Journal
Original language: English

Document Type: Article
Publisher: IAEME Publication

Journal of Molecular Structure

Volume 1165, 5 August 2018, Pages 288-292

Biogenic synthesis of CuO nanoparticles using Bauhinia tomentosa leaves extract: Characterization and its antibacterial application(Article)

Sharmila, G., Sakthi Pradeep, R., Sandiya, K., Santhiya, S., Muthukumaran, C., Jeyanthi, J., Manoj Kumar, N., Thirumarimurugan, M.

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View additional affiliations

Abstract

An eco-friendly, biogenic synthesis of copper oxide nanoparticles (CuO NPs) using Bauhinia tomentosa leaf extract was reported. Characterization of the biosynthesized CuO NPs were performed by XRD, UV–Vis spectroscopy, TEM, EDAX and FTIR analysis. The formation of CuO NPs by bioreducing activity of B. tomentosa leaf extract was confirmed by the characteristic surface plasmon resonance peak observed at 384 nm in UV–visible spectroscopy analysis. The spherical shaped nanoscale CuO particles were observed in TEM analysis and EDX spectrum confirmed the presence of Cu in the synthesized NPs. In FTIR analysis, the chemical bonds corresponds to the phytochemicals responsible for bioreduction activity were identified. B. tomentosa leaf extract derived CuO NPs showed significant antibacterial action against E. coli (22 mm) and P. aeruginosa (17 mm). Results of this study revealed that B. tomentosa leaf extract was found to be a good bioreducing agent for CuO NPs synthesis. The antibacterial efficacy of the prepared CuO NPs can be utilized in biomedical applications. © 2018 Elsevier B.V.

Author keywords

Antibacterial | Bauhinia tomentosa | CuO | Nanoparticles

Indexed keywords

Engineering controlled terms: Bond strength (chemical) | Chemical analysis | Escherichia coli | Fourier transform infrared spectroscopy | Medical applications | Nanoparticles | Spectrum analysis | Surface plasmon resonance | Synthesis (chemical)

Carbohydrate Polymers

Volume 194, 15 August 2018, Pages 311-318

Carboxymethylation of pectin: Optimization, characterization and in-vitro drug release studies(Article)

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Abstract

The sequential optimization of carboxymethylation of pectin by Plackett-Burman (PB) design and response surface methodology (RSM) was reported in this study. PB design was employed to screen the six process variables (ethanol concentration, liquid-polymer ratio, NaOH concentration, CAA concentration, temperature and time). Central composite design (CCD) was used to study the interaction effects of ethanol concentration, NaOH concentration, CAA concentration and time on degree of substitution (DS) in carboxymethylated pectin (CMP). Maximum DS value of 0.496 was predicted at ethanol concentration (80%), NaOH concentration (38%), CAA concentration (8.5%) and time (60 min). The synthesized CMP was characterized by FT-IR, XRD, TGA and viscometer. Results of FTIR, XRD and TGA confirmed the modification made in the pectin polymer and highly methylated. Faster release of 5-FU drug was observed with CMP-chitosan nanoparticles as compared to pectin-chitosan nanoparticles and the drug release followed zero order kinetics model. © 2018 Elsevier Ltd

Author keywords

Carboxymethylation | Optimization | PBD | Pectin | RSM

Indexed keywords

Engineering controlled terms: Chitosan | Ethanol | Nanoparticles | Optimization | Sodium hydroxide | Targeted drug delivery

Proceedings of the 4th International Conference on Electrical Energy Systems, ICEES 2018

20 August 2018, Article number 8443259, Pages 57-60

4th International Conference on Electrical Energy Systems, ICEES 2018; Chennai; India; 7 February 2018 through 9 February 2018; Category numberCFP1885K-ART; Code 138943

Enhancement of Low Voltage Ride Through Capability for PMSG Based Wind Energy Conversion System with Super Capacitor(Conference Paper)

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Abstract

The permanent magnet synchronous generator is increasingly popular due to its advantage of small in size, higher energy density, lower maintenance cost and ease of control. In order to maintain the stability of the grid under fault conditions, an energy storage device becomes vital. Most of the works done for LVRT/FRT using crowbar protection or chopper resistor have been used for dissipating the excessive energy during voltage dips, which increase the temperature across the resistor. However, the proposed energy storage device, super capacitor can cope up with the rapid power fluctuations and stabilize the output power for several tens of minutes. The characteristic of LVRT is found to be enhanced with super capacitor when compared to chopper resistor. In addition to this, super capacitor can be accessed at any operating condition. Simulation results have been obtained using MATLAB-SIMULINK software and analyzed. It is observed that super capacitor based PMSG performs well. © 2018 IEEE.

Author keywords

chopper resistor | LVRT/FRT | permanent magnet synchronous generator | super capacitor

Indexed keywords

Engineering controlled terms: Choppers (circuits) | Electric equipment protection | Energy conversion | Energy storage | MATLAB | Permanent magnets | Resistors | Synchronous generators | Wind power

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Design Automation for Embedded Systems

Volume 22, Issue 3, 1 September 2018, Pages 201-213

QOS distributed routing protocol for mobile ad-hoc wireless networks using intelligent packet carrying systems(RETRACTED)

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Update notice

Retraction Note to: QOS distributed routing protocol for mobile ad-hoc wireless networks using intelligent packet carrying systems (Des Autom Embed Syst, (2018), 22, (201–213), 10.1007/s10617-018-9204-5)
(2022) Design Automation for Embedded Systems, 26 (2), p. 129.

Abstract

The wireless network should provide high throughput and positive status and this paper suggest a system that supports real-time communications with excellence of service necessities for application based on wireless communications. In addition a hybrid network that interconnects both mobile networks and wireless networks. By inheriting the features of Solid Rocket Booster technology for mobile and wireless networks the race condition, and invalid condition problem has been solved. The number of packets received may vary based on the parameter like mobility, energy, memory, bandwidth, jamming and other parameter. In past years many algorithm has been proposed for increasing the probability of packet delivery but it's still a challenge. This paper uses an algorithm called intelligent packet carrying systems; it provides a tracking mechanism that tracks nodes in rural places. The effectives and reability has been calculated and the results are obtained using OPNET simulator. © 2018, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Journal of Structural Engineering (United States)

Volume 144, Issue 9, 1 September 2018, Article number 04018132

Distortional Buckling-Moment Resistance Capacity of Hybrid Double-I-Box Beams(Article)

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Abstract

This paper presents a comprehensive experimental and numerical study on distortional buckling-moment resistance capacity of built-up cold-formed steel hybrid double-I-box beams (HDIBBs) under four-point bending. These built-up beams are fabricated by means of four press-braked channel sections that are fastened together using bolted connections. The cross section of this closed-form built-up beam resembles the shape of a double-I box. Three different parameters were considered: (1) a hybrid parameter ratio that is yield strengths of flange steel to web steel (øh=fyf/fyw); (2) ratio of breadth to the overall depth of the section (B/D); and (3) flange thickness (tf). All the tested beams failed in a sort of distortional buckling mode. The test results revealed that the use of higher-grade steel in the flanges had a significant influence on buckling failure modes and moment capacities of the built-up members. In the hybrid built-up beams, the use of thicker and stiffened flange plates enhanced the moment carrying capacity of HDIBBs. It was found that the flange plate slenderness (Λpf) plays a major part in reducing the member moment resistance capacity due to local and distortional buckling of flanges. Appropriate nonlinear finite-element (FE) models were developed using commercially available software, and numerical analysis was performed. The FE and actual test results were in good agreement in terms of ultimate moment capacities and buckling modes. Therefore, the FE models were verified. The results were compared with the predicted member buckling resistance capacities from a standard design rule, which was found to slightly overestimate in its results. © 2018 American Society of Civil Engineers.

Author keywords

Built-up | Closed box | Cold-formed steel | Distortional buckling | Flange plate slenderness | Hybrid | Member moment resistance capacity

Indexed keywords

Engineering controlled terms: Fasteners | Studs (structural members)

Environmental Science and Pollution Research

Volume 25, Issue 25, 1 September 2018, Pages 24829-24844

Prediction and optimization of CI engine performance fuelled with Calophyllum inophyllum diesel blend using response surface methodology (RSM)(Article)

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Abstract

The transportation demand in India is increasing tremendously, which arouses the energy consumption by 4.1 to 6.1% increases each year from 2010 to 2050. In addition, the private vehicle ownership keeps on increasing almost 10% per year during the last decade and reaches 213 million tons of oil consumption in 2016. Thus, this makes India the third largest importer of crude oil in the world. Because of this problem, there is a need of promoting the alternative fuels (biodiesel) which are from different feedstocks for the transportation. This alternative fuel has better emission characteristics compared to neat diesel, hence the biodiesel can be used as direct alternative for diesel and it can also be blended with diesel to get better performance. However, the effect of compression ratio, injection timing, injection pressure, composition-blend ratio and air-fuel ratio, and the shape of the cylinder may affect the performance and emission characteristics of the diesel engine. This article deals with the effect of compression ratio in the performance of the engine while using Honne oil diesel blend and also to find out the optimum compression ratio. So the experimentations are conducted using Honne oil diesel blend-fueled CI engine at variable load conditions and at constant speed operations. In order to find out the optimum compression ratio, experiments are carried out on a single-cylinder, four-stroke variable compression ratio diesel engine, and it is found that 18:1 compression ratio gives better performance than the lower compression ratios. Engine performance tests were carried out at different compression ratio values. Using experimental data, regression model was developed and the values were predicted using response surface methodology. Then the predicted values were validated with the experimental results and a maximum error percentage of 6.057 with an average percentage of error as 3.57 were obtained. The optimum numeric factors for different responses were also selected using RSM. © 2018, Springer-Verlag GmbH Germany, part of Springer Nature.

Sadhana - Academy Proceedings in Engineering Sciences

Volume 43, Issue 9, 1 September 2018, Article number 136

Dynamic trust management for secure communications in social internet of things (SIoT)(Article)(Open Access)

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Abstract

The world has faced three Information and Communication Technology (ICT) revolutions and the third ICT wave led to Internet of Things, the notion of anything, everything, anytime and everywhere. Out of the many visions of IoT, one revolutionary concept is to make IoT sociable i.e., incorporating social networking within Internet of Things. This revolution has led to the notion of Social Internet of Things (SIoT). Establishing a SIoT network or community is not so simple and requires integration of heterogeneous technology and communication solutions. This paper focuses on establishing a secure and reliable communication over nodes in SIoT by computing trust dynamically among neighboring nodes. Trust Management is an important area that has attracted numerous researchers over the past few years. The proposed DTrustInfer computes trust based on first hand observation, second hand observation, centrality and dependability factor of a node. Properties of trust such as honesty, cooperativeness, community interest and energy of a node are considered for computing trust. Also, this paper ensures secure communication among SIoT nodes through simple secret codes. Experimental results show that the proposed DTrustInfer outperforms the existing trust models significantly. © 2018, Indian Academy of Sciences.

Author keywords

Internet of Things (IoT) | secret codes | Social Internet of Things (SIoT) | Social Networks (SN) | trust

Indexed keywords

IET Nanobiotechnology

Volume 12, Issue 6, 1 September 2018, Pages 787-794

Synthesis of Co_3O_4/graphene nanocomposite using paraffin wax for adsorption of methyl violet in water(Article)(Open Access)

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Abstract

This study discusses the use of Co_3O_4 impregnated graphene (CoOIG) as an efficient adsorbent for the removal of methyl violet (MV) dye from wastewater. CoOIG nanocomposites have been prepared by pyrolyzing paraffin wax with cobalt acetate. The synthesised nanocomposite was characterised by X-ray diffraction, field emission scanning electron microscope, transmission electron microscope, Fourier transform infrared spectroscope, Raman spectroscopy, and Brunauer-Emmett-Teller isotherm studies. The above studies indicate that the composites have cobalt oxide nanoparticles of size 51-58 nm embedded in the graphene nanoparticles. The adsorption studies were conducted with various parameters, pH, temperature and initial dye concentration, adsorbent dosage and contact time by the batch method. The adsorption of MV dye by the adsorbent CoOIG was about 90% initially at 15 min and 98% dye removal at pH 5. The data were fitted in Langmuir, Freundlich, Temkin, and Dubinin-Radushkevich and Sips isotherm models. Various thermodynamic parameters like Gibbs free energy, enthalpy, and entropy of the on-going adsorption process have also been calculated. © The Institution of Engineering and Technology 2018.

Indexed keywords

Engineering controlled terms: Adsorption | Dyes | Free energy | Gibbs free energy | Graphene | Isotherms | Nanocomposites | Nanoparticles | Paraffins | Scanning electron microscopy | Transmission electron microscopy

Engineering uncontrolled: Adsorption process | Brunauer emmett tellers | Cobalt oxide nanoparticles | Dubinin-Radushkevich

Journal of Renewable and Sustainable Energy

Volume 10, Issue 5, 1 September 2018, Article number 053702

An optimal low power digital controller for portable solar applications(Article)

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Abstract

The design of controllers for solar energy harvesting systems plays the key role in deciding the efficiency of the energy utilized. In applications of energy scavenging, the harvested power is consumed for about 70% in the operation of the converter and controller blocks before being supplied to the load. The proposed optimal Field Programmable Gate Array based Load Predictive Maximum Power Point Tracking (LP-MPPT) Digital Controller is used for low power, speedy, and decisive energy scavenging systems for a long run in applications of wireless or remote sensing or portable. LP-MPPT helps to predict the need of the load and generate the converter output as buck/boost/buck-boost mode power in comparison to the input from solar panels for every clock cycle. The power consumption of the controller section is comparatively reduced as the buck-boost mode of operation utilizes the no operation state. The proposed methodology is simulated and implemented using Xilinx ISE Design Suite 12.1 which is supported by the family SPARTAN 3E. The simulation results thus obtained show an increase in efficiency (94.3%) with trade off factors, namely, speed and area. © 2018 Author(s).

ISSN: 19417012
Source Type: Journal
Original language: English

DOI: 10.1063/1.5043500
Document Type: Article
Publisher: American Institute of Physics Inc.

Journal of Nanostructure in Chemistry

Volume 8, Issue 3, September 2018, Pages 293-299

Biosynthesis, characterization, and antibacterial activity of zinc oxide nanoparticles derived from Bauhinia tomentosa leaf extract(Article)(Open Access)

Sharmila, G., Muthukumaran, C., Sandiya, K., Santhiya, S., Pradeep, R.S., Kumar, N.M., Suriyanarayanan, N., Thirumarimurugan, M.

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View additional affiliations

Abstract

Abstract: A facile, eco-friendly synthesis of zinc oxide nanoparticles (ZnO NPs) employing Bauhinia tomentosa leaf extract as bioreducing agent was reported. The green-synthesized ZnO NPs were characterized by UV–Vis, TEM, EDX, XRD, and FTIR analyses. The formation of ZnO NPs was confirmed by the appearance of characteristic SPR peak at 370 nm due to the collective oscillation of electrons in the conduction band in UV–Vis spectra. The hexagonal morphology exhibiting nanosized ZnO was observed from the TEM and XRD analyses. The chemical bonds present in the as-synthesized ZnO NPs were identified by FTIR analysis. ZnO NPs showed a significant antibacterial activity against Gram-negative bacteria P. aeruginosa and E. coli than Gram-positive bacteria. Results of this study demonstrated that B. tomentosa leaf extract containing phytochemicals such as alkaloids, terpenoids, flavonoids, tannins, carbohydrates, and sterols possess bioreducing property for ZnO synthesis and the obtained ZnO NPs could be employed effectively as a better bactericidal agent for biological applications. Graphical abstract: [Figure not available: see fulltext.] © 2018, The Author(s).

Author keywords

Antibacterial activity | Bauhinia tomentosa | Green synthesis | Nanoparticles | ZnO

Funding details

Funding text

Indian Journal of Ecology

Volume 45, Issue 3, September 2018, Pages 560-565

Effect of bioclogging and biocementation on permeability and strength of soil(Article)

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Abstract

Laboratory experiments were conducted to determine the permeability and strength of soil samples before and after bioclogging and biocementation processes. In bioclogging, the extracellular polymeric substance was applied as a thin layer over the surface of the soil placed in the permeameter in three dosages and the constant head permeability study was carried out for two different samples namely silty sand and well graded sand. SEM analysis was done in order to find the presence of Dextran particles filling the voids present in the soil. In biocementation, sand columns are formed and bacterial and cementation solutions are poured to the layers and left for about 2 weeks. The results indicate that though exopolysaccharide was produced it was not penetrated into the soil and plug the voids and therefore no reduction in the permeability of soils was observed. However, unconfined compressive strength test indicates that biocementation resulted in an increase in the strength of soil.

Author keywords

Bacterial solution · Biocementation · Bioclogging · Cementation solution · Dextran · Exopolysaccharide · Permeability

ISSN: 03045250
Source Type: Journal
Original language: English

Document Type: Article
Publisher: Ecological Society of India

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Proceedings of the 2nd International Conference on Electronics, Communication and Aerospace Technology, ICECA 2018

26 September 2018, Article number 8474898, Pages 262-267

2nd International Conference on Electronics, Communication and Aerospace Technology, ICECA 2018; Coimbatore; India; 29 March 2018 through 31 March 2018; Category numberCFP18J88-ART; Code 140243

A 4-READ 2-WRITE Multi-Port Register File Design Using Pulsed-Latches(Conference Paper)

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Abstract

Pulsed-latches provide high performance with low power consumption by taking the advantages of both flip-flops and latches and thus, they are targeted in implementing different kinds of memory devices in various applications. One such memory device is the register files, which is traditionally being realized using SRAMs. In this paper, an area efficient and low power consumption design approach is proposed to perform the multi-read and multi-write operations in the pulsed-latches based multiport register files. These register files showed significant decrease in area as well as power consumption when compared to the SRAM based register files. An 8-BIT 4-READ and 2-WRITE (4R2W) pulsed-latches based multiport register file were designed and simulated in 180nm technology and its power-delay product was analyzed.

Indexed keywords

Engineering controlled terms: Electric power utilization · Energy efficiency · Flip flop circuits · Static random access storage

Engineering uncontrolled terms: Area-Efficient · Design approaches · Low-power consumption · Multi-port · Power delay product · Pulsed latches · Register files · Write operations

Engineering main heading: Pulsed power technology

Internet of Things Based Industrial Automation Using Brushless DC Motor Application with Resilient Directed Neural Network Control FED Virtual Z-Source Multilevel Inverter Topology(RETRACTED)

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Update notice

Retraction Note: Internet of Things Based Industrial Automation Using Brushless DC Motor Application with Resilient Directed Neural Network Control FED Virtual Z-Source Multilevel Inverter Topology(Wireless Pers Commun, (2018), 102, (3239–3254), 10.1007/s11277-018-5365-6)
(2023) Wireless Personal Communications, 128 (2), p. 1507.

Abstract

Internet of Things (IoT) is a high-speed communication technology which has carnal substances or devices entrenched with sensors, system connectivity, which allows to receive and interchange data. Industrial Monitoring and Control is required to assemble all the material information, statistics, and data related to the various industrial processes, motors, machines and devices employed in industrial premises. The technological improvements, remote control and monitoring via communication techniques such as wireless sensor network techniques have been widely used in Industries. Competitive advantages over AC motors make for DC motors to replace other electrical engines in applications stretching from high-speed automation to electric motorbikes. BLDC drives are very popular in many industries, at present automation are added standard, Virtual Z-source multilevel is a respectable optimal that can boost the output voltage of the drive. A novel soft computing based Resilient Directed Neural network (RDNN) found Virtual Z-source multilevel inverter, for BLDC motor drive control to make the system balanced when the load is unbalanced and to reduce the electrical torque pulsation. In this work, the utilization of the RDNN to tackle the reduced harmonics issue in VZS-MLI converters is proposed. This strategy permits active voltage control of the crucial and besides concealment of a particular set of harmonics. The performance is evaluated in various emphasis levels of the different control models. The sensors monitor the technical motor parameters like greatest rise and fall time, topmost overextend and inaccuracy value of load current and voltage in BLDC machine. Then the measured values are sent to the processing unit, which will analyze and display the parameters, where the processing unit also communicates with Gateway module to send information to cloud database for remote monitoring. The system also presents the Automatic and manual control methods to stop or start the BLDC machine to avoid

Inorganica Chimica Acta

Volume 482, 1 October 2018, Pages 774-778

Synthesis and crystal structure of $[Ni(Amgu)_2]X_2$ – Novel solid-state precursors for NiO nanoparticles(Article)

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Abstract

Aminoguanidine (Amgu) nickel complexes containing nitrate and chloride with the formula $[Ni(Amgu)_2]X_2$ [X = NO_3^- (1) and Cl^- (2)] were prepared and characterized by analytical, Fourier-transform infrared (FTIR) spectroscopic and single crystal X-ray diffraction studies. Compound 1 crystallized in the triclinic crystal system of space group P-1 with Z = 1, and compound 2 crystallized in the monoclinic crystal system of space group $P2_1/n$ with Z = 2. Both compounds have square planar geometry with two neutral aminoguanidine ligands acting as trans N,N-chelators. The N-N stretching of aminoguanidine ligands was corroborated by the FTIR spectroscopic peak observed at 1139 cm^{-1}. NiO nanoparticles were obtained by the decomposition of compounds 1 and 2, which were calcined at 400 °C for 4 h. The powder X-ray diffraction (PXRD) patterns confirmed that the prepared NiO nanoparticles had high purity and crystallinity. Therefore, these complexes may be used as solid-state precursors for the preparation of NiO nanoparticles owing to their low temperatures of decomposition. © 2018 Elsevier B.V.

Author keywords

Aminoguanidine | Nanoparticles | Nickel complex | NiO | Single crystal X-ray diffraction

Indexed keywords

Engineering controlled terms: Chlorine compounds | Crystallinity | Fourier transform infrared spectroscopy | Geometry | Ligands | Nanoparticles | Nickel oxide | Single crystals | Synthesis (chemical) | X ray diffraction

Environmental Science and Pollution Research

Volume 25, Issue 29, 1 October 2018, Pages 29115-29128

Optimization in the performance and emission parameters of a DI diesel engine fuelled with pentanol added Calophyllum inophyllum/diesel blends using response surface methodology(Article)

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View additional affiliations

Abstract

The primary objective of this work was to enhance the performance and emission of the computerized variable compression ratio (VCR) diesel engine fuelled with pentanol/Calophyllum inophyllum (CI)/diesel fuel blends. Based on the prerequisite for the current research, response surface methodology (RSM), an optimization technique, was adopted for the process parameters compression ratio (CR), load and fuel blends, and the optimized responses like brake thermal efficiency (BTE), brake specific fuel consumption (BSFC), oxides of nitrogen (NO_x), carbon monoxide (CO), carbon dioxide (CO_2), hydrocarbon (HC), and smoke were revealed with the help of Derringer's desirability approach. From the results, it is notified that pentanol-fuelled engine showed better performance and emissions at 17.5 CR, P20C20 (pentanol 20%+Calophyllum inophyllum 20%+diesel 60%) blend and 2.5 bmep (brake mean effective pressure) load conditions. The observed mathematical models and validation experiments show that the VCR diesel engine exhibits maximum efficiency and minimum emissions at the optimized input parameters.

Author keywords

Calophyllum inophyllum | Combustion | Compression ratio | Emission | Pentanol | Performance | Response surface methodology

Indexed keywords

Journal of Electronic Testing: Theory and Applications (JETTA)

Volume 34, Issue 5, 1 October 2018, Pages 607-614

High Performance Modified Static Segment Approximate Multiplier based on Significance Probability(Article)

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Abstract

Achieving high accuracy has become a key design objective in high quantity digital data computing devices. To enhance the accuracy, a high performance Modified Static Segment approximate Multiplier (MSSM) is proposed in this paper. It increases the accuracy based on the negating lower order significant information of input operands using Significance Estimator Logic Circuit (SELC). The performance of proposed MSSM is compared with the existing approximate multipliers such as a Dynamic Segment approximate Multiplier (DSM) and Static Segment approximate Multiplier (SSM) for all input combinations. These multipliers are implemented and simulated using Xilinx 14.2 ISE. In MSSM method, 99% of average computational accuracy can be achieved for a 16-bit multiplication even with an 8 × 8-bit multiplier from all combinations of input operands instead of 95% of average computational accuracy from 61% of input operand pair in the existing SSM method. The proposed 16-bit MSSM offers a savings of 83.45% LUTs, 38.78% power and it exhibits 24.40% less delay, 0.6% less computational accuracy than the existing DSM.

Author keywords

Computational accuracy | Defect detection | Image processing | MSSM | SELC | Significance probability

Indexed keywords

Engineering controlled terms: Computer circuits | Digital devices | Fractals | Image processing

Proceedings of the 3rd International Conference on Communication and Electronics Systems, ICCES 2018

October 2018, Article number 8724022, Pages 749-753

3rd IEEE International Conference on Communication and Electronics Systems, ICCES 2018; Coimbatore; India; 15 October 2018 through 16 October 2018; Category numberCFP18AWO-ART; Code 148501

Content Popularity Prediction Methods - A Survey(Conference Paper)

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Abstract

Prediction or the forecasting is the way of describing the future event in an efficient manner. Prediction can be used in actuarial science, marketing, child protection, financial services, travel, insurance, telecommunications, retail, mobility, healthcare, pharmaceuticals, capacity planning and other fields. One of the most widely used areas is social networking.So, Social media has an explosive growth of information allowing more users to become content creators and distributors of the web content. So, there exists an online competition, since a few items are getting popular and the remaining items are getting unpopular.Predicting the popularity is very useful in network dimensioning such as caching and replication. In this paper, we present a survey about content popularity methods in various network architectures with various functionalities and present the features that have good forecasting capacity. © 2018 IEEE.

Author keywords

Information-Centric Networking | Prediction | Web content

Indexed keywords

Engineering controlled terms: Network architecture | Surveys | Websites

Engineering uncontrolled terms: Capacity planning | Child protections | Content popularities | Explosive growth | Financial service

Proceedings of the 3rd International Conference on Communication and Electronics Systems, ICCES 2018

October 2018, Article number 8723980, Pages 692-695

3rd IEEE International Conference on Communication and Electronics Systems, ICCES 2018; Coimbatore; India; 15 October 2018 through 16 October 2018; Category numberCFP18AWO-ART; Code 148501

Correlation Based Feature Selection Algorithm for Machine Learning(Conference Paper)

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Abstract

Feature selection is an effective strategy to reduce dimensionality, remove irrelevant data and increase learning accuracy. The curse of dimensionality of data poses a severe challenge to many existing feature selection methods with respect to efficiency and effectiveness. In this paper, we use three feature selection algorithms namely Fast Correlation Based Feature Selection (FCBF), a variation of FCBF called Fast Correlation Based Feature Selection # (FCBF#) and Fast Correlation Based Feature Selection in Pieces (FCFBiP). The three feature selections are compared and experimental results prove that the FCFBiP is efficient compared to FCBF and FCBF#. © 2018 IEEE.

Author keywords

Fast Correlation Based Feature Selection (FCBF) | FCBF# | FCFBiP | filter methods | Wrapper methods

Indexed keywords

Engineering controlled terms: Bismuth compounds | Machine learning

Engineering uncontrolled terms: Fast Correlation Based Feature Selection (FCBF) | FCBF | FCFBiP | Filter method | Wrapper methods

Computers and Electrical Engineering

Volume 72, November 2018, Pages 894-909

Trust based data prediction, aggregation and reconstruction using compressed sensing for clustered wireless sensor networks(Article)

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Abstract

Sensing and relaying are the primary tasks of sensor nodes in a Wireless Sensor Network (WSN). Hence the recent research focus has been to devise secure, energy efficient ways to predict, aggregate and recover sensor data. In this paper, a novel method for secure data prediction in WSN has been proposed by using a Time Series Trust Model (TSTM) based on Toeplitz matrix and a Trust based Auto Regressive (TAR) process. The impact of the proposed trust model in data prediction and Compressed Sensing (CS) based aggregation and reconstruction is validated using various performance metrics and different attack models. The TAR model for prediction is evaluated against three different attack models. The proposed TSTM model outperformed existing trust model for varying percentage of compromised nodes. TSTM based data reconstruction using the Basis Pursuit (BP) algorithm registers best performance when the percentage of compromised nodes varies between 10% and 40% due to bad mouthing attack. © 2018 Elsevier Ltd

Author keywords

Aggregation | Autoregressive model | Compressed sensing | Prediction | Reconstruction | Trust

Indexed keywords

Engineering controlled terms: Agglomeration | Compressed sensing | Energy efficiency | Forecasting | Image reconstruction | Matrix algebra | Security of data

Journal of Magnetism and Magnetic Materials

Volume 465, 1 November 2018, Pages 634-639

Structural, dielectric and enhanced soft magnetic properties of lithium (Li) substituted nickel ferrite ($NiFe_2O_4$)nanoparticles(Article)

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View additional affiliations

Abstract

Li-$NiFe_2O_4$ NPs have been prepared by a simple chemical co-precipitation method. The structural analysis of Li-$NiFe_2O_4$ nanoparticles with 2–31 nm demonstrates a face centered cubic spinel phase. The scanning electron microscopy and high resolution transmission electron microscopy images highlight moderate good nanocrystalline nature as compared to $x = 0.4$ concentration. The dielectric analysis shows that Li-$NiFe_2O_4$ NPs has a high dielectric constant at $x = 0.2$ concentration and then reduced with respect to annealing temperature and concentration. The magnetization curves demonstrate soft magnetic nature where, the saturation and remnant magnetization increases and then coercivity decreases due to increase of annealing temperature and concentration. © 2018 Elsevier B.V.

Author keywords

Dielectric properties | Ferrite nanoparticles | Magnetic properties | Structural properties

Indexed keywords

Engineering controlled terms: Dielectric properties | Ferrite | Iron compounds | Lithium | Lithium compounds | Magnetic properties | Nanocrystals | Nanomagnetics | Nanoparticles | Nickel | Nickel compounds | Precipitation (chemical) | Saturation magnetization | Scanning electron microscopy | Structural properties

Microchemical Journal

Volume 142, November 2018, Pages 321-328

Novel adsorbent prepared from bio-hydrometallurgical leachate from waste printed circuit board used for the removal of methylene blue from aqueous solution(Article)

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Abstract

In the present study, the copper oxide nanoparticles (gCON) were synthesized from the extract of Prosopis juliflora (Sw.) leaves using copper nitrate, a leachate product of the waste printed circuit boards mediated through the bio-hydrometallurgical process. The synthesized gCON was characterized through the UV–Vis, Raman, FT-IR, zeta potential, XRD, BET model and SEM. Methylene blue (MB) adsorption onto gCON tested in batch trials by varying the pH, initial adsorbate concentration and contact time. The chemical kinetics of MB adsorption followed the pseudo-second-order and chemisorptive Elovich models with a high degree of linearity ($r^2 > 0.99$) and marginal error values. Further, the isotherm data suggested the monolayer coverage of MB as the experimental data aligns well with the Langmuir model ($r^2 > 0.99$) and the maximum dye adsorption capacity (q_m) of gCON was computed as 163.93 mg/g. The magnitude of thermodynamic functions identified the chemisorptive removal of MB as spontaneous and endothermic. The mass transfer analysis verified that both intra-particle and liquid film diffusion limits the adsorption process. Desorption results showed that gCON can be regenerated for a maximum of three cycles. The present study demonstrated that gCON can be used as an unconventional adsorbent for the removal of MB from aqueous solutions.

Author keywords

Bio-hydrometallurgical process | Green copper oxide nanoparticle | Methylene blue | Printed circuit board | Prosopis juliflora

Journal of Electronic Materials

Volume 47, Issue 11, 1 November 2018, Pages 6366-6372

Room-Temperature Gas Sensing Properties of Nanocrystalline-Structured Indium-Substituted Copper Ferrite Thin Film(Article)

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Abstract

Nanocrystalline indium-substituted copper ferrite thin film has been prepared by a chemical coprecipitation method and characterized by x-ray diffraction (XRD) analysis, scanning electron microscopy (SEM), transmission electron microscopy (TEM), Fourier-transform infrared (FTIR) spectroscopy, ultraviolet–visible (UV–Vis) spectroscopy, and gas sensing measurements. XRD and SEM analyses revealed heterogeneous particle formation with cubic structure. Fourier-transform infrared (FTIR) spectroscopy revealed normal behavior for ferrite materials. The bandgap of the material was found to lie in the range of 1.54 eV, implying semiconducting nature. Gas sensor analysis revealed excellent sensing behavior at room temperature. The material showed fast detection response for liquefied petroleum gas (LPG) at low concentration, with enhanced sensitivity at increased LPG concentration. The thin-film sensor showed repeatability nature with reproducibility of ~ 96%.

Author keywords

Ferrite materials | gas sensor | nanostructured material | thin film

Indexed keywords

Engineering controlled terms: Chemical detection | Chemical sensors | Copper | Copper alloys | Coprecipitation | Ferrite | Fourier transform infrared spectroscopy | Gas detectors | Gases | High resolution transmission electron microscopy

Materials Research Express

Volume 5, Issue 11, November 2018, Article number 115014

Al_2O_3-MgO nanocomposite based fiber optic temperature sensor(Article)

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Abstract

Fabrication and characterization of fiber optic temperature sensors using Al_2O_3-MgO nanocomposite as cladding material have been reported. Co-precipitation route was adopted to synthesize Al_2O_3, MgO and their composites of different composition. The synthesized Al_2O_3-MgO nanocomposites (25%-75%, 50%-50% and 75%-25%) of different mole concentrations have been characterized by x-ray diffraction (XRD), scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), Fourier transform infrared spectroscopy and UV-Visible spectroscopy to investigate the structural, morphological, elemental and optical properties. The temperature sensing probe was fabricated by coating Al_2O_3-MgO nanocomposites over the unclad portion of an optical fiber. The response of the sensors has been studied in the temperature range of 35 °C-80 °C. Further, the experimental result depicts an exorbitant temperature sensitivity of ~10.8 towards Al_2O_3-MgO nanocomposites (50%-50%) than other composites, pristine Al_2O_3 and MgO. In addition the sensor exhibits an ultrahigh sensitivity of 0.62%/°C with a better linear regression coefficient of 95%. Therefore, the proposed fiber optic sensor is capable of measuring dynamic temperatures in relentless environment. © 2018 IOP Publishing Ltd.

Author keywords

Al_2O_3-MgO | cladding modification technology | fiber optic sensor | nanocomposite | temperature sensor

Indexed keywords

Engineering controlled terms: Alumina | Aluminum oxide | Cladding (coating) | Cobalt compounds | Energy dispersive spectroscopy | Fiber optics

Journal of Materials Science: Materials in Electronics

Volume 29, Issue 21, 1 November 2018, Pages 18660-18667

Efficient humidity-sensitive electrical response of annealed lithium substituted nickel ferrite (Li–$NiFe_2O_4$) nanoparticles under ideal, real and corrosive environments(Article)

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View additional affiliations

Abstract

The Li–$NiFe_2O_4$ nanoparticles have been prepared via simple cost effective chemical co-precipitation method. X-ray diffraction analysis affirms the cubic spinel structure and particle size is ~ 32 nm. SEM and TEM analysis were revealed the needle shape of nanoparticles with agglomeration. XPS and FT-IR spectrum confirmed composition and usual behaviour of spinel ferrites. Band gap energy of material is 3.62 eV that imply semiconducting nature. Humidity sensor analysis is carried out three different environments in order to test the influence of medium stress factors on sensors parameters. Under these environments, Li–$NiFe_2O_4$ nanoparticles exhibit well sensing nature. Besides, the material displays high sensitivity at ideal environments and good stability in real environments. The results also show interesting characteristics of the maturing and aging process of humidity sensors. © 2018, Springer Science+Business Media, LLC, part of Springer Nature.

Indexed keywords

Engineering controlled terms: Atmospheric corrosion | Chemical analysis | Cost effectiveness | Energy gap | Humidity sensors | Lithium | Nanoparticles | Nickel | Particle size | Particle size analysis | X ray powder diffraction

Engineering uncontrolled: Band gap energy | Chemical coprecipitation method | Corrosive environment | Cubic spinel structure | Electrical response

Journal of Medical Systems

Volume 42, Issue 11, 1 November 2018, Article number 224

Medical Image Quality Assessment Using CSO Based Deep Neural Network(Article)

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Abstract

This manuscript proposed a hybrid method of Deep Neural Network (DNN) and Cuckoo Search Optimization (CSO) with No-Reference Image Quality Assessment (NR-IQA) for achieving high accuracy, low computational complexity, flexibility and etc. of a medical image. NR-IQA is proposed due to till now there is no perfect reference image for finding the quality of real time medical imaging. It is an effective method for assessing the real-world medical images. The proposed method takes the distorted image as an input and estimate the quality of the image without the assistance of reference image. The techniques CSO and DNN with NR-IQA produces the quality of the image with high quality score and low Mean Square Error (MSE). Also, the proposed method is used to improve the quality score thereby improving the quality of the image. So that the resultant image has good visual properties which is useful for the analysis of further medical proceedings. The simulation result shows that the proposed system improves the quality score by 8% when compared to the other existing systems. The SROCC value can be increased as 6%, 14%, 6 and 2% for the different existing methods such as NR-BIQA, SBVQP-ML, PTQL/PTVC and NR-SIQA (3D) respectively.

Author keywords

Cuckoo search optimization (CSO) | Deep neural network | No-reference image quality assessment (NR-IQA) | Regression

Indexed keywords

EMTREE medical terms: article | diagnostic test accuracy study | image quality | simulation | algorithm | artificial neural network | computer assisted diagnosis | image processing | procedures | time factor

Environmental Science and Pollution Research

Volume 25, Issue 33, 1 November 2018, Pages 33806-33819

Characterization of pyrolysis bio-oil derived from intermediate pyrolysis of Aegle marmelos de-oiled cake: study on performance and emission characteristics of C.I. engine fueled with Aegle marmelos pyrolysis oil-blends(Article)

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Abstract

The present research focuses on the analyzing the characteristics of bio-oil derived from intermediate pyrolysis of Aegle marmelos (AM) seed cake and its suitability for C.I. engine adaptation. Owing to the high volatile matter content of 73.69%, Aegle marmelos biomass was selected as the feedstock for this research. The intermediate pyrolysis was carried out at 600 °C in a 2-kg fixed bed type pyrolysis reactor at a heating rate of 10 °C/min and the obtained bio-oil was characterized by different analytical methods. As per American Society for Testing and Materials (ASTM) standards, physicochemical properties of the bio-oil were tested and it was observed that bio-oil is a highly viscous fluid with low calorific value. Analysis of bio-oil through FT-IR and GC-MS examination confirmed the presence of phenol, esters, alkyl, and oxygenated compounds. The performance and emission testing of direct injection diesel engine were conducted with various bio-oil blends and the results were compared with baseline diesel fuel. The experimental results showed that the addition of bio-oil decreased BTE (%) while increasing the BSEC (MJ/kW-h). At the same time, increasing the bio-oil ratio with diesel decreases dangerous emissions such as carbon monoxide and oxides of nitrogen emissions in the engine exhaust. According to engine test result, it was suggested that up to 20% of AM bio-oil (F20) can be employed as engine fuel for better engine operating characteristics.

Author keywords

Aegle marmelos de-oiled cake | C.I. engine test | FT-IR | GC-MS | Pyrolysis bio-oil

Indexed keywords

Materials Today: Proceedings

Volume 5, Issue 6, 2018, Pages 14499-14506

1st International Conference on Advanced Functional Materials, ICAFM 2017; Adhi College of Engineering and TechnologyNo.6, MunuAdhi NagarSankarapuram; India; 3 May 2017 through 5 May 2017; Code 137400

Influence of Process Parameters on CNC Turning of Aluminium Hybrid Metal Matrix Composites(Conference Paper)

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Abstract

An effort has been made in this investigation to find the influence of turning process parameters on the machinability of hybrid metal matrix composite comprising alumina (Al_2O_3) and molybdenum disulphide (MoS_2) particulates dispersed on aluminium casting alloy LM6 in turning process. Design of Experiments approach was used to plan the experiments and the acquired data were analysed using design expert software associated with response surface method (RSM). In this paper work cutting speed, feed and depth of cut were considered as input process parameters and the resultant force of cutting forces in three directions, Specific Cutting Pressure (SCP) and surface roughness R_a were considered as responses. Statistical analyses were carried out to estimate the performance of machining parameters. The influence of input parameters on machining-force, SCP and the surface roughness R_a were analysed using surface response graphs. The experimental study revealed that cutting speed and feed were the most influencing parameter that affects the machining force and SCP. © 2017 Elsevier Ltd.

Author keywords

Machining-Force, RSM, SCP, Surface plot, Surface roughness

Indexed keywords

Engineering controlled terms: Alumina, Aluminum alloys, Aluminum oxide, Analysis of variance (ANOVA), Cutting, Design of experiments, Layered semiconductors, Metallic matrix composites, Sulfur compounds, Surface roughness, Turning

Arabian Journal of Geosciences

Volume 11, Issue 22, 1 November 2018, Article number 706

Behavioural analysis of vertical and batter pile groups under vertical and lateral loading in sand(Article)

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Abstract

Laboratory model tests were carried out to study the behaviour of vertical piles and batter pile groups under vertical and lateral load. The model pile groups were made up of mild steel rod of 8-mm diameter. Parameters such as degree of batter and different length to diameter ratios of 7.50, 15.00 and 22.50 were considered in this study. The size of the model tank was 1000 mm × 1000mm × 800 mm. Experiments were performed on 3 × 3 model pile groups with a row of batter piles both positive and negative in addition to vertical pile groups with batter angle 0° in sandy soil subject to vertical and lateral loads. It was observed that the behaviour of vertical pile groups and group of piles with batter piles were similar but it showed substantial variation in the capacity of pile groups. Results indicated that the load–settlement relationships were non-linear for all model pile groups both under vertical and lateral loading. Numerical FEM analysis using ABAQUS/CAE 6.11 was also used to compare and validate the load carrying capacity of pile groups obtained from the experimental model tests. © 2018, Saudi Society for Geosciences.

Author keywords

Batter piles, FEM, Lateral load, Load–settlement, Vertical load

Indexed keywords

GEOBASE Subject Index: behavioral response, diameter, experiment, finite element method, loading, model test, pile group, sand, sandy soil

Journal of Power Electronics

Volume 18, Issue 6, November 2018, Article number JPE 18-6-20, Pages 1830-1843

Modelling and performance analysis of UPQC with digital kalman control algorithm under unbalanced distorted source voltage conditions(Article)

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Abstract

In this paper, the generation of a reference current and voltage signal based on a Kalman filter is offered for a 3-phase 4wire UPQC (Unified Power Quality Conditioner). The performance of the UPQC is improved with source voltages that are distorted due to harmonic components. Despite harmonic and frequency variations, the Kalman filter is capable enough to determine the amplitude and the phase angle of load currents and source voltages. The calculation of the first state is sufficient to identify the fundamental components of the current, voltage and angle. Therefore, the Kalman state estimator is fast and simple. A Kalman based control strategy is proposed and implemented for a UPQC in a distribution system. The performance of the proposed control strategy is assessed for all possible source conditions with varying nonlinear and linear loads. The functioning of the proposed control algorithm with a UPQC is scrutinized and validated through simulations employing MATLAB/Simulink software. Using a FPGA SPATRAN 3A DSP board, the proposed algorithm is developed and implemented. A small-scale laboratory prototype is built to verify the simulation results. The stated control scheme for the UPQC reduces the following issues, voltage sags, voltage swells, harmonic distortions (voltage and current), unbalanced supply voltage and unbalanced power factor under dynamic and steady-state operating conditions.

Author keywords

Active power filter | Distortions | Imbalance voltage | Kalman filter | Phase locked loop (PLL) | Synchronous reference frame (SRF) | Unified power quality conditioner (UPQC)

Proceedings of the 2018 International Conference on Current Trends towards Converging Technologies, ICCTCT 2018

27 November 2018, Article number 8550853

2018 International Conference on Current Trends towards Converging Technologies, ICCTCT 2018; Coimbatore, Tamil Nadu; India; 1 March 2018 through 3 March 2018; Category numberCFP18M64-PRT; Code 143196

Intuitionistic Fuzzy C-Means Clustering Using Rough set for MRI Segmentation(Conference Paper)

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Abstract

Medical image segmentation needs higher segmentation accuracy due to the occurrence of noises in the images. Fuzzy sets theories are able to handle the vagueness and uncertainty through membership functions in image segmentation. Rough sets theory (RST) is to deal with uncertainty and incompleteness. It focuses on the feature selection based on classification. In real applications, it may be impossible to obtain complete information of a given pattern set due to artifacts. Uncertain information will cause lacking of information for a pattern set in various recognition and classification algorithms. This paper proposes a method to segment the magnetic resonance images with and without noises powerfully. The proposed method uses the intuitionistic fuzzy c-means algorithm for segmenting cerebro spinal fluid (CSF), white matter (WM) and gray matter (GM) tissues in the MRI. Intuitionistic fuzzy image representations are done by using non-membership value, hesitation along with the membership value for the MR image. The membership value and nonmembership value have been obtained using fuzzy trapezoidal membership and fuzzy complement function respectively. Further, intuitionistic fuzzy roughness measures and fuzzy c-means clustering determines the initial cluster centroids by considering lower and upper approximation and updates the euclidean distance between the pixels. The proposed method have been implemented and analyzed with performance metrics for the synthetic and real MR images. Experimental results reveal a superior degree of segmentation on both synthetic and real MR images compared to existing methods.

Author keywords

Fuzzy c means | Fuzzy set | Intuitionistic fuzzy set | Rough set

Indexed keywords

IET Generation, Transmission and Distribution

Volume 12, Issue 21, 27 November 2018, Pages 5713-5722

Load frequency control of a dynamic interconnected power system using generalised Hopfield neural network based self-adaptive PID controller(Article)

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Abstract

A novel generalised Hopfield neural network (GHNN) based self-adaptive proportional–integral–derivative (PID) controller for load frequency control (LFC) is designed for a two-area interconnected power system with nonlinearities of generator rate constraint and governor dead band. The control problem is conceptualised as an optimisation problem with an objective function as an area control error in terms of the PID controller parameters. The differential equations governing the behaviour of the GHNN were solved to obtain the controller parameters K_p, K_i and K_d. To test the feasibility and robustness of the proposed controller, the system is tested in the presence of randomness in load demands, imprecisely modelled system dynamics, nonlinearities in the system model and uncertainties in the system parameter variations. The proposed method is simulated using Matlab R2014b/Simulink and the results obtained have shown that the propounded controller performance is superior to the integral, PID and fuzzy-based proportional–integral controllers. In addition, the Lyapunov stability analysis of the overall closed-loop system was carried out and the controller is implemented in real-time digital simulator run in hardware-in-the-loop to validate the effectiveness of the proposed method. Furthermore, the proposed controller is applied to the three-area power system to test its adaptability.

Indexed keywords

Engineering controlled terms: Closed loop systems | Control nonlinearities | Controllers | Differential equations | Electric control equipment | Electric frequency control | Electric load management | Electric power system control

Journal of the Taiwan Institute of Chemical Engineers

Volume 93, December 2018, Pages 211-225

Adsorption of acid yellow 36 onto green nanoceria and amine functionalized green nanoceria: Comparative studies on kinetics, isotherm, thermodynamics, and diffusion analysis(Article)

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Abstract

In this study, the green nanoceria (GN) was synthesized from Prosopis juliflora (Sw.) leaves extract, then amine functionalized to $GN–NH_2$ (AGN) with epichlorohydrin and ammonium hydroxide. The synthesized GN and AGN were characterized by FT-IR, zeta potential, XRD, BET model and.HR-TEM. Sequentially, Acid Yellow 36 (AY36) was adsorbed onto the GN and AGN in aqueous solutions in batch trials by varying the pH, initial adsorbate concentration and contact time. Further, the equilibrium kinetics, isotherm, thermodynamics, and diffusion analysis were probed for the experimental data. In the ambient temperature and at acidic pH of 2, the maximum removal efficiency of AY36 is 73.3 and 92.9% for GN and AGN respectively. The kinetic data exhibited good correlation coefficient (r^2> 0.99) for the pseudo-second-order and elovich models with marginal error values signifying the chemisorption type of adsorption process. Moreover, the equilibrium data suggesting the monolayer coverage of adsorbate as it fits well with the Langmuir isotherm model (r^2> 0.99) and the maximum adsorption capacities of GN and AGN are 16.39 and 26.95 (mg/g), respectively. The energy functions of chemical thermodynamics revealed the adsorbate transport across the phase boundary is of spontaneous and endothermic. Diffusional models demonstrated that the intra-particle diffusion controls the rate and dominates the external boundary layer diffusion. Further, the study proposed the electrostatic interactions or surface complexation might facilitate the AY36 adsorption onto AGN. The potential restorative ability of the adsorbents was proved by desorption studies and thus identifies them as effective adsorbents for the removal of AY36 from aqueous solutions.

Author keywords

Acid yellow 36 adsorption | Amine functionalization | Green nanoceria | Prosopis juliflora

Energies

Volume 11, Issue 12, 1 December 2018, Article number 3330

High impedance fault detection in medium voltage distribution network using discrete wavelet transform and adaptive neuro-fuzzy inference system(Article)(Open Access)

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View additional affiliations

Abstract

This paper presents a method to detect and classify the high impedance fault that occur in the medium voltage (MV) distribution network using discrete wavelet transform (DWT) and adaptive neuro-fuzzy inference system (ANFIS). The network is designed using MATLAB software R2014b and various faults such as high impedance, symmetrical and unsymmetrical fault have been applied to study the effectiveness of the proposed ANFIS classifier method. This is achieved by training the ANFIS classifier using the features (standard deviation values) extracted from the three-phase fault current signal by DWT technique for various cases of fault with different values of fault resistance in the system. The success and discrimination rate obtained for identifying and classifying the high impedance fault from the proffered method is 100% whereas the values are 66.7% and 85% respectively for conventional fuzzy based approach. The results indicate that the proposed method is more efficient to identify and discriminate the high impedance fault from other faults in the power system. © 2018 by the authors.

Author keywords

Adaptive neuro-fuzzy inference system (ANFIS) | Discrete Wavelet Transform (DWT) | Fuzzy logic system (FLS) | High impedance fault (HIF)

Indexed keywords

Engineering controlled: Discrete wavelet transforms | Electric fault location | Fault detection | Fuzzy logic | Fuzzy neural networks

Materials Science- Poland

Volume 36, Issue 4, 1 December 2018, Pages 675-684

Influence of molar concentration and temperature on structural, optical, electrical and X-ray sensing properties of chemically grown nickel-bismuth-sulfide ($Ni_x Bi_{2-x} S_3$) thin films(Article) (Open Access)

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Abstract

In this report, ternary semiconducting $Ni_x Bi_{2-x} S_3$ (x = 0.2 M and 0.5 M) thin films were synthesized in situ for the first time by a chemical bath deposition technique at different bath temperatures (60 °C, 70 °C and 80 °C). The effects of concentration and deposition temperature on the deposited films were studied by combining the results of structural, morphological, optical and electrical analyses. The growth of $Ni_x Bi_{2-x} S_3$ films with good crystalline nature and interconnected grain arrangement takes place due to increasing the concentration of Ni^{2+} ions in bismuth sulfide matrix. EDS result confirmed the stoichiometry of $Ni_x Bi_{2-x} S_3$ formation. Wettability test demonstrated that the surface of the film was hydrophilic in nature. The optical absorption spectra revealed that the bandgap E_g of the x = 0.5 M film deposited at 70 °C was about 1.36 eV. Current-voltage (I-V) characteristics of the x = 0.5 M film deposited at 70 °C were studied under X-ray radiation and dark condition. An X-ray detection sensitivity analysis showed that the detection sensitivity is optimum when the bias voltage applied across the film is low (~0.9 V). These findings reveal that the film with x = 0.5 M deposited at 70 °C can be used as an efficient low cost X-ray sensor. © 2018 Sabarish R. et al., published by Sciendo 2018.

Author keywords

activation energy | chemical bath deposition | photoluminescence | sensor | ternary compounds | X-ray

Indexed keywords

Engineering controlled: Activation energy | Bismuth alloys | Bismuth compounds | Deposition | Layered semiconductors | Light absorption

Archives of Civil Engineering

Volume 64, Issue 4, 1 December 2018, Pages 22-29

Experimental study of hybrid rubberized composite slabs(Article)(Open Access)

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Abstract

Rubberized concrete is made up of scrap tyre rubbers where the fine aggregate is partially replaced by it, as the waste rubber is being a threat to the environment. It is estimated that only 4% of the waste tyre is used in the application of civil engineering and also there is shortage of fine aggregates. The primary objective of this study is to investigate the preliminary concrete properties of M25 and M30 concretes. The fine aggregate is replaced by pre-treated crumb rubber with 10, 15 and 20 % of total weight. Various tests are conducted on the rubberized concrete specimens such as compressive strength, split tensile strength, flexural strength and slump test. The investigation is carried out to determine the impact load behavior of hybrid rubberized composite slabs. In addition 0%, 1%, 1.5%, and 2% of replacement of rubber fibers for total weight of coarse aggregate is also made. The specimen of size 300 mm x 300 mm x 50 mm thickness is subjected to drop hammer test to find its performance against the impact loads. The number of blows for the first crack and complete failure of slab was found and the characteristics were studied. © 2018 P. Subashree et al., published by Sciendo 2018.

Author keywords

Crumb rubber | Ductility Index | Energy absorption | Impact test | Rubberized concrete slab

Indexed keywords

Engineering controlled terms: Aggregates | Compressive strength | Concrete slabs | Energy absorption | Impact testing | Tensile strength

Energy

Volume 165, 15 December 2018, Pages 1292-1319

Engine characteristics analysis of chaulmoogra oil blends and corrosion analysis of injector nozzle using scanning electron microscopy/energy dispersive spectroscopy(Article)

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Abstract

This work describes the performance, combustion and emission behavior of chaulmoogra oil blend and neat diesel in the variable compression ratio, variable speed compression ignition engine with exhaust gas recirculation (EGR). Exergy analysis was employed to investigate availability shares involved in the research engine. Artificial neural network (ANN) modeling and particle swarm optimization (PSO) are adopted with response surface methodology (RSM) in order to investigate the engine performance fuelled with ternary blend (65% diesel+25% chaulmoogra oil+10% diethyl ether) and neat diesel. In this work, compression ratio (CR) is varied from 14.5 to 20.6, engine speed varied from 1500 to 2400 revolution per minute (rpm) and EGR varied from 0 to 30%. The optimized condition was observed as 10% EGR, 18.1CR and 1672 rpm with respect to lesser exhaust emissions and enhanced thermal efficiency. Maximum brake thermal efficiency of 29.12% was observed 10% EGR rate and maximum exergy efficiency of 52.64% was observed for the ternary blend at the optimized engine condition. The results conclude that the RSM-ANN-PSO provide better the engine performance modeling with acceptable accuracy. The corrosion and wear analyses were done on the fuel injector nozzle and cylinder gaskets using scanning electron microscopy (SEM) and energy dispersive spectroscopy (EDS). © 2018 Elsevier Ltd

Author keywords

ANN | Chaulmoogra oil | Compression ratio | EGR | RSM-PSO | SEM/EDS

Indexed keywords

Engineering controlled terms: Corrosion | Diesel engines | Energy dispersive spectroscopy | Exergy | Exhaust gas recirculation | Ignition

Environmental Progress and Sustainable Energy

Volume 38, Issue 1, January/Februaryy 2019, Pages 278-285

Building a low cost wind turbine in highways for rural house electricity demand(Article) (Open Access)

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Abstract

The main aim of this work is to design, fabricate, and test a wind turbine for power generation applications in rural areas. Vertical Axis Wind Turbines were selected to harness the energy from wind through the drag forces induced due to vehicular movements. Various parameters were analyzed for the design of a low-cost wind turbine. A Savonius blade was selected for the design, which could be accommodated on the median of the highways. By using recycled materials, a low-cost wind turbine was fabricated at a cost of $117.5 approximately. The wind turbine was placed on the houses and on the highway medians to test the power output at various operating conditions. Average electricity consumption at selected rural houses were calculated. The calculated average electricity demand during power cuts in the selected rural houses was around 0.2–0.6 kWh/day. Average generated electricity from the turbine at highways was observed to be around 0.67 kWh/day. The Levelized cost of electricity (LCOE) of the generated electricity from the proposed SWT on highways is around $0.04/kWh. The LCOE of the proposed design is relatively cheaper when compared with the conventional horizontal axis wind turbines. The energy demand during power cuts was met completely when the SWT was placed on the highways. © 2018 American Institute of Chemical Engineers Environ Prog, 38: 278–285, 2019. © 2018 American Institute of Chemical Engineers

Author keywords

highway energy generation | low cost wind turbine | renewable energy | savonius wind turbine

Indexed keywords

Mathematics and Computers in Simulation

Volume 155, January 2019, Pages 269-276

α-Phase retrieval frame in Hilbert space and its application(Article)

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Abstract

In the present work, the properties of α-phase retrieval frame with a redundant set of vectors under perturbation of the frame set have been discussed. We provided the necessary and sufficient condition to exist in the exact reconstruction using α-phase retrieval frame. The deletion of the noise for the reconstructed signal has been discussed. Finally, this paper provided if bounded nonlinear operator L^{α} on infinite dimensional complex Hilbert space is a global phase shift, then Kernel of the operator is spanning a set of the vector. © 2018 International Association for Mathematics and Computers in Simulation (IMACS)

Author keywords

Frame | Hilbert space | Orthonormal basis | Phase retrieval | Signal reconstruction

Indexed keywords

Engineering controlled terms: Hilbert spaces | Mathematical operators | Signal reconstruction

Engineering uncontrolled terms: Alpha phase | Exact reconstruction | Frame | Infinite dimensional | ITS applications | Nonlinear operator | Orthonormal basis | Phase retrieval

Mathematics and Computers in Simulation

Volume 155, January 2019, Pages 324-334

Frame Reconstruction with Noise Reduction in Hilbert space and Application in Communication Systems(Article)

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Abstract

In this work, classification for Frame and Fourier coefficient has been discussed. We provided the relation between hidden code coefficients and signal coefficients on $L^2[-T,T]$ and introduced a theorem that has been proved for recovering the original signal. We provided Key exchange algorithms to store or transmit the information. After decoding, we recovered the filter signal that is less than or equal to original signal with negligible amount of errors. In the last theorem of this paper, we provided a technique to obtain the error to recover the exact information. The application in communication systems for speech signal with low and high frequencies has been discussed at the end. © 2018 International Association for Mathematics and Computers in Simulation (IMACS)

Author keywords

Frame | Hilbert space | Orthonormal basis | Signal reconstruction

Indexed keywords

Engineering controlled terms: Fourier analysis | Hilbert spaces | Recovery | Speech communication | Vector spaces

Measurement: Journal of the International Measurement Confederation

Volume 131, January 2019, Pages 143-155

Investigation of the stability on boring tool attached with double impact dampers using Taguchi based Grey analysis and cutting tool temperature investigation through FLUKE-Thermal imager(Article)

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Abstract

This article focuses on the investigation of machining characteristics of double impact dampers attached with boring tool and grey relational analysis (GRA) based multi-objective optimization for lower tool wear and better cutting force. Taguchi based orthogonal array method was exploited to formulate the experimental plan for the boring operation. Considering impact damper positions, speed and depth of cut as the input control factors, the output responses such as cutting force and tool wear were obtained from the L27 orthogonal array. ANOVA results exposed that damper position and speed had more effect on tool wear and cutting force respectively than depth of cut. Based on the obtained output response for cutting force and tool wear a comprehensive mathematical model was developed. The developed mathematical model for tool wear and cutting force predicted values similar to that of experimental results. The obtained result was corroborated clinched Fluke thermal image analyzer. Thermal imaging result showed that the optimized cutting conditions gives low tool temperature there by reduced tool wear can be obtained. Multi-objective criteria optimization was done through GRA technique and the recommended optimum parameters set provides better cutting force (Cf) of 342.47 N and less tool wear (Tw) of 0.22 mm. © 2018 Elsevier Ltd

Author keywords

Boring process | Fluke thermal image analyzer | Gra | Impact dampers | Taguchi | Tool wear

Indexed keywords

Journal of Magnetism and Magnetic Materials

Volume 469, 1 January 2019, Pages 691-697

Study of structural, morphological and magnetic properties of Ag substituted cobalt ferrite nanoparticles prepared by honey assisted combustion method and evaluation of their antibacterial activity(Article)

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View additional affiliations

Abstract

Pure and Ag substituted cobalt ferrite nanoparticles (NPs) having the composition $(1-x)CoFe_2O_4$: xAg (x = 0.0, 0.2) were synthesized by a novel honey assisted combustion method in order to investigate their structural and magnetic properties along with their antibacterial activity. XRD patters confirm the spinel phase of $CoFe_2O_4$ and the presence of silver (Ag) nanoparticles in the spinel network. The incorporation of Ag in $CoFe_2O_4$ spinel structure enhanced the size of the unit cell, resulting to higher value of lattice parameter (a) compared to the pure $CoFe_2O_4$. The sintering process promoted the growth of the crystallite sizes (D). The crystallite sizes of the synthesized and annealed powders were found in the range of 24–41 nm. From the EDX studies, it seemed that the distribution of Ag nanoparticles was non-uniform. The saturation magnetization (M_s) and coercivity (H_c) of the powders were influenced by annealing as well as with the substitution of Ag. The highest value of saturation magnetization (60 emu/g) was obtained by the $CoFe_2O_4$ nanoparticles with the coercivity value 1358 Oe. The saturation magnetization and coercivity of Ag doped $CoFe_2O_4$ were less than that of pure $CoFe_2O_4$. The present cobalt ferrite nanoparticles and Ag doped cobalt ferrite nanoparticles have shown good antibacterial activities. But Ag doped cobalt ferrite nanoparticles seems to be the potential candidates for effective antibacterial activity. The structural and magnetic results along with the results of antibacterial activities are reported in the present manuscript.

Author keywords

Honey assisted synthesis | Magnetic properties | Nanoparticles | Structural analysis

Advances in Intelligent Systems and Computing

Volume 841, 2019, Pages 719-724

International Conference on Emerging Trends in Expert Applications and Security, ICETEAS 2018; Jaipur; India; 17 February 2018 through 18 February 2018; Code 221339

An Efficient FPGA-Based Shunt Active Filter for Power Quality Enhancement(Conference Paper)

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Abstract

Maintaining power quality is being an important task within the operation of the available facility. It is compelling by the quality standards (IEEE-519) to limit the harmonics distortion at suitable intervals. The excessive use of power electronic devices in distribution system has evolved the matter of power quality; it is leading to harmonics generation and in substantial economic losses. Filters approaches are effective and economical technique for harmonics mitigation. This work proposes a novel technique with Field Programmable Gate Array (FPGA) controller for controlling the shunt active filter to mitigate the harmonics in power systems. Harmonics identification methodology and compensation management adopted are incorporated in this work.

Author keywords

FPGA | Harmonics | Instantaneous P-Q theory | Shunt active filter

Indexed keywords

Engineering controlled terms:	Electric power systems; Field programmable gate arrays (FPGA); Harmonic analysis; Losses; Power quality; Wages
Engineering uncontrolled terms	Compensation management; Harmonics; Harmonics in power systems; Harmonics mitigation; P-q theory; Power electronic devices; Power quality enhancement; Shunt active filters

International Journal of Operational Research

Volume 34, Issue 1, 2019, Pages 66-84

An inventory model for imperfect production system with rework and shortages(Article)(Open Access)

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Abstract

This paper considers a production inventory model with planned backorders for a single product. The product is manufactured in a single stage manufacturing system. The manufacturing system generates imperfect quality products. All these defective products are reworked in the same cycle. This paper develops two inventory models for two operational policies. The first policy covers the case that the rework is done and the shortages are not permitted. The second policy covers the case that the rework is done and the shortages are permitted. The generation of defective items during most practical production processes is almost inevitable. These imperfect quality items can sometimes be reworked and repaired, hence the overall production costs can be reduced significantly. To achieve this objective, a mathematical model is developed. In particular, the optimal production lot size which minimises the total cost is derived. This model is developed for deriving the necessary and sufficient conditions for having a unique solution. An illustrative example is provided and validated. The validation of result in this model was coded in Microsoft Visual Basic 6.0. © 2019 Inderscience Enterprises Ltd.

Author keywords

cycle time | defective items | demand and production. | economic production quantity | EPQ | rework | shortages

ISSN: 17457645 DOI: 10.1504/IJOR.2019.096939

International Journal of Modelling, Identification and Control

Volume 31, Issue 1, 2019, Pages 39-52

A recursive discrete Kalman filter for the generation of reference signal to UPQC with unbalanced and distorted supply conditions(Article)(Open Access)

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Abstract

This paper describes the development of a robust control technology adapting Kalman filter in order to attend to the problems that arise in power quality. This methodology makes use of a three-phase three-wire unified power quality conditioner (UPQC) under unbalanced and distorted supply conditions. In spite of harmonics and frequency oscillation, the Kalman filter determines the amplitude, phase angle and frequency of load currents and source voltages. The main ideas are to use Kalman filtering algorithm to acquire fundamental component of load current and source voltage and to use the least squares method which is relatively simple and faster. The proposed robust Kalman filter-based UPQC system mitigated the issues such as voltage sag, voltage swell, harmonics distortions (voltage and current), and unbalanced supply voltage and power factor. The results are justified using the MATLAB/Simulink software to support the Kalman filter-based control algorithm under steady state and dynamic operating conditions. Copyright © 2019 Inderscience Enterprises Ltd.

Author keywords

Kalman filter | Phase locked loop | PLL | Power factor | SRF | Synchronous reference frame | THD | Unbalanced source | Unified power quality conditioner | UPQC

Indexed keywords

Engineering controlled terms: Electric power factor | Least squares approximations | MATLAB | Phase locked loops | Power quality | Quality control

Lecture Notes in Computational Vision and Biomechanics

Volume 30, 2019, Pages 389-407

Enhanced techniques to secure medical image and data transit(Book Chapter)

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Abstract

This paper displays the work related to the secured medical picture transmission in light of watermarking and encryption. Client particular watermark is installed into the LSB of unique picture. Implanting watermark in LSB does not influence the nature of picture. This watermarked picture is then encoded by utilizing a pixel repositioning calculation. Every pixel is repositioned in light of the rest of after division by number 10. This leftover portion lattice goes about as encryption key and is required at the season of unscrambling as well. Comprehensive analyses are completed on proposed approach. The outcomes demonstrate that the watermark inserted is intangible and can be effectively separated at the recipient. Likewise, the encoded picture has no visual importance with the first picture and histogram of scrambled picture is changed. Encoded picture can be decoded with no loss of data from the picture. From this decoded picture watermark can be removed which endures no misfortune in the watermark. PSNR esteems for an arrangement of medicinal pictures are fulfilling. © Springer Nature Switzerland AG 2019.

Author keywords

Digital Watermark | LSB | PSNR | Restorative imaging

ISSN: 22129391
Source Type: Book Series
Original language: English

DOI: 10.1007/978-3-030-00665-5_40
Document Type: Book Chapter
Publisher: Springer Netherlands

Lecture Notes in Civil Engineering

Volume 14, 2019, Pages 1-9

Behaviourial study on geopolymer column in soil(Book Chapter)

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Abstract

Geopolymer soil column is one of the advancements in Ground improvement techniques. The study is aimed at the comparison of Geopolymer soil column and untreated sand in the load carrying capacity and settlement behavior of footing resting on loose sand. The effects of Geopolymer soil column and untreated sand are investigated by conducting experimental studies. The parameters involved in this study include soil column spacings and curing periods. A load test was carried out on a model footing resting on sand with Geopolymer soil column and untreated sand. Load test is repeated on the footing with Geopolymer soil column at varying curing periods of 7, 14, and 28 days. The load-settlement curve for different curing periods day were compared. It was observed that the Geopolymer soil column has high bearing capacity improvement factor compared to untreated sand. Settlement also considerably reduced while using Geopolymer soil column. A parametric study has been carried out to compare the settlement of Geopolymer soil column and untreated sand by finite element modelling using PLAXIS 2D Software and the results are agreeable with the experimental results. © Springer Nature Singapore Pte Ltd 2019.

Author keywords

Bearing capacity | Column spacings | Curing periods | Geopolymer | Settlement

Indexed keywords

Engineering controlled terms: Bearing capacity | Curing | Geopolymers | Sand | Soils

Engineering uncontrolled terms: Bearing capacity improvement factors | Column spacings | Curing periods | Finite element modelling | Geopolymer | Load settlement curves | Settlement | Settlement behaviors

International Journal of Biomedical Engineering and Technology

Volume 29, Issue 3, 2019, Pages 246-272

TBAC: Tree-based access control approach for secure access of PHR in cloud(Article)

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Abstract

Personal Health Record (PHR) system is a currently emerging patient-oriented model for sharing the health information through a cloud environment. Previously, single attribute authority-based security scheme was used for sharing the PHRs in the cloud. But, this security scheme is not practically applicable due to the security and privacy issues. The existing access control approaches require more time to encrypt and decrypt the PHR file. This paper proposes a Tree-Based Access Control (TBAC) approach for fine-grained and secure access of the PHR in the cloud environment. In our approach, Tree-based Group Diffie-Hellman (TBGDH) algorithm is used to generate the key instance for the encryption process. The Attribute-based Encryption (ABE) approach is used with different hierarchical levels of the users to protect the personal health data. The access policies are based on the user attribute.

Author keywords

ABE | Attribute-based encryption | Cloud computing | Diffie-Hellman | Key generation | MA-ABE | Multi-authority ABE | Personal health record | PHR | TBAC | TBGDH | Tree-based access control | Tree-based group Diffie-Hellman

Indexed keywords

Engineering controlled terms: Cloud computing | Cryptography | Health | Trees (mathematics)

Engineering uncontrolled terms: Attribute-based encryptions | Diffie Hellman | Key generation | MA-ABE | Multi authorities | Personal health record | TBAC | TBGDH | Tree-based

Applied Ecology and Environmental Research

Volume 17, Issue 2, 2019, Pages 2593-2617

Identification and control of saltwater intrusion by ADR approach in the coastal aquifers of Tuticorin, India(Article)(Open Access)

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Abstract

Due to industrial growth and urbanisation, excessive usage of groundwater resulted in a problem of saltwater intrusion in Tuticorin, India where control and management is very much essential. In the present study, groundwater samples are collected and analysed from 38 observation wells in years 2014 and 2018. Thirteen parameters namely pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Hardness (TH), Calcium (Ca^{2+}), Magnesium (Mg^{2+}), Sodium (Na^{+}) Potassium (K^{+}), Bicarbonate (HCO_3^{-}), Chloride (Cl^{-}), Sulphate (SO_4^{2-}) Nitrate (NO_3^{-}) and Fluoride (F^{-}) are determined and considered in calculating the Water Quality Index (WQI) based upon weighted arithmetic index method. Geographical information system (GIS) is used to interpolate water quality data by inverse distance weighted method. Experimental investigation indicates saltwater intrusion in the coastal aquifer of Tuticorin is due to excessive withdrawal of groundwater. Potential intrusion of saltwater is studied with respect to distance of observation wells from seashore. Finite Element Modelling of Flow (FEFLOW) is used to select the optimum pumping and recharge rate to control saltwater intrusion. A model is calibrated with hydraulic head measured using piezometer in the observation well, as well as salt concentration. The model is simulated using three different groundwater scenarios such as Abstraction, Recharge and combined Abstraction, Desalination Recharge (ADR) method. The simulation results depicted that the planned ADR system accomplishes significantly better than using abstraction or recharge well.

Author keywords

FEFLOW | GIS | Groundwater management | Hydraulic head | Water quality index

Journal of the Balkan Tribological Association

Volume 25, Issue 1, 2019, Pages 224-235

Effect of cutting tool nose radius on surface roughness by using response surface methodology(Article)

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Abstract

The purpose of this experimental investigation was to analyze the effect of nose radius on surface roughness, in Computer Numerical Control (CNC) turning of EN31 alloy steel in wet condition. The tool geometry (nose radius) on surface roughness was studied and analyzed with the effect of cutting conditions such as speed, feed and depth of cut. Then, the Material Removal Rate (MRR) for the machining process was done by mathematical and analytical methods. Design of Experiments (DOE) was conducted for the analysis of the influence of the turning parameter on the surface roughness and Material Removal Rate by using Response Surface Methodology (RSM) and then followed by optimization of the results using Analysis of Variance (ANOVA) to minimize the surface roughness and to maximize the Material Removal Rate. While increasing the nose radius then the surface roughness value was decreased. Material Removal Rate was increased when decrease the surface roughness, the cutting speed values can be significant.

Author keywords

Material removal rate | Nose radius | Surface roughness

ISSN: 13104772
Source Type: Journal

Document Type: Article
Publisher: Scibulcom Ltd.

Materials Today: Proceedings

Volume 9, 2019, Pages 164-174

1st International Conference on Nanoscience and Nanotechnology, ICNAN 2016; Vellore; India; 19 October 2016 through 21 October 2016; Code 147014

Fabrication of fiber optic based temperature sensor(Conference Paper)

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Abstract

The metal oxide semiconductors (ZnO, SnO_2, Al_2O_3 and TiO_2) were synthesized by co-precipitation method. The synthesized nanoparticles were characterized by X-ray diffraction (XRD), scanning electron microscope (SEM), energy dispersive spectrometer (EDS) and UV-Visible spectrometer in diffused reflectance (DR) mode. The XRD results stipulated that the ZnO nanoparticle is crystallized in hexagonal wurtzite structure, SnO_2 nanoparticles in rutile tetragonal structure, Al_2O_3 nanoparticle in rombohedral structure and TiO_2 nanoparticle in rutile anatase structure. The SEM investigation affirms that all the synthesized nanopowders are composed of uniformly distributed grains. The UV-Vis spectrum proclaimed that the synthesized nanoparticles having the band gap of 3.2 eV (ZnO), 3.3 eV (SnO_2) and 3.5 eV (TiO_2) respectively. The synthesized nanoparticles were replaced with small cladding region of the optical fiber and act as a temperature sensing materials. The temperature sensing characteristics of the synthesized nanoparticles were investigated for broad wavelength range (200-1000 nm). It reveals that the synthesized Al_2O_3 nanoparticles were given linear and high sensitivity (~27) at 697 nm compared with other sensing materials. Further, we have studied the wavelength dependent temperature sensing characteristics of Al_2O_3nanopowders and it show better sensitivity (~34) in blue wavelength region (450 nm-495 nm). Selection and/or Peer-review under responsibility of International Conference on Nanoscience and Nanotechnology (ICNAN'16)

Author keywords

Fiber optic sensor | Metal oxide | Nanopowder | Temperature sensing

Indexed keywords

Current Medical Imaging Reviews

Volume 15, Issue 1, 2019, Pages 52-60

Ultrasound fetal image segmentation techniques: A review(Review)

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Abstract

Background: This paper reviews segmentation techniques for 2D ultrasound fetal images. Fetal anatomy measurements derived from the segmentation results are used to monitor the growth of the fetus. Discussion: The segmentation of fetal ultrasound images is a difficult task due to inherent artifacts and degradation of image quality with gestational age. There are segmentation techniques for particular biological structures such as head, stomach, and femur. The whole fetal segmentation algorithms are only very few. Conclusion: This paper presents a review of these segmentation techniques and the metrics used to evaluate them are summarized. © 2019 Bentham Science Publishers.

Author keywords

Anatomy | Biometric measurements | Femur length | Fetal | Quality metrics | Review | Segmentation | Ultrasound

Indexed keywords

EMTREE medical terms: artifact | femur | fetus | fetus (anatomy) | fetus echography | fetus growth | gestational age | head | image quality | image segmentation | review | stomach | article | fetus (anatomy) | segmentation algorithm

ISSN: 15734056 DOI: 10.2174/1573405613666170622115527

International Journal of Environment and Sustainable Development

Volume 18, Issue 2, 2019, Pages 131-148

Mechanical characterisation and flexural performance of eco-friendly concrete produced with fly ash as cement replacement and coconut shell coarse aggregate(Article)

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Abstract

The aim of this study is to investigate the effect of adding fly ash, an industrial by-product and coconut shell, an agricultural waste on the mechanical and flexural characteristics of eco-concrete. The study focuses on density, compressive strength, tensile strength and flexural behaviour of the coconut shell eco-concrete. Two different mixes are developed, one with coconut shell and the other with conventional aggregate and coconut shell as coarse aggregate. The cement content is replaced with class F fly ash at 0%, 10%, 20% and 30% by weight. The test result shows that the coconut shell concrete produced with 10% fly ash has recorded higher compressive, tensile strength than other proportions. Fly ash inclusion further reduces the density of coconut shell concrete. The higher deflection of coconut shell concrete before failure shows that it has failed in a ductile manner. The flexural behaviour is comparable with other lightweight concretes. It is suggested that an eco-friendly, cost effective structural lightweight concrete can be produced by using coconut shell and fly ash. © 2019 Inderscience Enterprises Ltd.

Author keywords

Coconut shell aggregate | Compressive strength | Eco-concrete | Flexural behaviour | Fly ash | Split tensile strength

Indexed keywords

Engineering controlled terms: Aggregates | Agricultural robots | Agricultural wastes | Cements | Compressive strength | Cost effectiveness

Turkish Journal of Electrical Engineering and Computer Sciences

Volume 27, Issue 3, 2019, Pages 2321-2330

Design of area-efficient IIR filter using FPPE(Article)(Open Access)

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Abstract

Floating point arithmetic circuits provide wide dynamic range and high precision, and they are widely used in scientific computing and signal processing applications, but the complexity increases in hardware implementations of floating point units. In VLSI design architecture, many applications suffer in size of the components used in logical operations. The aim of reducing architecture is to gain reduction in power loss and also in area, but the reduction in size of the components leads to an increase in delay and memory. Hence, to overcome these limitations and to optimize the area, a novel design of floating point processing element (FPPE) architecture is proposed in this work with a smaller number of logical components and registers. A partially folded arithmetic function architecture is modeled for the design of an infinite impulse response (IIR) filter using FPPE and implemented on a field programmable gate array (FPGA) with efficient area. FPGAs are widely used in the implementation of floating point computing modules due to the increase in gate density and embedded arithmetic cores. Synthesis results prove that the proposed design of the IIR filter provides efficient area compared with existing works. The modules are designed in Verilog and implemented on Xilinx FPGAs. © TÜBİTAK

Author keywords

Field programmable gate arrays | Floating point arithmetic | Floating point processing element | IEEE 754-2008 standard | Infinite impulse response filters

Indexed keywords

Engineering controlled terms: Computer circuits | Digital arithmetic | Field programmable gate arrays (FPGA) | Impulse response | Integrated circuit design | Logic gates | Memory architecture | Number theory | Signal processing | Signal receivers

Communications in Computer and Information Science

Volume 892, 2019, Pages 521-537

22nd International Symposium on VLSI Design and Test, VDAT 2018; Madurai; India; 28 June 2018 through 30 June 2018; Code 223369

A Novel Design Approach to Implement Multi-port Register Files Using Pulsed-Latches(Conference Paper)

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Abstract

Pulsed-latches provide high performance with low power consumption by taking the advantages of both flip-flops and latches and thus, they are targeted in implementing different kinds of memory devices in various applications. One such memory device is the register files, which is traditionally being realized using SRAMs. To implement n READ/WRITE multi-ports in SRAM register file design, the transistors that forms READ/WRITE ports must be replicated n times. Thus, there exist a proportionality between the number of transistors required per cell and the number of READ/WRITE ports per cell. This relationship is completely eliminated in the proposed pulsed-latches based register file design. The proposed pulsed-latches requires only 10 transistors per cell for any number of READ/WRITE ports. The proposed pulsed-latches based multiport register files consumes low power, area efficient and performs multi-read and multi-write operations. Hence, to implement n READ/WRITE ports in pulsed-latches based register files, n individual non-overlapping pulses are required, thereby making the number of transistors required per cell to be unchanged. These register files showed significant decrease in area as well as power consumption when compared to the SRAM based register files. An 8-bit(1X8), 64-bit(8X8), 128-bit(16X8) and a 256-bit(32X8) 4-READ and 2-WRITE (4R2W) pulsed-latches based multiport register files were designed and simulated in cadence 180 nm technology. © 2019, Springer Nature Singapore Pte Ltd.

Indexed keywords

Engineering controlled terms: Cells | Cytology | Electric power utilization | Flip flop circuits | Static random access storage | Transistors | VLSI circuits

Engineering uncontrolled: Area-Efficient | Low Power | Low-power consumption | Multi-port | Novel design | Pulsed latches | Register files

Methods in Molecular Biology

Volume 1995, 2019, Pages 369-381

Producing oleaginous organisms using food waste: Challenges and outcomes(Book Chapter)

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Abstract

With organic or food waste being one of the main constituents of the total urban waste generated, it not only makes it essential to seek means for its safe disposal but at the same time reiterates the huge potential that lies with the proper utilization of such a widely available resource. Oleaginous microbes that are effective in producing or storing oil would use food waste rich in carbohydrates, lipids, and proteins, and this oil in turn could be an alternative feedstock for the production of biofuels. However, there are few challenges in the process. The various challenges in this process and methods to address them are discussed in the present chapter.

Author keywords

Biodiesel · Food waste · Lipids · Oleaginous

Indexed keywords

EMTREE drug terms: 2 propanol · alkali · biodiesel · chloroform · detergent · enzyme · hexane · methanol · nitrogen · sulfate · biofuel · oil

EMTREE medical terms: aeration · bacterium culture · carbohydrate analysis · carbon nitrogen ratio · cell permeabilization · concentration (parameter) · enzyme chemistry · food waste · fungal cell wall · fungus culture · heat shock · inoculation · lipid storage · lipogenesis · microbial growth · nonhuman · oleaginous organism · organisms · organisms by carbon source · osmotic stress · pH · temperature · ultrasound · waste management · bacterium

International Journal of Bio-Inspired Computation

Volume 14, Issue 2, 2019, Pages 103-113

Trust aware nature inspired optimised routing in clustered wireless sensor networks(Article)

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Abstract

Wireless sensor networks (WSN) consist of sensor nodes which have capabilities of sensing, computation and communication. Routing algorithms are required in a WSN when a node is unable to send a data to the base station directly. In this paper, a trust aware optimised compressed sensing-based data aggregation and routing algorithm has been proposed for clustered WSN. Compressed sensing is used for data aggregation from sensor nodes with reduced overhead. Nature inspired optimisation has been implemented to obtain trade-off between transmission distance, hop-count, number of transmitted message and most trusted path using artificial bee colony algorithm, ant colony optimisation, differential evolution, firefly algorithm and particle swarm optimisation. Trust-based reconstruction of the compressed data is done at the base station in the presence of malicious nodes.

Author keywords

ACO · Ant colony optimisation · Artificial bee colony algorithm · Differential evolution · Firefly algorithm · Multi-objective optimisation · Particle swarm optimisation · PSO · Routing · Trust management · Wireless sensor networks · WSN

Indexed keywords

Engineering controlled terms: Ant colony optimization · Base stations · Bioluminescence · Biomimetics · Compressed sensing · Economic and social effects · Multiobjective optimization · Network routing · Particle swarm optimization (PSO) · Wireless sensor networks

Indian Journal of Environmental Protection

Volume 39, Issue 6, 2019, Pages 524-530

Ambient air quality monitoring and modelling in Coimbatore city(Article)

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Abstract

The atmosphere, which makes up the largest fraction of the biosphere, is a dynamic system that continuously absorbs a wide range of solids, liquids and gases from both natural and artificial sources. Therefore, the estimation of such gaseous air pollutants in the ambient air in the urban area of Coimbatore becomes important. In this study, it is proposed to perform the distribution of wind speed and direction at a particular location graphically using wind rose diagram. Sampling locations are selected based on vehicle density. The samples were collected and the concentrations of gaseous air pollutants were estimated, the results were compared with National Ambient Air Quality Standards (NAAQS). In addition to this, traffic survey was conducted in the selected locations to determine the density of vehicles. From the selected locations ambient air quality being monitored, from this monitoring data, artificial neural network (ANN) and CALINE-4 has to be created. Integrated sensor suite (ISS) was used to observe and record the meteorological parameters such as wind speed, wind direction, rainfall intensity, ambient temperature and relative humidity. ANN model has been used to predict the future air quality by giving the traffic as well as a meteorological parameter as an input. CALINE-4 model has been used to simulate the site specified dispersion of NOx along the roadways. © 2019-Kalpana Corporation.

Author keywords

Air quality index | Modelling software such as caline-4 and ann | Monitoring

ISSN: 02537141 Document Type: Article
CODEN: IJEPD Publisher: Scientific Publishers

International Journal of Electrical Engineering Education

2019

Public assistance intensification of wind-integrated restructured endowment system using thyristor-controlled series compensator peerless location and gauging using the hybrid Genetic Algorithm-Gravitational Search Algorithm

(Article in press ?)

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Abstract

In a deregulated electricity market, it may at times become challenging to swift all the essential power which are obligatory to move along the transmission line due to congestion. This paper primly waltz up the finest allotment of thyristor-controlled series compensator in deregulated capacity setup with wind generator by considering the maximization of social welfare cost as objective function. In this work, hybrid market model has been considered and the hybrid algorithm is used as a tool, in which Gravitational Search Algorithm is used for attaining optimal location of thyristor-controlled series compensator as major issue, though Genetic Algorithm-based top-notch outflow of power minimizes operating cost after incorporating thyristor-controlled series compensator and Wind Generator as sub-optimization problem. The coherence of this prospective has been tested and analyzed on modified IEEE 14-bus system and modified IEEE 118-bus system at different loading conditions. The influences on the locational marginal pricing and system voltage have been also investigated in this work and the obtained results are compared with other globally accepted techniques reported in the literary texts. © The Author(s) 2019.

Author keywords

hybrid Genetic Algorithm-Gravitational Search Algorithm | Restructured power system | Social Welfare Maximization | thyristor-controlled series compensator and optimal location

Indexed keywords

Acta Protozoologica

Volume 58, Issue 1, 2019, Pages 31-41

Novel media for lipid production of Chlorococcum oleofaciens: A RSM approach(Article) (Open Access)

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Abstract

The algal medium was optimized to increase the biomass and lipid production of Chlorococcum oleofaciens. The significant variables were screened and chosen from previously reported algal culture media using Plackett Burman Design (PBD). Optimization of the significant variables were performed using central composite design. The Pareto chart for PBD revealed that the salts such as sodium bicarbonate, sodium nitrate, potassium nitrate and ferrous sulphate had enhanced the biomass and lipid production. The variables and its effect on the responses were further studied by central composite design (CCD). A new medium was formulated based on the response surface methodology. The predicted concentration of $NaHCO_3$, $NaNO_3$, KNO_3, $MgSO_4$. $7H_2$ O were found to be 6.75 g/L, 0.75 g/L, 1.88 g/L and 0.35 g/L respectively. The actual and the predicted total lipid yield for the optimized media was around 0.74 g/L and 0.78 g/L respectively. The optimal medium has been named as AM medium. Growth and the lipid yields of C. oleofaciens were found higher in AM medium. The specific growth rates of C. oleofaciens in AM and CFTRI media were found to be 0.14 day^{-1} and 0.19 day^{-1} respectively. The biomass produced by the optimized AM medium was found to be 2.7 times greater compared to the CFTRI medium. The lipid was extracted and GC-MS was performed which revealed that the fatty acids were predominantly of the class C15:0, C18:0, C16:0 and C12:0. It is concluded that besides lipid content, AM medium increased the cell number leading to the increase in biomass.

Author keywords

AM medium | Biomass | Central composite design | Lipid | Medium optimization | Plackett Burman Design

Journal of Manufacturing Technology Research

Volume 11, Issue 3-4, 2019, Pages 137-154

Optimization and effect of squeeze casting process parameters on tensile strength of hybrid metal matrix composite(Article)

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Abstract

The squeeze casting process is leading liquid state method for casting metal matrix composite. This is accomplished economically through the conversion of mechanical energy into interface energy at the reinforcement-matrix interface zone. This experimental study focuses on processing of hybrid metal matrix (LM24-SiC_p-coconut shell ash) composite to optimize and to analyze the effect of squeeze casting process parameters viz. reinforcement percentage, pouring temperature, squeeze pressure and mould temperature on the tensile strength of the composites. Experiments were conducted based on L27 (3^4) orthogonal array. Results revealed that squeeze pressure and reinforcement percentage were the most influencing process parameters on tensile strength. A mathematical model was developed for the prediction of tensile strength using nonlinear regression analysis and validated through confirmation experiments. Optimum parametric condition was obtained using Taguchi method and Genetic Algorithm tool, which could exhibit 25% improvement on tensile strength of the composite comparing conventional alloys.

Author keywords

Coconut shell ash | Genetic algorithm | LM24 aluminium alloy | Metal matrix composite | Silicon carbide | Squeeze casting | Taguchi method

ISSN: 19438095 Document Type: Article

Indian Journal of Ecology

Volume 46, Issue 4, 2019, Pages 823-827

Impact of industrial wastewater disposal on surface water bodies in kalingarayan canal, Erode district(Article)

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Abstract

The Kalingarayan canal is crossing the major textile town Erode which is abundantly occupied by textile units. Major streams carrying the untreated / semi treated industrial effluents are mixed into the canal. However, the gradual introduction of a large number of new chemical compounds and the technologies has resulted in much higher number of contaminants. The original situation, which local intense pollution from a limited number of well-defined sources has been transferred into a situation with widespread contamination by a large variety of compounds from a multitude of sources. Continuous disposal of industrial effluents on canal, which has limited capacity to assimilate the pollution load, also leads to ground water pollution. Kalingarayan canal has helped to cultivate more than 6000 hectares but farmers are experiencing various problems. The area of cultivation is reduced to 3000 hectares because of the contamination in the canal by the different polluting industries like tanneries, textiles and dyeing units located in Erode and Tirupur taluk areas. The farmers and their cattle are affected by the pollution of the canal. Hence their yield on their lands has decreased to a certain extent. Thus, this study gives a clear picture of pollution source points, types of effluents added in the canal. The scope of the present study is to assess the impact on surface water of Kalingarayan canal, a comprehensive experimental study to identify the pollutant levels in the surface water of the Kalingarayan canal and to suggest a suitable remedial measure to handle this problem. The results of the analysis were correlated with the water quality standards of BIS. It shows that all the parameters studied are exceeding in the permissible limits. This is due to more discharge of industrial effluents into the canal and it should be regularly monitored and wastewater should be treated. This will control pollution and prevent the depletion of the quality of canal water.

Author keywords

Dyers | Industrial effluents | Kalingarayan canal | Pollution | Sewage water | Tanners

Defence Science Journal

Volume 69, Issue 4, 2019, Pages 396-401

Assessing the performance of nano lubricant on zinc aluminium alloy(Article)(Open Access)

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Abstract

In the field of tribology, Zinc Aluminium (ZA) alloys have been widely investigated for their superior wear characteristics. They were found to be suitable alternatives for bearing bronzes for the operating conditions of high mechanical load and moderate sliding speeds. Addition of nano-particles in the lubricating oil (base oil) to enhance the characteristics of the base oil is known as nano lubrication. In this study, sliding wear behaviour of ZA27 was investigated under dry, base oil and nano oil lubrication conditions, by varying load, sliding distance and sliding speed. With the base oil as SAE 40, nano graphite was added in two step method which was further used to identify the lubrication regime under different lubrication conditions. From the limited study of single melt samples, the results appear that the wear behaviour of ZA27 alloy improved under nanc lubrication conditions with reduction in operating temperature. It could be observed from SEM images that the presence of nano-particles reduced scarring and wear, leading to enhancement in the tribological performance of ZA27 alloy.

Author keywords

Nano-graphite | Nano-lubrication | Wear behaviour | ZA27

Indexed keywords

Engineering controlled terms: Bearings (machine parts) | Graphite | Image enhancement | Nanoparticles | Wear of materials | Zinc alloys

Journal of the Balkan Tribological Association

Volume 25, Issue 3, 2019, Pages 517-534

Thin layer drying of sago (Tapioca pearls)(Article)

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View additional affiliations

Abstract

In this study, an investigation of drying of Sago in a forced convection electrically heated hot air cabinet drying test device was done to ascertain the influence of temperatures of air at 60°C, 70°C, 80°C, and bed thicknesses of 7.0 mm, 10.5 mm and 14.0 mm for a constant velocity of air flow of 2.0 m/s to generate the experimental data. With the experimental data thus generated, a regression analysis was performed to fit with the twelve widely used mathematical models viz. Lewis, Page, Modified Page, Henderson and Pabis, Logarithmic, Two-term, Two-term exponential, Wang and Singh, Diffusion approximation, Modified Henderson and Pabis, Verma and Midilli models. These twelve thin layer drying models were compared with each other using statistical parameters such as coefficient of determination (r^2), Root Mean Square Error (RMSE) and chi-square (χ^2) to select the best model. Based on the results, Midilli model is considered as the most suitable model compared to others adequately describing drying kinetics of Tapioca pearls (Sago).

Author keywords

Air heater | Drying | Mathematical modeling | Sago | Thin layer

Funding details

Funding text

The Authors wish to acknowledge the support offered by M/s Selliamman Sago Factory, Alavaipatti, Tamilnadu, India for timely supply of required quantity of sago pearls for conducting the experiments.

Journal of the Balkan Tribological Association

Volume 25, Issue 3, 2019, Pages 617-632

Investigations on scavenging performance of a novel two stroke spark ignited free piston engine(Article)

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View additional affiliations

Abstract

In this research work an attempt has been made to investigate the scavenging performance of a novel spark ignited two stroke free piston engine with spring system using three different spring materials as a rebound device. Free piston engines do not have a conventional crank shaft. The connecting rod of the free piston engine is fixed rigidly to the piston and the other end is attached to the spring. FPE with linear generator has been identified as novel technology for hybrid vehicle. The objective of the work is to analyze the scavenging performance to optimize important parameters namely geometry of spring and material of spring. 3D model of engine has been simulated for the combustion process to identify the scavenging efficiency by using spring pressure. Computational fluid dynamic analysis is carried out by varying the parameters to find out better scavenging efficiency in order to achieve fuel economy. The optimum of scavenging efficiency was seen for the free piston engine employed with chrome vanadium alloy steel spring.

Author keywords

Computer simulation | Free piston engine | Rigidity modulus of materials | Scavenging | Spring materials

ISSN: 13104772 **Document Type:** Article

Journal of the Balkan Tribological Association

Volume 25, Issue 3, 2019, Pages 718-729

Comprehensive analysis of different winglet models to enhance the windmill performance(Article)

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Abstract

Renewable energy has become the leading resource as eco-friendly energy. The recent research on wind energy explores the opportunity of increasing the effectiveness of horizontal axis wind turbine and also reduction of lift-induced drag by adding winglets at the tip of the turbine blade. This paper describes the influence of different model winglets attached to wind mill turbine blade. The performance of winglets attached blades in wind turbine was investigated in ANSYS CFD to evaluate the power variation on low speed wind mill. This virtual investigation was conducted for three different winglets individually. The virtual analysis showed that the blended winglet was the best winglet compared to the other two turbine blades design. The numerical investigation revealed that adding a blended winglet to the base line turbine blade increased the output power by 4 watts resulting in overall increase in power by 2% to 3% output and power coefficient.

Author keywords

Aerodynamics | CFD | Wind turbine | Winglet | Wingtip vortices

Funding details

Funding sponsor	Funding number	Acronym
	08/647(0002)/2017-EMR-I	
Bangladesh Council of Scientific and Industrial Research		BCSIR

GIS and Geostatistical Techniques for Groundwater Science

1 January 2019, Pages 153-164

Intelligent prediction modeling of water quality using artificial neural networking: Nambiyar river basin, Tamil Nadu, India
(Book Chapter)

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Abstract

An attempt has been made in the Nambiyar River Basin, Tamil Nadu, India, using neural network and geographical information system (GIS) techniques, to assess and predict groundwater-quality changes. Statistical analysis signifies the correlation between the major constituents. The intelligent predictive model (IPM) developed using artificial neural network (ANN) and GIS signifies the potential of an ANN prediction model to simulate and predict the hardness, total dissolved solids and chloride with acceptable accuracies. The findings of this study show, in comparison with a statistical model, the ability of ANN modelling in predicting the simulation of water-quality parameters in the study area is significant. It is also suggested that the present water-quality variations might have been mainly due to industrial effluents.

Author keywords

ANN | Nambiyar basin | Regression | Statistics | Water quality

ISBN: 978-012815413-7;978-012815414-4
Source Type: Book
Original language: English

DOI: 10.1016/B978-0-12-815413-7.00011-0
Document Type: Book Chapter
Publisher: Elsevier

Advanced Biofuels: Applications, Technologies and Environmental Sustainability

1 January 2019, Pages 181-213

Exploration and enhancement on fuel stability of biodiesel: A step forward in the track of global commercialization
(Book Chapter)

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Abstract

Studies concerning the use of renewable energy sources as the substitute for diesel fuel have been increasing due to the ever-increasing demand and diminishing supply of fossil fuels caused by rapid rate of industrialization and increasing vehicle population in the recent decades. To overcome these serious issues, biodiesel extracted from many feedstocks have been investigated and implemented for the past few decades. Biodiesel has been recommended as a vehicular fuel because its physicochemical properties are similar to diesel fuel. Due to the benefits like renewability, feasibility, availability, higher combustion efficiency, and lower emission, biodiesel has been suggested as the superior renewable source. Over the past few decades, nearly 350 species of biodiesel feedstocks have been explored and studied for performance, emission, and combustion characteristics for diesel engines by many researchers. However, the commercial use of biodiesel in the global fuel market has been limited because of the main drawback of instability of fuel properties due to the deterioration of its quality when it is in contact with oxygen unlike petroleum diesel. Stability of fuel properties is chiefly significant to ensure the expected performance and life of the diesel engine. There are three types of stabilities like oxidation stability, storage stability, and thermal stability, playing chief roles in making the fuel quality stable. Antioxidants are often used to inhibit biodiesel oxidative degradation. Phenolic synthetic antioxidants are more efficient when compared to other antioxidants. This research investigates the effects of commercially available and cheap synthetic antioxidants (PY-pyrogallol, PG-propyl gallate, TBHQ-tert-butylhydroxyquinone, BHT-butylated hydroxytoluene, BHA-butylated hydroxyanisole) at various concentrations (375 ppm, 750 ppm, 1000 ppm, 1125 ppm, and 1500 ppm) on the fuel stability of Calophyllum inophyllum biodiesel.

Author keywords

Deep Learning and Parallel Computing Environment for Bioengineering Systems

1 January 2019, Pages 37-52

Image Fusion Through Deep Convolutional Neural Network
(Book Chapter)

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Abstract

Recent rapid deployment of imaging technologies and improvement of computational power allow us to process different data that are collected from various sensing modalities, employed in many applications of medical imaging, computer vision and remote sensing. A major gain of combining the outcomes of different modalities is to utilize the complementary information from each modality to form a better image. The method that predominantly combines images from multi-modalities in order to exalt the view of an image with upgraded complementary information is termed image fusion. With it, the multi-sensor data with complementary information about the particular region are comparatively analyzed. The new image formed by image fusion is suitable for image processing methods such as pattern or object recognition, segmentation, etc., and also for the purposes of human perception. The most essential issue in image fusion to be addressed is to define standard fusion rules for merging the multi-modal images. Current technologies aim at machine learning (ML) and deep learning (DL) for automatic image processing. The method of convolutional neural network (CNN) cannot be used directly to fuse multi-modal medical images. Various solutions have been demonstrated in the literature to make the best use of CNN for medical image fusion. This chapter presents a survey of image fusion algorithms based on deep convolutional neural network, and the results obtained by these methods are interpreted and discussed.

Author keywords

CNN | DL | Feature extraction | Image fusion | Image registration | Multi-modal | Pyramid decomposition | Similarity learning

Materials Today: Proceedings

Volume 22, 2019, Pages 2412-2423

2nd International Conference on Materials Manufacturing and Modelling, ICMMM 2019; VIT UniversityVellore; India; 29 March 2019 through 31 March 2019; Code 159945

Experimental Investigation of Squeeze cast Aluminium 2024/Zn alloy using Taguchi method(Conference Paper)

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Abstract

Casting is a manufacturing process where a metal is heated to a proper temperature and is then poured into a mold or cavity which contains it in the proper shape during solidification. In this experimental work investigation has been performed on Squeeze casting of Aluminium 2024 and Zinc alloy. The effect of squeeze casting parameters like different weight percentage of zinc and squeeze time has been investigated the relationship between tensile strength, micro-hardness and corrosion of the casted sample. Aluminium 2024 is taken as a base material and Zinc is taken as a alloy material. Different weight percentage of Zinc of 4% and 5% and Squeeze time of 10 min and 15 min are taken for the study. Taguchi L4 orthogonal array is employed for the experimental design. Finally, analysis of variance (ANOVA) is performed to know the impact of individual factors on tensile strength, hardness and corrosion resistance. It is observed that the weight percentage of zinc is the most influenced parameters. Multiple regression equation is formed for estimated predicted values of tensile strength, micro-hardness and corrosion resistance. As a conclusion, it has been derived that the weight percentage of zinc provide better hardness and corrosion resistance and squeeze time influence tensile strength of the samples for the given experimental conditions.

Author keywords

ANOVA | different weight percentage of zinc | Squeeze casting | squeeze time

Indexed keywords

Materials Today: Proceedings

Volume 22, 2019, Pages 1517-1523

2nd International Conference on Materials Manufacturing and Modelling, ICMMM 2019; VIT UniversityVellore; India; 29 March 2019 through 31 March 2019; Code 159945

Comparative Analysis of Friction Stir Welded Joints using Water run and Air stream cooling for Superior Strength(Conference Paper)

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Abstract

The present study is focused mainly on the comparative analysis of mechanical properties and microstructure of nitrogen stainless steel using friction stir welding (FSW). Temperature max out is the major factor for quality welding and for this reason water run is used for cooling while welding nitrogen stainless steel and also air stream cooling is used for comparison of strength in the welding. It is found that by using water run cooling in the welding area, the heat affected zone shows superior density in dislocation and nugget zone shows a grain size which is in better-quality when compared to air stream cooling in the joints. In addition to the above tests immersion corrosion test is conducted to analyze how much wear the tool undergone during the welding process and it has observed better corrosion resistance for water run cooling

Author keywords

air stream | Friction stir welding | mechanical properties, immersion corrosion | microstructure | water run

ISSN: 22147853
Source Type: Conference Proceeding
Original language: English

DOI: 10.1016/j.matpr.2020.02.069
Document Type: Conference Paper
Volume Editors: Yarlagadda P.K.D.V.,Jeyapandiarajan P.,Joel J.,Ill-Soo K.,Yan-Ling

Materials Today: Proceedings

Volume 22, 2019, Pages 1489-1498

2nd International Conference on Materials Manufacturing and Modelling, ICMMM 2019; VIT UniversityVellore; India; 29 March 2019 through 31 March 2019; Code 159945

Boulevard for Effective Consumption of Power and Energy in Friction Stir Welding(Conference Paper)

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Abstract

The research work performed using AA7204-5022 material is to create a welding pathway for Friction Stir Welding process with low energy and power utilization along with good quality welds. The mentioned objective has been obtained by varying the welding parameters as welding speed and spindle speed. From this study, it has been recorded that the energy and power utilization can be précised by varying the temperature in the work piece as well as in the weld roots. By analyzing the power available in the mechanical process and also in the external source, the energy and power utilization analysis has been performed. An additional procedure handled for the judgment of good quality welding is the tensile test by analyzing the failures in the weld cross section. With the help of the results obtained during the respective welding operations a pathway for the low energy and power consumption with the high weld quality has been obtained. The result portrays that spindle speed and weld speed plays a significant role in energy and power consumption. At lowest spindle and weld speed, the power utilization is minimized, whereas the energy utilization is reduced at higher spindle speed. Hence it has been found that the minimized power and energy utilization steering at opposite direction in the map of welding parameters. Power consumption augments at both higher weld and spindle speed; meanwhile the significant governing factor for energy utilization is the weld speed. Hence at increased weld speed, the energy consumption could be decreased leading to reduced cost and also increased productivity. Spindle speed and partial penetration restricts the minimization of energy utilization at higher weld speed. But the major thing needed is the high quality welding. For this purpose increasing the welding speed is the only way to obtain good quality welding © 2019 Elsevier Ltd.

Author keywords

Materials Today: Proceedings

Volume 22, 2019, Pages 1829-1837

2nd International Conference on Materials Manufacturing and Modelling, ICMMM 2019; VIT UniversityVellore; India; 29 March 2019 through 31 March 2019; Code 159945

Comparison of Strength in Dissimilar AA7204-5021 Using Friction Stir Welding by Varying Tool Pin Profile(Conference Paper)

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Abstract

Friction Stir Welding (FSW) of AA7204-5021 was performed with three different types of tool pin profile to analyze the strength of the materials. The fabricated welded materials undergone hardness testing for hardness of the material whereas tensile testing to identify the ductility of the work piece for the tool pin profile. By keeping the welding parameters like welding speed, traverse speed and tool rotational speed constant the work is performed for one tool profile. Furthermore investigation for the remaining two tool pin profile is performed for the selection of best tool pin profile. In this investigation the welding parameters are kept as high as possible for better results. By analyzing the stress strain ratio graphical results the better tool pin profile is selected for fixed parameters in the butt welded materials © 2019 Elsevier Ltd.

Author keywords

AA7204-5021 | Butt joints | Friction stir welding | Hardness test | Tensile test | Thermal imaging

Indexed keywords

Engineering controlled terms: Butt welding | Friction | Friction stir welding | Infrared imaging | Materials testing apparatus | Research laboratories | Tensile testing

Refining Biomass Residues for Sustainable Energy and Bioproducts: Technology, Advances, Life Cycle Assessment, and Economics

1 January 2019, Pages 87-109

Application of heterogeneous acid catalyst derived from biomass for biodiesel process intensification: A comprehensive review (Book Chapter)

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Abstract

Hordes of viable methods to prepare catalysts from biomasses are available for enriching the quality and yield of biodiesel. The heterogeneous acid catalysts are advantageous because of their reactivity toward low-valued feedstocks and reusability. The latest studies on biodiesel production using green catalytic processes promote the use of biomass-derived solid acid catalysts as a result of their low price and eco-friendly attribute, leading to a sustainable biodiesel production. This review focuses on the discussion of various heterogeneous acid catalysts derived from biomass with an added emphasis on polycyclic aromatic hydrocarbons containing sulfonic acid group. Their effects on acid site strength, porosity as well as surface hydrophobicity for biodiesel production have also been discussed in this chapter. The use of these biomass derived catalysts paves a greener route for biodiesel production.

Author keywords

Biodiesel | Esterification | Heterogeneous acid catalyst | Sulfonation | Transesterification

Materials Today: Proceedings

Volume 27, 2019, Pages 2174-2178

2019 International Conference on Materials and Manufacturing Methods, MMM 2019; Tiruchirapalli; India; 5 July 2019 through 7 July 2019; Code 161764

Investigation on spark electrical discharge machining of Si_3N_4 based advanced conductive ceramic composites(Conference Paper)

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Abstract

Ceramics are increasingly being used in aerospace, and have been used in the engineering industry for many years. Because ceramic is generally lighter than metal alloys, EDM has long been used for conductive ceramic materials for their forming complex shaped holes and design of all kinds of industrial applications. Furthermore, a considerable number of engineering challenges can be expected regarding the processing of ceramic materials on a percentage of composition level. In order to examine the investigation of the material removal mechanism and surface topography at a different processing temperature in the limit of high-temperature 1200-1600 °C of silicon nitride (Si3N4) based advanced ceramic composites (ACC) and analyzing various process parameters of spark EDM. Establish the relationship between the geometrical tolerances, crack behavior, Thermal spalling, pores and craters were investigated. Furthermore, the advantage, disadvantage, application, and productivity introduced conductive ceramic composites has been explored. In this work we reviewed the EDM characteristics of Si3N4-TiN and Nickel-Titanium alloys and also comparative analyses of the microstructure; hardness and composition of Electrical discharge machined surfaces were discussed.

Author keywords

ACC | Ceramic composites | EDM | Nickel-titanium alloys | Si_3N_4-TiN

Indexed keywords

Materials Today: Proceedings

Volume 27, 2019, Pages 2708-2712

2019 International Conference on Materials and Manufacturing Methods, MMM 2019; Tiruchirapalli; India; 5 July 2019 through 7 July 2019; Code 161764

Investigations on electrochemical machining (ECM) of Al7075 material using copper electrode for improving geometrical tolerance(Conference Paper)

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Abstract

This research work focuses on electrochemical machining performance evaluation of Al7075 material ECM has become the most important and high precision technique in the manufacturing sector, since many intricate 3D profiles can be machined using a copper electrode. ECM process widely applied in aerospace industries using of multiple hole drilling, turbine blades within close limits and drilling jet engine turbine blades, etc. The objective of this experiment is found the maximum Material Removal Rate (MRR), reducing the machining time, good hardness and surface finish. The machining parameter considered were current (12 V), duty cycle (75%), and electrolyte concentration (32%). The performance measures such as metal removal rate (MRR), the machining time (min), hardness, form and orientation tolerance were examined. Main effect plot, interaction plot and contour plot analysis were used to optimize the process parameters for ECM processes. As a result, metal removal rate is maximized by increasing the electrolyte concentration (36 g/l), duty cycle (95%) and machining voltage (16 v). Metal hardness is improved by decreasing the machining voltage (12 V), duty cycle (75%) and increasing the electrolyte concentration (36 g/l). Minimum circularity is achieved at machining voltage, electrolyte concentration, and duty cycle are reduced. Minimum cylindricity is obtained while increasing the electrolyte concentration and decreasing the machining voltage. Minimum perpendicularity is achieved to increase of voltage and decrease of electrolyte concentration.

Author keywords

Circularity Cylindricity ECM Hardness MRR Perpendicularity

Materials Today: Proceedings

Volume 41, 2019, Pages 1024-1029

2019 Advances in Minerals, Metals, Materials, Manufacturing and Modelling, ICAM5 2019; Warangal; India; 25 September 2019 through 27 September 2019; Code 168165

Characterization studies on weld strength of rotary friction welded austenitic stainless steel tubes(Conference Paper)

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Abstract

Austenitic stainless steel (SS304) tubes of outer diameter 19mm, 2mm thickness are joined together by rotary friction welding (RFW). The characterization studies are done by varying heating load, upset load, heating time, upset time and keeping constant spindle speed of 1100rpm. The tensile and microhardness test were conducted for each fabricated joints to evaluate the mechanical properties of welded samples. The joint strength increased with increase in upset load and heating load. The maximum joint strength of 780MPa and hardness of 210HV achieved for weld parameter of upset load 143MPa and upset time 4sec. The detailed fracture analysis reveals the weld sample joints had experienced a ductile mode of fracture at parent metal location. The microstructure analysis revealed coarse grain structure in the weld zone compared to base metal.

Author keywords

Austenitic stainless steel Friction welding Mechanical properties Tensile test Tube welding

Indexed keywords

Engineering controlled terms: Friction Friction welding Tensile strength Tensile testing Tubular steel structures Welds

Materials Today: Proceedings

Volume 45, 2019, Pages 4020-4025

2nd International Conference on Nanoscience and Nanotechnology, ICNAN 2019; Vellore; India; 29 November 2019 through 1 December 2019; Code 145688

Surfactant concentration influences the morphology and electrochemical properties of CuO Nanoparticles synthesized via microwave method(Conference Paper)

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Abstract

Here, we detail the influence of the surfactant concentration on the morphological, structural and energy-storage property of CuO electrode material. When proposed as a supercapacitor material in neutral electrolyte (NaCl), it shows excellent electrochemical nature. Besides, it attains high specific capacitance (303F g^{-1} at 2 mVs^{-1}), good rate performance (102F g^{-1} at 25 mVs^{-1}) and good cyclic stability. In count, it has low charge transfer resistance (2.04 X), which is very essential when performing supercapacitive study at high current rates. These results are enhancing the study of CuO based electrodes for supercapacitor applications.

Author keywords

CuO electrode Neutral electrolyte Supercapacitors Surfactant SDS

Indexed keywords

Engineering controlled terms: Charge transfer · Copper oxides · Electrodes · Electrolytes · Morphology · Sodium chloride · Surface active agents · Synthesis (chemical)

Engineering uncontrolled: CuO electrode neutral electrolyte supercapacitor surfactant SDS · CuO nanoparticles · Electrochemicals · Electrode material

Materials Today: Proceedings

Volume 46, 2019, Pages 9862-9868

2019 International Mechanical Engineering Congress, IMEC 2019; National Institute of TechnologyTiruchirappalli; India; 29 November 2019 through 1 December 2019; Code 171966

Study on availability analysis, performance and emission behavior for an oxygen enriched turbocharged diesel engine(Conference Paper)

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Abstract

There is an ever-increasing necessity for sustainable energy resources. The restrictions on diesel engines, which were already strict in the previous decade, are only going to increase in the next one. A zero-emission diesel engine has become an absolute necessity. Furthermore, it is critical to increase the thermal efficiency of these engines. Dimethyl Carbonate (DMC) is gaining popularity as an oxygenated additive to diesel due to its desirable boiling point and good solubility. The current work investigates the performance, emission and exergy parameters of a diesel engine with DMC as an additive. Additionally, we also explore the effects of oxygenation at the air side by introducing a turbocharger at the intake manifold. Four different blends of oxygenated additives were analysed with the turbocharger in operation. Here, a 5% blend of DMC produced the most desirable results. When a 5% blend of DMC with diesel was tried out, the brake thermal efficiency increased by 4 percent. At maximum brake mean pressure 4.8 bar, the maximum exergy efficiency was 65%. This blend also has least the brake specific fuel consumption and carbon monoxide emissions. These results emphasize the usage of DMC as an additive, and are of direct relevance to the alternative fuel industry - aiding it in making informed decisions about blending fuel additives.

Author keywords

Diesel engine · Dimethyl carbonate · Exergy · Injection pressure · Particulate emissions · Performance

Indexed keywords

Materials Today: Proceedings

Volume 46, 2019, Pages 9229-9231

2019 International Mechanical Engineering Congress, IMEC 2019; National Institute of TechnologyTiruchirappalli; India; 29 November 2019 through 1 December 2019; Code 171966

A study on corrosion behavior of stainless steel dissimilar alloy weld joints (321 & 347)(Conference Paper)

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Abstract

In this work dissimilar weld is obtained between SS 321 and SS 347 through robot guided MIG welding process. The Weldments are subjected to intergranular Corrosion test as per ASTM A262 and studied. Particularly considering the applications in wide range such as chemical storage, exhaust manifolds of automobiles and aircraft, where the surfaces are subjected to corrosive environment is taken for investigation. The specimens were welded with two different electrode wires ER 321 and ER 347. The results found that at 140A welding current and with ER347 there are no intergranular cracks and fissures found. The ER 347 is found to be the best suited electrode when compared to ER321 for welding these dissimilar joints. © 2019 Elsevier Ltd.

Author keywords

Aerospace welding | Corrosion & robotic welding | MIG welding | SS 321 | SS 347

Indexed keywords

Engineering controlled terms: Alloy steel | Austenitic stainless steel | Corrosive effects | Gas metal arc welding | Gas welding | Inert gas welding | Steel corrosion | Weld decay | Welding electrodes | Welds

Materials Today: Proceedings

Volume 46, 2019, Pages 9207-9211

2019 International Mechanical Engineering Congress, IMEC 2019; National Institute of TechnologyTiruchirappalli; India; 29 November 2019 through 1 December 2019; Code 171966

Predicting tensile strength of filler added friction stir welded AA6082 and AA5052 dissimilar joint(Conference Paper)

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Abstract

Friction Stir Welding (FSW) process parameters and tool parameters are playing pivotal role in the weld joint characteristics. The combination is selected for the investigation of AA6082 and AA5052, which finds major application in ship structural frame and building constructions. Along with these usual parameters the composition of filler elements is considered in this work to improve the weld joint strength. The process parameters considered in this study are rotational speed, welding speed, shoulder penetration, filler holes center distance, and powder mixing ratio. The Central Composite Design (CCD), the most commonly used Response Surface Methodology (RSM) is considered to develop the prediction equation. A validation analysis is carried out and the results were compared with the relative impact of input parameters on tensile strength. The maximum tensile strength of fabricated joint was obtained with the process parameters combination of 1000 rpm rotational speed, 125 mm/min welding speed, 0.15 mm shoulder penetration, 2 mm filler holes center distance, and powder mixing ratio of 95% Mg and 5% Cr. © 2019 Elsevier Ltd.

Author keywords

Aluminium alloy | Friction stir welding | Powder mixing ratio | Response surface methodology | Tensile strength

Indexed keywords

Engineering controlled: Aluminum alloys | Fillers | Friction | Mixing | Research laboratories | Surface properties | Tensile strength | Welds

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Materials Today: Proceedings

Volume 48, 2019, Pages 155-159

2019 International Conference on Impacts of Innovations in Science and Technology for Societal Development: Materials Science, IISTSD 2019; Tamil Nadu; India; 19 September 2019 through 21 September 2019; Code 176044

Haze image restoration based on physical optics model using raspberry pi B+V1.2(Conference Paper)

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Abstract

Dehazing is still a challenging problem for the outdoor images. The occurrence of haze, fog, mist etc., reduce the visibility of captured images in the outdoor environment. There are several dehazing techniques proposed to resolve the haze in the outdoor images but the existing techniques suffers from the computational time complexity. For a real-time application time complexity plays a major role. As a part of real-time application haze removal is done using the raspberry pi b+v1.2. The hazy image is restored by taking dark channel with patch size of 11 x 11 to avoid the oversaturation of recovered scene radiance and halo effect. Getting the image size and channels, the image is flattened to get the top bright points. Then the image is padded at the ends with a square of side of the window to get the minimum comparision at the ends. Because the atmospheric light to be taken from the foreground as the background has almost same pixel values distributed. The intensity is found, from that maximum among these pixels are found and considered for atmospheric light. The transmission map is found, hazy image is restored. And the performance of modified approach is compared with paper perception oriented haze image restoration based on physical optics model. Hence, to give a better dehazing images with reduced computational time using raspberry pi b+v1.2.

Author keywords

Atmospheric light | Dark channel | Raspberry pi | Scene restoration | Transmission map

Indexed keywords

Engineering controlled terms: Demulsification | Image reconstruction | Light | Light transmission | Physical optics | Pixels

2:

Advances in Computerized Analysis in Clinical and Medical Imaging

1 January 2019, Pages 17-39

Independent Vector Analysis of Non-Negative Image Mixture Model for Clinical Image Separation (Book Chapter)

Sugumar, D., Vanathi, P.T., Gao, X.-Z., Ott, F.E., Vallavi, M.S.A.

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View additional affiliations

Abstract

Chest X-Ray (CXR) plays a significant role in the investigative imaging schemes for diagnosing chest diseases such as lung cancer, tuberculosis, pneumonia, and asthma. The lung nodules are overlaid with ribs in CXRs. Hence, lung nodules and bony structures need to be separated to increase the perceptibility of the infected area and analysis of chest diseases without much trouble. The purpose of this chapter is to separate hard bony structures and soft lung tissue in CXRs. To separate blindly the mixed source, independent component analysis is used for one-dimensional data, whereas independent vector analysis (IVA) is applied to multidimensional data. Therefore, to achieve the separation of bone image and lung image in the CXR, two-dimensional IVA is presented. The performance of IVA is compared with other reported blind image separation (BIS) technique for standard images, dual-energy CXR images as well as conventional CXR images. The IVA algorithm for the separation of dual-energy CXR is better and dynamic.

ISBN: 978-042982049-6;978-113833329-1
Source Type: Book
Original language: English

DOI: 10.1201/9780429446030-2
Document Type: Book Chapter
Publisher: CRC Press

International Research Journal of Multidisciplinary Technovation

Volume 1, Issue 3, 2019, Pages 65-72

IDENTIFICATION OF POWER SYSTEM DISTURBANCES USING WAVELET TRANSFORM(Article) (Open Access)

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Abstract

Electrical power system consists of three main structures which are generation, transmission and distribution system. If any disturbances occur in the system, it will affect the normal operating condition of the system. When a short circuit fault occurs in the system, the high fault current is produced and it will affect the overall reliability, power quality, protective devices in the system. In renewable integrated system, the fault will affect the overall interconnected system. Therefore fault identification plays a major role in power system.The objective is to identify the fault occurs in the system using wavelet.The fault identification requires fast and accurate analysis. The tripping action depends mainly on the voltage and current waveforms during the fault. Wavelet transform(WT) is a mathematical tool used for the analysis of the current waveform during faulty condition. The symmetrical and unsymmetrical faults are created and the fault current in the system is given to the wavelet transform. Energy values are extracted from wavelet transform and it used to identify the fault. The proposed methodology is verified by using MATLAB/simulink model.

Author keywords

symmetrical fault | unsymmetrical fault | wavelet transform(wt)

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ISSN: 25821040
Source Type: Journal
Original language: English

DOI: 10.34256/irjmt1938
Document Type: Article
Publisher: Asian Research Association

Evolutionary Mapping Techniques for Systolic Computing System (Book Chapter)

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Abstract

Systolic arrays are hardware structures built for fast and efficient operation of regular algorithms that perform the same task with different data at different time instants. Systolic arrays replace a pipeline structure with an array of processing elements that can be programmed to perform a common operation. Regularity, reconfigurability and scalability are some of the features of systolic design. Systolic architectures offer the competence to uphold the high-throughput capacity requirement. Multi-dimensional image processing algorithms, video streaming, nonlinear optimization problems and decision based algorithms are a few of many algorithms that are computationally demanding and can be benefited by implementing systolic arrays. To satisfy a highly held comparison parameter of computational efficiency, there exists a bottleneck of memory hierarchy. It is undeniable that hardware and software have to go hand in hand to remove the bottleneck and achieve better performance. Any regular algorithm such as matrix multiplication can be implemented in systolic architecture through mapping hardware computations to a space time transformation using a dependence graph. Systolic design methodology maps an N-dimensional dependence graph to a lower-dimensional systolic architecture using a transformation. Mapping is a process of assigning each point in iteration space a scheduled processing element for the operation at discrete time. Mapping can be done heuristically with high cost in accuracy and design time. Evolutionary algorithms act as an alternative solution for efficient search for mapping solutions. The evolutionary algorithms belong to non-traditional techniques which mimic the biological behavior of organisms to obtain the solution. They duplicate the nature of species evolution, group of ants, swarm of birds, school of fishes, groups of frogs, etc. The decision of choosing an evolutionary algorithm for the mapping process is based on its swift learning capabilities and less computation time compared to traditional random, exhaustive search procedures. Evolutionary algorithms start with a population of possible solutions and, through biological operators such as crossover, mutation, evolution based on social behavior and personal experience, the algorithm moves to a better solution. Differential evolution, bacterial foraging optimization, bees algorithm, genetic algorithm, particle swarm optimization, memetic algorithm, ant colony optimization, and shuffled frog leaping algorithm are some of the evolutionary algorithms, and a few of the listed processes are discussed in this chapter. This discussion is an accolade for an architecture that has been developed for the main reason of improving the hardware utilization efficiency, cost effectiveness and performance of iterative algorithms. Grey tone difference matrix generation in texture analysis [1] is taken as an example to prove the efficiency of systolic arrays that are mapped with evolutionary algorithms. Parameters for comparing the efficiency of the algorithms are the number of iterations for which there has been no improvement in the cost function, mapping matrices, average value of the cost function and processing time in achieving the desired result.

International Research Journal of Multidisciplinary Technovation

Volume 1, Issue 5, 2019, Pages 17-25

Integrated Dual Output Converter with Low Electric Stress on Components(Article)(Open Access)

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Abstract

In recent days there is a vast development in the field of power electronic converters. Necessity of multiple level of voltage demand is raised for single supply system. To meet different level of load demand single input and multiple output topologies (SIMO) are created. There are many such converters fall under SIMO converters. The Integrated Dual Output Converter (IDOC) is one among them. The IDOC is a DC-DC converter that performs boost and buck operations simultaneously with a single input. It is basically evolved from boost converter, replacing a single switch by couple of switches. Both the switches are connected in series not only to perform both buck and boost operation but also to provide continuous input current. Main advantage of IDOC over conventional boost and buck converter is the reduced number of switches. Comparisons among another six buck-boost converters and the proposed IDOC converter are presented. It is found that the proposed converter's voltage gain is smaller than the other converters' in step-down mode. Also, based upon the comparisons among the same kind and same number of components, the voltage and current stresses on the power switch of the proposed IDOC converter are less than or equal to those of the comparative converters, and the voltage stress on the charge pump capacitor and the switching device power rating of the proposed IDOC converter are always lower than those of other comparative converters. These advantages make component selection for the proposed converter much easier, and it can be used for industrial application. In order to check the behavior of the converter simulation is carried out in a MATLAB/SIMULINK. The simulation results validated the operation of the converter.

Author keywords

Conventional Boost converter | conventional buck converter | Integrated Dual Output Converter (IDOC) | Single Input Multi Output converter (SIMO)

Sustainable Waste Management: Policies and Case Studies: 7th IconSWM—ISWMAW 2017: Volume 1

1 January 2019, Pages 441-452

A Detailed Assessment on the Flow of Mobile Phones as E-Waste in Coimbatore District (Book Chapter)

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View additional affiliations

Abstract

The advancements in technology development have paved a way for the innovations in telecommunication field. The telephones had been recreated into pagers and then into mobile phones which reduced the size and increased the portability. This increased the obsolescence rate due to the planned obsolescence of the manufacturers. e-waste or the electronic waste has been the talk for the past decade due to their increased generation rate. Though various regulations have been passed in the year 2012 and 2016 for controlling the generation of e-waste nothing persist to the extent. The mushrooming mobile industries are the major criteria for the higher generation of e-waste. A study has been done to find out the flow of mobile phones which would become an e-waste in near future. Questionnaires have been designed and distributed to the reputed dealers/retailers and the list of authorised mobile brands was accounted. From the study, only 40% of the mobile brands prevalent in the city were authorised which includes the fast-moving brands like Oppo, Vivo and Xiaomi. The study revealed that many mobiles that have been sold during the great sale days have not been authorised which increases the e-waste generation (orphaned e-waste) and so stringent rules should be made in accordance with the authorisation of retailing mobile phones. This could help create awareness on the extended producer responsibility where the dealers/retailers would play a major part in reducing e-waste generation.

Author keywords

Coimbatore | E-waste | Inventory | Mobile phones | Questionnaire

Sustainable Waste Management: Policies and Case Studies: 7th IconSWM—ISWMAW 2017: Volume 1

1 January 2019, Pages 499-506

A Case Study on the Implementing Challenges of the E-waste Rules Collection Centre's Perspective in Coimbatore Region (Book Chapter)

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View additional affiliations

Abstract

Eight lakh tons of e-waste which have been generated in India play a significant role in the resource recovery which needs a serious attention in its collection, segregation and treatment for the environmentally sound management and disposal of e-waste. The initial step lies in the hands of consumers and bulk consumers. As per the e-waste rules, the e-waste generated should be transferred either to the producers in the name of extended producer responsibility (EPR) or it should be given to the collection centres in order to recycle it efficiently. The collection centres should follow the rules given by the Central Pollution Control Board (CPCB). From the earlier in-depth literature study, in Coimbatore region, collection centres were in need of transferring the e-waste generated to the recyclers. But there are various problems for the collection centres to prosper in it. An attempt has been made to find out the difficulties of the collection of e-waste from the consumers and bulk consumers, and various difficulties faced in transferring the e-waste to the authorised recyclers. © Springer Nature Singapore Pte Ltd. 2020.

Author keywords

Collection centre | E-waste rules | Extended producer responsibility | Recyclers | Recycling of e-waste

International Research Journal of Multidisciplinary Technovation

Volume 1, Issue 3, 2019, Pages 16-27

ESTIMATION OF PV MODULE PARAMETERS USING GENERALIZED HOPFIELD NEURAL NETWORK(Article)(Open Access)

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Abstract

The estimation of solar photovoltaic (PV) system with help of electrical model parameters, such as photon generated current, the diode saturation current, series resistance, shunt resistance, and diode ideality factor, are desirable to predict the real performance characteristics of solar PV under varying environmental conditions. Finally, performance indices, such as PV characteristics curve are estimated for the various solar PV panels using GHNN optimization technique. © 2019, Asian Research Association. All rights reserved.

Author keywords

Generalized Hopfield Neural Network (GHNN) | Photovoltaic (PV)

ISSN: 25821040
Source Type: Journal
Original language: English

DOI: 10.34256/irjmt1933
Document Type: Article
Publisher: Asian Research Association

Dharmarajan, R.; Department of Electrical and Electronics Engineering, Government College of Technology, TN, Coimbatore, India;

Proceedings - 17th IEEE International Conference on Machine Learning and Applications, ICMLA 2018

15 January 2019, Article number 8614201, Pages 1081-1086

17th IEEE International Conference on Machine Learning and Applications, ICMLA 2018; Orlando; United States; 17 December 2018 through 20 December 2018; Category numberCFP18592-USB; Code 144456

Two-Stage Machine Learning Framework for Simultaneous Forecasting of Price-Load in the Smart Grid(Conference Paper)

Victoire, A.A.T., Gobu, B., Jaikumar, S., Arulmozhi, N., Kanimozhi, P., Victoire, A.T.

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View additional affiliations

Abstract

In this paper, the electricity load and price patterns of consumers are forecasted using a two-stage forecasting framework. The electricity usage statistics of the consumers are recorded through smart meters and based on the historical load and price patterns the proposed model forecasts the future loads and prices used for further bidding purposes. A hybrid two stage forecasting framework combining the variational mode decomposition (VMD) method, echo state neural network (ESNN) and differential evolution (DE) algorithm is proposed. The training of the hybrid forecasting framework is done by decomposing the load and price time-series data using the VMD. The decomposed data are then used for training the ESNN. Differential evolution algorithm is used to tune the ESNN. Initially, the price and load data are used separately to train the ESNN, and in the second stage, both the data are used along with the forecasted output of the previous stage are used to train the ESNN. The proposed forecasting framework is experimented on 3 smart gird data derived from Smart Meter Energy Consumption Data in London Households of UK Power Networks (UKPN), for demonstration purpose. © 2018 IEEE.

Author keywords

Differential evolution | Echo state neural network | Smart grid | Variational mode decomposition

Indexed keywords

Environmental Science and Pollution Research

Volume 26, Issue 3, 30 January 2019, Pages 3075-3090

Oxidation stability of yeast biodiesel using Rancimat analysis: validation using infrared spectroscopy and gas chromatography–mass spectrometry(Article)

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Abstract

Biodiesel and single cell oils obtained from oleaginous yeasts grown in industrial waste are attractive alternatives to the conventional fuels. However, there are only few articles dealing with the stability of the microbial biofuels. Hence, this study aimed at characterizing the storage time of biodiesels using Rancimat methods. The microbial oil and the biodiesel obtained from microbial oil have been characterized with storage stability due to various oxidizing and thermal damage. Here, the microbial fuels were subject to Rancimat analysis and found to have high thermal-oxidative stability of 18 and 8.78 h for biodiesel and oil, respectively. The storage stability resulting from storage conditions was extrapolated for biodiesel and oil and has been found to be 1.62 and 0.54 years, respectively. The infrared spectroscopic analysis reveals the degree of oxidation found after the induction time was reached and shows the characteristic peaks for degradation products. Gas chromatography revealed the compounds that were responsible for the stability as well as the amount of degradation products left. © 2018, Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Fourier-transform infrared spectroscopy | Gas chromatography–mass spectrometry | Induction time | Microbial biodiesel | Storage stability | Thermal oxidative stability

Indexed keywords

GEOBASE Subject Index: biofuel | degradation | diesel | FTIR spectroscopy | fuel | gas chromatography | industrial waste | mass spectrometry | oil | oxidation | storage | yeast

Simulation

Volume 95, Issue 2, 1 February 2019, Pages 99-116

Abstraction, ensemble, and disaggregation approaches to estimate evapotranspiration for use in hydrologic models(Article)

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Abstract

Evapotranspiration (ET) is the most dominant hydrologic process in water balance, yet it is difficult to measure in a watershed. This feature of ET has resulted in the development of many ET equations to estimate ET indirectly. While developing the Watershed Processes Simulation (WAPROS) model, the need for incorporating a good ET procedure is keenly felt, as the main objective is to simulate water balance of the watershed. Among many alternatives, ensemble estimate procedure is selected, for which six ET equations have been chosen. As the input data requirement for ET equations are highly demanding, the ET equations have been modified to dispense with some unimportant data, retaining the validity of the estimate. The details of selected ET equations and the method of ensemble are discussed. The method of disaggregation of potential ET into potential evaporation and potential transpiration has been discussed. As the WAPROS model has been planned as an hourly simulation model, the method of disaggregation of daily ET data into hourly ET data also assumed more importance. In this model, hourly distribution of potential values has been disaggregated into 24 hours for evaporation and 12 hours (daylight) for transpiration. As measured data for actual ET are not available, simulated ET data cannot be compared directly. It requires comprehensive sensitivity analysis of ET equations and estimate of the ensemble method. The sensitivities of ET and hydrologic processes to changes in air temperature are also incorporated. New metrics to aid in sensitivity analysis have been introduced to capture the quantum of changes. © The Author(s) 2018.

Author keywords

disaggregation | ensemble approach | evaporation | Evapotranspiration | model abstraction | sensitivity analysis | transpiration

Indexed keywords

Advances in Structural Engineering

Volume 22, Issue 3, 1 February 2019, Pages 641-655

Lateral-torsional buckling capacity of Hybrid Double-I-Box Beams: A numerical approach(Article)

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Abstract

In this article, a parametric study on the lateral-torsional buckling performance of thin-walled cold-formed steel Hybrid Double-I-Box Beams through numerical analyses has been presented. These built-up beams have distinctive cross-section geometry; the presence of more section modulus at the flanges provides high resistance to flexural bending and the closed-box portion offers high stiffness to resist torsion and lateral buckling. Therefore, these beams can be used for longer spans. The nonlinear finite element analysis was performed using ABAQUS software. All the beams were modelled as ideal finite element models adopting simply supported boundary conditions and loads were applied as end moments. To acquire a large number of data, three varying parameters were considered namely, hybrid parameter ratio, that is, yield strength of flange steel to web steel (1.0, 1.3, 1.5 and 1.7); ratio of breadth to depth of the beam (4/6, 5/6, 6/6 and 7/6); and length of the beam (1.0, 2.5, 5.0, 10, 15, 20, 30, 40, 50 and 60 in m). The thickness of both the flanges and the webs were 2.5 mm. All these parameters alter the overall slenderness of the members. It is shown that at larger spans, Hybrid Double-I-Box Beams experience lateral buckling. The results obtained from the numerical studies were plotted on nondimensional moment versus nondimensional slenderness graph. These results were compared with the predictions using effective width method design rules specified in Euro codes EN 3-1-3 and buckling curve-d of EN 3-1-1, which was originally adopted lateral-torsional buckling capacities of hot-rolled steel 'I' sections, and the adequacy is checked. It was found that Hybrid Double-I-Box Beams has higher lateral-torsional buckling capacity than common 'I' or box sections. Hence, a new simplified design equation was proposed for determining lateral-torsional buckling capacity of Hybrid Double-I-Box Beams. © The Author(s) 2018.

Author keywords

effective width method | flexural bending | ideal finite element models | lateral-torsional buckling | nondimensional moment | nondimensional slenderness

Indexed keywords

Dataset on the assessment of water quality of surface water in Kalingarayan Canal for heavy metal pollution, Tamil Nadu(Data Paper)(Open Access)

Mohanakavitha, T., Divahar, R., Meenambal, T., Shankar, K., Rawat, V.S., Haile, T.D., Gadafa, C.

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Abstract

This data article aimed to investigate the quality of surface water in Kalingarayan Canal for heavy metal pollution, Tamil Nadu. Eight heavy metals like Fe, Cu, Mn, Cr, Zn, Cd, Pb, and Ni were analyzed in the water, for a period of three years, spanning the time frame between January 2014 to December 2016. Eight stations were selected along the Kalingarayan Canal, and water samples were collected on a monthly basis from these stations. The pH of the samples was in the alkaline state (6.88–8.90), whereas conductance was in the range of 394–4276 μs/cm. The average concentration of heavy metals in the surface water ranges from 0.040 to 10.75, 0.030 to 0.890, 0.02 to 0.91, 0.00 to 1.96, 0.00 to 0.01, 0.00 to 0.053, 0.01 to 0.12 and 0.110 to 3.40 mg/L for the metals Fe, Mn, Zn, Cu, Cd, Ni, Pb and Cr respectively. The dominance of various heavy metals in the surface water follows the sequence: Fe > Cr > Cu > Zn > Mn > Pb > Ni > Cd respectively. The canal is affected by anthropogenic activities and industrialization in terms of heavy metals. © 2019

Author keywords

Anthropogenic activities | Heavy metals | Surface water | Water-quality

Indexed keywords

Engineering controlled terms:	Alkalinity, Hydraulic structures, River pollution, Surface waters, Water quality
Engineering uncontrolled terms	Alkalines, Anthropogenic activity, Assessment of water qualities, Average concentration, Heavy metals pollution, Industrialisation, Tamil Nadu, Time frame, Water samples
Engineering main heading:	Heavy metals

Journal of Scientific and Industrial Research

Volume 78, Issue 2, February 2019, Pages 96-101

Study on performance of wind mill by adding winglet in turbine blade: Virtual analysis(Article)

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Abstract

This research paper discusses the performance evaluation of wind mill by attaching winglet in turbine blade. Five winglet parameters namely winglet height, curvature radius, cant angle, sweep angle and twist angle are considered in this analysis, to get hold of how these parameters have influenced on lift coefficient and drag coefficient. Fifteen combinations of winglet model were modeled in Solid works and virtual analyses were carried out to identify the best winglet model that yield higher power output in the wind mill. Aerodynamic analysis was also carried out to study the performance of winglet at the tip of the rotor blade to account for the fluid forces with blades comprising different winglet configurations. The numerical investigation revealed that by adding a winglet to the base line turbine blade increases the co-efficient of lift by 2.3% resulting 2% to 3% rise in power output, and the reductions in vortex formation at tip of the blade in the total drag by 10.4%. From the analysis results, it is found that the sweep angle, cant angle and twist angle have influenced the windmill performance to extent of 2% increase, the coefficient of lift and 6% decrease in the coefficient of drag. © 2020 Phcogj.Com.

Author keywords

Drag co-efficient | Lift co-efficient | Turbine blade | Wind mill | Winglet

Indexed keywords

GEOBASE Subject Index:	drag coefficient, numerical model, performance assessment, polar vortex, virtual reality, vortex, wind turbine

Funding details

Journal of Molecular Structure

Volume 1177, 5 February 2019, Pages 485-490

Effect of temperature on gas sensing properties of lithium (Li) substituted ($NiFe_2O_4$) nickel ferrite thin film(Article)

Manikandan, V., Kim, J.-H., Mirzaei, A., Kim, S.S., Vigneselvan, S., Singh, M., Chandrasekaran, J.

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View additional affiliations

Abstract

In particular, less attention has been paid to lithium substituted nickel ferrite thin films for gas sensing studies. In this work, lithium substituted nickel ferrite thin film was prepared by chemical co-precipitation method. The Rietveld refinement X-ray diffraction (XRD) analysis provides all reflection planes of lithium substituted nickel ferrite thin film and reveals well formation. Scanning electron microscopy (SEM) reports the surface of thin film has needle structure particles and X-ray photoelectron spectroscopy (XPS) depicts the presence of all necessary elements. Brunauer-Emmett-Teller (BET) analysis provides adsorption and desorption rate of sensor film. UV–Vis absorption spectroscopy shows that the film has absorption peak which is in visible region. Transmission electron microscopy (TEM) presents rod structure nanoparticles with huge space and confirms the formation of lithium substituted nickel ferrite thin film from selected area electron diffraction (SAED) pattern. Hydrogen gas sensing tests shows that the optimal sensing temperature was 200 °C and sensor produces 95% reproducibility. © 2018 Elsevier B.V.

Author keywords

Ferrites, Hydrogen gas, Surface morphology, Thin film

Indexed keywords

Engineering controlled terms: Absorption spectroscopy, Chemical detection, Electron diffraction, Ferrite, Gas detectors, High resolution transmission electron microscopy, Iron compounds, Lithium, Lithium compounds, Nickel

Environmental Science and Pollution Research

Volume 26, Issue 4, 8 February 2019, Pages 3436-3446

Experimental investigation on engine characteristics fueled with waste HDPE oil and study on NO_x emission variation using thermal imager(Article)

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Abstract

For heavy duty applications like power generation and transportation, the best option is the compression ignition engines, but the major concerns are the rising prices and environmental issues due to the rapid depleting sources of conventional fossil fuels. The present investigation is to study the performance and emission characteristics of a single cylinder four-stroke, air-cooled direct injection diesel engine runs with an alternate fuel as waste high density polyethylene plastic oil (HDPE) obtained by catalytic pyrolysis. At constant speed, test fuels have been experimented successfully to determine the engine performance such as brake thermal efficiency, brake specific energy consumption, and exhaust gas emissions such as carbon monoxide, carbon dioxide, oxides of nitrogen, and unburned hydrocarbons. The result shows that the brake thermal efficiency is lower at all load conditions when compared to diesel fuel whereas the brake specific energy consumption decreases with increase in engine load and increases with increase in waste plastic oil blend ratio. CO emission increases and NO_x emission level decreases with enhancement in engine load whereas the NO_x emission and CO emission augments with increase in waste plastic oil blend percentage. But in case of NO_x emission increase in concentration of waste plastic oil with diesel leads to raise in emission level. By using thermal imager, the link between in-cylinder temperature and NO_x emission has been fixed. With the help of this course of action, it has been observed that in-cylinder temperature plays the major role in NO_x concentration. © 2018, Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Diesel engine, Emission, Performance, Thermal imager, Waste plastic oil

Indexed keywords

Cluster Computing

Volume 22, 1 March 2019, Pages 4421-4430

High resolution DPWM clustered architecture for digitally controlled DC–DC converter using FPGA(Article)

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Abstract

Several researches have been done in literature to improve the resolution of pulse mode architectures used for controlling the DC–DC converters. Resolution can be measured as the number of bits used for representing the duty cycle control input [1]. Higher the resolution of control inputs more precisely the changes in output voltage with DC–DC converter can be addressed [2]. Traditional architectures implemented with counter and other delay line structure occupies large area and also has less throughput with an increase in number of control inputs. But the DC–DC converters used in portable and mobile based applications must be compact and consumes low power [3]. This proposed DPWM architecture uses Block RAM available in FPGA to store the binary bit patterns to derive variable duty cycle pulses [4]. The architecture is proposed for three different control inputs like four bit, three bit and two bit control inputs. This proposed architecture for a four bit control input can address 4096 bit patterns and has maximum operating clock frequency of 306.84 megahertz (MHz).

Author keywords

BRAM, DPWM, FPGA, Resolution, Switching converters

Indexed keywords

Engineering controlled terms: Computer networks, Optical resolving power, Software engineering

Engineering uncontrolled terms: BRAM, Clustered architectures, Digitally controlled, DPWM, High resolution DPWM, Proposed architectures

Cluster Computing

Volume 22, 1 March 2019, Pages 3737-3747

Shape adaptive DCT compression for high quality surveillance using wireless sensor networks(Article)

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Abstract

Wireless surveillance networks consists of numerous camera and sensor node to transmit the surveillance details from a remote location to the user nodes. Large amount of information transmitted via the sensor nodes are non-priority information like the background which never changes throughout the surveillance time. This non priority information requires more space and is of no use in transmitting so this information can be compressed to the maximum level without affecting the quality of the image transmitted. For efficient transmission of the input data it is important that only Region of Interest (ROI) is transmitted with lower compression ratio and the non ROI regions to be compressed as much as possible. In this proposed work a shape adaptive DCT compression and Decompression scheme is proposed for efficient image data transmission over the wireless sensor networks. The frames from the surveillance sensor networks are acquired and the ROI is calculated using dynamic saliency maps. The image is then divided into two parts, the transmitting node performs the shape adaptive DCT on the image and transmits the image to the user node where the decompression is done using the inverse shape adaptive DCT. The performance of the proposed algorithm is tested on the set of video images and performance is tabulated for the quality of image and current consumption when the compressed image is transmitted by sender ENTDEV019 ESP 8266 WiFi MCU node and received by receiver ENTDEV019 ESP 8266 WiFi node.

Author keywords

DCT (direct cosine transform), IDCT (inverse direct cosine transform), PSADCT (pseudo shape adaptive DCT), SA DCT (shape adaptive DCT)

Indexed keywords

Microchemical Journal

Volume 145, March 2019, Pages 578-587

Green synthesis of ZnO nanoparticles using Tecoma castanifolia leaf extract: Characterization and evaluation of its antioxidant, bactericidal and anticancer activities(Article)

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Abstract

An efficient, facile and green synthesis of zinc oxide nanoparticles (ZnO NPs) using Tecoma castanifolia leaf extract was reported. ZnO NPs was characterized by UV–Vis spectroscopy, TEM, EDX, XRD and FTIR. Phytochemical constituents of T. castanifolia leaf extract were analyzed by GC–MS. UV–Vis absorption showed SPR band at 370–400 nm which confirms the formation of ZnO NPs. TEM analysis exhibits spherical shape with size 70–75 nm and XRD results revealed the hexagonal phase of wurtzite structure. FTIR spectra confirmed the presence of O–H, C–H, amide-I, II groups, C–O bond and metal-oxygen groups. The presence of bioactive phytochemical constituents in the methanolic extracts of T. castanifolia was identified by GC–MS. An excellent antibacterial activity was observed for both Gram positive and Gram negative bacteria. Results of antioxidant activity showed that increase in concentration of ZnO nanoparticles increases the radical scavenging activity. Anticancer activity with IC_{50} value as 65 μg/mL which conferred better cytotoxic effects of ZnO NPs on proliferation of A549 cell line. The present study revealed that the pharmacologically active compounds present in the green synthesized ZnO nanoparticles pave the way to lead its effective application in biomedical and nano-drug delivery systems.

Author keywords

Antibacterial | Anticancer | Antioxidant | Green synthesis | Tecoma castanifolia | Zinc oxide nanoparticles

ISSN: 0026265X DOI: 10.1016/j.microc.2018.11.022

Microchemical Journal

Volume 145, March 2019, Pages 791-800

Simultaneous removal of binary dye from textile effluent using cobalt ferrite-alginate nanocomposite: Performance and mechanism(Article)

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Abstract

The rapid removal of dye effluent containing two or more dyes is in demand due to its significant environmental issues. The present communication deals with the simultaneous adsorption of Reactive red 195 (RR195) and Reactive yellow 145 (RY145) from a textile dye effluent in a binary component system. Cobalt ferrite-alginate nanocomposite synthesized by ex-situ polymerization was employed as an adsorbent for the removal of binary dye effluent. The first order derivative spectrophotometric method was applied for the simultaneous quantification of RR195 and RY145 in binary solutions. The binary adsorption equilibrium could be achieved within 60 min, and the adsorption process followed pseudo second order kinetics. The removal efficiency could be maintained in a wide pH range of 3–6. The presence of amine, hydroxyl, carbonate and ferrite groups on the adsorbent surface played a vital role in the removal of RR195 and RY145 from their binary mixture. The continuous adsorption experiments revealed that the breakthrough time and exhaustion time increases with an increase in the bed height. The experimental results present new sustainable, cost effective biocompatible nanocomposite as a potential adsorbent for the removal of real-time dye effluent. Moreover, it is magnetically separable and reusable. The cobalt ferrite-alginate as a sole nanocomposite is capable of eliminating the whole dye content from a mixture and serves as a better solution for effective water remediation.

Author keywords

Binary dye adsorption | Cobalt ferrite-alginate | Column modelling | Fixed bed system | Nanocomposite

International Journal of Biological Macromolecules

Volume 124, 1 March 2019, Pages 750-758

Pectin extraction from Helianthus annuus (sunflower) heads using RSM and ANN modelling by a genetic algorithm approach(Article)

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View additional affiliations

Abstract

In this work, Response Surface Methodology (RSM) and Artificial Neural Network coupled with genetic algorithm (ANN-GA) have been used to develop a model and optimise the conditions for the extraction of pectin from sunflower heads. Input parameters were extraction time (10–20 min), temperature (40–60 °C), frequency (30–60 Hz), solid/liquid ratio (S/L) (1:20–1:40 g/mL) while pectin yield (PY%) was the output. Results showed that ANN-GA had a higher prediction efficiency than RSM. Using ANN as the fitness function, a maximum pectin yield of 29.1 ± 0.07% was searched by genetic algorithm at the time of 10 min, temperature of 59.9 °C, frequency of 30 Hz, and solid liquid ratio of 1:29.9 g/mL while the experimental value was found to be 29.5 ± 0.7%. Extracted pectin was characterised by FTIR and ^{13}C NMR. Thus, ANN coupled GA has proved to be the effective method for the optimization of process parameters for pectin extraction from sunflower heads. © 2018 Elsevier B.V.

Author keywords

Helianthus annuus (sunflower) | Pectin | Response surface methodology

Indexed keywords

EMTREE drug terms: pectin | pectin | plant extract

Microchemical Journal

Volume 145, March 2019, Pages 1162-1168

Transesterification of castor oil for biodiesel production: Process optimization and characterization(Article)

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Abstract

In the present study, batch scale biodiesel production was carried out using castor oil by alkali-catalyzed transesterification process was reported. Initially, the transesterification parameters like reaction time, catalyst concentration, reaction temperature and oil: methanol molar ratio on biodiesel production was optimized by conventional method followed by statistical based central composite design method. According to the optimized experimental results, the maximum of 94.9% FAME yield was obtained at 60 °C with 1.25% (w/v) KOH catalyst and 1:12 oil: methanol molar ratio for 60 min of reaction, which was in agreement with the predicted yield (93.7%). The purification of crude biodiesel was performed by simple evaporation and silica gel adsorption. The quality of fatty acid methyl ester was examined by Fourier Transform Infrared spectroscopy (FT-IR), Thin layer chromatography (TLC) and Gas Chromatography–Mass Spectrometry (GC–MS). The analytical results showed that significant quantity of methyl ester groups like ricinoleic, linolenic, palmitic acid and oleic acid were present in the biodiesel. © 2018 Elsevier B.V.

Author keywords

Biodiesel | Castor oil | GC–MS | RSM | Transesterification

ISSN: 0026265X
CODEN: MICJA

DOI: 10.1016/j.microc.2018.12.039
Document Type: Article

Indian Journal of Chemical Technology

Volume 26, Issue 2, March 2019, Pages 122-130

Stable and microcrystalline Ce-Fe Bi-metal oxide nano particles: Synthesis, characterization and fluoride adsorption performance in drinking water(Article)

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Abstract

The cerium-iron bi-metal oxide nano particles have been prepared as an adsorbent for the removal of fluoride from drinking water. The incorporated cerium ion into iron oxide is characterized using transition electron micrograph (TEM), X-ray diffraction (XRD) and Fourier transform infrared spectroscopy (FTIR), and morphologically observed by scanning electron microscope (SEM), energy dispersive X-ray (EDX) and Brunauer-Emmet-Teller surface area analyzer (BET). The effects of various factors such as solution pH, adsorbent dosage, equilibration time, initial fluoride ion concentration, water solubility and zero point charge have been investigated. The results show that the adsorbent removed about 98% of fluoride from drinking water at both acid and basic pH range, and the nano particles have extremely small size, high surface area, greater stability and microcrystalline nature. The experimental results suggest that this nano-adsorbent is promising for treating fluoride contaminated water.

Author keywords

Adsorption | Bi-metal oxide | Co-precipitation | Fluoride | Nano particles

Funding details

Funding text

The authors thank the partial financial support from TEQIP Phase II and members of the Department of Chemistry, Government College of Technology, Coimbatore, and we acknowledge the technical support of SAIF-IITM for SEM analysis, PSG Institute of Advance Science and Research for TEM analysis, DRDO-Bharathiyar University Center for Life Sciences for XRD and FTIR analysis and Bangalore Institute of Technology for BET

2019 5th International Conference on Advanced Computing and Communication Systems, ICACCS 2019

1 March 2019, Article number 8728528, Pages 855-857

5th International Conference on Advanced Computing and Communication Systems, ICACCS 2019; Coimbatore; India; 15 March 2019 through 16 March 2019; Category numberCFP19YAF-ART; Code 148637

Implementation of Distributed Arithmetic based Sum-of-Products(RETRACTED)

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Update notice

Retraction: Implementation of Distributed Arithmetic based Sum-of-Products (2019 5th International Conference on Advanced Computing and Communication Systems, ICACCS 2019 (2019) (855-857) DOI: 10.1109/ICACCS.2019.8728528)
(2019) 2019 5th International Conference on Advanced Computing and Communication Systems, ICACCS 2019, 2019-January

Abstract

This paper deals with approximate Sum-of-Products (SOP) models and its application in linear convolution. SOP unit finds its application in many DSP applications like convolution and design of filters. In this brief, three Approximate Sum-of-Products (ASOP) models have achieved comparable improvements in area and power. SOP units use the concept of distributed arithmetic to find the vector products without the use of multipliers. Performance is justified by using the distributed arithmetic model for linear convolution of input vectors. The approximate models have achieved significant improvements in area power parameters.

Author keywords

Convolution | Distributed arithmetic | Lookup tables. | Sum of products (SOP)

Indexed keywords

2019 5th International Conference on Advanced Computing and Communication Systems, ICACCS 2019

March 2019, Article number 8728390, Pages 947-953

5th International Conference on Advanced Computing and Communication Systems, ICACCS 2019; Coimbatore; India; 15 March 2019 through 16 March 2019; Category numberCFP19YAF-ART; Code 148637

A Comparative Study on Image Registration Techniques for SAR Images(Conference Paper)

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Abstract

High resolution Synthetic Aperture Radar (SAR) images are extensively employed in many applications like object tracking, object detection, image fusion, image mosaicing. Image registration is mandatory process for all these applications. To register SAR images, feature based registration methods have been successfully deployed in recent years. State of art detectors like Harris Corner, SIFT, SURF, BRIEF, ORB, etc. have been applied to align SAR images. Among all feature detectors, SIFT and SURF algorithm proved to give better solutions for the SAR image registration problem due to its invariance and robustness. So in this paper, the attempt is made to give a detailed survey of SIFT and SURF based SAR image alignment. © 2019 IEEE.

Author keywords

Feature descriptors | Feature Matching. | Image registration | SIFT | SURF | Synthetic aperture radar (SAR)

Indexed keywords

Engineering controlled terms: Edge detection | Feature extraction | Image fusion | Image registration | Object detection | Synthetic aperture radar

Engineering uncontrolled terms: Feature based registration | Feature descriptors | Feature matching | High resolution synthetic aperture radar images | Image registration techniques | Registration problems | SIFT | SURF

2019 5th International Conference on Advanced Computing and Communication Systems, ICACCS 2019

March 2019, Article number 8728436, Pages 1083-1088

5th International Conference on Advanced Computing and Communication Systems, ICACCS 2019; Coimbatore; India; 15 March 2019 through 16 March 2019; Category numberCFP19YAF-ART; Code 148637

Efficient Utilization of Renewable Energy Employing SEPIC Converter for Standalone Solar PV System(Conference Paper)

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Abstract

this paper an Efficient Utilization of Renewable Energy means the power generated from natural also called Renewable Energy Sources is utilized in instant at generation or stored properly in to the energy storage unit. This can be performed by designing power management unit for various conditions; this power can be managed between Solar PV system, Standalone DC load and Energy Storage unit. Employing SEPIC (Single Ended Primary Inductance Converter) as Power Modulator unit, which can modulates or convert the parameters related to the Power. In order to maintain standalone DC load with solar PV system is considered as renewable energy source employing SEPIC converter and with Better Power conditioning unit for renewable source. Here Perturb Observe Maximum Power Point Tracking system (PO-MPPT) Algorithm is developed for Power Conditioning Unit. © 2019 IEEE.

Author keywords

DC-DC power Modulation | Energy storage unit | Solar PV | Standalone DC load

Indexed keywords

Engineering controlled terms: DC-DC converters | Energy storage | Maximum power point trackers | Natural resources

2019 5th International Conference on Advanced Computing and Communication Systems, ICACCS 2019

March 2019, Article number 8728486, Pages 849-854

5th International Conference on Advanced Computing and Communication Systems, ICACCS 2019; Coimbatore; India; 15 March 2019 through 16 March 2019; Category numberCFP19YAF-ART; Code 148637

Hardware Designs for Histogram of Oriented Gradients in Pedestrian Detection: A Survey(Conference Paper)

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Abstract

Feature detection, narrowed down to pedestrian detection, is an imperative domain where automated applications such as Automatic Driver Support Systems, Robotics and similar image vision and machine vision technologies. Histogram of Oriented Gradients (HOG) is a robust, scalable and efficient feature extraction method that works on luminance gradients among neighboring pixels. The extracted feature is normalized and classified through support vector machines (SVM). Improvements in the design through approximate computations, parallelism and pipelining applied to SVM classification and histogram generation, Parallel implementation of entire HOG and exploration of possible applications of the algorithm. This paper cites the software improvements of HOG and hardware implementations targeted on FPGA for variations of HOG. © 2019 IEEE.

Author keywords

Feature detection | FPGA implementation | Histogram of Oriented gradients | Resolution of images and frame rate

Indexed keywords

Engineering controlled terms: Automobile drivers | Field programmable gate arrays (FPGA) | Graphic methods | Support vector machines

Engineering uncontrolled terms: Feature detection | Feature extraction methods | FPGA implementations | Frame rate | Histogram of oriented gradients

2019 5th International Conference on Advanced Computing and Communication Systems, ICACCS 2019

March 2019, Article number 8728507, Pages 390-394

5th International Conference on Advanced Computing and Communication Systems, ICACCS 2019; Coimbatore; India; 15 March 2019 through 16 March 2019; Category numberCFP19YAF-ART; Code 148637

Accident Alert System Application Using a Privacy-Preserving Blockchain-Based Incentive Mechanism(Conference Paper)

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Abstract

In this era of rapid growth of vehicles, the ratio of road accident increases day by day. Nowadays, Traffic incidents are persistent problems in both developed and developing countries which result in huge loss of life and property. No one in this world is ready to gaze what's happening around them. Nobody cares even when an accident occurs. This paper provides an innovative solution by developing an Accident Alert Message System using an Android Smartphone Application that can be used from the accident zone. The application uses GPS technology for location mapping and sends an alert and notification of an accident. The generated accident alert message is endorsed by the nearby registered users who also witness the accident to ensure the increased reputation of the message. Based on the endorsement of the message, the system will instantly transmit the location of the accident to the nearby emergency services. In this case, users usually lack the enthusiasm to generate or endorse alert messages because they might fear that their privacy will be breached. At the same time, users do not benefit from generating or endorsing alert messages which also makes them lack the enthusiasm or motivation to respond to messages. In order to provide a solution to resolve these issues, this paper presents a novel privacy-preserving Blockchain - Based Incentive Mechanism for Accident Alert Message System. The main objective of the paper is to encourage the users to generate and endorse accident alert messages from the accident zone without revealing the user's identity. Also, some incentives to the users are paid to the message generators and endorsers and the transactions get stored based on the Blockchain technology; hence the privacy of the user is preserved. Our proposed system ensures the reliability of alert messages without revealing the privacy of the user and is reliable and efficient in the non-fully-trusted environment. © 2019 IEEE.

Indian Journal of Ecology

Volume 46, Issue 1, March 2019, Pages 49-54

Assessment of water quality of surface water in kalingarayan canal for heavy metal pollution, Tamil nadu(Article)

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Abstract

Kalingarayan canal is one of the leading oldest canal in Erode district. Many industries are located along stretch of the canal and dumping most of the solids waste into the canal water. For the investigation, samples were collected from the above canal for analysing parameters like pH, EC, Fe, Cu, Mn, Cr, Zn, Cd, Pb and Ni for two years 2015 and 2016. The pH of the samples were in the alkaline state (7.2 to 7.89), whereas conductance was in the range of 529-2687 µs/cm. The average concentration of heavy metals in the surface water range from 0.045-8.530, 0.040-0.710, 0.023-0.723, 0.002-1.557, 0.001-0.009, 0.002-0.053, 0.009-0.097 and 0.140-2.698 mg/L for the metals Fe, Mn, Zn, Cu, Cd, Ni, Pb and Cr respectively. Heavy metal concentrations except Cd and Zn exceeds limit in all analysed samples in accordance with two standards, Bureau of Indian Standards and WHO. The dominance of various heavy metals in the surface water is follows the sequence: Fe > Cr > Cu > Zn > Mn > Pb > Ni> Cd. The results revealed that there was negatively correlation of Cd with all the variables. Mn is positively and significantly correlated (at 0.05 level) in summer season with all the other studied parameters. This study revealed that quality of water in the canal is affected by anthropogenic activities and industrialization. © 2019 Ecological Society of India.

Author keywords

Bis | Correlation | Solid waste | Surface water | Water quality | Who

ISSN: 03045250 Document Type: Article

Chemical Engineering Communications

Volume 206, Issue 3, 4 March 2019, Pages 409-418

Kinetic and thermodynamic studies on the extraction of bio oil from Chlorella vulgaris and the subsequent biodiesel production(Article)

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Abstract

This research article investigates the extraction of bio-oil from Chlorella vulgaris algae which is then subjected to biodiesel production. To evaluate the maximum oil content, four different pretreatment methods and solvent systems were inspected. Among them, maximum oil yield was obtained from ultrasonic pretreated biomass followed by methanol and methyl tertiary butyl ether solvent extraction. Physico-chemical properties of the bio-oil were analyzed as per AOAC Official Methods. The experiments were then designed to determine how variation in different process parameters influences extraction. From these results, kinetic and thermodynamic parameters were also analyzed. The positive values of ΔS and ΔH and the negative value of ΔG indicate that this process is endothermic, irreversible and spontaneous, respectively. The extracted bio-oil was then subjected to acid catalyzed reaction for biodiesel production. A yield of 98.2 wt% biodiesel was obtained at the optimized condition. Fuel properties were analyzed as per ASTM methods. © 2018, © 2018 Taylor & Francis.

Author keywords

bio-oil | Biodiesel | extraction | kinetics | microalgae | thermodynamics

Indexed keywords

Engineering controlled terms: Algae | Chemical analysis | Enzyme kinetics | Extraction | Kinetics | Organic solvents | Solvent extraction | Thermodynamics

Materials Research Express

Volume 6, Issue 6, 6 March 2019, Article number 066502

Two body abrasive wear characteristics of Al7068/Si_3N_4/BN hybrid composite(Article)

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Abstract

The present study emphasises the mechanical and tribological characteristics of stir cast Al7068/Si_3N_4/BN hybrid metal matrix composite. The composites were prepared at various weight percentages of Si_3N_4 and BN and their mechanical properties were evaluated. The composite with maximum tensile strength of 238.7 MPa was obtained for 10% Si_3N_4 and 5%BN. The abrasive wear test was conducted to evaluate wear rate of composites using pin-on-disc apparatus by varying abrasive grit size, load, sliding velocity and sliding distance. The Taguchi L27 orthogonal array was used to design the experiments and analyse the effect of process parameters. The ANOVA test revealed that the wear rate is highly influenced by mass fraction of Si_3N_4 and grit size of abrasives. The worn out surface of wear test specimen was analysed using SEM to understand the mechanism of wear. © 2019 IOP Publishing Ltd.

Author keywords

abrasive wear, ANOVA, composites

Indexed keywords

Engineering controlled terms: Abrasion, Abrasives, Analysis of variance (ANOVA), Composite materials, Mechanical properties, Metallic matrix composites, Tensile strength

Engineering uncontrolled: Hybrid composites, Hybrid metal matrix composites, Pin-on-disc apparatus, Process parameters, Sliding velocities

Environmental Science and Pollution Research

Volume 26, Issue 7, 8 March 2019, Pages 6677-6695

Experimental investigation and exergy analysis on homogeneous charge compression ignition engine fueled with natural gas and diethyl ether(Article)

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Abstract

In this work, diethyl ether (DEE) and compressed natural gas (CNG) port fuel injection (PFI) was investigated in direct injection (DI) compression ignition engine to determine the performance, combustion, and emission behaviors. In dual fuel mode, DEE and neat diesel were used as fuel energy, whereas in homogeneous charge compression ignition (HCCI) mode, DEE, and CNG were used as fuel energy. The engine behavior was analyzed for different inlet charge temperatures. Exergy analysis has been carried out for analyzing the various availability shares in the engine. The maximum brake thermal efficiency of the engine increased at peak load from 27.31% in neat diesel to 29.12% for dual fuel mode (D + CNG). Hydrocarbon and carbon monoxide emissions were reduced and oxides of nitrogen increased with the inlet charge heating mode. Maximum exergy efficiency was observed as 57.1% in dual fuel operation. The result of this work proves that CNG in dual and HCCI are effective for engine operation. © 2019, Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Charge inlet temperature, CNG, Diethyl ether, Dual fuel, HCCI

Indexed keywords

GEOBASE Subject Index: combustion, energy efficiency, engine, ether, exergy, experimental study, fuel, natural gas, performance assessment, temperature

Environmental Science and Pollution Research

Volume 26, Issue 7, 8 March 2019, Pages 6980-7004

Experimental assessment and multi-response optimization of diesel engine performance and emission characteristics fuelled with Aegle marmelos seed cake pyrolysis oil-diesel blends using Grey relational analysis coupled principal component analysis(Article)

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Abstract

This research focuses on the detailed experimental assessment of compression ignition (CI) engine behavior fuelled with Aegle marmelos (AM) seed cake pyrolysis oil blends. The study on effects of engine performance and emission a characteristic was designed using L_{25} orthogonal array (OA). These multi-objectives were normalized through gray relational analysis (GRA). Likewise, the principal component analysis (PCA) was performed to assess the weighting values respective to every performance and emission characteristics. The variability induced by using the input process parameters was allocated using analysis of variance (ANOVA). Hence, GRA-coupled PCA were employed to determine the optimal combination of CI engine control factors. The greater combination of engine characteristics levels were selected with F_5 and W_5. The higher brake thermal efficiency (BTE) have been obtained for F20 fuel as 22.01% at peak engine load, which is 11.43% for diesel. At peak load condition, F20 fuel emits 14.99% lower HC and 18.52% lower CO as compared to diesel fuel. The improved engine performance and emission characters can be attained by setting the optimal engine parameter combination as F20 blend at full engine load condition. The validation experiments show an improved average engine performance of 67.36% and average lower emission of 64.99% with the composite desirability of 0.8458. © 2019, Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Aegel marmelos seed cake | Emission | Engine test | Grey relational analysis | Principal component analysis | Pyrolysis oil

Indexed keywords

Journal of Magnetism and Magnetic Materials

Volume 474, 15 March 2019, Pages 563-569

Fabrication and characterization of Ru-doped $LiCuFe_2O_4$ nanoparticles and their capacitive and resistive humidity sensor applications(Article)

Manikandan, V., Tudorache, F., Petrila, I., Mane, R.S., Kuncser, V., Vasile, B., Morgan, D., Vigneselvan, S., Mirzaei, A.

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View additional affiliations

Abstract

Polycrystalline ruthenium-doped lithium-copper-ferrite (Ru-$LiCuFe_2O_4$)nanoparticles (NPs) are synthesized using a simple and cost-effective chemical co-precipitation method and annealed at different temperatures for increasing the crystallinity. The transmission and scanning electron microscopy images have confirmed the presence of soft agglomerations and cuboids for the samples annealed at 1100 °C. X-ray photoelectron results along with Raman spectra have collectively demonstrated the presence of Ru in the structure of Ru-$LiCuFe_2O_4$ NPs. The dielectric properties of as-synthesized Ru-$LiCuFe_2O_4$ NPs are investigated using LCR meter where the smaller NPs demonstrates a higher dielectric constant. Also, the results of magnetic measurements of annealed Ru-$LiCuFe_2O_4$ NPs have corroborated a soft magnetic nature due to the pinning sites that endow lower coercivity, remanence and saturation magnetization than that of the pristine one. The variation of permittivity and electrical resistivity with respect to frequency under humidity conditions suggested that this material has a potential to use as capacitive and resistive humidity sensor. The results of this study open the doors for utilization of metal-doped magnetic ferrites for humidity sensing applications. © 2018 Elsevier B.V.

Author keywords

Electrical behavior | Humidity sensor | Magnetic properties | Particle size

Indexed keywords

International Research Journal of Multidisciplinary Technovation

Volume 1, Issue 2, 25 March 2019, Pages 150-157

Implementation of Differential Algorithm for Busbar Protection(Article)(Open Access)

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Abstract

Faults in power systems are classified as internal and external faults. Faults within the zone are termed as internal faults whereas; the faults outside the Zone are called as external faults. Ideally, a relay outward after the protection of a zone should operate only for internal faults. It should restrain from operating for external faults or through faults. In this project, the busbar protection using differential protection scheme has been investigated for internal and external faults. The current magnitude from the Current Transformer is compared with a preset value and when the current exceeds the preset value, and then a trip command is given to associated circuit breaker. In this work, an algorithm has been developed to improve the selectivity of the relay and the same is tested on three-phase bus bar having two incoming lines and three outgoing lines at different fault levels and the results are verified for internal and external faults. The entire algorithm is programmed and graphical views of relay performance are verified using the MP LAB platform.

Author keywords

Busbar protection | CT saturation | Numerical relay | Ratio mismatch of CT secondary. Works on busbar protection

ISSN: 25821040
Source Type: Journal
Original language: English

DOI: 10.34256/irjmt19220
Document Type: Article
Publisher: Asian Research Association

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International Research Journal of Multidisciplinary Technovation

Volume 1, Issue 2, 25 March 2019, Pages 137-149

PV Module Parameters Estimation Using Newton Raphson(Article)(Open Access)

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Abstract

The estimation of solar photovoltaic (PV) system with help of electrical model parameters, such as photon generated current, the diode saturation current, series resistance, shunt resistance, and diode ideality factor, are desirable to predict the real performance characteristics of solar PV under varying environmental conditions. Finally, performance indices, such as PV characteristics curve are estimated for the various solar PV panels, using Newton Raphson (NR) to reveal the effectiveness of the proposed method. Also, validation with `experimental data has been considered. Finally, through the comparative analysis of the results, it is revealed that the proposed method offers solar PV characteristics closer to the real characteristics.

Author keywords

Newton Raphson (NR) | Photovoltaic (PV)

ISSN: 25821040
Source Type: Journal
Original language: English

DOI: 10.34256/irjmt19219
Document Type: Article
Publisher: Asian Research Association

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Renewable Energy

Volume 134, April 2019, Pages 579-602

Optimization of compression ignition engine fueled with diesel - chaulmoogra oil - diethyl ether blend with engine parameters and exhaust gas recirculation(Article)

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Abstract

This study investigates the performance, combustion and emission characteristics of diesel (D)/straight vegetable oil (SVO)/diethyl ether (DEE) blend in a variable compression ratio engine (VCR), variable engine speed direct injection compression ignition (CI) engine. The compression ratio (CR), speed (N), and load (L) were taken as input factors for the diesel engine optimization. This investigation is done through a combination of experimental data analysis and artificial neural network (ANN) modeling. The response surface methodology (RSM) optimization concerned to minimize the engine emissions and maximize the engine performance. Three optimization works were conducted for 65% D+25% SVO+10% DEE blend, in optimization-1 (opti-1) considered 0% exhaust gas recirculation (EGR), Opti-2 considered 5% EGR and Opti-3 considered 10% EGR. Compared to diesel, carbon monoxide (CO), oxides of nitrogen (NOx), and hydrocarbon (HC) were reduced by 12.8%, 4.19% and 9.61% respectively for blend fuel in opti-2.

Author keywords

ANN, Chaulmoogra oil, Compression ratio, EGR, Optimization, Speed

Indexed keywords

Engineering controlled terms: Carbon monoxide, Compression ratio (machinery), Diesel engines, Direct injection, Ethers, Gases, Ignition, Neural networks, Optimization, Speed

Industrial Crops and Products

Volume 130, April 2019, Pages 467-477

Ultrasound aided extraction of yellow pigment from Tecoma castanifolia floral petals: Optimization by response surface method and evaluation of the antioxidant activity(Article)

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Abstract

Pigments are organic or inorganic compounds which are used as colouring agents in food, textile, cosmetics, and pharmaceutical industries. Presently, pigment extracted from natural sources gained more attention since it is eco-friendly and possess medicinal property. In this study, the extraction of yellow pigment from Tecoma castanifolia floral petals using ultrasonic waves was reported. Response surface method (RSM) was employed to optimize the extraction parameters such as flower mass, solvent concentration, time, and ultrasonic power. The pigment absorbance (OD), total phenolic content (TPC), and antioxidant activity (AA) were considered as responses. Response surface analysis predicted the optimal level of flower mass, methanol concentration, extraction time, and sonication power as 2 g, 100%, 15 min, and 30 W respectively for the maximum response of OD (3.46), TPC (246.6 mg/g), and AA (55.7%). The model obtained in the RSM was well fitted the validation experimental results. The phenolics, aromatic compounds and esters which may be responsible for the antioxidant capacity of the extracted pigment were confirmed by the GC–MS and FT-IR analysis. The yellow pigment extracted from T. castanifolia can be used as natural colouring agent and antioxidant additive to the food products.

Author keywords

Antioxidant activity, Extraction, RSM, Total phenolic content, Ultrasound, Yellow pigment

Indexed keywords

Engineering controlled Additives, Antioxidants, Food products, Inorganic compounds, Surface analysis, Surface properties

Environmental Science and Pollution Research

Volume 26, Issue 11, 1 April 2019, Pages 11371-11386

Generation of biodiesel from industrial wastewater using oleaginous yeast: performance and emission characteristics of microbial biodiesel and its blends on a compression injection diesel engine(Article)(Open Access)

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Abstract

Microbial-derived biodiesel was tested on a lab scale CI diesel engine for carrying out exhaust emission and performance characteristics. The performance, emission, and combustion characteristics of a single cylinder four stroke fixed compression ratio engine when fueled with microbial bio-diesel and its 10–30% blends with diesel (on a volume basis) were investigated and compared with conventional diesel. The bio-diesel was obtained from microbes which were grown by combining distillery spent wash with lignocellulosic hydrolysate at nutrient deprived conditions. The microbes consumed the wastes and converted the high strength waste water into lipids, which were trans-esterified to form bio-diesel. Testing of microbial bio-diesel blends with ordinary diesel at different loading pressures and the emission characteristics were compared. Results indicate that with increasing of the blends, reduction of HC and CO emissions were observed, whilst brake thermal efficiency maxed out at 20% blending. Further increase of blends showed a tendency of increasing of both emissions in the exhaust stream. The Brake Specific Fuel consumption was observed to decline with blending until 20% and then increased. The nitrogen oxide emissions, however, were found to increase with increasing blend ratios and reached a maximum at 20% blend. The escalation of HC, CO, CO_2, and NOx emissions was also observed at higher blending ratios and higher engine loads. The performance studies were able to show that out of the three blends of biodiesel, 20% biodiesel blend was able to deliver the best of reduced hydrocarbon and carbon monoxide emissions, whilst also delivering the highest Brake thermal efficiency and the lowest Brake Specific Fuel consumption.

Author keywords

Journal of Scientific and Industrial Research

Volume 78, Issue 4, April 2019, Pages 216-222

Machinability studies on precipitation hardened stainless steel using cryo-treated textured carbide inserts(Article)

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View additional affiliations

Abstract

Precipitation hardened stainless steel 17Cr-4Ni is martensitic steel posing high strength and excellent resistance against corrosion. Precipitation Hardened steel is considered as more difficult to machine materials and, consequently must be machined using different procedures. Response Surface Methodology (RSM) is applied to analyze the machinability characteristics of 17-4 PH steel using textured cryo-treated tungsten carbide inserts. The characteristics such as main cutting force, vibration acceleration in three axes and surface roughness R_a were taken as responses in dry turning of PH steel. Mathematical models were developed and validated using ANOVA. The optimal parameters were identified using graphical and numerical methods and the interactive effect of input parameters were also studied using three-dimensional surface plots.

Author keywords

Analysis Of Variance | Cryogenic Treatment | Cutting Force | Hardened Stainless Steel | Surface Roughness | Vibration Acceleration

ISSN: 00224456
Source Type: Journal
Original language: English
Document Type: Article
Publisher: Scientific Publishers

Materials and Manufacturing Processes

Volume 34, Issue 5, 4 April 2019, Pages 502-510

Machinability analysis of high strength materials with Cryo-Treated textured tungsten carbide inserts(Article)

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View additional affiliations

Abstract

In some critical applications, Precipitation Hardened PH stainless steel 17Cr-4Ni is used in the hardened condition. After heat treatment, machining is difficult but possible with special attention. In this study, an effort has been taken to model the machinability evaluation of 17–4 PH stainless steel using Cryo-Treated textured tungsten carbide inserts via Response Surface Methodology (RSM). Different machining characteristics such as tangential force, surface roughness and vibration components in three axes were considered as responses. In this present investigation, three-dimensional (3D) surface plots were used to study the effect of process parameters such as machining speed, feed, and machining depth with their interactions. The study revealed that the combination of higher machining speed with lower feed results better surface finish and also the machining depth has a significant effect on surface roughness R_a. Lower machining speed, lower feed and higher machining depth induced more vibration; however, the vibration was reduced at higher feed. The machining variables were optimized using response surface methodology desirability approach. Experimental results were in close conformity with the results of developed mathematical models, and optimal parameter was obtained through response surface method overlay plot. © 2019, © 2019 Taylor & Francis.

Author keywords

CNC | Cryo-Treated | desirability | Texture | turning

Indexed keywords

Journal of Magnetism and Magnetic Materials

Volume 476, 15 April 2019, Pages 18-23

Enhancement in magnetic and dielectric properties of the ruthenium-doped copper ferrite(Ru-$CuFe_2O_4$) nanoparticles(Article)

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View additional affiliations

Abstract

Ruthenium-doped copper ferriteRu-$CuFe_2O_4$nanoparticles (NPs) have been synthesized using a simple and cost-effective wet chemical co-precipitation deposition method. The crystallographic scanning electron microscopy images confirm cubic crystal structure and agglomerated-type surface appearance. The crystallite sizes are 6–24 nm in the range. Dielectric measurement analysis estimates the dielectric constant and loss of Ru-$CuFe_2O_4$ NPs. In this connection, dielectric constant and loss are reduced virtue of air annealing for various temperatures. Also, the dielectric loss confirms the relaxation peak. From magnetic measurement results, the coercivity decreases whereas saturation and remanence magnetization are increased. These features have approved the soft magnetic nature in the Ru-$CuFe_2O_4$ NPs. © 2018 Elsevier B.V.

Author keywords

Copper ferrite | Dielectric properties | Ferrites | Microstructure | Soft magnetic nature

Indexed keywords

Engineering controlled terms: Copper | Copper alloys | Copper compounds | Cost effectiveness | Crystal structure | Dielectric losses | Dielectric properties | Ferrite | Iron compounds | Magnetic materials | Microstructure | Precipitation (chemical) | Remanence | Ruthenium | Ruthenium compounds | Saturation magnetization | Scanning electron microscopy

Cluster Computing

Volume 22, 1 May 2019, Pages 6855-6864

Sensorless cluster based neural-fuzzy control strategy for four quadrant operation of three phase BLDC motor with load variations(Article)

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Abstract

Brushless DC (BLDC) motors are, in fact, a type of permanent magnet synchronous motors with a very high level of efficiency. An attempt has been made in this research work to design and implement four quadrant control of a BLDC motor drive with regenerative braking in either direction with a Position sensor less neural-fuzzy controller. The complete closed loop system being speed-controlled, four quadrant operation has been obtained using step speed input while the suitability of the developed model has been tested under full load stress during steady state. The results obtained satisfy the four quadrant operation requirements of advanced drives where controlled starts and stops are essential in both forward and reverse directions. This is evident in the effectiveness of current and torque tracking and ease of speed transition from motoring to regeneration and vice versa. The design simulation of four quadrant control of the BLDC motor is carried out using MATLAB. A simulink model is developed to simulate and analyze the operation of the motor. A permanent magnet synchronous machine with trapezoidal back EMF is modeled as a BLDC machine. The developed model finds applications in advanced industrial drives as an energy-efficient and cost-effective alternative to eliminate the effects of supply voltage drops and mechanical load variations.

Author keywords

BLDC Motor, Fuzzy-neural, Load Variations, Sensor-less, Voltage Drops

Indexed keywords

Engineering controlled: AC motors, Closed loop systems, Cost effectiveness, Electric drives, Energy efficiency, Fuzzy control

Materials Chemistry and Physics

Volume 229, 1 May 2019, Pages 448-452

Rapid humidity sensing activities of lithium-substituted copper-ferrite (Li–CuFe_2O_4) thin films(Article)

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View additional affiliations

Abstract

In this study, nanocrystalline lithium-substituted copper ferrite (Li–CuFe_2O_4) nanoparticles with high surface area were synthesized by using a facile and cost-effective wet chemical co-precipitation method followed by crystallization at 900 °C. The powder X-ray diffraction pattern endows the crystalline behavior with minimum crystallite size of 13 nm. The scanning electron microscopy image has confirmed an irregular nanoparticles formation where as the transmission electron microscopy image has identified cubical shaped crystals of polycrystalline nature, approved from the respective selected area electron diffraction spectrum. Thin films of Li–CuFe_2O_4 are envisaged as humidity sensors where moderate sensitivity of 2.2 MΩ/% RH towards the entire range of humidity and fast response/recovery time of 7/36 s is obtained. Notably, as-fabricated humidity sensor of Li–CuFe_2O_4 has confirmed ~99% reproducibility, confirming its chemical stability and mechanical robustness for commercial viability.

Author keywords

Ferrite materials, Humidity sensor, Nanostructure material, Thin films

Indexed keywords

Engineering controlled terms: Chemical stability, Copper, Copper alloys, Cost effectiveness, Crystallite size, Electron diffraction, Ferrite, High resolution transmission electron microscopy, Humidity sensors, Lithium, Magnetic materials, Nanocrystals

Magazine of Concrete Research

Volume 71, Issue 9, 1 May 2019, Pages 449-460

Effect of recycled coarse aggregate and foundry sand on the properties of self-compacting concrete(Article)

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Abstract

In this paper, the possibility of utilising foundry sand and recycled coarse aggregate (RCA) obtained from a ready-mix concrete plant for making self-compacting concrete (SCC) was evaluated. In this experiment, 25 concrete mixes were made in which the substitution of RCA was 0, 25, 50, 75 and 100% as coarse aggregate and substitution of foundry sand was 0, 10, 15, 20 and 25% as fine aggregate. The cement content, water and silica fume were kept constant for all 25 mixes. The effects of foundry sand and RCA on the fresh properties of concrete and the hardened properties of SCC were evaluated. The results of the investigation showed that the hardened properties of concrete with 20% foundry sand were significantly improved when compared to conventional concrete. However, the hardened properties of the SCC with 100% RCA were poorer than for conventional concrete with 100% natural coarse aggregate. Strength decreases with the increase in percentage of substitution of RCA. It was found that an M20 grade of structural SCC was achieved with 75% substitution of RCA.

Indexed keywords

Engineering controlled terms:	Aggregates, Foundries, Hardening, Recycling, Self compacting concrete, Silica fume
Engineering uncontrolled terms	Cement content, Coarse aggregates, Conventional concrete, Fine aggregates, Fresh properties, Hardened properties, Ready-mix concrete, Recycled coarse aggregate

Journal of Renewable and Sustainable Energy

Volume 11, Issue 3, 1 May 2019, Article number 033302

A hybrid MWOAL approach for fast and efficient maximum power point tracking in wind energy conversion systems(Article)(Open Access)

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Abstract

This paper proposes an efficient hybrid approach for the fast and efficient MPPT in WECS. The system consists of an MPPT based control of IPMSG consisting of a hybrid Meta-heuristic algorithm. The hybrid Meta-heuristic algorithm presented in the proposed approach is the joined execution of both WOA and the ALO algorithm named as MWOAL. In the proposed approach, the WOA is considered to resolve the optimal gain parameters of the PI controller with a minimum error objective function based on the variation of direct and quadrature current parameters. Here, the searching behavior of the whales is modified by using the efficient ALO algorithm is known as modified WOAL MWOAL. The setpoint direct axis and the quadrature axis current parameters of the WECS are determined using the MPPT technique and the loss minimization approach based on the generator speed variation. Hence, the proposed scheme has improved the efficiency of the WECS. At that point, the performance of the proposed adaptive MPPT control of WECS is executed in the MATLAB/Simulink working platform and the execution is assessed using the existing techniques.

Indexed keywords

Engineering controlled terms:	Energy conversion, Heuristic algorithms, Maximum power point trackers
Engineering uncontrolled terms	Current parameters, Hybrid Meta-heuristic, Loss minimization, MATLAB /simulink, Maximum Power Point Tracking, Objective functions, Searching behavior, Wind energy conversion system

Materials Research Express

Volume 6, Issue 8, 17 May 2019, Article number 086580

Effect of magnesium and chromium fillers on the microstructure and tensile strength of friction stir welded dissimilar aluminium alloys(Article)

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Abstract

Aluminium alloy plays a vital role in major engineering industries due to its high strength to weight ratio. Friction stir welding is a well-established technique to weld aluminium for more than three decades. The objective of the work is to introduce the filler materials (Mg & Cr) between the joints during welding to improve the joint strength and corrosion resistance property. The tool rotational speed, welding speed, plunge depth, center distance between the filler holes, and powder mixing ratio are considered as major parameters. The tensile strength test and microstructure evaluations are done. The best result was gained with the process parameters combination of 1000 rpm tool rotational speed, 120 mm min^{-1} welding speed, 0.15 mm plunge depth, center distance between the filler holes 2 mm, and powder mixing ratio 95% Mg and 5% Cr. © 2019 IOP Publishing Ltd.

Author keywords

aluminium alloy | center distance | dissimilar joint | filler holes | Friction stir welding | powder mixing ratio | tensile strength

Indexed keywords

Engineering controlled terms: Aluminum alloys | Corrosion resistance | Fillers | Friction | Friction stir welding | High strength alloys | Microstructure | Mixing | Research laboratories

Engineering uncontrolled Center distance | Dissimilar joints | Engineering industries | Microstructure evaluations | Powder mixing

International Research Journal of Multidisciplinary Technovation

Volume 1, Issue 3, 25 May 2019, Pages 48-56

LOAD FORECASTING MODEL FOR ENERGY MANAGEMENT SYSTEM USING ELMAN NEURAL NETWORK(Article)(Open Access)

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Abstract

Electric load forecasting is used for forecasting of future electric loads. Since the economy and reliability of operations of a power system are greatly affected by electric load, cost savings mainly depend on load forecasting accuracy. An accurate system load forecasting which is used to calculate short-term electric load forecasts, is an essential component of any Energy Management System (EMS). This can be improved by making use of Artificial Neural Networks (ANN). Existing Boosted Neural Networks (BooNN) technique helps in reduction of forecasting errors and variation in forecasting accuracy. However it is not flexible to rapid load changes.In the proposed work, Elman Neural Network technique is considered. This technique improves the load forecasting accuracy. The proposed method is implemented in IEEE 14 bus system. Simulation results showed that this method has increased the Voltage profile and also the active power losses have been reduced. Overall power transfer capability has been improved. Also the computational time has been minimized when compared to the existing techniques. © 2019, Asian Research Association. All rights reserved.

Author keywords

Elman Neural Network | Energy Management System(EMS) | Forecasting

ISSN: 25821040
Source Type: Journal
Original language: English

DOI: 10.34256/irjmt1936
Document Type: Article
Publisher: Asian Research Association

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International Research Journal of Multidisciplinary Technovation

Volume 1, Issue 3, 25 May 2019, Pages 28-39

A WAVELET BASED DIFFERENTIAL ALGORITHM FOR BUSBAR PROTECTION(Article) (Open Access)

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Abstract

Busbar protection is an essential component in power system design, protecting the most important system node for network stability and security. When faults occurs on busbar itself, it takes much time to isolate the bus from source which may cause much damage in the bus system. Faults in power system are classified as internal and external faults. Faults within the zone are termed as internal faults whereas, the faults outside the Zone are called as external faults. Ideally, a relay looking after the protection of a zone should operate only for internal faults. It should restrain from operating for external faults or through faults. In this paper the busbar protection using differential protection scheme has been investigated for internal and external faults. An algorithm has been developed to improve the selectivity of the relay and the same has been tested in IEEE9 bus system for internal and external faults. Separation of De-noised signal from fault signal is made using wavelet transform so that the nature of fault occurs on the system can be identified. In this study Daubechies 4 at level 3 is used to separate original signal and de-noised signal. The entire simulation has been done using MATLAB R2017a.

Author keywords

Busbar protection | Internal and external faults | Mother Wavelet | Works on busbar protection

ISSN: 25821040
Source Type: Journal
DOI: 10.34256/irjmt1934
Document Type: Article

International Research Journal of Multidisciplinary Technovation

Volume 1, Issue 3, 25 May 2019, Pages 57-64

COORDINATION CONTROL OF MICROGRID USING SLIDING MODE CONTROLLER(Article) (Open Access)

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Abstract

Traditional power generation and consumption are undergoing major transformation. One of the tendencies is to integrate microgrid into the distribution network with high penetration of renewable energy resources. A synchronous generator and a PV farm supply power to the system's AC and DC sides, respectively. A DC/DC boost converter with a maximum power point tracking (MPPT) function is implemented to maximize the energy generation from the PV farm. In the existing system a model predictive power and voltage control (MPPVC) method is developed for the AC/DC interlinking converter this has a drawback in smooth grid synchronization. But in the proposed system a sliding mode controller is used to link the AC bus with the DC bus while regulating the system voltage and frequency and it ensures smooth power transfer between the DC and AC sub grids. Meanwhile, smooth grid synchronization and connection can be achieved. Proposed constant frequency sliding mode control retains the advantages of good dynamic response as in hysteresis control, better reference tracking switching frequency and less sensitivity to parameter variations and non liner loads. From the Simulation results it is verified that the proposed topology is coordinated for power management in both AC and DC sides under critical loads with high efficiency, reliability, and robustness under both grid-connected and islanding modes.

Author keywords

permanent magnet synchronous generator (PMSG) | Power Quality (PQ) | Pulse Width Modulation (PWM) | Renewable Energy Sources (RES) | sliding mode controller (SMC)

International Research Journal of Multidisciplinary Technovation

Volume 1, Issue 3, 25 May 2019, Pages 40-47

DESIGN OF SOLAR PV BASED SHUNT ACTIVE FILTER FOR NONLINEASR LOAD(Article) (Open Access)

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Abstract

Elevation of power electronics technology, converter are the main causes for power quality issues, because of their high switching characteristics.so to reduce the harmonics injected by the nonlinear load, the filters are play a major role to improve a power quality improvement, particularly shunt active filter is more reliable for reduce a harmonic in power system network. This novel technique proposed for design a shunt active filter with solar photovoltaic array integrated into nonlinear load using a Point of Common Coupling (PCC) technique. Zero crossing detection technique are used to extract the magnitude of a fundamental active components of distorted load currents. The estimation of harmonic isolator and current compensation are controlled by Field Programmable Gate Array (FPGA) controller, different types of compensation techniques are used in this work Synchronous reference frame theory, instantaneous reactive power theory (PQ) and hysteresis current control technique. These techniques enable extraction of active power, regulates a load voltage and maintain a phasor sequence at PCC under the voltage sag and swell. Simulation is carried out by MATLAB/SIMULINK for different compensations techniques and Total Harmonics Distortion (THD) values are tabulated.

Author keywords

Field Programmable Gate Array (FPGA) | Photovoltaic (PV) | Point of Common Coupling (PCC)

ISSN: 25821040
Source Type: Journal
DOI: 10.34256/irjmt1935
Document Type: Article

Volume 92, Issue 3, June 2019, Pages 768-782

Experimental investigation on improvement of storage stability of bio-oil derived from intermediate pyrolysis of Calophyllum inophyllum seed cake(Article)

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Abstract

Due to the unstable nature of bio-oil, it becomes mandatory to analyze the changes in physical and chemical properties of the bio-oil during storage to appreciate its chemical instability, for developing stabilization strategies. The present study aims to investigate the oxidative and thermal stability of bio-oil extracted from pyrolyzing Calophyllum inophyllum (CI) deoiled seed cake in a fixed bed reactor at 500 °C under the constant heating rate of 30 °C/min. Each stability analysis method involve an accelerated aging procedure based on standards established by ASTM (D5304 and E2009) and European standard (EN 14112). Fourier Transform Infrared Spectroscopy and Gas Chromatography-Mass Spectrometry were employed to analytically characterize the un-aged and aged bio-oil samples. The results clearly depict that stabilizing Calophyllum inophyllum bio-oil with 10% (w/w) methanol improved its stability than that of the crude sample. Addition of methanol reduced the change in viscosity of bio-oil by 38.55% during accelerated aging process. The oxidation stability index of bio-oil stabilized with methanol was found to be 3.97 h which is in accordance with ASTM D6751. FT-IR and GC-MS results showed an increase in the relative concentration of C-O (carboxylic acids, ethers and esters) and C=O (carbonyl) functional groups in aged bio-oil samples.

Author keywords

Calophyllum inophyllum | Methanol | Oxidation | Stability | Viscosity

Indexed keywords

Engineering controlled terms: Chemical reactors | Convergence of numerical methods | Fourier transform infrared spectroscopy | Gas chromatography | Mass spectrometry | Methanol | Oxidation | Stability | Thermodynamic stability | Viscosity

Renewable Energy

Volume 136, June 2019, Pages 91-103

Prediction of performance and emission characteristics of diesel engine fuelled with waste biomass pyrolysis oil using response surface methodology(Article)

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View additional affiliations

Abstract

Advanced third generation biofuels like pyrolysis oil generated from waste biomass paves way for a cleaner and sustainable environment. An experimental-cum-statistical analysis was performed with the aim of determining the optimal engine operating conditions (with respect to compression ratio, load and fuel blend) to enhance the engine operating characteristics (performance and emission) of a diesel engine. Multiple regression models designed by using response surface methodology (RSM) for the output response variables like brake specific fuel consumption (BSFC), brake thermal efficiency (BTE), oxides of carbon ($CO\&CO_2$), hydrocarbon (HC), oxides of nitrogen (NOx) and smoke opacity were found to be statistically significant by analysis of variance. Optimization was carried out using desirability approach with a target of maximizing BTE and CO_2 simultaneously by minimizing all other responses. From the results, it can be observed that the optimum conditions for bio-oil operation were 18:1 compression ratio, 20% fuel blend and 100% load. The models developed by RSM were validated through confirmatory experiments and found that the models were satisfactory to report the influence of compression ratio, load and bio-oil concentration on the operating characteristics of the diesel engine as the error in prediction is within 5%. © 2019 Elsevier Ltd

Author keywords

Bio-oil | Calophyllum inophyllum | Optimization | Pyrolysis | RSM | Waste biomass

Indexed keywords

Materials Science- Poland

Volume 37, Issue 2, 1 June 2019, Pages 265-279

Selective crystallization of gamma glycine for NLO applications using magnesium sulfate ($MgSO_4$) as an additive(Article)(Open Access)

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Abstract

Crystallization of γ-glycine in the presence of selected concentration (9 g/mL) of tailor-made additive magnesium sulfate heptahydrate salt ($MgSO_4 \cdot 7H_2O$) has been studied at ambient temperature by adopting slow solvent evaporation procedure. The morphological modifications of glycine crystals grown from pure aqueous solutions of glycine and from glycine solutions containing magnesium species in the amount of 0.1 g/mL to 16 g/mL have been investigated thoroughly. The crystalline nature and phase identification of the crystalline material were confirmed by X-ray powder diffraction and SXRD studies. NMR studies revealed the information about the molecular conformation in solution, phase changes, functional groups and chemical environment. FT-IR spectra revealed distinct difference between α and γ-glycine polymorphs in the region around 880 cm^{-1} to 930 cm^{-1}. The grown γ-glycine crystal had a lower cut-off value at 200 nm and the bandgap value evaluated from the Tauc plot was found to be 5.83 eV. The marked differences between α and γ-polymorphs of glycine were also revealed by DSC thermograms. The mechanical strength of the γ-glycine crystal was studied with the help of Vickers microhardness instrument. Kurtz-powder NLO study proved the generation of second harmonics (i.e. green light emission) in the grown γ-glycine crystal and its efficiency was calculated as 1.44 times better than that of the reference material potassium dihydrogen phosphate. © 2019 S. Anbu Chudar Azhagan et al., published by Sciendo.

Author keywords

crystal morphology | nucleation | single crystal growth | solubility | solvents | X-ray diffraction

Indexed keywords

Indian Journal of Geo-Marine Sciences

Volume 48, Issue 6, June 2019, Pages 943-946

Marine water quality studies at Tuticorin harbour coastal area(Article)

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Abstract

Rapid population growth and increasing industrial activities including marine activities have resulted in increasing water pollution, which is considered as one of the primary issues of environmental pollution in coastal region of developing countries including coastal area of Tuticorin harbour in Tamilnadu, India. Seawater samples were collected from three different sampling points in Tuticorin coastal area to study the physical and chemical characteristics, using various analytical techniques. The studies reveal that the physical and chemical composition of all the samples collected from the sites mainly depend on the discharge from the sources of pollutants and all the physico-chemical parameters are within the permissible limits.

Author keywords

Chemical parameters · Marine pollution · Tuticorin harbor · Water quality

Indexed keywords

GEOBASE Subject Index: coastal zone · developing world · industrial emission · physicochemical property · pollutant source · water pollution · water quality

Regional Index: India · Tamil Nadu

Indian Journal of Geo-Marine Sciences

Volume 48, Issue 6, June 2019, Pages 853-856

Comparative study of evapo-transpiration and rainfall analysis of Pollachi watershed in Coimbatore, Tamil Nadu, India(Article)

Meiaraj, C., Jeyapriya, S.P.

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Abstract

The present study was about the analysis of rainfall data and estimation of evapo-transpiration values for the predominant crops in Pollachi watershed area. The average monthly rainfall data for the period of 10 years (2004-2013) of Pollachi region of Coimbatore district inferred that the 46% of rainfall is received during south-west monsoon and 34% of rainfall is received from north-east monsoon seasons. From the comparative study of evapo-transpiration, it is observed that the value found out by the Penman method is low and the value obtained by the Hargreaves class A pan evaporation method is high. From the study, it is suggested that Penman method is most suitable for evapo-transpiration estimation.

Author keywords

Cropwat · Evapo-transpiration · Frequency · Pollachi · Rainfall · Watershed

Indexed keywords

GEOBASE Subject Index: comparative study · crop · evapotranspiration · frequency analysis · rainfall · watershed

Regional Index: Coimbatore · India · Tamil Nadu

Archives of Civil Engineering

Volume 65, Issue 2, 1 June 2019, Pages 181-192

Theoretical Investigations for the Verification of Shear Centre and Deflection of Sigma Section by Back Propagation Neural Network Using Python(Article)(Open Access)

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Abstract

The most important challenges in the construction field is to do the experimentation of the designing at real time. It leads to the wastage of the materials and time consuming process. In this paper, an artificial neural network based model for the verification of sigma section characteristics like shear centre and deflection are designed and verified. The physical properties like weight, depth, flange, lip, outer web, thickness, and area to bring shear centre are used in the model. Similarly, weight, purlin centres with allowable loading of different values used in the model for deflection verification. The overall average error rate as 1.278 percent to the shear centre and 2.967 percent to the deflection are achieved by the model successfully. The proposed model will act as supportive tool to the steel roof constructors, engineers, and designers who are involved in construction as well as in the section fabricators industry. © 2019 S. Janani et al., published by Sciendo.

Author keywords

Artificial Neural Network (ANN) | Back Propagation Neural Network (BPNN) | Deflection | Roof Construction | Shear Centre | Sigma section

Indexed keywords

Engineering controlled terms: Deflection (structures) | Neural networks | Roofs | Torsional stress

Proceedings of the National Academy of Sciences India Section B - Biological Sciences

Volume 89, Issue 2, 5 June 2019, Pages 729-738

In Vitro Evaluation of Secondary Metabolites: Characterization and Antimicrobial Activity of Manilkara zapota L. Seed Extract(Article)

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Abstract

In the present study, seed extracts were analysed for its effective biological activity. The seed extracts were primarily subjected to qualitative and quantitative phytochemical analysis and further preceded to techniques such as TLC and bioautography to determine the active compounds through spot specification. The active compounds were further premeditated by GC–MS and FT-IR methods for antimicrobial analysis by agar well diffusion assay against few human pathogens including multidrug resistant phenotypes. The acetone extract of M. Zapota seeds revealed the presence of a significant number of secondary metabolites that ascertained that the plant possesses a rich group of bioactive compounds. The extract was quantified for its total phenolics (67.15 ± 4.35 mg/g), tannins (49.93 ± 8.76 mg/g) and flavonoids (60.06 ± 6.4 mg/g) respectively. GC–MS analysis exhibited the presence of 30 active compounds including both saturated and unsaturated fatty acids. FTIR analysis indicated 16 functional concrete structures of alkanes, alkenes, amines and aliphatic amines. Moreover, RF values calculated for the TLC spots along with the DPPH sprayed biography shows the presence of antioxidant compounds. Among the investigated microorganisms, Micrococcus luteus, Candida albicans and MRSA E-1122 strain exhibited the highest zone of inhibition. The present study provides convincing evidence that M. zapota seeds possess significant activity over human pathogens and MDR-MRSA by its active biocompounds present in the extract that helps to reduce oxidative stress by carrying off an antioxidant molecule that could be developed into therapeutic agents.

Ceramics International

Volume 45, Issue 9, 15 June 2019, Pages 12382-12386

Green synthesis, characterization and biological activities of nanoceria(Article)

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Abstract

Nanoceria green synthesis using Pisonia alba leaf extract was reported in this study. UV–Vis spectroscopy, TEM, EDX, XRD and FTIR were employed to characterize the synthesized nanoceria (CeO_2 nanoparticles). The nanoceria synthesis and size were confirmed by UV–Vis and TEM analysis. The cerium signals observed in the EDX spectrum revealed that the synthesized nanoceria was pure in nature. The cubic fluorite crystal structure of the nanoceria was confirmed from XRD analysis. The chemical bonds pertaining to the bioreducing phytochemicals in P. alba leaf extract were identified by FTIR analysis. Nanoceria showed good antioxidant activity which was assessed by DPPH and FRAP assay. P. alba leaf extract derived nanoceria was highly inhibited the growth of Aspergillus flavus and Fusarium solani fungal strains. The antioxidant and antifungal properties of P. alba leaf extract derived nanoceria can make it as a suitable candidate for biological applications.

Author keywords

Antifungal · Antioxidant · Nanoceria · Pisonia alba

Indexed keywords

Engineering controlled terms:	Antioxidants · Aspergillus · Bond strength (chemical) · Cerium oxide · Crystal structure · Fluorspar · Fourier transform infrared spectroscopy · Synthesis (chemical) · X ray diffraction
Engineering uncontrolled terms	Anti-fungal · Anti-fungal properties · Anti-oxidant activities · Aspergillus flavus · Biological applications