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Documents

1) Thirunavukkarasu, A.[a] , Sivashankar, R.[b] , Nithya, R.[a] , Sathya, A.B.[c] , Priyadharshini, V.[a] , Kumar, B.P.[a] , Muthuveni, M.[a] , Krishnamoorthy, S.[d]

Sustainable organic waste management using vermicomposting: a critical review on the prevailing research gaps and opportunities
(2022) *Environmental Science: Processes and Impacts*, 25 (3), pp. 364-381. Cited 1 time.

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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.

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2) Ragavan G, V.R.[a] , Lakshmanan, P.[b] , Mahalingam, M.[b]

Examining the surface roughness and kerf quality of micro-slots cut on the surfaces of Ti-B4C nanocomposites by WEDM: a desirability approach
(2022) *Materials Research Express*, 9 (12), art. no. 125009, . Cited 1 time.

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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-B4C nanocomposites were prepared by powder metallurgical route. Micro slots were cut on the Ti-B4C 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 B4C 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.

Author Keywords
desirability approach; kerf quality; powder metallurgy; scanning electron microscopy; surface roughness; Ti nanocomposites; WEDM

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3) Kanniyappan, V.[a] , Tamilperuvalathan, S.[b]

Investigation and Prediction of ECMM characteristics of Hardened Die Steel with Nanoparticle Added Electrolytes Using Hybrid Deep Neural Network
(2022) *Polish Journal of Chemical Technology*, 24 (4), pp. 7-22. Cited 3 times.

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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.

Author Keywords
Die hardened steel; ECMM; hybrid; machining parameters; neural network; prediction; RSM

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4) Nadarajan, J.[a] , Sivanraj, R.[b]

Attention-Based Multiscale Spatiotemporal Network for Traffic Forecast with Fusion of External Factors
(2022) *ISPRS International Journal of Geo-Information*, 11 (12), art. no. 619, . Cited 5 times.

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Abstract

Periodic traffic prediction and analysis is essential for urbanisation 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
attention; data fusion; encoder–decoder; external factors; spatiotemporal; traffic prediction

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5) Kumar, A.[a] , Moradpour, M.[b] , Losito, M.[a] , Franke, W.-T.[b] , Ramasamy, S.[c] , Baccoli, R.[d] , Gatto, G.[b]

Wide Band Gap Devices and Their Application in Power Electronics
(2022) *Energies*, 15 (23), art. no. 9172, . Cited 30 times.

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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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6) Mathivanan, S.[a] , Rajeswari, A.[b]

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)
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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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7) Thirunavukkarasu, A.[a] , Nithya, R.[a] , Jeyanthi, J.[b]

Transdermal drug delivery systems for the effective management of type 2 diabetes mellitus: A review
(2022) *Diabetes Research and Clinical Practice*, 194, art. no. 109996, . Cited 4 times.

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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 chronlogically 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.

Author Keywords
Diabetes mellitus; Insulin; Research gaps; Transdermal drug delivery

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8) Suguna, A.[a] , Ranganayaki, V.[b] , Deepa, S.N.[c]

Design of Full-Order Neural Observer with Nonlinear Filter Techniques for State Estimation of a Three-Tank Process Control System
(2022) *Iranian Journal of Science and Technology - Transactions of Electrical Engineering*, 46 (4), pp. 1057-1087.

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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 0.1085 × 10–3 for the measured heights h1, h2 and h3, respectively. The new RLS-EKF observer with its recursive determination of the maximum likelihood has attained ARMSE of 2.1982 × 10–6, 0.1512 × 10–6 and 0.0261 × 10–7 for the measured heights h1, h2 and h3, 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.

Author Keywords
Extended Kalman filter; Likelihood synthesizer; Neural observer; Observer design; State estimator; Three-tank process system; Unscented Kalman filter

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9) Mathivanan, S.[a] , Rajeswari, A.[b]

Omnidirectional Microstrip MIMO Antenna for Intelligent Vehicle RADAR Communication
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DOI: 10.1007/s11277-022-09923-4

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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, εr = 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 λo spacing between the consecutive patches in x–y plane. Each circular patch radius is 0.1446 λo and substrate dimension is 3.4800 λo × 2.5133 λo × 0.0309 λoλ λ. 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 λo × 1.546 λo × 0.0309 λo were arranged in cuboid shape. Four (2 × 2) circular patches with radius 0.1446 λo each and 0.5 λo 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 8.20 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 exceedingly compact. Finally, the low cast 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.

Author Keywords
Circular patch; Corporate feed; MIMO antenna; Omnidirectional; RADAR

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10) Soniya, S.M., Chithra, R.

Experimental investigation of response of HSTC beam encased with Hf-ECC and LWAC
(2022) *Structural Concrete*, 23 (6), pp. 3397-3415. Cited 1 time.

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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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11) Sathees Kumar, V.[a] , Gokulan, R.[b] , Geetha, M.B.[c] , Zunaithur Rahman, D.[d]

Biosorption of heavy metal ions from the aqueous solutions using groundnut shell activated carbon: batch adsorption, kinetic and thermodynamic studies
(2022) *Global Nest Journal*, 24 (4), pp. 729-742. Cited 5 times.

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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, 92.28% 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.

Author Keywords
batch adsorption; desorption; groundnut shell powder; heavy metals; Industrial effluent; thermodynamics

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12) Sivashankar, R.[a] , Sivasubramanian, V.[b] , Anand Kishore, K.[a] , Sathya, A.B.[c] , Thirunavukkarasu, A.[d] , Nithya, R.[d] , Deepanraj, B.[e]

Metanil Yellow dye adsorption using green and chemical mediated synthesized manganese ferrite: An insight into equilibrium, kinetics and thermodynamics
(2022) *Chemosphere*, 307, art. no. 136218, . Cited 15 times.

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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 (qmax) 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

Author Keywords
Aquatic macrophages; Chemical mediated manganese ferrite; Dye sequestration; Green manganese ferrite; Magnetic nanocomposite; Metanil yellow

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13) Velumani, M., Jeyadharmarajan, J.

Recycling of Tannery (chrome) sludge into sludge biochar (SB) /TiO2 nanocomposite via chemical activation through hydrothermal pre-treatment
(2022) *Journal of Material Cycles and Waste Management*, 24 (6), pp. 2255-2269. Cited 5 times.

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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 TiO2 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/TiO2 nanocomposite exhibits a higher surface area of 636.23 m2/g when compared with the sludge biochar/TiO2 nanocomposite without chemical activation. The present research work mainly focuses on the synthesis and investigation of structural properties of c-SB/TiO2 nanocomposite prepared by hydrothermal pre-treatment. The morphological and structural properties of sludge biochar/TiO2 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/TiO2 nanocomposite was used to degrade Cr (VI) by varying its initial concentration, catalyst dosage and initial pH. Results indicate that c-SB/TiO2 nanocomposite shows 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 0.3 g/L, degradation efficiency of 98.65% Cr (VI) has been achieved for a reaction time of 180 min. Additionally, COD measurement shows a 69.4% 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/TiO2 nanocomposite; Chemical activation; Hydrothermal pre-treatment; Photocatalyst; Photocatalytic degradation; Sludge biochar

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14) Miraclin Joyce Pamila, J.C.[a] , Senthamil Selvi, R.[b] , Santhi, P.[c] , Nithya, T.M.[d]

Ensemble classifier based big data classification with hybrid optimal feature selection
(2022) *Advances in Engineering Software*, 173, art. no. 103183, . Cited 3 times.

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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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15) Mugilan, T.[a] , Aezhisai Vallavi, M.S.[a] , Sugumar, D.[b]

Materialistic characterization, thermal properties, and cytocompatibility investigations on acrylic acid-functionalized nSiO2-reinforced PEEK polymeric nanocomposite
(2022) *Colloid and Polymer Science*, 300 (10), pp. 1155-1168. Cited 1 time.

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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 nSiO2 ceramic particle-reinforced PEEK (nSiO2@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 nSiO2@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.

Author Keywords
Biomaterials; Cell adhesion; FESEM; In vitro; Polymer nanocomposite

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16) Velusamy, K.[a] , Periyasamy, S.[b] , Kumar, P.S.[c d] , Rangasamy, G.[e] , Nisha Pauline, J.M.[a] , Ramaraju, P.[a] , Mohanasundaram, S.[a] , Nguyen Vo, D.-V.[f]

Biosensor for heavy metals detection in wastewater: A review
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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
Biosensor; Heavy metals; Pollutants detection; Reproducibility; Wastewater

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17) Madhuvanthi, S.[a] , Jayanthi, S.[b] , Suresh, S.[c] , Pugazhendhi, A.[d]

Optimization of consolidated bioprocessing by response surface methodology in the conversion of corn stover to bioethanol by thermophilic Geobacillus thermoglucosidasius
(2022) *Chemosphere*, 304, art. no. 135242, . Cited 7 times.

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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

Author Keywords
Bioethanol; Central composite design; Consolidated bioprocessing; Geobacillus thermoglucosidasius; Plackett-burman design; Response surface methodology

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18) Karthik, V.[a] , Selvakumar, P.[b] , Senthil Kumar, P.[c d f] , Satheeskumar, V.[e] , Godwin Vijaysunder, M.[a] , Hariharan, S.[a] , Antony, K.[a]

Recent advances in electrochemical sensor developments for detecting emerging pollutant in water environment
(2022) *Chemosphere*, 304, art. no. 135331, . Cited 34 times.

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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

Author Keywords
Electrochemical sensors; Electrodes; Pharmaceutical pollutants; Pollutants detection; Wastewater

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19) Ravathi, M.C., Chithra, R.

Strength optimization of recycled fine aggregate self-curing concrete using Taguchi design
(2022) *Structural Concrete*, 23 (5), pp. 3062-3072. Cited 2 times.

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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

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20) Janarthanan, K.[a] , Sivanandi, P.[b]

Extraction and characterization of waste plastic pyrolysis oil for diesel engines
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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

Author Keywords
CI engine; Emissions; Environment; Performance; Pollution.; Pyrolysis

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21) Esudass, H.P.B.[a] , Sundararajan, V.[c] , Selvaraj, D.K.[b]

Coordination complexes of rare earth metals with hydrazine and isomeric acetamidobenzoates as ligands–spectral, thermal and kinetic studies
(2022) *Arabian Journal of Chemistry*, 15 (9), art. no. 104009, .

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Abstract
The isomeric acetamido benzoic acids (abbreviated as acambH) on reaction with hydrazine hydrate and lanthanides, La3+, Ce3+, Pr3+, Nd3+, Sm3+ and Gd3+ form complexes of formulae, [Ln{x-C6H4(CH3CONH)}3(N2H4)] 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, 13C, 1H NMR and mass spectroscopic, XRD, SEM-EDAX, thermal and conductance studies. The difference between IR bands of vC=O asym (acid) and vC=O sym(acid) range, 122–166 cm−1 supports the bidental coordination of carboxylate ions to metal. vN-N values of 955 to 980 cm−1, substantiate bridging bidentate coordination of hydrazine to metal. vC=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 13C – NMR, 1H- NMR and the LC-Mass techniques substantiated the composition of the complexes. © 2022

Author Keywords
Acetamidobenzoic acid; Lanthanides; Magnetic susceptibility; SEM-EDAX; TG–DTA

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22) Prasanna Moorthy, V.[a] , Siva Subramanian, S.[b] , Tamilselvan, V.[b] , Muthubalaji, S.[c] , Rajesh, P.[d] , Shajin, F.H.[d]

A hybrid technique based energy management in hybrid electric vehicle system
(2022) *International Journal of Energy Research*, 46 (11), pp. 15499-15520. Cited 4 times.

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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.

Author Keywords
energy management system; fuel consumption; hybrid electric vehicle; parametric investigation

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23) Subramanian, N.[a] , Kasimani, R.[b]

Effects of antioxidant additive and injector hole number on combustion phenomenon of DI diesel engine operating with kapok methyl ester blends
(2022) *Environmental Progress and Sustainable Energy*, 41 (5), art. no. e13825, .

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Abstract

Alternate fuel research is aimed at improving the eminence of combustion behavior. This result focusses 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; NOx; nozzle; specific fuel consumption

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24) Yazhini, E.[a] , Chithra, R.[b]

Performance study of fibre reinforced functionally graded concrete pipes
(2022) *Construction and Building Materials*, 344, art. no. 128224, . Cited 4 times.

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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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25) Madhumitha, M.[a] , Ravathi, M.C.[b] , Chithra, R.[b]

Integrated Electro-Coagulation Treatment of Dye Wastewater using Biochar with Aluminium Electrode
(2022) *Indian Journal of Environmental Protection*, 42 (8), pp. 1001-1007.

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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
Adsorbent dosage; Biochar; Characterization; Current density; Electro-coagulation; Optical density

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26) Nandakumar, N., Balakrishnan, S.

Experimental investigation and characterization of titanium diboride reinforced AA6063 in-situ composites
(2022) *Materials Research Express*, 9 (8), art. no. 086508, .

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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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27) Varun, B.[a] , Gopi, S.[b] , Manikandan, R.[c]

Influence of cowpat ash particles on micro structure, mechanical and tribological properties of Al 7075 composites
(2022) *Journal of Ceramic Processing Research*, 23 (4), pp. 511-522. Cited 1 time.

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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.

Author Keywords
Double stage stir casting; Fractured and worn SEM analysis; Mechanical and tribological properties; Optical & SEM microscope

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28) Ponnambalam, N.[a] , Thangavel, S.[b] , Murali, G.[c d] , Vatin, N.I.[c]

Impact Strength of Preplaced Aggregate Concrete Comprising Glass Fibre Mesh and Steel Fibres: Experiments and Modeling
(2022) *Materials*, 15 (15), art. no. 5259, . Cited 1 time.

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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.

Author Keywords
concrete; failure; fibre; glass fibre mesh; impact energy; modelling

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29) Ranjith Kumar, K.[a] , Venkatesan, M.[b] , Saravanan, R.[c]

A hybrid control topology for cascaded multilevel inverter with hybrid renewable energy generation subsystem
(2022) *Solar Energy*, 242, pp. 323-334. Cited 7 times.

DOI: 10.1016/j.solener.2022.07.021

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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

Author Keywords
Cascaded Multilevel Inverter (CMLI); Control signals; Energy conversion; External disturbances; Gain parameters; Load power demand; Power regulation

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30) Muthusamy Subramanian, A.V., Thanigachalam, M.

Mechanical performances, in-vitro antibacterial study and bone stress prediction of ceramic particulates filled polyether ether ketone nanocomposites for medical applications
(2022) *Journal of Polymer Research*, 29 (8), art. no. 318, . Cited 9 times.

DOI: 10.1007/s10965-022-03180-6

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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 TiO2 (T-NPs) and SiO2 (S-NPs) reinforced biopolymer nanocomposites 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.

Author Keywords
Biomaterials; Bone stress; Dental implant; FESEM; Mechanical properties; Polymer nanocomposite

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31) Ayyanar, C.B.[a] , Dharshinii, M.D.[b] , Marimuthu, K.[a] , Akhil, S.[a] , Mugilan, T.[c] , Bharathiraj, C.[d] , Mavinkere Rangappa, S.[e] , Khan, A.[f g] , Siengchin, S.[e]

Design, fabrication, and characterization of natural fillers loaded HDPE composites for domestic applications
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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.

Author Keywords
cloth clip; coconut coir fillers; composites; domestic application; high-density polyethylene

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32) Rathika, G.[a] , Suba, V.[b] , Lakshmi, D.S.[c] , Rani, R.[a]

Exploring the Biosynthesized Metal Nanoparticles for their Catalytic Degradation of Toxic Water Wastes and Antimicrobial Potential
(2022) *Journal of Inorganic and Organometallic Polymers and Materials*, 32 (8), pp. 3153-3169. Cited 2 times.

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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 (Co3O4) nanoparticles. The copper oxide (CuO) and Co3O4 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 (Co3O4) and oval shaped (CuO) isolated nanoparticles. The catalytic adequacy of the developed catalyst, CuO and Co3O4 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.]

Author Keywords
Antibacterial activity; Dye removal; Green synthesis; Metal nanoparticles; Pine gums

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2-s2.0-85129409464

33) Boopathi, N.[a] , Kadarkarai, R.[b]

A laboratory-scale study of residential greywater treatment with sugarcane in a constructed wetland
(2022) *Environmental Science and Pollution Research*, 29 (40), pp. 61178-61186. Cited 1 time.

DOI: 10.1007/s11356-022-20264-4

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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%, 82–91.06%, and 75.83–84.02%, respectively.

Author Keywords
Bioenergy crops; BOD; COD; Coir pith; Phytoremediation; Sugarcane

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34) Selvakumar, P.[a] , Adane, A.A.[a] , Zelalem, T.[a] , Hunegnaw, B.M.[a] , Karthik, V.[b] , Kavitha, S.[c] , Jayakumar, M.[d] , Karmegam, N.[e] , Govarthanan, M.[f] , Kim, W.[f]

Optimization of binary acids pretreatment of corncob biomass for enhanced recovery of cellulose to produce bioethanol
(2022) *Fuel*, 321, art. no. 124060, . Cited 57 times.

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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 (H2SO4 + CH3COOH) 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

Author Keywords
Binary acids pretreatment; Bioethanol; Cellulose; Corncob biomass; Fermentation; Lignocellulose

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35) Radoor, S.[a] , Karayil, J.[b] , Jayakumar, A.[a] , Nandi, D.[a] , Parameswaranpillai, J.[c] , Lee, J.[d e] , Shivanna, J.M.[f] , Nithya, R.[g] , Siengchin, S.[a h]

Adsorption of Cationic Dye onto ZSM-5 Zeolite-Based Bio Membrane: Characterizations, Kinetics and Adsorption Isotherm
(2022) *Journal of Polymers and the Environment*, 30 (8), pp. 3279-3292. Cited 16 times.

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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.

Author Keywords
Adsorption; Carboxymethyl cellulose; Gelatin; Rhodamine B; ZSM-5 zeolite

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36) Praburanganathan, S.[a] , Chithra, S.[b] , Simha reddy, Y.B.[a]

Synergistic effect on the performance of ash-based bricks with glass wastes and granite tailings along with strength prediction by adopting machine learning approach
(2022) *Environmental Science and Pollution Research*, 29 (36), pp. 54193-54218. Cited 1 time.

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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 R2 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.

Author Keywords
Bricks; Glass waste; Granite tailings; Marine environment; Random forests; Saline soil environment

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37) Periyasamy, S.[a] , Ragul, S.[a] , Sundararaj, K.[b] , Premkumar, P.S.[b]

Numerical Investigation on the Cold Flow Field of a Typical Cavity-based Scramjet Combustor with Double Ramp Entry
(2022) *International Journal of Turbo and Jet Engines*, 39 (3), pp. 439-449. Cited 1 time.

DOI: 10.1515/tjj-2020-0011

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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

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38) Ayyappan, S.[a] , Saminathan, M.[b] , Selvarasan, R.[c]

Investigation on mechanical and tribological properties of magnesite reinforced aluminium 6061 composites
(2022) *Materials Research Express*, 9 (7), art. no. 075502, . Cited 3 times.

DOI: 10.1088/2053-1591/ac7f11

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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 × 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.

Author Keywords
Al 6061 alloy; dead burned magnesite (DBM); lightly calcined magnesite (LCM); stir casting method; wastage magnesite (WM)

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39) Nagalingam, A.[a] , Palanivel, I.[a] , Ramanathan, T.[b]

Assessment of Optimum Mechanical Properties for Friction Stir Welding of Pure Copper and Aluminium Bronze
(2022) *Chiang Mai Journal of Science*, 49 (4), pp. 1164-1183. Cited 1 time.

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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
aluminium bronze; copper; dissimilar welding; response surface methodology

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40) Ravanan, A.[a b] , Palanivel, I.[a] , Kulendran, B.[c]

Microstructure, Tensile, and Fractography Analysis of Al2016 and Al2618 Age Hardened Aluminium Alloys
(2022) *Chiang Mai Journal of Science*, 49 (4), pp. 1217-1232. Cited 1 time.

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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. © 2022, Chiang Mai University. All rights reserved.

Author Keywords
age hardening; Al2016; Al2618; fractography; microstructure; T6 Al alloys; T7 Al alloys; tensile property

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41) Tamilselvan, R.[a] , Periyasamy, S.[b]

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)
(2022) *Journal of Mechanical Science and Technology*, 36 (7), p. 3775.

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Abstract
Due to an unfortunate oversight, the affiliation of the 2nd author has been given erroneously. The affiliation should be corrected as follows: 2Department 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.

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42) Vanitha, V.[a] , Vallimurugan, E.[b]

A hybrid approach for optimal energy management system of internet of things enabled residential buildings in smart grid
(2022) *International Journal of Energy Research*, 46 (9), pp. 12530-12548. Cited 5 times.

DOI: 10.1002/er.8024

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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.

Author Keywords
energy management; IoT; peak-to-average ratio; real-time pricing signal; residential buildings; smart grid (SG)

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2-s2.0-85129133030

43) Karthik, V.[a] , Karuna, B.[a] , Kumar, P.S.[b c] , Saravanan, A.[d] , Hemavathy, R.V.[e]

Development of lab-on-chip biosensor for the detection of toxic heavy metals: A review
(2022) *Chemosphere*, 299, art. no. 134427, . Cited 27 times.

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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

Author Keywords
Biosensor; Environmental monitoring; Heavy metal; Lab on-chip; Wastewater

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44) Ramasamy, M.[a] , Meena Kowshalya, A.[b]

Information Gain Based Feature Selection for Improved Textual Sentiment Analysis
(2022) *Wireless Personal Communications*, 125 (2), pp. 1203-1219. Cited 11 times.

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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.

Author Keywords
Classification; Feature selection; Information gain; Textual sentiment analysis

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45) Sivashankar, R.[a] , Thirunavukkarasu, A.[b] , Nithya, R.[b] , Madhubala, V.[b] , Deepanraj, B.[c d]

Karanja oil transesterification using green synthesized bimetallic oxide catalyst, gCaO-CeO2: Comparative investigations with the monometallic oxide catalysts on the catalytic efficacy and stability
(2022) *Fuel*, 319, art. no. 123711, . Cited 14 times.

DOI: 10.1016/j.fuel.2022.123711

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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 96.17 % 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. © 2022 Elsevier Ltd

Author Keywords
Fatty acid ethyl ester; Heterogeneous bimetallic oxide catalyst; Karanja oil; Mesquite leaves; Transesterification

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46) Oorkalan, A.[a] , Chithra, S.[b]

Investigation on the Properties of Sustainable Steel Fiber Reinforced Reactive Powder Concrete by Utilization of Coir Pith Aggregates and Pyrogenic Silica
(2022) *Silicon*, 14 (10), pp. 5545-5562. Cited 3 times.

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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. © 2021, Springer Nature B.V.

Author Keywords
Coir pith; Durability; Internal curing workability; Mechanical strength; Pyrogenic silica; Sustainable RPC

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47) Harshavarthini, S.[a] , Sakthivel, R.[a] , Poornesh Kumar, K.S.[b] , Kong, F.[c]

State estimation and frequency stabilization of multi-area power systems via fault-alarm approach
(2022) *Asian Journal of Control*, 24 (4), pp. 1954-1964. Cited 2 times.

DOI: 10.1002/asjc.2557

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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
fault-alarm-based hybrid control; multi-area power systems; transmission delays and uncertainties

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48) Chinnasamy, S.[a] , Venugopal, P.[a] , Kasimani, R.[b]

Aerodynamic Force Measurements Using Blower Balance Tunnel at Low Reynolds Number
(2022) *Handbook of Research on Aspects and Applications of Incompressible and Compressible Aerodynamics*, pp. 142-156.

DOI: 10.4018/978-1-6684-4230-2.ch007

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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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49) Manoharan, V., Tamilperuvalathan, S.

Prediction on enhanced electrochemical discharge machining behaviors of zirconia-silicon nitride using hybrid DNN based spotted hyena optimization
(2022) *International Journal of Energy Research*, 46 (7), pp. 9221-9241. Cited 11 times.

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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.

Author Keywords
Box Behnken; deep neural network; electrochemical discharge machining; electrolytic concentration; spotted hyena optimization

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50) Sandhiya, M.[a] , Kumar, M.[b]

Performance analysis of solar evaporation for treating coconut husk retting water
(2022) *Desalination and Water Treatment*, 261, pp. 24-32.

DOI: 10.5004/dwt.2022.28513

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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 rack), 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.

Author Keywords
5-day biochemical oxygen demand; Algal growth; Biomass; Briquettes; Coconut husk retting water; Environmental pollution; Kallipatti village; Meteorological parameters; Physico-chemical parameters; Rate of evaporation; Solar evaporation system; Water contamination

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51) Prakash, R.[a] , Divyah, N.[b] , Srividhya, S.[c] , Avudaiappan, S.[d e] , Amran, M.[f g] , Naidu Raman, S.[h] , Guindos, P.[e] , Vatin, N.I.[i] , Fediuk, R.[i j]

Effect of Steel Fiber on the Strength and Flexural Characteristics of Coconut Shell Concrete Partially Blended with Fly Ash
(2022) *Materials*, 15 (12), art. no. 4272, . Cited 49 times.

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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.

Author Keywords
coconut shell; ductility; flexural strength; fly ash; steel fiber

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52) Thirunavukkarasu, A.[a] , Nithya, R.[a] , Kumar, S.M.[b] , Priyadharshini, V.[a] , Kumar, B.P.[a] , Premnath, P.[a] , Sivashankar, R.[c] , Sathya, A.B.[d]

A business canvas model on vermicomposting process: Key insights onto technological and economical aspects
(2022) *Bioresource Technology Reports*, 18, art. no. 101119, . Cited 7 times.

DOI: 10.1016/j.biteb.2022.101119

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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
Business model; Cost economics; Eisenia fetida; Organic waste; Pilot-scale vermicompost

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53) Murugeswari, T.[a] , Rathi, S.[b]

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.

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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.

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54) Kumarasamy, V.[a] , Sampath, R.[a] , Kandasamy, S.[b]

Experimental Study on Hardened Mechanical and Durability Properties of Industrial Ash Bricks
(2022) *Iranian Journal of Science and Technology - Transactions of Civil Engineering*, 46 (3), pp. 1929-1936. Cited 8 times.

DOI: 10.1007/s40996-021-00783-9

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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
Abrasion; Energy dispersive spectroscopy; Industrial Ash Brick; Scanning electron microscopy images; Sorptivity; Water absorption

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55) Velusamy, K.[a] , Chellam, P.[b] , Kumar, P.S.[c d] , Venkatachalam, J.[e] , Periyasamy, S.[f] , Saravanan, R.[g]

Functionalization of MXene-based nanomaterials for the treatment of micropollutants in aquatic system: A review
(2022) *Environmental Pollution*, 301, art. no. 119034, . Cited 29 times.

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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

Author Keywords
Adsorption capacity; Feasibility; Nanoparticles; Pollutants; Wastewater treatment

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56) Malavika, R.[a] , Valarmathi, M.L.[b]

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
(2022) *Concurrency and Computation: Practice and Experience*, 34 (11), art. no. e6854, . Cited 4 times.

DOI: 10.1002/cpe.6854

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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 46.2%, 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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2-s2.0-85124525484

57) Karthik, M.[a] , Narmadhai, N.[b]

Experimental Evaluation on Suitability of Alternate Fluids with the Influence of Additives for Power System Transformer Applications
(2022) *Journal of Electrical Engineering and Technology*, 17 (3), pp. 1883-1906. Cited 3 times.

DOI: 10.1007/s42835-022-01035-0

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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. ©

Author Keywords
Antioxidants; Biodegradability; Mineral oil; Natural esters; Transformers

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58) Kailasa Gounder, Y., Subramanian, S.

Enhancement of battery life in microgrid energy management using mixed integer linear programming and hybrid knapsack
(2022) *International Journal of Energy Research*, 46 (6), pp. 8158-8174. Cited 2 times.

DOI: 10.1002/er.7717

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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.

Author Keywords
day-ahead scheduling; knapsack; lifetime of battery; microgrid; mixed integer linear programming

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59) Jayalakshmi, R.[a] , Jeyanthi, J.[a] , Aswin Sidhaarth, K.R.[b]

Versatile application of cobalt ferrite nanoparticles for the removal of heavy metals and dyes from aqueous solution
(2022) *Environmental Nanotechnology, Monitoring and Management*, 17, art. no. 100659, . Cited 33 times.

DOI: 10.1016/j.enmm.2022.100659

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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 m2/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, 831 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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60) Booramurthy, V.K.[a] , Kasimani, R.[b] , Pandian, S.[c] , Subramanian, D.[d]

Magnetic Nano-catalyzed Synthesis of Biodiesel from Tannery Sludge: Characterization, Optimization and Kinetic Studies
(2022) *Arabian Journal for Science and Engineering*, 47 (5), pp. 6341-6353. Cited 11 times.

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Abstract
The fat extracted from tannery sludge was utilized for producing biodiesel by transesterification reaction using a short chain alcohol and a nano-catalyst (Fe3O4/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 × 103 min−1, respectively, denote activation energy and frequency factor. © 2021, King Fahd University of Petroleum & Minerals.

Author Keywords
Biodiesel; Co-precipitation; Kinetics; Nano-catalyst; Transesterification

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61) Priya Vadhana, K.T.[a] , Vairam, S.[b] , Ushadevi, B.[a] , Parveen, S.[c]

New Mg(II) and Ca(II) Mixed Strontium Squarates: Structural Characterization, DNA/BSA Interaction, Antioxidant and Anticancer Activities
(2022) *Journal of Cluster Science*, 33 (3), pp. 867-885. Cited 2 times.

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Abstract
New mixed alkaline earth metal squarates, viz [Sr0.965Mg0.035(C4O4)(H2O)2]·H2O—(1) and [Sr0.88Ca0.12(C4O4)(H2O)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.

Author Keywords
Antioxidants; Bridging ligands; Cytotoxicity; Squaric acid; Strontium–calcium complex; Strontium–magnesium complex

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62) Balasubramonian, M.[a] , Ramachandran, R.[b] , Veerasamy, V.[c] , Albert, P.A.C.P.[b] , Wahab, N.I.A.[c]

A comprehensive analysis of numerical techniques for estimation of solar PV parameters under dynamic environmental condition
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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 (Rse), shunt resistance (Rsh), diode ideality factor (A), light generated current (ILG), diode reverse saturation current (Isat) 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, U5-80, 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 agreement with experimental results.

Author Keywords
Gauss-Seidel; Maximum power point; Newton-Raphson; Single diode model; Solar PV parameter estimation

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63) Veerasamy, V.[a] , Abdul Wahab, N.I.[b] , Ramachandran, R.[c] , Othman, M.L.[b] , Hizam, H.[b] , Satheesh Kumar, J.[c] , Irudayaraj, A.X.R.[b]

Design of single- and multi-loop self-adaptive PID controller using heuristic based recurrent neural network for ALFC of hybrid power system
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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

Author Keywords
Automatic load frequency control; Heuristic based hopfield neural network; Hybrid power system; Particle swarm optimization-Gravitational search algorithm

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64) Govindaraj, V.[a] , Thirumalasamy, S.[b] , Sankar, J.I.[c] , Gopi, S.[d]

Groundwater potential mapping and natural remediation through artificial recharge structures in Vellore District, Tamil Nadu, India using geospatial techniques
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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 km2, moderate water is 736.3 km2, and 18 villages have 'poor' occurrences of 586.7 km2, 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.

Author Keywords
Artificial recharge structures; Geospatial techniques; Groundwater potential; India; Natural remediation; Vellore District

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65) Ravathi, M.C.[a] , Chithra, R.[b] , Saranya, E.[b]

Experimental and Analytical Evaluation of the Mechanical Properties of High-Strength Self-Curing Concrete with Recycled Fine Aggregates
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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.

Author Keywords
High-strength concrete; Recycled fine aggregates (RFA); Regression analysis; Self-curing

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66) Periyasamy, S.[a] , Karthik, V.[b] , Senthil Kumar, P.[c d] , Isabel, J.B.[e] , Temesgen, T.[a] , Hunegnaw, B.M.[a] , Melese, B.B.[a] , Mohamed, B.A.[f g] , Vo, D.-V.N.[h]

Chemical, physical and biological methods to convert lignocellulosic waste into value-added products. A review
(2022) *Environmental Chemistry Letters*, 20 (2), pp. 1129-1152. Cited 86 times.

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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 CO2 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.

Author Keywords
Industrial applications; Lignocellulosic biomass; Monomeric sugars; Potential agricultural wastes; Pretreatment methods

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67) Dhandayuthapani, K.[a] , Kumar, P.S.[b] , Chia, W.Y.[c] , Chew, K.W.[d e] , Karthik, V.[f] , Selvarangaraj, H.[a] , Selvakumar, P.[g] , Sivashanmugam, P.[h] , Show, P.L.[c]

Bioethanol from hydrolysate of ultrasonic processed robust microalgal biomass cultivated in dairy wastewater under optimal strategy
(2022) *Energy*, 244, art. no. 122604, . Cited 18 times.

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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−2s−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

Author Keywords
Bioethanol; Chlorella sorokiniana NITTS3; Dairy wastewater; Microalgal biomass; Microalgal hydrolysates; Ultrasonic pre-treatment

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68) Chitra, S.[a] , Jayakumar, J.[b] , Venkateshkumar, P.[b] , Chacko, S.[b] , Sivabalan[a]

Identification of Power Leakage and Protection of Over Voltage in Residential Buildings
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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

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69) Nagarajan, V.[a] , Solaiyappan, A.[a] , Mahalingam, S.K.[b] , Nagarajan, L.[b] , Salunkhe, S.[b] , Nasr, E.A.[c] , Shanmugam, R.[d] , Hussein, H.M.A.M.[e f]

Meta-Heuristic Technique-Based Parametric Optimization for Electrochemical Machining of Monel 400 Alloys to Investigate the Material Removal Rate and the Sludge
(2022) *Applied Sciences (Switzerland)*, 12 (6), art. no. 2793, . Cited 13 times.

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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 14 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 conflicting performances (i.e., MRR = 0.242 g/min and NP = 57.7202 PPM). Hence, it is confirmed that these metaheuristic algorithms of MFO and GWO are more suitable for finding the optimum process parameters for machining Monel 400 alloys with ECM. This work explores a greater scope for the ECM process with better machining performance. © 2022 by the authors. Licensee MDPI, Basel, Switzerland.

Author Keywords
electrochemical machining (ECM); grey wolf optimizer (GWO); material removal rate (MRR); Monel 400 alloys; moth-flame optimization algorithm (MFO); nickel presence (NP)

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70) Chinnappan, B.A.[a] , Krishnaswamy, M.[a] , Thanigachalam, M.[b] , Xu, H.[c] , Khan, S.I.[d] , Hoque, M.E.[d]

Fabrication, Characterization and In Vitro Assessment of Laevistrombus canarium-Derived Hydroxyapatite Particulate-Filled Polymer Composite for Implant Applications
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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 melting temperature (Tm) was found to be 128.4◦C for the same 30 wt% of HDPE/LC composite specimen. Excellent cell viability was observed during the in vitro biocompatibility study for EtO-sterilized 30 wt% of HDPE/LC composite specimen, except for a report of mild cytotoxicity in the case of higher concentration (50 µL) of the MG-63 cell line. The results demonstrate the potential of the fabricated composite as a suitable biomaterial for medical implant applications.

Author Keywords
Cytotoxicity; DSC; FESEM; Laevistrombus canarium; Seashell particulates; TGA

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71) Banu, A.[a] , Jones, B.F.[b] , Muthuraj, V.[b] , Govindan, K.[c] , Senthil kumar, P.[d] , Sasikumar, M.[e] , Thamilselvan, M.[f] , Vidhya, B.[g] , Rajesh, S.[g] , Sakunthala, A.[g]

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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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 MgMn2O4 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 MgMn2O4 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 MgNi0.5Mn1.5O4 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.

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72) Shoba, B., Jeyanthi, J.

Performance Analysis of Rubber Seed Shell Activated Carbon Incorporated Polymeric Membrane for the Separation of Oil-in-Water Emulsion
(2022) *Journal of Polymers and the Environment*, 30 (3), pp. 1055-1071. Cited 4 times.

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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 (Rq) 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. © 2021, The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature.

Author Keywords
Antifouling properties; COD removal efficiency; Composite membrane; Rubber seed shell activated carbon; Surface morphology

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73) Tamil Elakkiya, V.[a] , Meenakshi, R.V.[a] , Senthil Kumar, P.[b] , Karthik, V.[c] , Ravi Shankar, K.[a] , Sureshkumar, P.[a] , Hanan, A.[a]

Green synthesis of copper nanoparticles using Sesbania aculeata to enhance the plant growth and antimicrobial activities
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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).

Author Keywords
Analysis; Antimicrobial activities; Biofertilizer; Inhibition; Nanoparticles; Plant growth

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74) Manojkumar, N.[a] , Muthukumaran, C.[b] , Sharmila, G.[b]

A comprehensive review on the application of response surface methodology for optimization of biodiesel production using different oil sources
(2022) *Journal of King Saud University - Engineering Sciences*, 34 (3), pp. 198-208. Cited 54 times.

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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
Biodiesel; CCD; Oils; Optimization; RSM

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75) Subramanian, S.[a] , Gounder, Y.K.[a] , Linganathan, S.[b]

Day-ahead solar irradiance forecast using sequence-to-sequence model with attention mechanism
(2022) *Indonesian Journal of Electrical Engineering and Computer Science*, 25 (2), pp. 900-909. Cited 1 time.

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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. © 2022 Institute of Advanced Engineering and Science. All rights reserved.

Author Keywords

Attention; Long short-term memory; Sequence-to-sequence LSTM; Solar irradiance forecast

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76) Saravanakumar, R.[a] , Muthukumaran, K.[b] , Sivasankari, C.[b] , Sathiyapriya, N.[c] , Sakthipandi, K.[d]

Role of Purged Air in the Synthesis of the Mesoporous NiO/C Composite and Its Application in Wastewater Treatment
(2022) *Water, Air, and Soil Pollution*, 233 (2), art. no. 53, . Cited 4 times.

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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 (pHpzc), 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 qe (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. © 2022, The Author(s), under exclusive licence to Springer Nature Switzerland AG.

Author Keywords
Adsorption; Carbon composite; Heavy metal ions; NiO/carbon; Pb(II) ion removal; Role of dissolved gases

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77) Velusamy, K.[a] , Periyasamy, S.[b] , Kumar, P.S.[c d] , C., F.C.[c d] , Jayaraj, T.[e] , Gokulakrishnan, M.[a] , Keerthana, P.[a]

Transformation of aqueous methyl orange to green metabolites using bacterial strains isolated from textile industry effluent
(2022) *Environmental Technology and Innovation*, 25, art. no. 102126, . Cited 25 times.

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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
Aeromonas hydrophila; Degradation; Metabolites; Methyl orange; Wastewater

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78) Manikandan, V.[a] , Marnadu, R.[b] , Chandrasekaran, J.[c] , Vigneselvan, S.[d] , Mane, R.S.[e] , Banks, C.E.[f] , Mirzaei, A.[g]

Inherent characteristics of ultra-photosensitive Al/Cu-CeO2/p-Si metal oxide semiconductor diodes
(2022) *Journal of Materials Chemistry C*, 10 (4), pp. 1445-1457. Cited 7 times.

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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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79) Anitha, J.[a] , Selvakumar, R.[b] , Hema, S.[c] , Murugan, K.[d] , Premkumar, T.[e]

Facile green synthesis of nano-sized ZnO using leaf extract of Morinda tinctoria: MCF-7 cell cycle arrest, antiproliferation, and apoptosis studies
(2022) *Journal of Industrial and Engineering Chemistry*, 105, pp. 520-529. Cited 22 times.

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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 IC50 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

Author Keywords
Breast cancer; Green synthesis; Morinda tinctoria; Nuna; Zinc oxide nanoparticles

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80) Alagarsamy, A.[a] , Chandrasekaran, S.[b] , Manikandan, A.[c d]

Green synthesis and characterization studies of biogenic zirconium oxide (ZrO2) nanoparticles for adsorptive removal of methylene blue dye
(2022) *Journal of Molecular Structure*, 1247, art. no. 131275, . Cited 52 times.

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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 R2 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

Author Keywords
Adsorption; Desorption; Methylene blue; Nanoparticles; Sapindus mukorossi; Zirconium oxide

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81) Ramasamy, S.[a] , Gatto, G.[b] , Kumar, A.[b]

Various Non-Isolated Three Phase grid-integrated PV Inverter Topologies for Leakage Current Reduction-A simulation-based study
(2022) *2022 IEEE International Power and Renewable Energy Conference, IPRECON 2022*, . Cited 4 times.

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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
CMV; grid-connected PV systems; LC reduction; Three-phase transformerless inverter topologies

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82) Karthik, V.[a] , Periyasamy, S.[b] , Beula Isabel, J.[c] , Kalaivani, S.[d] , Temesgen, T.[b]

Application of Biochar for Wastewater Treatment
(2022) *Biochar and its Application in Bioremediation*, pp. 363-380. Cited 5 times.

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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.

Author Keywords
Adsorption; Biochar; Biochar surface modification; Bioremediation; Pollutant removal; Wastewater

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2-s2.0-85149587984

83) Anita, M.[a] , Meena Kowshalya, A.[b] , Maheswari, B.[c] , Muthuram, A.[d]

An Extensive Review of Machine Learning Techniques for EEG Signal Processing
(2022) *International Conference on Automation, Computing and Renewable Systems, ICACRS 2022 - Proceedings*, pp. 669-673. Cited 1 time.

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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 it 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.

Author Keywords
Classification; Decomposition; Electroencephalogram (EEG); Preprocessing; Seizure

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84) Puvendran, H.L.[a] , Narmadhai, N.[b]

A Compact Integrated Converter for Plug-In Electric Vehicles
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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 kW/h 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

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85) Jothi Lakshmi, S.[a] , Deepa, P.[b]

Blind image deblurring using GLCM and negans obtuse mono proximate distance
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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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86) Kandasamy, J.[a] , Arunagirinathan, S.[a] , Sivaraj, P.[b] , Pameela, M.[c] , Subham, G.T.[a] , Nagarajan, R.[d]

Detection of Cyber Attack in Electric Vehicles using ALSTM based Machine Learning
(2022) *4th International Conference on Inventive Research in Computing Applications, ICIRCA 2022 - Proceedings*, pp. 596-600. Cited 1 time.

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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.

Author Keywords
Advanced Long Short Term Memory; Cyber threats; Double powered system; Electric Vehicles; Modeling of cyber attacks

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87) Sadheesh, S.[a] , Jeyanthi, J.[b] , Mohan, L.R.[a] , Reshmi, N.[a] , Sashwath, Y.G.[a]

Effects of air pollution due to vehicular emission in coimbatore and reduction strategies: A review
(2022) *IOP Conference Series: Earth and Environmental Science*, 1125 (1), art. no. 012004, . Cited 1 time.

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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.

Author Keywords
Air Pollution; Air quality Index; Pollutants; Transportation; Vehicular emission

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88) Suganya, T.[a] , Rajendran, V.[b] , Mangaiyarkarasi, P.[a]

Analysis of Equivalent Skin Model with Battery-Less Cardiac Pacemaker using Improved MPPT Controller
(2022) *6th International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud), I-SMAC 2022 - Proceedings*, pp. 331-339.

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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. © 2022 IEEE.

Author Keywords
arithmetic optimization algorithm and maximum power point tracking; Implantable Cardiac Pacemaker; Skin equivalent model

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89) Raghappriya, M.[a] , Kanthalakshmi, S.[b]

Pitch and yaw motion control of 2 DoF helicopter subjected to faults using sliding-mode control
(2022) *Archives of Control Sciences*, 32 (2), pp. 359-381. Cited 1 time.

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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. Copyright © 2022. The Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (CC BY-NC-ND 4.0 https://creativecommons.org/licenses/by-nc-nd/4.0/), which permits use, distribution, and reproduction in any medium, provided that the article is properly cited, the use is non-commercial, and no modifications or adaptations are made

Author Keywords
actuator; component faults; fault tolerant control; reaching law; sensor; sliding mode control; super-twisting

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90) Karunanidhi, S.[a] , Decruz, A.M.M.A.J.[b] , Kasimani, R.[c]

Processing on Curcuma longa waste oil-diesel blends for using as better alternative to diesel fuel
(2022) *Science and Technology for Energy Transition (STET)*, 77 (3), art. no. 18, .

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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. © The Author(s), published by EDP Sciences, 2022.

Author Keywords
Alternative fuels; Curcuma longa; Diesel; Grey Relational Analysis; Performance characteristics; Renewable energy sources

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91) Suguna, A.[a] , Deepa, S.N.[b] , Rajasingam, N.[c]

Modeling and Tuning of PID Controller for Continuous Stirred Tank Reactor
(2022) *Lecture Notes in Electrical Engineering*, 758, pp. 817-823.

DOI: 10.1007/978-981-16-2183-3_77

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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

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92) Khan, K.A., Rama, M.

Finite Element Analysis and simulation of missile impact on Nuclear Reactor Containment Structure
(2022) *Electronic Journal of Structural Engineering*, 22 (2), pp. 27-32. Cited 1 time.

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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.

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93) Devi, R., Gopalakrishnan, V.

Up-Link/Down-Link Availability Calculation in Cloud Using Ford Fulkerson Algorithm
(2022) *Communications in Computer and Information Science*, 1631, pp. 76-90.

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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 algorithm is efficient when compared to the existing measurement methodologies like Trouble Ticketing, Device reach-ability and SNMP (Simple Network Maintenance Protocol).

Author Keywords
Availability; Cloud customers; Cloud providers; Ford Fulkerson; Open Shortest Path First; Routing Information Protocol

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94) Gopalakrishnan, P.[a] , Jeyanthi, J.[b]

Importance of radon assessment in indoor Environment-a review
(2022) *Materials Today: Proceedings*, 56, pp. 1495-1500. Cited 7 times.

DOI: 10.1016/j.matpr.2021.12.534

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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

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95) Babu, B.R.[a] , Thenmozhi, R.[b]

PREDICTION OF COMPRESSIVE STRENGTH OF SINTERED FLY ASH AGGREGATE CONCRETE USING ARTIFICIAL NEURAL NETWORKING
(2022) *Revista Romana de Materiale/ Romanian Journal of Materials*, 52 (3), pp. 311-317.

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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 lightweight 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
Lightweight Concrete; MATLAB; Neural Networking; sintered fly ash aggregate

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96) Kumaraswamy, S.[a] , Singaram, J.[b]

Statistical optimization of lipase production from oil mill effluent by Acinetobacter sp. KSPE71 [СТАТИСТИЧКА ОПТИМИЗАЦИЈА ПРОИЗВОДЊЕ ЛИПАЗЕ ИЗ ОТПАДА УЉАРЕ ПРИМЕНОМ Acinetobacter SP. KSPE71]
(2022) *Journal of the Serbian Chemical Society*, 87 (9), pp. 997-1010.

DOI: 10.2298/JSC220119038K

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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 % NH4Cl 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.

Author Keywords
enzyme for fat hydrolysis; industrial waste; oil degradation; recycle of lipid waste; submerged fermentation; waste valorisation

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97) Rithic, C.H., Srinivasan, N., Anbu, S.

Design and Development of Temperature Controlled Intelligent Portable Reefer Container for Delivery Optimisation in Logistics and Supply Chain Management
(2022) *3rd International Conference on Electronics and Sustainable Communication Systems, ICESC 2022 - Proceedings*, pp. 58-63.

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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.

Author Keywords
Embedded C; ESP32 microcontroller; Firebase; Heroku database; Over The Air (OTA) updates; Python; Temperature Control; Thermoelectric-cooling

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98) Dilip Charaan, R.M.[a] , Therasa, P.R.[a] , Lavanya Jeya, B.[b]

Solar Aware Routing with Super Capacitors to Balance Energy in Unequal Clusters for WSN
(2022) *3rd International Conference on Electronics and Sustainable Communication Systems, ICESC 2022 - Proceedings*, pp. 1689-1695. Cited 2 times.

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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.

Author Keywords
Energy Efficiency; LEACH; Routing; Super Capacitor; WSN

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99) Raag Harshavardhan, P.[a] , Subbaiyan, A.[b] , Vasavi, U.[a] , Thirumoorthy, P.[b] , Periyasamy, M.[c] , Jesteena Johney, J.[d] , Ragunathan, R.[d] , Pichaipillai, S.[e] , Velusamy, S.[b] , Balamoorthy, D.[f]

Enhanced Biodegradation of Battery-Contaminated Soil Using Bacillus sp. (MZ959824) and Its Phytotoxicity Study
(2022) *Advances in Materials Science and Engineering*, 2022, art. no. 5697465, . Cited 5 times.

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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. © 2022 P. Raag Harshavardhan et al.

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100) Kalvinathan, V.[a] , Chitra, S.[b]

Power Optimization in Hybrid Renewable Energy Standalone System using SMC-ANFIS
(2022) *Advances in Electrical and Computer Engineering*, 22 (3), pp. 69-78. Cited 3 times.

DOI: 10.4316/AECE.2022.03008

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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
Fuel cell; Hybrid system; Performance analysis; Photo voltaic; Power management

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101) Babu, B.R.[a] , Thenmozhi, R.[b]

Behaviour of sintered fly ash aggregates and steel fibers on rein-forced concrete slabs subjected to punching
(2022) *Revista de la Construccion*, 21 (2), pp. 228-247. Cited 1 time.

DOI: 10.7764/RDLC.21.2.228

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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 fibers 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.

Author Keywords
Abaqus; Aci 2011; Is 456; Punching shear strength; Sintered fly ash aggregates; Steel fibers

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102) Karthik, V.[a] , Periyasamy, S.[b] , Beula Isabel, J.[c] , Temesgen, T.[b]

Restoration of Contaminated Agricultural Soils
(2022) *Biochar and its Application in Bioremediation*, pp. 381-401. Cited 4 times.

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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
Agricultural soils; Contaminated soil restoration; Human-made pollutants; Soil restoration techniques; Stable ecosystem

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103) SN CH Dattu, V.[a] , Lokesh, M.[b] , Kumar, A.[c] , Rajkumar, M.[d] , Aezhisai Vallavi, M.S.[e] , Sagai Francis Britto, A.[f]

Mechanical characterization of polymer composite reinforced with Bio-fillers
(2022) *Materials Today: Proceedings*, 69, pp. 695-699. Cited 8 times.

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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
Bio-filler; Epoxy composite; Mechanical properties; Polymer composite; Tamarind seed powder

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104) Jagadheeswari, R.[a] , Oorkalan, A.[a] , Chithra, S.[b] , Srinivasan, N.P.[c]

Experimental and examination of Recron 3S fibre on reinforced concrete
(2022) *Materials Today: Proceedings*, 69, pp. 645-649. Cited 4 times.

DOI: 10.1016/j.matpr.2022.06.537

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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

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105) Divakar, S.[a] , Chitharthan, S.[b] , Shanmugapriyan, V.G.[c] , Thalaieswaran, S.[a] , Gopinath, K.[a]

Optimization of process parameters for mechanical properties of Al- Al2O3- graphite hybrid composite fabricated using stir casting process
(2022) *Materials Today: Proceedings*, 65, pp. 3937-3945. Cited 1 time.

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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 Al2O3 (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 Al2O3 MMC having 0.5% graphite, and 6% Al2O3 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

Author Keywords
Composite Materials; Matrix material; Mechanical Properties; Reinforcement; Taguchi

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106) Natarajan, E.[a] , Kaviarasan, V.[b] , Lim, W.H.[a] , Ramesh, S.[c] , Palanikumar, K.[d] , Sekar, T.[e] , Mok, V.H.[a]

Gorilla Troops Optimizer Combined with ANFIS for Wire Cut EDM of Aluminum Alloy
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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 σ = 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. © 2022 Elango Natarajan et al.

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107) Sundaramoorthi, P.[a] , Venkatesh, G.S.[b] , Moorthy, V.P.[c]

DSTATCOM BASED ADDITIVE AND SUBTRACTIVE TOPOLOGY MULTILEVEL INVERTER FOR IMPROVING POWER

QUALITY
(2022) *International Journal on Technical and Physical Problems of Engineering*, 14 (2), pp. 36-45. Cited 2 times.

[a] Nehru College of Engineering and Research Centre, Kerala, Thrissur, India
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[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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108) Praburanganathan, S.[a] , Chithra, S.[b]

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
(2022) *International Journal of Masonry Research and Innovation*, 7 (4), pp. 366-394.

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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.

Author Keywords
brick; copper slag; crumb rubber; durability; granite waste; industrial waste rejects; masonry units; strength; ultrasonic pulse velocity

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2-s2.0-85133603119

109) Chinnachamy, M.[a] , Balakrishnan, R.[b]

Experimental investigation on machining characteristics of EN24 alloy steel using desirability approach

(2022) *Materials Today: Proceedings*, 65, pp. 3581-3589. Cited 3 times.

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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
Cutting tool temperature; Desirability; EN24; Response surface methodogy; Surface roughness; Turning

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110) Kumaravel, P.[a] , Suresh, P.[a] , Raja, K.V.[a] , Sekar, T.[b]

Improvement of Micro-Electrochemical Discharge Machining of Austenitic Stainless Steel 316L using NaOH electrolyte containing N2
(2022) *International Journal of Electrochemical Science*, 17, art. no. 220747, . Cited 4 times.

DOI: 10.20964/2022.07.53

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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. © 2022. The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (http://creativecommons.org/licenses/by/4.0/).

Author Keywords
Duty cycle; Electrolyte concentration; Mrr; Naoh electrolyte; Twr; Voltage; Mecdm

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2-s2.0-85132213904

111) Abinaya, S.[a] , Rajasenbagam, T.[b]

Enhanced Visual Analytics Technique for Content-Based Medical Image Retrieval
(2022) *International Journal of Electrical and Electronics Research*, 10 (2), pp. 93-99. Cited 3 times.

DOI: 10.37391/IJEER.100207

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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. © 2022 by S.Abinaya and T.Rajasenbagam.

Author Keywords
Content-based image retrieval; Image retrieval; Lung CT images; Visual Analytics for Medical Image Retrieval (VAMIR)

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2-s2.0-85131685712

112) Nafisa Begam, M.N.[a] , Muthukumaran, K.[b] , Thamarai, P.[c] , Joshua, J.P.[d]

Adsorption isotherm and kinetic studies for the decolorization of sunset yellow FCF dye using economically feasible low-cost adsorbent
(2022) *Global Nest Journal*, 24 (2), pp. 276-285. Cited 3 times.

DOI: 10.30955/gnj.004266

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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.

Author Keywords
Adsorption; mixed fruit peel waste adsorbent; sunset yellow

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2-s2.0-85130979276

113) Vengatajalapathi, N., Ayyappan, S., Rajasekar, V.

Eco-friendly filtration of Nickel from the sludge during electrochemical machining of Monel 400 alloys
(2022) *Global Nest Journal*, 24 (2), pp. 203-211. Cited 2 times.

DOI: 10.30955/gnj.004226

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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.

Author Keywords
Eco-friendly Electrochemical Machining (EECM); Environmental pollutants; Material Removal Rate (MRR); Monel400 combination alloys

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2-s2.0-85130926815

114) Mugilan, T.[a] , Sridhar, N.[a] , Sathishkumar, G.B.[b]

Multi response hybrid optimization of sustainable high-speed end milling on 89.7Ti-6Al-4V
(2022) *Materials Today: Proceedings*, 65, pp. 3170-3176. Cited 1 time.

DOI: 10.1016/j.matpr.2022.05.362

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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

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115) Anbu, S.[a b] , Senthilkumar, M.[c d] , Murugesh, T.S.[c d]

Design of a Multiloop Controller for a Nonlinear Process
(2022) *International Journal of Advanced Computer Science and Applications*, 13 (4), pp. 290-299. Cited 1 time.

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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.

Author Keywords
closed loop performance; interaction; multi input multi output control; Nonlinear process; stability

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116) Praburanganathan, S.[a] , Chithra, S.[b] , Divyah, N.[b] , Sudharsan, N.[c] , Reddy, Y.B.S.[a] , Vigneshwaran[a]

Value-added waste substitution using slag and rubber aggregates in the sustainable and eco-friendly compressed brick production
(2022) *Revista de la Construccion*, 21 (1), pp. 5-20. Cited 8 times.

DOI: 10.7764/RDLC.21.1.5

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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.

Author Keywords
Copper slag; Mechanical properties; Microstructure; Recycled waste; Rubber aggregate

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117) Madhumathi, R.[a] , Kowshalya, A.M.[b] , Shruthi, R.[a]

Assessment of Sentiment Analysis Using Information Gain Based Feature Selection Approach
(2022) *Computer Systems Science and Engineering*, 43 (2), pp. 849-860. Cited 2 times.

DOI: 10.32604/csse.2022.023568

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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.

Author Keywords
document level; feature level; information gain; sentence level; Sentiment analysis

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CODEN: CSSEE
2-s2.0-85129263305

118) Azhagan, S.A.C.[a] , Marianandhakumar, V.[b]

Binary mixture of lithium chloride and methyl orange dye on adipic acid crystallization from methanol solvent and their characterization studies
(2022) *Molecular Crystals and Liquid Crystals*, 744 (1), pp. 109-123.

DOI: 10.1080/15421406.2022.2057706

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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. © 2022 Taylor & Francis Group, LLC.

Author Keywords
Adipic acid; crystal growth; crystal structure; FTIR; powder XRD; recrystallization

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119) Arulmozhi, N.[a] , Albert Victorie, T.A.[b]

Kalman Filter and H∞Filter Based Linear Quadratic Regulator for Furuta Pendulum
(2022) *Computer Systems Science and Engineering*, 43 (2), pp. 605-623. Cited 2 times.

DOI: 10.32604/csse.2022.023376

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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. © 2022 CRL Publishing. All rights reserved.

Author Keywords
Furuta pendulum; kalman filter; linear quadratic regulator; non-linear process; two filter configurations

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120) Samuel Hansen, R.[a] , Blessy Queen Mary, M.[b] , Somesh Subramanian, S.[c] , Aldrin Raj, J.[c] , Joe Patrick Gnanaraj, S.[d] , Appadurai, M.[e]

Utilization of PCM in inclined and single basin solar stills to improve the daily productivity
(2022) *Materials Today: Proceedings*, 62, pp. 967-972. Cited 11 times.

DOI: 10.1016/j.matpr.2022.04.092

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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, steeped 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, 74.5% 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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121) Kandasamy, J.[a] , Ramachandran, R.[a] , Veerasamy, V.[b]

Automatic Load Frequency Control for Interconnected Micro-Grid System
(2022) *Proceedings of the International Conference on Electronics and Renewable Systems, ICEARS 2022*, pp. 222-227. Cited 3 times.

DOI: 10.1109/ICEARS53579.2022.9752042

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[b] Nanyang Technological University, School of Elcetrical 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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122) Arumugamurthi, S.S.[a] , Sivanandi, P.[b] , Kandasamy, S.[c]

Biodiesel production from non-edible crops using waste tyre heterogeneous acid catalyst
(2022) *Energy Sources, Part A: Recovery, Utilization and Environmental Effects*, 44 (2), pp. 3223-3238. Cited 11 times.

DOI: 10.1080/15567036.2022.2062492

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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.

Author Keywords
Biodiesel; catalyst; pongamia pinnata; spent tyre waste; transesterification

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123) Madhuvanthi, S., Selvapriya, K., Nirmala, R.A., Agalya, A., Jeya, N.

Extraction and characterization of pectin derived from underutilized papaya seeds as a value-added product
(2022) *Journal of Applied and Natural Science*, 14 (1), pp. 127-132. Cited 7 times.

DOI: 10.31018/jans.v14i1.3269

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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.

Author Keywords
Gas chromatography; Methoxy content; One factor at a time; Pectin; Proximate Analysis

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124) Kiruba, D.A.[a] , Muthukumaran, K.[b] , Thamarai, P.[c]

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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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 87.1% removal efficiency for Ni(II) ions. Pseudo-second order correlations had a higher R2 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 (R2 = 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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125) Arunkumar, S., Ramesh, K.

Design and optimization of solar parabolic trough collector with evacuated absorber by grey relational analysis
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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.

Author Keywords
Evacuated absorber; Grey relational analysis; Parabolic trough collector; Performance analysis; Solar energy

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126) Malarvizhi, T.[a] , Muthukumaran, K.[b] , Thamarai, P.[c]

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
(2022) *Desalination and Water Treatment*, 245, pp. 286-296. Cited 1 time.

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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
Biosorption; Isotherm studies; Methylene blue; Rice husk; Sugarcane bagasse; Wheat bran

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127) Vadivel, A.[a] , Periyasamy, S.[b] , Mithun Kumar, V.V.[a] , Praveen, M.[a]

Experimental Investigation on Performance and Emission Characteristics of Low Heat Rejection Engine Operating on Biodiesel
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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 Al2O3 and TiO2 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 CO2 were reduced in the Annona biodiesel-coated engine, the NOx emission improved in biodiesel in comparison to diesel fuel. © 2022, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author Keywords
Annona methyl ester; Low heat rejection; Thermal barrier coating

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128) Ayyakkannu, V.[a] , Sivanandi, P.[b] , Sampathkumar, A.[c]

Emission Analysis of Compression Ignition Engine with Induced Chemical Reaction Between Engine Exhaust and Slaked Calcium Hydroxide Solution
(2022) *Lecture Notes in Mechanical Engineering*, pp. 587-598.

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Abstract
In the current scenario, one of the primary challenges is global warming and the primitive task is to curtail the emission of CO2 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, CO2, and NOx 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, CO2, and CO by 13, 11.3, and 35%, respectively. The slight increase of the NOx 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.

Author Keywords
Calcium hydroxide solution; CI engine; Exhaust line

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129) Vasaki, M.[a] , Sithan, M.[a] , Ravindran, G.[b] , Paramasivan, B.[c] , Ekambaram, G.[d] , Karri, R.R.[e]

Biodiesel production from lignocellulosic biomass using Yarrowia lipolytica
(2022) *Energy Conversion and Management: X*, 13, art. no. 100167, . Cited 26 times.

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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 H2SO4 at 25 min of ultra-sonication provided the best depolymerisation 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 K2CO3 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.

Author Keywords
Biodiesel; In-situ transesterification; Lignocellulosic biomass hydrolysates; Oleaginous microorganism; Single-cell oil; Yarrowia lipolytica

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130) Thanigachalam, M., Muthusamy Subramanian, A.V.

Evaluation of PEEK-TiO2- SiO2 nanocomposite as biomedical implants with regard to in-vitro biocompatibility and material characterization
(2022) *Journal of Biomaterials Science, Polymer Edition*, 33 (6), pp. 727-746. Cited 11 times.

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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 TiO2 and SiO2 nanoparticles (NP) were used to reinforce the PEEK matrix. The PEEK/TiO2/SiO2 (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.

Author Keywords
antibacterial activity; biomaterial; cell adhesion; cytotoxicity; In-vitro; MG-63 cell line

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131) Thanigachalam, M., Muthusamy Subramanian, A.V.

In-vitro cytotoxicity assessment and cell adhesion study of functionalized nTiO2 reinforced PEEK biocompatible polymer composite
(2022) *Polymer-Plastics Technology and Materials*, 61 (5), pp. 566-576. Cited 7 times.

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Abstract
This research aims to develop a nontoxic PEEK-based acrylic acid-functionalized nTiO2 reinforced polymer nanocomposite fabricated by injection molding. Functional groups in PEEK, synthesized nTiO2, and PEEK+nTiO2 composite have been identified through FTIR analysis. Effect of acrylic acid-functionalized nTiO2 particles on the thermal degradation was investigated using DSC, TGA analysis, and biocompatibility of PEEK+nTiO2 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

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132) Ayyakkannu, V.[a] , Sivanandi, P.[b]

Effect of cerium oxide nanoadditive on Annona Methyl Ester in a thermally coated direct injection diesel engine
(2022) *International Journal of Ambient Energy*, 43 (1), pp. 5992-6006. Cited 2 times.

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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.

Author Keywords
Annona seed oil methyl ester; cerium oxide nanoadditive; diesel engine; NOx emission reduction; Thermal barrier coating

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133) Oliver, S.G.[a] , Purusothaman, T.[b]

Lightweight and secure mutual authentication scheme for IoT devices using CoAP protocol
(2022) *Computer Systems Science and Engineering*, 41 (2), pp. 767-780. Cited 14 times.

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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
AES; CoAP; Encryption; IoT; Message transmisssion

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134) Priya, M., Jeyanthi, J., Thiruvenkatamani, G.

Recycling of industrial waste material of fly ash cenosphere for the treatment of car wash water effluent
(2022) *Journal of Material Cycles and Waste Management*, 24 (1), pp. 321-332. Cited 1 time.

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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. © 2021, Springer Japan KK, part of Springer Nature.

Author Keywords
Characterisation; Chitosan; Contaminant removal; Fly ash cenosphere; Modification

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135) Manoharan, V.[a] , Tamilperuvalathan, S.[a] , Natarajan, E.[b] , Ponnusamy, P.[c]

Experimental Investigation on Electrochemical Discharge Machining of Zirconia
(2022) *Lecture Notes in Mechanical Engineering*, pp. 27-34. Cited 4 times.

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Abstract
In the present industrial development, an essential usage of hard materials such as ceramics immensely increased. Zirconia (ZrO2) 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.

Author Keywords
Box–Behnken design; Electrochemical discharge machining; Material removal rate; Zirconia

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136) Muthuvairavan, G.[a] , Soma Sundaram, S.[a] , Palani, P.K.[b]

Exergy Analysis of R1234yf and R1234ze as an Alternative to R134a in a Domestic Refrigeration System
(2022) *Lecture Notes in Mechanical Engineering*, pp. 975-982. Cited 2 times.

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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.

Author Keywords
Alternate refrigerants; Coefficient of performance; Exergy analysis; Irreversibility; Second law of thermodynamics; Vapor compression refrigeration system

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137) Vijayakumar, K.[a] , Sekar, T.[b] , Vijay, M.[b]

Experimental Studies on Material Removal Rate of Die Steel in Electrochemical Micromachining Process Using Taguchi Method
(2022) *Lecture Notes in Mechanical Engineering*, pp. 181-187.

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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
Die steel; ECMM; MRR; Taguchi method

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138) Yamini, C.[a] , Sharmila, G.[b] , Muthukumaran, C.[b] , Pavithran, K.[a] , Manojkumar, N.[a]

Proteomic perspectives on thermotolerant microbes: an updated review
(2022) *Molecular Biology Reports*, 49 (1), pp. 629-646. Cited 4 times.

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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.

Author Keywords
iTRAQ; Mass spectrometry; Proteomics; Thermotolerant microbes

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139) C. J, A.[a] , Gopi, S.[b] , Mohan, D.G.[c] , ShashiKumar, S.[d]

Predicting the ultimate tensile strength and wear rate of aluminium hybrid surface composites fabricated via friction stir processing using computational methods
(2022) *Journal of Adhesion Science and Technology*, 36 (16), pp. 1707-1726. Cited 20 times.

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Abstract
In the present study, aluminium hybrid surface composites were prepared by incorporating boron carbide (B4C) and Aluminium oxide (Al2O3) 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.

Author Keywords
ceramics; computational methods; friction stir processing; Hybrid surface composites; wear rate

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140) Amuthambigaiyin Sundari, K.[a] , Maruthupandi, P.[b]

Optimal Design of PID Controller for the analysis of Two TANK System Using Metaheuristic Optimization Algorithm

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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
Bubble net whale optimisation algorithm (BNWOA); Interactive and non-interactive tank; Meta-heuristic algorithm; PID controller

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141) Padmanabhan, G.[a] , Subitha, T.[b] , Kishore, K.S.[b]

Influence of Eco-Sand Drains on the Performance of Consolidation Characteristics Founded on Soft Clay Deposits
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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.

Author Keywords
Consolidation; Drainage; Soft clay

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142) Arunachalam Sivagurulingam, A.P.[a] , Sivanandi, P.[b] , Pandian, S.[c]

Isolation, mass cultivation, and biodiesel production potential of marine microalgae identified from Bay of Bengal
(2022) *Environmental Science and Pollution Research*, 29 (5), pp. 6646-6655. Cited 9 times.

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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.

Author Keywords
Biomass; Fatty acid; Identification; Investigation; Lipids; Sulfuric acid

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143) Rajasenbagam, T.[a] , Jeyanthi, S.[b] , Uma Maheswari, N.[b]

Floor Plan Designer Application by Predicting Spatial Configuration Using Machine Learning
(2022) *Lecture Notes in Networks and Systems*, 191, pp. 665-673.

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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.

Author Keywords
Floor plan; Machine learning; Spatial recognition

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144) Kanthalakshmi, S.[a] , Raghappriya, M.[b]

Active fault diagnosis of 2 DoF helicopter using particle filter-based log-likelihood ratio
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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.

Author Keywords
actuator and component faults; Fault diagnosis; likelihood ratio; non-linear filtering; particle filter; sensor

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145) Sampathkumar, S.[a] , Rajeswari, R.[b]

An Automated Crop and Plant Disease Identification Scheme Using Cognitive Fuzzy C-Means Algorithm
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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, Seeding 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.

Author Keywords
Approximation; Filtering; Horticulture; Image mining; Noise removal; Plant pathology; Suspicious region segmentation

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146) Booramurthy, V.K.[a] , Kasimani, R.[b] , Pandian, S.[c]

Biodiesel Production from Tannery Waste using a Nano Catalyst (Ferric-Manganese Doped Sulphated Zirconia)
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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-SO4/ZrO2). 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

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