IEI Epitome

September 2019, Volume 4, Number 9

Contents

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Members in the News

Dr Wooday P Krishna, FIE

Chairman, R&D Committee, IEI

Council Member of the Institution of Engineers (India) and President of Karnataka Gandhi Smarak Nidhi, Dr Wooday P Krishna has been nominated as Member of the Executive Committee of Bharatiya Vidya Bhavan's Gandhi Centre of Science and Human Values headquartered in Bengaluru for the term 2019-22.

Prof Amar Kumar Das, MIE

Assistant Professor, Department Of Mechanical Engineering, Gandhi Institute for Technology (GIFT), Bhubaneswar

Awarded Certificate of Appreciation from NPTEL, IIT Madras in recognition of his role as mentor for the NPTEL Online Certification Course offering IC Engines and Gas Turbines.

Successfully completed the Roving Seminar on the Patent Cooperation Treaty(PCT) organised by World Intellectual property Organisation (WIPO) in cooperation with Indian Patent Office(IPO) on 28 June , 2019.

Mr Vinay Kumar Shukla, *MIE*

Manager, Instrumentation Department, National Fertilizers Limited, Bhatinda

Awarded First Prize for work in Hindi noting and drafting letters and reports writing under Hindi Protsahan Yojana year 2018-19 of National Fertilizer Ltd.

Dr Sardar Ali, FIE

Professor and HOD, Department of Electrical and Electronics Engineering, Deccan College of Engineering and Technology, Hyderabad

Received 'Lifetime Achievement in Engineering Leadership' Award during the 2nd Higher Education Leadership Meet (HELM 2019) of Venus International Foundation on 5 January, 2019.

Mr Vimalathithan D P, AMIE

Mahendra Institute Engineering and Technology, Salem, Tiruchengode, Namakkal Dist. Tamilnadu

Nominated as "Faculty Adviser" of IEI Students' Chapter (Chemical) at Department of Petrochemical Engineering, Mahendra Institute of Engineering and Technology, Namakkal, Tamil Nadu for the year 2018-2019.

Mr Venkata Narayana Angina, MIE

Research Officer (Water Supply), National Institution for Transforming India (NITI Aayog), Government of India, New Delhi

Awarded "Master of Technology in Environmental Engineering" by Visvesvaraya National Institute of Technology (VNIT), Nagpur on 17th July, 2019 and the M Tech Thesis was presented on the topic 'Evaluation of Typical Rural Water Supply Systems in Haryana in Delhi-NCR Region'.

Mr Koppuravuri V Pratap, AMIE

Assistant Professor, Department of Civil Engineering, Narasaraopeta Engineering College (Autonomous), Narasaraopet, Guntur district, Andhra Pradesh

Received a special recognition under "Best Young Faculty" for the year 2019 from the DK International Research Foundation on 30 June 2019, under category DKIRF Awards at Perambalur, Tamilnadu.

Mr Rahul Nagnath Yerrawar, AMIE

Research Scholar, Savitribai Phule Pune University

Successfully completed Ph.D. in Mechanical Engineering on 20 May, 2019 on the topic "Parametric Analysis and Development of Methodology for Semi Active Vibration Control using a Magneto Rheological (MR) Damper" from Savitribai Phule Pune University.

Publication

Mr Varun Shukla, MIE
Assistant Professor, Department: Electronics & Communication, PSIT, Kanpur
E-mail: varun.shuklaa@gmail.com

Title of Paper: "Authentication Aspects of Dynamic Routing Protocols: Associated Problem & Proposed Solution", *International Journal of Recent Technology and Engineering, Volume 8, Issue 2, July 2019.*

DOI: 10.35940/ijrte.B1503.078219

Co-authors : Atul Chaturvedi, Neelam Srivastava

Abstract: Cryptography as a stream is very important for communication security. Cryptography provides many goals for communication security and authentication is one of them. Routing is an integral part of computer networks and router security is extremely important because routing provides suitable path to the traffic generated in the network. Authentication is very important for routing protocols. In this paper we discuss security flaws in routing authentication and provide a unique solution which is never presented to overcome this problem. We also discuss the security analysis of the proposed method which proves that the proposed method is robust in various aspects. The proposed method provides many advantages and the method is so simple that anybody can use it.

Keywords: Advance Encryption Standard (AES); Dynamic Routing; Exterior Gateway Protocol (EGP); Hash Functions; Interior Gateway Protocol (IGP); MD 5 hash

Mr Asim Kumar Nath, MIE
Jindal Steel & Power Limited, Angul, Odisha
E-mail: asim.nath@angul.jspl.com

Title of Paper: "Grid Power Management in Steel Plant", *Monthly Publication on Steel & Non-Ferrous Metal, Steel & Metallurgy, Kolkata, Volume 21 & Issue 05, March 2019.*

Abstract: All steel plants across the country set-up their own Captive Power Plant (CPP) for their use and at the same time synchronized them with the grid supply for their stability. Studies have shown that during starting a large motor, the frequency excursion will be in the order of 25% without grid support. The CPP continue to get connected to the utility system and operate their plant in synchronism with the grid due to the following reason:

- The grid provides stability to the plant to start large motors.
- The dip in voltage and frequency at the time of starting of large motors is minimized as the grid supply acts as an infinite bus.
- In some cases, the slow responses of the CPP's governors and excitation system will make the plant sluggish without the support of the grid.
- The shocks created by sudden load throw off's and consequent tripping of CPP's generator on over speed is avoided with the grid taking care of the shocks.
- The connection with the grid helps CPP's connected to Steel Melting Shop and Furnace i.e the system with fluctuating load in stabilizing their units.
- Therefore, the Grid acts as a supporting system for the CPPs for its successful operation in terms of electrical performances.

Keywords: Grid Power; Governor; Synchronous speed; Droop; Is-landing mode; NAS value

Publication

Dr G Vinay Kumar, AMIE
Chartered Engineer (Civil) and Certified UAV Practitioner, Associate Professor, R & D coordinator, Department of Civil Engineering, Dhanekula Institute of Engg & Tech, JNTU-K, Vijayawada
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Title of Paper: "Assessment of the Baspa Basin Glaciers Mass Budget using Different Remote Sensing Methods and Modeling Techniques", *Geocarto International, pp.1-21.*

https://doi.org/10.1080/10106049.2018.1516247

Co-authors : Kulkarni, A V and Gupta, A K

Abstract: Glacial melt water is the key source for various socio-industrial and domestic activities in the Himalayas. Several recent studies suggest that glaciers are experiencing rapid melt. The glaciers health can be best assessed by mass balance. However, the mass balance investigations using in-situ methods for a large sample of glaciers are highly difficult in the Himalaya. Hence, remote sensing methods and modeling techniques are preferred. However, there is a lack of information on uncertainties associated with these methods in assessing the regional scale mass balance. Hence, these methods are applied to evaluate the regional scale mass budget of Baspa basin, Western Himalaya between 2000 and 2011. The total mass loss estimated using geodetic method amounts to −0.49 ± 0.1 gigatons, temperature index method to −0.43 ± 0.012 gigatons and AAR method to −0.36 ± 0.1 gigatons. Furthermore, this study highlights the limitations of these methods in mass loss evaluation in data scarce Himalayan regions.

Keywords: Geodetic method; Accumulation area ratio method; Temperature index method; Baspa basin; Mass balance

Title of Paper: "Applications of SPOT-7 Tri-stereo Imagery in Deriving the Surface Topography and Mass Changes of Glaciers in Indian Himalaya", Geocarto International.

https://doi.org/10.1080/10106049.2019.1648567

Co-authors : A V Kulkarni, Helgi Bjornsson, Sriram Gullapalli and Mallesh Ballina

Abstract: The present study describes the application of satellite images of SPOT 7, acquired on 10th October 2014 for producing the high spatial resolution digital elevation models of five glaciers in the Indian Himalaya. For data processing, we applied a Semi-Global Matching algorithm deployed in LPS- ERDAS. Ground control points were also used for validation, which were obtained during the autumn of 2014. Then, precise estimate are derived for the glacier area, the terminus elevation, the areas of supraglacial debris and the areas of proglacial lakes. Further, the ASTER (obtained in 2011) and SRTM V3 (of 2000) elevation models were used in conjunction with the generated SPOT-7 DEM to estimate the glaciers mass balance between 2000, 2011 and 2014. Mass balance was observed negative for all five glaciers, but the mass loss decreased from the mean of -0.99 ± 0.27 m.w.e.a −1 in 2000- 2011 to -0.61 ± 0.31 m.w.e.a −1 from 2011 to 2014.

Keywords: SPOT-7 DEM; SGM algorithm; Baspa basin; Western himalaya

Title of Paper: "Reconciling High Glacier Surface Melting in Summer with Air Temperature in the Semi-Arid Zone of Western Himalaya", Water 2019, 11, 1561. Water (MDPI), 11(8), 1561.

https://doi.org/10.3390/w11081561

Co-authors : Pratap B, Sharma P, Patel L, Singh A T, Oulkar S, Thamban M

Abstract: In Himalaya, the temperature plays a key role in the process of snow and ice melting and, importantly, the precipitation phase changes (i.e., snow or rain). Consequently, in longer period, the melting and temperature gradient determine the state of the Himalayan glaciers. This necessitates the continuous monitoring of glacier surface melting and a well-established meteorological network in the Himalaya. An attempt has been made to study the seasonal and annual (October 2015 to September 2017) characteristics of air temperature, near-surface temperature lapse rate (tlr), in-situ glacier surface melting, and surface melt simulation by temperature-index (T-index) models for Sutri Dhaka Glacier catchment, Lahaul-Spiti region in Western Himalaya. The tlr of the catchment ranges from 0.3 to 6.5 °C km −1 , varying on a monthly and seasonal timescale, which suggests the need for avoiding the use of standard environmental lapse rate (SELR ~6.5 °C km −1). The measured and extrapolated average air temperature (tavg) was found to be positive on glacier surface (4500 to 5500 m asl) between June and September (summer). Ablation data calculated for the balance years 2015–16 and 2016–17 shows an average melting of −4.20 ± 0.84 and −3.09 ± 0.62 m w.e., respectively. In compliance with positive air temperature in summer, ablation was also found to be maximum ~88% of total yearly ice melt. When comparing the observed and modelled ablation data with air temperature, we show that the high summer glacier melt was caused by warmer summer air temperature and minimum spells of summer precipitation in the catchment.

Keywords: Himalayan glaciers; Summer melting; Temperature lapse rate and high-altitude observations

Publication

Dr Yogendra Arya, AMIE
Assistant Professor, Department of Electrical and Electronics Engineering, Maharaja Surajmal Institute of Technology, Janakpuri, New Delhi
E-mail: mr.y.arya@gmail.com

Title of Paper: "AGC of PV-thermal and Hydro-thermal Power Systems using CES and a New Multi-stage FPIDF-(1+PI) Controller," *Renewable Energy, Elsevier, Volume 134, pp. 796–806, Apr. 2019.*

DOI: https://doi.org/10.1016/j.renene.2018.11.071

Abstract: The interconnected power system with renewable energy sources is an intricate nonlinear system, which frequently brings to light the serious problem of the system frequency and tie-line power fluctuations due to deficient damping under severe and dynamically changing loading conditions. Primarily, the power system generation-demand equilibrium point amendments following a contingency and in this case, it is stiffer to recapture a tolerable equilibrium point via conventional control practices. To overcome this problem, advanced control techniques and fast acting energy storage systems (ESS) are requisite. The ESS such as capacitive energy storage (CES) units have tremendous capability in preserving the generation-demand balance and perpetuating the power grid frequency by effective damping of the power-frequency oscillations caused due to the sudden and variable load disturbances in power system. Hence, the impact of CES units in automatic generation control (AGC) of interconnected power system is analysed and contrasted critically in this paper. Motivated by the fact that fuzzy control techniques display superior performance under volatile operating conditions in contrast to conventional control strategies, this paper also proposes a new design of intelligent multi-stage fuzzy assisted PID with filter-(1 + PI) i.e., FPIDF-(1 + PI) controller to enhance the conduct of AGC of power system. Initially, a two-area photovoltaic-reheat thermal system is considered and the parameters of FPIDF-(1 + PI) controller are optimized utilising imperialist competition algorithm. The ascendancy of the proposed controller is substantiated by comparing the outcomes with PI/FPI/FPIDF controller based on various existing optimization techniques. It is observed that CES units installed in each control area sustain the area controller to restore the area frequency and tie-line power deviations adequately and hastily following a step load disturbance in an area. To exhibit the potency and scalability of CES and the proposed controller over other prevalent control methods, the study is also extended to a multi-unit multi-source hydro-thermal power system. Finally, robustness of the proposed controller with/without CES is validated under large changes in the system parameters and random load demands. Hence, the proposed approach asserts better and vigorous results to supply reliable and high-quality electric power to the end user.

Keywords: Energy system; Capacity energy storage; Optimized the PV system; Robust controller; Automatic generation control

Title of Paper: "A New Optimized Fuzzy FOPI-FOPD Controller for Automatic Generation Control of Electric Power Systems", *Journal of The Franklin Institute, Volume 356, Issue 11, pp. 5611–5629, May 2019, Elsevier*

DOI: https://doi.org/10.1016/j.jfranklin.2019.02.034

Abstract: In the rapidly expanding size and complexity of the electricity network, automatic generation control (AGC) is contemplated to be the most remarkable option for offering good quality electric power supply to the end users. An AGC system entails highly vigorous, competent and intelligent control technique to deliver a healthy power under stochastic nature of consumers' power demand. Hence, in this paper, a hybrid fuzzy fractional order proportional integral-fractional order proportional derivative (FFOPI-FOPD) controller is proposed as a new expert control technique to tackle AGC profitably in isolated and interconnected multi-area power systems. A recently developed imperialist competitive algorithm (ICA) is utilized for the optimization of the output gains (K_P /K_{P1} /K_I /K_D) and other parameters such as order of integrator (λ) and differentiator (μ) of FFOPI-FOPD controller exercising integral of squared error criterion. The proposed technique is firstly implemented on 1-area thermal system, then to express its potential and extensibility, the work is extended to 2-area hydro-thermal and 3-area thermal power systems widespread in the literature. The eminence of the method is betokened by comparing the results with the various newly published control methodologies and FPI/FFOPI controller designed in the study via ICA in terms of minimum values of various error criteria and undershoots/overshoots/settling times of frequency and tie-line power deviations following a sudden load demand in an area. The sensitivity analysis substantiates that the suggested controller is robust and performs staunchly under the wide variations in the system parameters, random load pattern and in the company of physical constraints to produce more clean electricity.

Keywords: Automatic generation control; FFOPI; FoPD

Publication

Dr Shanavas S., MIE
Associate Professor and Head, Department of Mechanical Engineering, MEA Engineering College
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Title of Paper: "Effect of Welding on Pitting and Intergranular Corrosion Behavior of Marine Grade Aluminum Alloy", *Materials Performance and Characterization (ASTM International), May 2019*

https://doi.org/10.1520/MPC20180118

Abstract: AA 5052 H32 aluminum alloy is one of the most commonly used materials in the marine environment due to its good formability, good weldability, and better corrosion resistance. Assessment of resistance of welds of the alloy against corrosion is necessary for reliable design. In the present study, pitting and intergranular corrosion behavior of tungsten inert gas (TIG), normal friction stir welding (FSW), and underwater FSW (UFSW) joints of AA 5052 H32 aluminum alloy and parent alloy are investigated. Electrochemical corrosion behavior by Tafel polarization technique and intergranular corrosion susceptibility by mass loss of the specimen in concentrated nitric acid solution are studied as per ASTM standards. The corrosion studies were conducted on welded plates for which welding parameters during TIG welding and FSW were kept optimum for maximum tensile strength. The result shows that corrosion resistance of welded joints is inferior to that of parent metals. Corrosion resistance of the FSW joint and UFSW joint are nearly equal and found to be higher compared with the TIG joint. Density and size of pits formed on the parent metal and welded joints are examined via macro- and microscopic analysis and atomic force microscopic study. Results also show that the specimens welded by FSW and UFSW processes are immune to intergranular corrosion attack.

Keywords: Corrosion, Aluminum alloy 5052 H32, Friction stir welding, Tungsten inert gas welding, Polarization resistance, Intergranular corrosion

Prof Manoj Kumar, FIE
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Title of Paper: "Study of Microstructure Evolution, Mechanical Properties and Hot Corrosion Behavior of Friction Stir Processed Boiler Steel ", *Materials Research Express., Volume 6, Issue 9, July 2019.*

https://doi.org/10.1088/2053-1591/ab2e48

Co-authors : Singh S., Kaur M., Singh H. and Singh S

Abstract: In this investigation, commonly used boiler steel (SA210) was friction stir processed (FSPed) using pinless tool with plunge depth of 1 mm, transverse speed as 30 mm/min and tool-spindle rotational speeds of 600 revolution per minute (rpm), 300 rpm, and 150 rpm respectively with three number of passes in each case. Scanning Electron Microscopy (SEM) and Optical Microscopy (OM) analyses were done in order to characterize the Friction Stir Processed specimens. Prediction of the grain size distribution after friction stir processing under different rotational speeds was done using Electron Back Scattered Diffraction (EBSD). The initial grain sizes of the selected boiler steel (25 µm) has been decreased to 7.3 µm, 4.3 µm, and 1.75 µm respectively with decrease in rotational speed. The microhardness and tensile strength was evaluated of all the FSPed samples. The microhardness of the FSPed samples was enhanced by factor of 2, 2.5 and 3 in comparison to base steel respectively with the decrease in rotational speeds; this may be due to phase transformation (austenite to martensite and ferrite) verified by Image processing software "Image-J" and refinement in grain size as per Hall-Petch equation. The ultimate tensile strength was improved by 8%, 16% and 25% respectively in comparison to base metal, which may be accredited to enlarge in grain boundaries which hinder the dislocation movement. FSPed steel having grain size of 1.75µm offered 68% resistance to hot corrosion in comparison to base steel. The enhanced corrosion resistance might be attributed to the increased microhardness, fine grain structures and the presence of protective oxides on the top surface layer.

Key words: Friction stir processing; Characterization; Corrosion, SEM/EDS/XRD

Publication

Mr Naga Eswara Naveen Pasala, AMIE
Faculty-Department of Mechanical Engineering Sanketika Vidya Parishad Engineering College, Affiliated to Andhra University, Visakhapatnam
E-mail: pne.naveen@gmail.com

Title of Paper: "Effect of Functionalization and Concentration of Carbon Nanotubes on Mechanical, Wear and Fatigue Behaviours of Polyoxymethylene/Carbon Nanotube nanocomposites", *Bulletin of Materials Science, 42(3), 98, 2019.*

https://doi.org/10.1007/s12034-019-1746-z

Co-authors: Goriparthi Bhanu K, Ravi Sankar H and Ghosh Somnath

Abstract: The main focus of this work is to improve the mechanical, wear and fatigue behaviours of polyoxymethylene (POM) by reinforcing with carbon nanotubes (CNTs). To improve compatibility between CNTs and POM, the surface of the CNTs was modified by various methods of functionalization like carboxylation, silanation, carbonylation and amination. The functionalized CNTs were characterized by Fourier transform infrared spectroscopy to confirm the different functional groups attached to the surface. POM/CNT nanocomposites were developed with functionalized CNTs in different concentrations varying from 0.25 to 2 wt%. Nanocomposites with 1 wt% of silanated CNTs resulted in maximum improvement of tensile, flexural and impact properties. Furthermore, experimental results on fatigue and dry sliding wear tests revealed that the fatigue strength, specific wear rate and friction coefficient are sensitive to functionalization and concentration of CNTs.

Keywords: Carbon nanotubes; Silanation; Carboxylation; Amination; Carbonylation; Wear fatigue

Tittle of the Paper: "Influence of Titanium Dioxide on the Mechanical Properties of Short Glass Fiber Reinforced Nylon 66". *Recent Advances in Material Sciences. Lecture Notes on Multidisciplinary Industrial Engineering. Springer, Singapore, August-2019.*

https://doi.org/10.1007/978-981-13-7643-6_16

Co-Authors: T. Mukesh Kumar and P. Naga Raju

Abstract: The main objective of this paper is to enhance the mechanical properties of polymer composites by using Nano reinforcement. The high-temperature sustainability of TiO2 reinforced throughout in nylon 66 to improve the mechanical properties of polymer composites. The present work aims at improving the mechanical properties of polymer composites by varying the volume percentage ofTiO2 and addition of the small volume fraction of glass fibers so as to improve the dispersion bonding between nylon 66 and TiO2. Characterization of these composite is carried out using scanning electron microscopy (SEM) and X-raydiffraction (XRD) analysis. The effect of TiO2 content and functionalization methods on tensile strength, tensile modulus, and flexural strength are evaluated.

Keywords : Nylon 66; Titanium dioxide; Glass fiber; Tensile strength; UTM.

Tittle of the Paper: "Experimental Testing and Evaluation of Coconut Coir/Rice Husk Fiber Reinforced with Polymer Composites". *Recent Advances in Material Sciences. Lecture Notes on Multidisciplinary Industrial Engineering. Springer, Singapore August-2019.*

https://doi.org/10.1007/978-981-13-7643-6_17

Co-Authors:RV Prasad and Rajendra D

Abstract: Coconut coir fiber blended with rice husk reinforced in polyester composites manufactured by hand lay up method shows better properties than the other natural fibers and extended many applications due to their low weight, high strength, and anti-corrosive nature. In this paper, the effect of chemically treated fibers (silane) on mechanical properties with different volume fractions 5, 10, 15,20, 25, and 30% is reported. Chemically treated natural fibers show better mechanical properties than the untreated fibers due to removal of the waxy layer on the fiber and improvement of the interfacial bond between the fibers and polyester; after conducting all the treatments, it is proved that silane-treated fibers give better results than the other chemical treatments. The mechanical performance of the composite under dry and wet conditions and water absorption behavior of the composite are investigated by using computerized universal testing machine. The results finally concluded that 5% volume fraction composites play the best performance than the other ones because of their bonding strength and dispersion in the structure of the matrix.

Keywords: Silane treatment; Mechanical properties; Coconut coir; Rice husk; Tension; UTM.

Publication

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Senior Instructor, Department of Civil Engineering, North Eastern Regional Institute of Science and Technology(NERIST) Itanagar,Arunachal Pradesh
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Title of Paper: "Hybrid Simulator for Water Distribution Networks with Control Valves". *Journal of Water Resources Planning and Management (ASCE), 145(10), 06019009.*

DOI:10.1061/(ASCE)WR.1943-5452.0001116

Co-authors : Gorev, N. B., Gorev, V. N., Kodzhespirova, I. F., Shedlovsky, I. A.

Abstract: This technical note presents a hybrid simulator designed for water distribution networks with control valves. The simulator is a modification of EPANET 2 that can handle valves using both the EPANET 2 heuristics and a recently proposed alternative method that models valves as pipes whose resistance is adjusted to meet the valve setting. The method copes with cases where the EPANET 2 heuristics fails, but it requires a larger number of iterations. The hybrid simulator starts with running the EPANET 2 heuristics and switches to the alternative method only if the former fails (cannot find a solution or produces incorrect results), thus using to advantage the fast convergence of the EPANET 2 heuristics and the more stable yet slower convergence of the alternative method. Verification tests demonstrated the ability of the hybrid simulator to deal with ill-posed problems and large networks with thousands of nodes, pipes, and valves. DOI: 10.1061/(ASCE) WR.1943-5452.0001116. © 2019 American Society of Civil Engineers.

Keywords: Check valve; Flow control valve; Global gradient algorithm; Hybrid simulator; Pressure-reducing valve; Pressure- sustaining valve; Water distribution network.

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Formerly Chief Engineer, Tecnimont India Private Limited, Mumbai, India. & Adhoc-faculty, Department of Civil Engineering, NIT, Calicut, Kerala
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Title of Paper: "Equipment-Structure Interaction and its effect on Seismic Demand", *IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-ISSN: 2278-1684,p-ISSN: 2320-334X, Volume 16, Issue 3 Ser. V (May. - June. 2019), PP 44-50.*

DOI: 10.9790/1684-1603054450

Abstract: The seismic design and evaluation of structures built in petrochemical facilities present a challenging task for the design engineers. The structures found in these facilities can be broadly classified into building structures and nonbuilding structures. The "combination structures" wherein non-building structures such as vessels, exchangers etc. are supported by a steel or reinforced concrete primary structure represents a unique category in the perspective of seismic design. In reality, the seismic behavior of combination structures is mainly governed by the complex interaction between the primary structure and nonbuilding structures. A good understanding of equipment structure interaction is essential in the design of both the nonbuilding structure as well as the primary structure. The paper presents the results of a seismic assessment study performed on a multi-storied steel primary structure supporting a vertical vessel representing a combination structure. Both the coupled and decoupled models were analyzed for two weight ratios representing the weight of nonbuilding structure in terms of effective seismic weight of the system. The analysis results highlight the importance of weight ratio in the structure-equipment interaction affecting their assessment and design.

Keywords: Equipment structure interaction; Combination structure; Coupled model; Seismic demand; Linear dynamic time history; Nonbuilding structure; Petrochemical facilities

Publication

Mr Nenavath Bheema, MIE
Deputy Manager, Nuclear Fuel Complex, Department of Atomic Energy, Govt of India, Hyderabad
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Title of Paper: "Experience in Installation, Commissioning & Maintenance of Fire Detection & Alarm Systems for Enhanced Industrial Safety at NFC", *36th DAE Safety & Occupational Health Profesionals Meet (DAE-SOHPM), 2019, August 21 – 23, 2019 NFC, Hyderabad, Telangana. Jointly organized by Nuclear Fuel Complex (NFC) and Atomic Energy Regulatory Board (AERB).*

Abstract: A Fire Detection & Alarm System is designed to sense smoke, excessive heat or fire and provide an alert for a particular area of the building/place. The type of fire alarm system needed depends on the type of storage / building, location and the layout of the structure. The fire detection & alarm systems are important devices to keep personnel and property safe. Proper installation of fire alarm systems is important so that the detectors will operate properly and the audible and lighted alerts can easily sensitize the occupants. Fire Alarm System is designed to provide round the clock security against fire in the complete premises of Nuclear Fuel Complex. A Microprocessor based addressable analogue type fire alarm and detection system is under use for various building/areas to detect and provide alarm signal in the main fire alarm panel located in the central control room. Various types of fire detectors (smoke/heat /flame) have been installed in various production plants in NFC depending upon type of fire load existing. Preventive maintenance and testing of all the fire alarm systems and fire detectors are done periodically for ensuring the functionality of the system as per AERB guidelines. Further, new fire detectors are being installed in new plants / expansion buildings in NFC to meet the fire safety requirements. Also possibility of integrating video based surveillance systems to the existing Fire Alarm System in future.

Keywords: Fire alarm system; Conventional fire alarm system; Addressable fire alarm system; Smoke detector; Heat detector; UV/IR flame detector; Multi sensors; Hooters; Manual call points; Control panel

Dr. N. Kirubanandasarathy, FIE
Professor in Department of Electronics & Communication Engineering of Syed Ammal Engineering College, Ramanathapuram, Tamilnadu
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Title of Paper: "A Novel Algorithm for Hyperspectral Image Denoising in Medical Application", *Journal of Medical Systems, Volume 43, Issue 9, September 2019*

Abstract: The one of the preprocessing step for hyperspectral imagery is noise reduction. The images are received by the detector and this can be degraded by several factors like atmospherical things and device noises which emit temperature noise, processing noise and explosion noise. There are several strategies are developed already to cut back the signal to noise magnitude relation of the hyperspectral image. However, the stationary noise of the many denoising ways developed cannot be applied on to the gauge boson noise. Thus, the each gauge boson and thermal noise square measure gift within the captured hyperspectral image (HSI). In this paper, we tend to projected a replacement denoising framework known as tensor-based filtering employing a PARAFAC tensor decomposition methodology for scale back each noise. The proposed technique performs better in removing noise as analysed with different technologies including multiple linear regression (MLR) algorithm and combined algorithm called multidimensional wavelet transforms with multiway wiener filter (MWPT-MWF) technique. The performance analysis of the new denoising framework has more efficient for reducing signal dependent (PN) and signal independent noise (TN) as compared with other conventional method. Hence this novel denoising approach would be more beneficial for detection of skin allergy and also this algorithm will be very useful for detection of retinal exudates and diagnosis of diabetes mellitus and retinopathy disease in medical application.

Keywords: PARAFAC; Novel denoising technique; Hyperspectral image; Medical application

Publication

Mr Arindrajit Pal, MIE
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Title of Paper: "A Multipath Load Balancing Routing Protocol in Mobile Ad Hoc Network Using Recurrent Neural Network", *CICBA 2018: International Conference on Computational Intelligence, Communications, and Business Analytics, page: 458-464, CCIS, Volume 1030, Springer, Singapore, published online on 25 June 2019*

https://doi.org/10.1007/978-981-13-8578-0_36

Co-authors : Paramartha Dutta, Amlan Chakrabarti, Jyoti Prakash Singh

Abstract: The route congestion and propagation delay is one of the major issue of the mobile ad hoc network (MANET) which can be overcome by the multi-path communication. But communication through multi-path routing may create a bottle neck problem in the destination node. To select the optimal number of paths between a set of paths can be generated by different parameters. We consider those paths which take minimum time to deliver a data packet from source to destination. Now to distribute the data packets which are generated by source node through these paths in such a way that no path is being overloaded. In this paper, we apply the recurrent neural network based ERNN (Elman recurrent neural network) approach to predict the future load of different paths in the network. This is a time series prediction model using recurrent neural network for evaluating the values in the future time frame. Our experiment shows that this technique can perform very good result in comparison with other state of the art multi-path routing techniques.

Keywords: MANET Multi-path routing Neural network Elman recurrent neural network Time series RNN

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Title of Paper: "A Study on Improving Dyeability of Polyester Fabric using Lipase Enzyme", *AUTEX Research Journal, Poland, Volume 223, Issue16, pp. 514-514, May 2019 ISSN : 1470-9589 . IF – 0.927.*

DOI 10.2478/aut-2019-0030

https://www.degruyter.com/downloadpdf/j/aut-2019-0030/aut-2019-0030.pdf

Co-authors : Dr M Senthil Kumar

Abstract: Enzymatic hydrolysis on synthetic fibers enhances the hydrophilicity and solves the concerns regarding the environmental issues of textile industry. Lipase hydrolyses ester linkages in polyethylene terephthalate and produces polar hydroxyl and carboxylic groups. The study aims to identify and investigate the effect of enzyme treatment on weight loss and surface modification of polyester fabrics. Also the functional groups present before and after treatment and the effect of enzyme treatment on the improvement of dye uptake are studied. The test indicates that enzymatic process creates less surface damage, weight loss and improved moisture regain, dye uptake, and shear properties.

Keywords: Enzymatic hydrolysis; Polyethylene terephthalate; Weight loss; Shear properties

Publication

Mr Arun Kumar Mohanta, MIE
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Title of Paper: "Municipal Solid Waste Management in Bhubaneswar: Current Practices, Challenges and Prospects", *International Journal of Advanced Engineering and Technology ISSN: 2456-7655; Volume 3; Issue 3; July 2019; pp 27-30.*

Abstract: Over the past decade, generation of municipal solid wastes (MSW) in Bhubaneswar has increased more than 60%. However, MSW management in Bhubaneswar can be considered relatively poor and disorganised. The most preferred of MSW disposal method in Bhubaneswar is through landfilling due to several factors. This method is not sustainable and brings a lot of problems. This paper reviews the characteristics of Bhubaneswar MSW, reports the current practices of MSW management, and provides some suggestions to improve MSW management system in Bhubaneswar. In recent years, management of municipal solid waste has been a serious environmental issue of concern. Unhealthy waste disposal practises pave a way for air, water, soil and land pollution. Sanitary landfills are a great solution for this. Sanitary landfills are engineered means of confining waste to as small an area as possible, Covering it with daily layers of earth and compacting it to reduce its volume. The different techniques for the disposal of solid waste like incineration, composting, recycle, landfilling etc. The collection, transportation and disposal of the waste for Bhubaneswar City is done by Bhubaneswar Municipal Corporation.

Keywords: Municipal solid wastes (MSW); MSW management; Waste to energy; Renewable energy; Disposal; Sanitary landfills

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Title of Paper: "ACDAS: Authenticated Controlled Data Access and Sharing Scheme for Cloud Storage", *International Journal of Communication Systems, Published on on August 16, 2019.*

https://doi.org/10.1002/dac.4072

Co-authors : Deepnarayan Tiwari, G R Gangadharan

Abstract: Cloud storage services require cost-effective, scalable, and self-managed secure data management functionality. Public cloud storage always enforces users to adopt the restricted generic security consideration provided by the cloud service provider. On the contrary, private cloud storage gives users the opportunity to configure a self-managed and controlled authenticated data security model to control the accessing and sharing of data in a private cloud. However, this introduces several new challenges to data security. One critical issue is how to enable a secure, authenticated data storage model for data access with controlled data accessibility. In this paper, we propose an authenticated controlled data access and sharing scheme called ACDAS to address this issue. In our proposed scheme, we employ a biometric-based authentication model for secure access to data storage and sharing. To provide flexible data sharing under the control of a data owner, we propose a variant of a proxy reencryption scheme where the cloud server uses a proxy reencryption key and the data owner generates a credential token during decryption to control the accessibility of the users. The security analysis shows that our proposed scheme is resistant to various attacks, including a stolen verifier attack, a replay attack, a password guessing attack, and a stolen mobile device attack. Further, our proposed scheme satisfies the considered security requirements of a data storage and sharing system. The experimental results demonstrate that ACDAS can achieve the security goals together with the practical efficiency of storage, computation, and communication compared with other related schemes.

Keywords: Data storage and sharing; Owner-controlled fine- grained data access control; Private cloud storage; Proxy re-encryption

Publication

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Title of Paper: "Studies on Erosion of Atmospheric Plasma Sprayed NiCrBSi/Mo/Flyash Coating". *International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181 Special Issue - 2019.*

Co-authors : Dr. M. R Ramesh, Dr. Rajanna S, Padmini B. V

Abstract: In the current work, the erosion behavior of plasma sprayed NiCrBSi/Mo/Flyash cenosphere coating deposited on Super Ni76 steel was studied. The coating was characterized using a scanning electron microscope (SEM). Microhardness, porosity, fracture toughness and ductility of the coating were quantified. The solid particle erosion test was carried out at room temperature using alumina powder at 30° and 90° impact angles. The erosion resistance of the coating was observed to be higher at lower impact angles. The stability of the molybdenum, alumina and oxide layers helps to improve the corrosion resistance of the coating. The eroded coating surface morphology reveals a brittle pattern of material removal.

Keywords: Substrate, Coating, Erosion, Plasma spray

Title of Paper: "Studies on Microstructure and Microhardness of Plasma Sprayed NiCrBSi/Flyash/TiO2/Cr2O3/Mo Composite Coatings, *International Journal of Technical Innovation in Modern Engineering & Science (IJTIMES), Volume 4, Issue 6, June-2018.*

Co-authors : Dr Rajanna S, Dr M R Ramesh

Abstract: In a wide variety of applications, mechanical components are subjected to severe conditions, such as high load, speed or temperature and hostile chemical environment. Thus, their surface modification is necessary in order to protect them against various types of degradation. Thermal spraying has emerged as an important tool of increasingly sophisticated surface engineering technology. Plasma spraying is a rather simple process from a practical point of view. In the present investigation, NiCrBSi along flyash, Cr_2O_3, Mo and TiO_2 composite coating were obtained by atmospheric plasma spray process on Super Ni 76. The coating was characterized using scanning electron microscope to study the surface morphology and cross section to study the nature of coatings deposited. All the composite coatings had good bonding with substrate material and continuous interface without any porosity. The microhardness studies showed that the composite coatings had higher microhardness values than that of substrate material.

Keywords: Flyash, Wear, Composite, Chromium, Plasma spraying

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Title of Paper: "Solar Energy for Traction of High Speed Rail Transportation: A Techno-economic Analysis", *Civil Engineering Journal Vol. 5, No. 7, July, 2019, pp 1566-1576.*

Abstract: To meet the growing expectation of traveling public, world railways are going ahead in a big way to introduce high speed trains Electric railways require huge amounts of energy. Many rail networks run their own dedicated power plants. With a view to augment the capacity of the rail networks grid connection so as to make the railway self-reliant, a grid tied PV solar plant with battery storage has been proposed. The present concept is based on installing solar panels along the length of a HS rail network so that the ballast-less tracks could be used as energy carriers. Ballast less tracks require little or no maintenance, and the space along the tracks provides a large surface area on which arrays of PV modules can be mounted to generate electricity from sunlight. An example demonstrates that a 330 MW grid connected PV solar plant with battery storage for the Mumbai–Ahmedabad high speed rail link, generates electricity at $1.67× 106 /MW output and levelized electricity cost at 12.05 c/kWh. Net saving in tariff after payback period is about $ 58 million per annum.

Keywords: H S railways; Slab track; Solar plant; Battery storage; Shinkansen

Publication by Members

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Title of Paper: "5G Wireless Cellular Networks - A Conceptual Analysis on Perception, Network Requirements, and Enabling Technologies: It will be Implemented!", *Journal of The Institution of Engineers (India), Series B, Volume 100, Issue 2, April 2019, pp 1-5.*

https://doi.org/10.1007/s40031-018-0366-0

Co-authors : Misra G, Agarwal, S

Abstract: With regards to the future mobile wireless generation some of the key objectives that need to be focused that significant improve in data rate, increase in capacity, decrease in latency and much better QoS. In modern scientific world, 5G stands in a new row in getting the wireless communication achieved in a smarter and efficient way as compared to the conventional wireless system. This survey paper deliberates to serve as a guideline for the understanding of 5th generation mobile wireless cellular network Perception, Network requirements, while pinpointing the enabling technologies in 5G core and wireless network. All these accomplishments would be encouraging universal standardization and increase the rate of research and development towards the innovation of various technologies by collaborating all the contributors in the global 5G ecosystem.

Keywords: Data rate; Decrease in latency; QoS; Network requirements; 5G

Title of Paper : "Analyzing Impacts of Spatial Correlation for Multi-user Environment with Robust Concatenation of Advanced FEC Schemes", *Springer Wireless Personal Communications, June-2019, pp. 1-47.*

https://doi.org/10.1007/s11277-019-06612-7

Co-author : Mehta S N

Abstract : In recent days, the enhancement of MIMO in the area of wireless communications with spatial correlation characteristics by means of the Forward-Error-Correction (FEC) techniques has been introduced as a vital technology. To overcome the limitations of the FEC in MIMO-OFDM systems, this paper introduces the effect of spatial correlation in FEC for Multi-user MIMO-OFDM system. Here, the Error Correction Codes (ECC) namely Low-Density Parity Check (LDPC-CC), Turbo code CC, Convolutional Code (CC) and Reed-Solomon code (RSC-CC), and Polar Code CC (PC-CC) are authenticated for three channel representations known as Rayleigh, Rician and Additive White Gaussian Noise (AWGN) for multi-user (MU) with 8 users and single user (SU) MIMO-OFDM system. The investigation is carried out by means of four modulation techniques like, Binary Phase Shift Keying (BPSK), Quadrature Phase Shift Keying (QPSK), Quadrature Amplitude Modulation (QAM)-16 and QAM-64. It is done under three antenna configurations like 2×2, 2×4, and 4×4. In addition, the Peak Signal to Noise Ratio (PSNR) is deployed to recognize the image transmission and the Bit Error Rate (BER), is employed to recognize the data transmission. Furthermore, from the experimental results, the PC-CC in multi-user system is found to offer better performance than the other configuration.

Keywords: MIMO-OFDM; QPSK; QAM-16; QAM-64; BER; PSNR

Title of paper : "First Order Calculation of Performance Metrics of Perovskite/Si Tandem Solar Cells", *AIP Conference Proceedings 2105, Published online on May 2019.*

https://doi.org/10.1063/1.5100711

Co-authors : Sumanshu Agarwal, Kabita Agarwal

Abstract: The impressive optoelectronic properties of perovskite along with its optimal bandgap for application in a tandem solar cell has resulted in a lot of research interest in the field of perovskite/Si tandem solar cells. However, due to the lack of clarity of the design space optimization, the progress in the area is slow. In that context, here, we calculate the limiting performance metrics of perovskite/Si tandem solar cell as a function of active layers thicknesses and accordingly identify the optimum thicknesses of the active layer. Our results show that while the thickness of perovskite affects the performance of the device largely, the effect of the thickness of Si is nominal. Further, due to the increase in the two counter processes i.e., generation rate and recombination rate in the device with the thickness, there exist a pair of optimum thickness; and we elucidate the same. Indeed, our modelling methodology and results provide the direction for design space optimization of the perovskite/Si tandem solar cells.

Keywords : Photovoltaics; Detailed balance; Optimization; Fill factor; Open circuit voltage; Short circuit current

Publication

Dr Punith Kumar M B, AMIE

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Title of Paper: "Design and Verification of Serial Peripheral Interface Master Core Using Universal Verification Methodology", *International Journal of Computer Sciences and Engineering, Volume 7, Special Issue-14, May 2019, pp 7-11.*

Co-author : Sreekantesha H N

Abstract: In today's world, number of communication protocols for both long and short distance communication purpose, long distance protocols is USB (Universal Serial Bus), ETHERNET, PCI-EXPRESS. SPI (Serial Peripheral interface) and I2C are used for short distance communication protocols. SPI is one of the commonly used bus protocol for connecting peripheral devices to microprocessor .SPI is full duplex, high speed an synchronous bus protocol used for on-board or intra-chip communication In this project the configurable architecture of SPI Protocol with Wishbone Interface has been designed .The main advantage of this design is it overcomes the weaknesses of traditional SPI Bus protocol. As the complexity of the circuit is numerous so there is need of verification methodology to quench the product failure. This project emphasizes on verification of SPI master core verification using Universal Verification Methodology.

Keywords: SPI; Wishbone; UVM; System Verilog

Title of Paper: "Design and Verification of SPI Master Core Using UVM", *Journal of Emerging Technologies and Innovative Research, Volume 6, Issue 5, pp 239-244, May 2019, ISSN 2349-5162.*

DoI:https://doi.org/10.26438/ijcse/v7si14.711

Co-author : Sreekantesha H N

Abstract: Serial Peripheral Interface (SPI) is one of the commonly used bus protocol for connecting peripheral devices to microprocessor. SPI is full duplex, high speed an synchronous bus protocol used for on-board or intra-chip communication In this project the configurable architecture of SPI Protocol with Wishbone Interface has been designed .The main advantage of this design is it overcomes the weaknesses of traditional SPI Bus protocol. As the complexity of the circuit is numerous so there is need of verification methodology to quench the product failure. This project emphasizes on verification of SPI design using Universal Verification Methodology. In this project the verification components and testing environment has been constructed using System Verilog. The SPI core has been verified for all its design features with the help of different test cases scenarios also the functionality of the design has been exercised by introducing bugs in the design. The SPI core has been designed using verilog with some modifications to improve the performance of the design and verification has been done using Mentor Graphics Questasim 10.4e. We have achieved 100% functional coverage with no assertion failures in the verification.

Keywords: SPI; Wishbone; UVM; System Verilog

e-Book Review

Title of e-Book: **Research Methodology**

A Practical and Scientific Approach

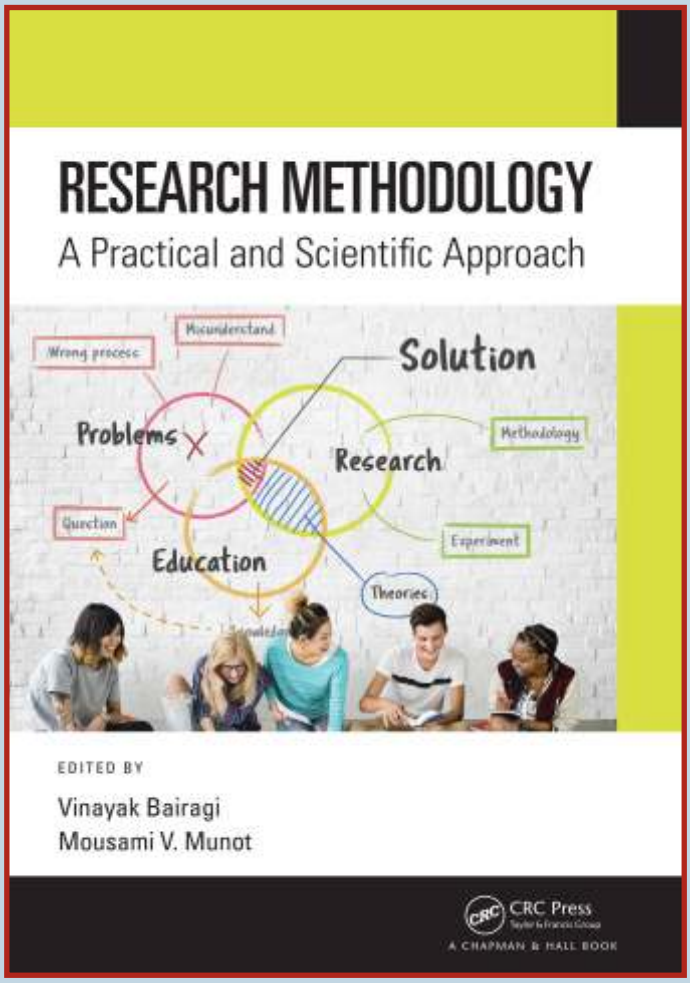
Edited by : Dr Bairagi Vinayak K , MIE; Ms Mousami V. Munot

The book, "Research Methodology: A practical and scientific approach for researchers" presents a comprehensive overview of theoretical and practical knowledge required for every scientific research and presents valuable pointers for effective and quality investigation, which is expected to largely benefit the research community. The contributors of the book ensured simple and coherent language for easy and quick understanding of the concepts. A step by step systematic and detailed guidance is the key feature along with inclusion and discussion of a variety of cases for inculcating critical thinking and analysis skills amongst the readers which will certainly benefit every researcher in its own research.

Features:

o Simple and coherent language ensuring easy understanding of the concepts; o A step by step systematic and detailed guidance; o Clear, concise and effective representation; o Inclusion of various case studies; o Enhanced technical content; o Details on publishing, indexing and citations; o Towards IPR;

This book serves as a text book for aspirant and active researchers. This book will provide a strong foundation in the development of the skill set required in the journey of M.E, M. S., Ph.D. It will also encourage and provide valuable pointers to the readers towards publication and IPR. It will certainly help the research community to enjoy great satisfaction as the biggest outcome of the research.



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ENDB	Policy, Technology & Awareness for River Rejuvenation	September 30 2019	endb@ieindia.org
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National Conference on "VLSI, Communication & Computer Networks"

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October 17-18, 2019

Mobile No: 9884591122; E-mail: drtkavitharaj@gmail.com

International Conference on "Emerging Trends in Electrical & Electronics Engineering-2019 (ETEEE-2019)"

to be organised by

Swami Vivekananda School of Engineering & Technology

Chaitanya Prasad, Madanpur, Bhubaneswar, Odisha

December 01-02, 2019

Mobile No: 9778178559; E-mail: kailashsenapati@gmail.com

Mallabhum Institute of Technology, IM No.: IM000199-8, organized the National Conference on "Device Modeling and Soft Computing for Real-time Applications (DMSC 2019)" during September 13-14, 2019 at the premises of the College in collaboration with The Institution of Engineers (India). The keynote address was given by Dr. Prasanta Kumar Guha, Electrical & Electronics Comm. Engg. Dept., Indian Institute of Technology, Kharagpur on the topic "Highly Sensitive and Selective Resistive Gas Sensors on MEMS--CMOS Platform". Dr. Arup Kr. Nandi, Principal Scientist, CSIR-CMERI, delivered a lecture on "Introduction of Genetic Algorithm in Solving Optimization Problems: Application in EV Energy Management". The Conference focused on the desire to move towards computer aided design and expert systems, thus, reinforcing the need for device modeling and soft computation for real-time applications.

For details you may contact Mr. Ankan Bhattacharya, Assistant Professor, Department of Electronics and Communication Engineering, Mallabhum Institute of Technology, Bishnupur.

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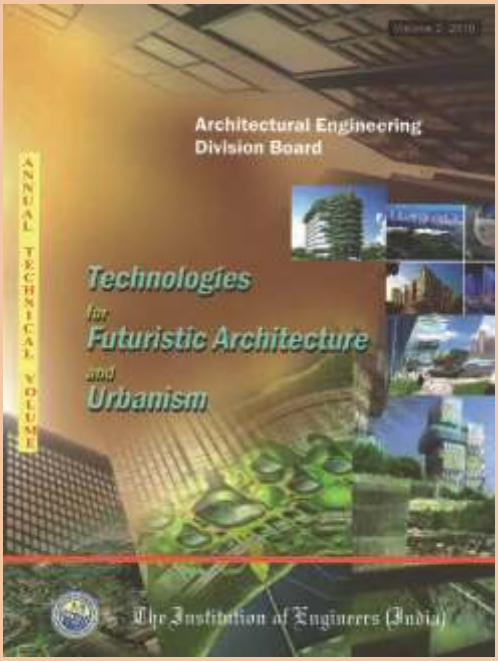

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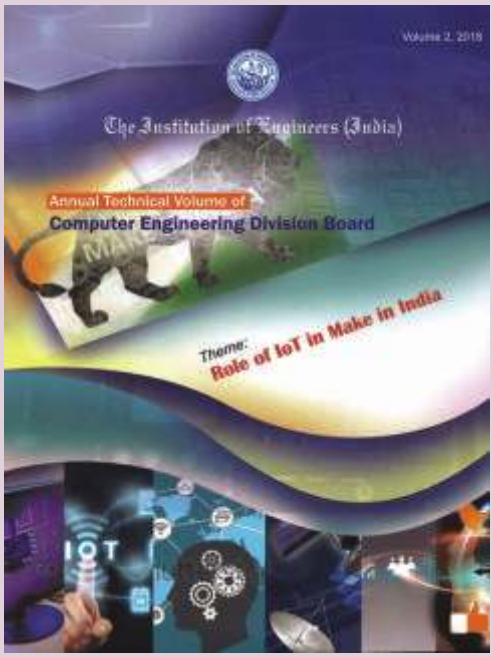

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