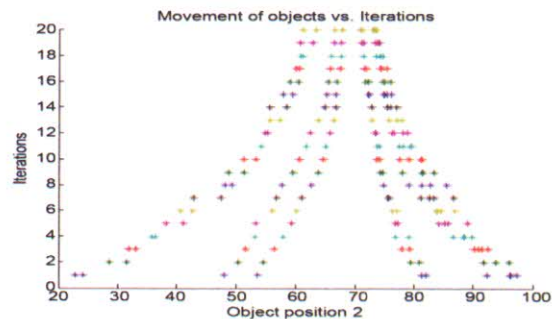


CONTENTS

Management & Information Technology

- 203 **Performance Analysis of a Novel Hybrid Optimization Technique for Sizing and Placement of DG Units**
- In today's scenario Distributed Generation (DG) resources have gained a lot of attention due to their positive impact on distribution system. Multisource hybrid power generation system with the utilization of Renewable Energy Resources (RES) is of greater concern considering environmental aspects. The considered resources are photovoltaic panels, wind turbine and battery storage. This paper attempts to solve this problem using a hybrid Modified Human Opinion Dynamics Gravitational search algorithm (MHODGSA) based Optimization algorithm and compares the solution of the stated multi-objective problem with that of (Gravitational search algorithm) GSA optimization techniques for 33 Bus Distribution System. The results of MHODGSA method is found to be moderately better than the GSA method in terms of accuracy while there is a significant improvement in terms of convergence.



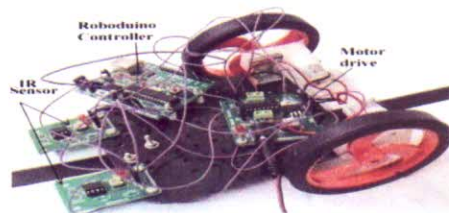
S Bakshi, T Thakur & R Khanna

- 208 **Determinants of Counterfeit Purchase: A Study on Young Consumers of India**
- Counterfeit trade is not a new phenomenon. This multi-billion dollar industry is significantly affecting an ever-wider range of goods and markets of branded products. The present study offers insights into non-deceptive counterfeiting by focusing on young consumers of India. Structural Equation Modeling technique was used to test the hypothesized relationships. Data of 304 young consumers confirmed that intentions to buy counterfeited products are dependent on the consumer's attitude. The attitude was highly influenced by price-quality inference, perceived risk and product attributes. The paper reinforces the mediator role of attitude in the relationship between these antecedents and behavioral intentions.

G Prakash & P Pathak

212 **Investigation in Autonomous Line Follower Robot**

The line follower robot is a mobile machine that can detect and follow a line drawn on the floor. In this paper, a predefined path is provided and the path is made up of a black line on a white surface with high contrast color. The mobile robot senses the path with two of its infrared sensors that installed under the robot and a third infrared sensor is used for obstacle avoidance. The left sensor controls the right wheel and the right sensor control the left wheel. The sensors detect the path and provide the information to the microprocessor. The microprocessor activates the motors depending on the path which may be straight or curved. The robot is allowed to follow a line of 4m length with varying wheel diameter and Castor position. The times taken for the travel under different arrangement were tabulated. Design of Experiments is used for finding optimal design parameters of the robot for time taken to complete the travel along the predefined path. The parameters considered are Wheel Diameter 'D' for three levels (70 mm, 80 mm, 90 mm), Centre to Centre (C-C Distance) between the Caster wheel centre and the Rear wheel centre for three levels (90 mm, 100 mm, 112 mm). Finally empirical model have been formulated by the application of Regression Modeling after evaluation of Test of hypothesis for above mentioned levels and factors for significant effects. The results obtained from the design of experiments are given fed in to the fuzzy logic controller. The results of the two methods were compared and obtained satisfactory results.

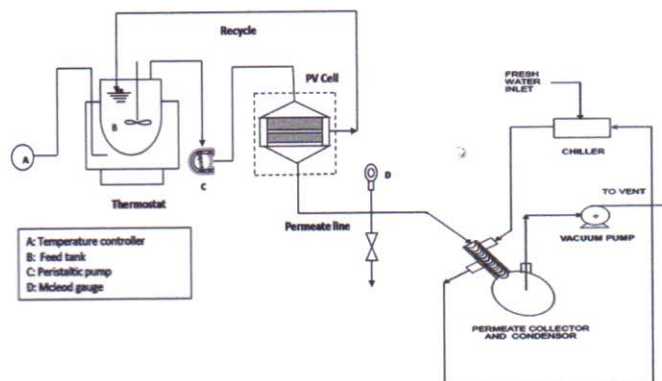


D Elayaraja & S Ramabalan

S & T and Industrial Research

217 **Effect of Temperature on Pervaporation Dehydration of Water-Acetic Acid Binary Mixture**

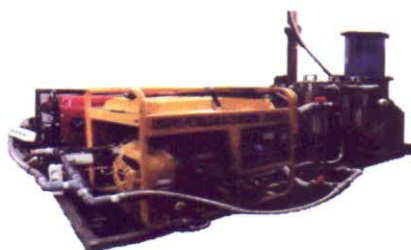
Dehydration of acetic acid was carried out in a small scale pervaporation pilot plant unit using commercial polyvinyl alcohol (PVA) membrane supported on polyether sulfone (PES). The hydrophilic membrane was able to selectively transport water molecules from the acetic-acid water mixture. It was observed that PVA membrane swelled significantly when the acetic acid concentration was increased in the feed solution. With increase in feed temperature degree of swelling decreased marginally. At 25oC the maximum degree of swelling was found out to be 46.3%, which reduced to 39.5% at 65oC. Although the pervaporation flux increased with increasing temperature of the liquid feed mixture, the separation factor decreased. From the temperature dependence of diffusion and permeation values, the Arrhenius apparent activation parameters have been estimated. The resulting activation energy values, obtained for water permeation being lower than those of acetic acid permeation values, suggest that the membranes have higher separation efficiency.



H K Dave & K Nath

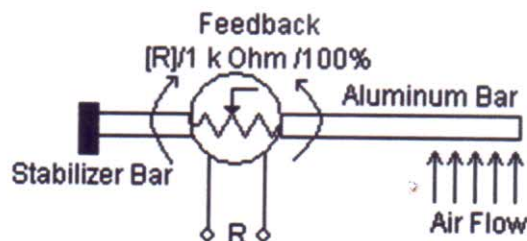
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- 223 **Reducing Gasoline Specific Consumption in Dual-Fuel Electricity Generation by Using Combustible Gas from Rice Husk Gasification**
- Using air gasification process, rice husk is possible to be converted into combustible gas mixture which contains mainly CO, H₂, and several hydrocarbon substances. The gas is possible for fueling gasoline engine generator to generate electricity in dual-fuel operation mode, while partially substitutes the gasoline consumption. Obviously, it will influence the generator's performance. This research reports the gasoline consumption savings in dual-fuel operation of electricity generation at different electricity loads. The gas flowrate was limited with the engine vibration level. A small scale air-blown downdraft gasifier converted rice husk at maximum capacity of 1 kg/h to the gas. A 1 kWe gasoline engine generator was used for this operation. At electricity load of 0.92 kVA in dual-fuel operation, the saving of gasoline (L/kVAh) attained 20.9% and the thermal system energy efficiency was about 11%. In this case, the producer gas flow rate was 1.84 L.s⁻¹ and Specific Gasification Rate (SGR) was 81.53 kg/(m².h). The energy equivalent was 4.6 kg rice husk/L gasoline or 0.7 kg rice husk/kVAh



Wusana Agung Wibowo, Sunu Herwi
Pranolo & Agung Tri Wijayanta

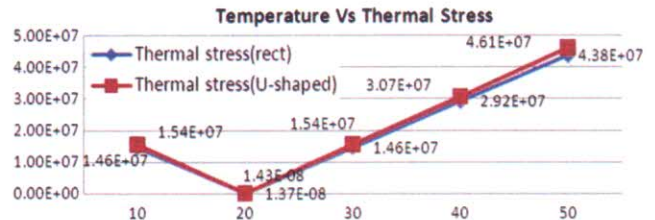
- 229 **Design and Implementation of a Closed Loop Electronic Driver Circuit for the Air Curtains Used in Aspirators**
- Although their low efficiency values, permanent split capacitor (PSC) motors are preferred especially for the aspirators used in household applications for their low cost and high durability. Those motors are the main components that provide the working of the air curtains. One of the most important characteristics of air curtains is that they work discretely with work levels. As the level is increased, noise level also increases along with energy consumption and heat. That undesired situation causes efficiency problems for energy consumption. Additionally, high noise values are disturbing for the house residents. The speed of the conventional PSC motors are adjusted in stages which allows to set only discrete speed values. In this study, a new electronic driver circuit that eliminates the discrete speed adjustment and allows to set a speed value in the interval of the PSC stages is designed for the devices that provide the air flow in aspirators. An automatic feedback system is developed in order to control the motor speed. For that feedback mechanism, a novel air flow sensor is designed. In addition, a fault detection and warning system is developed for possible errors. As a result of the experiments, the developed driver circuit and feedback system shows less heat and noise values along with higher energy efficiency.



Mehmet Fatih Isik, Mustafa Resit Haboglu
& Hilmi Yanmaz

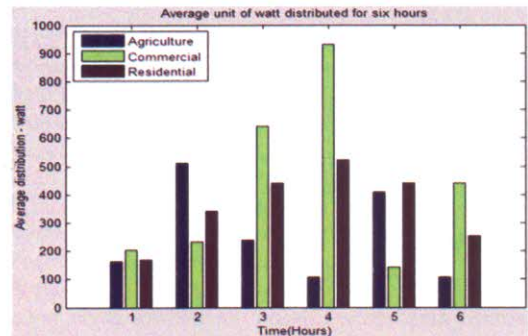
- 235 **Design Simulation and Analysis of U-Shaped and Rectangular MEMS Based Triple Coupled Cantilevers**
- In this paper, we have proposed a new shape Micro-Electromechanical Systems (MEMS) based triple coupled Cantilever sensor, named as U-Shaped Cantilever. We have designed and simulated a U-Shaped MEMS based micro-cantilever made up of P-Silicon (Polycrystalline, Lightly doped) in COMSOL multiphysics. U-Shaped single beam Cantilever is designed with the dimensions of $100\mu\text{m} \times 20\mu\text{m} \times 2\mu\text{m}$. U-shaped triple coupled Cantilever is designed with the dimensions of $20\mu\text{m} \times 120\mu\text{m} \times 2\mu\text{m}$, $100\mu\text{m} \times 20\mu\text{m} \times 2\mu\text{m}$. The simulation results like displacement, Eigen-frequency, surface stress, temperature, measurements of the U-shaped triple coupled cantilever is compared with rectangular triple coupled cantilever.

N Siddaiah, B Manjusree, A L G N Aditya & D V Rama Koti Reddy



- 239 **Estimation of Power Distribution in Substation Components using Object Oriented Analysis and Design**
- An object oriented model for the estimation of power that is distributed to the substation components is analysed and designed. The substation component comprises agriculture, industrial and residential regions. The important contribution of this paper is to evaluate the distribution of power in specified time slot of six hours and calculate the average power distributed to the substation components. The object oriented analysis (OOA) is examined in the first level and object oriented design (OOD) in the next level. The object oriented principles encapsulation, polymorphism and inheritance is effectively carried out for the power distribution system. The distribution results are shown by the mat lab and starUML softwares. The unified modelling language (UML) is used to show the structural form of power distribution system and its components in a simplified form.

S P Angelin Claret & M Germanus Alex



- 244 **Selection of an Efficient Plant Growth Promoting Rhizobacteria for Inoculating Withania Somnifera**
- Withania somnifera* is a medicinal plant well documented for its health benefits since ancient times. The present study was aimed at comparing the effectiveness of plant growth promoting rhizobacteria (PGPR) on the growth and yield of *W. somnifera*. Nine different PGPR were screened for their efficiency. Some of the PGPR used like *Bacillus subtilis*, *Pseudomonas fluorescens*, *Azotobacter chroococcum*, *Azospirillum brasilense*, are well known for their growth promotion in plants, some like *Methylobacterium radiotolerans*, *Exiguobacterium acetylicum*, *Paenibacillus polymyxa*, *Pantoea dispersa* and *Bacillus sonorensis* were used for the first time to see their influence on *W. somnifera*. Plants inoculated with PGPR showed significantly improved growth and yield compared to the uninoculated plants. The results of this study suggest that *Bacillus sonorensis* has a great potential to increase the growth and yield of *W. somnifera* and possesses all the PGPR traits and therefore can be used for inoculating *W. somnifera*.

N Anuroopa & D J Bagyaraj

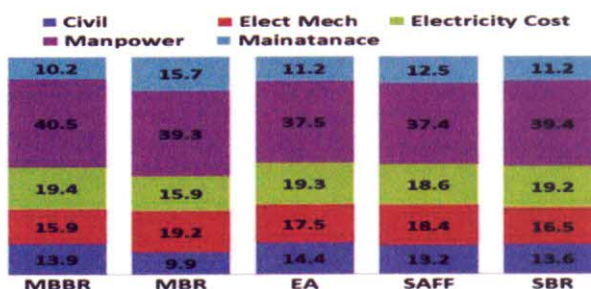
Energy and Environment

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Cost-Effective Treatment Technology for Small Size Sewage Treatment Plants in India

The present paper discusses cost effective wastewater treatment technologies for small size Sewage Treatment Plants (STPs) in India. Wastewater treatment technologies are gaining importance for an attention of policy-makers and industries for meeting the required pollution control guidelines as laid down by the regulators of the countries and to make the wastewater fit for desired usages resulting in conservation of water resources. This article provides an analysis of technologies commonly used in this sector in terms of cost assessment and footprint requirement for selecting its suitability in Indian climate. Various aerobic treatment technologies viz. Moving bed biofilm reactor (MBBR), Membrane bioreactor (MBR), Sequencing batch Reactor (SBR), Extended Aeration (EA), submerged aerobic fixed film (SAFF), suitable for treating wastewater have been considered for comparative analysis which includes operation and maintenance (O & M) cost also. The study suggests SBR as most cost-effective treatment technology and MBR most expensive among various available treatment options.

S Gautam, S Ahmed, A Dhingra & Z Fathma

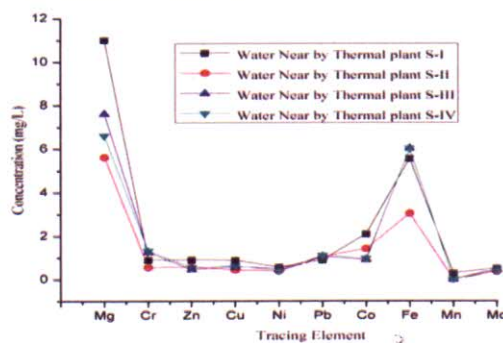


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Leaching Characteristics of Heavy Metal in Bottom Ash from Indian Thermal Power Plant

The disposal of bottom ash in the thermal power plant is a challenging task. The objective of the present study was to investigate the leaching characteristics of the bottom ash disposed in ash pond of thermal power plants. The studies were conducted with bottom ashes from ash disposal system. A series of leaching test have been performed with different liquid to solid ratio (L/S). The (L/S) varies from 20:1 to 60:1. It is observed that the elements of Mn, Mg, Cr, Zn, Ni, and Cu are most abundant elements while Pb, Mo, Fe and Co are the least abundant elements. It is also observed that the leaching characteristics of the bottom ash are affected by the pH of extraction solution and liquid to solid (L/S) ratio.

S Kumar, G Singh & S K Mohapatra



Author-Reader Platform

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Instructions to contributors