

[Site Map](#)



Welcome to ARPN Journal of Engineering and Applied Sciences

[Home](#)

[Archive](#)

[Submit Paper](#)

[Author Guidelines](#)

[Editorial Board](#)

[Publication Fee](#)

[Status of upcoming papers](#)

ARPN Journal of Engineering and Applied Sciences (ISSN 1819-6608) is an online peer-reviewed International research journal aiming at promoting and publishing original high quality research in all disciplines of engineering sciences and technology.

All research articles submitted to ARPN-JEAS should be original in nature, never previously published in any journal or presented in a conference or undergoing such process across the globe. All the submissions will be peer-reviewed by the panel of experts associated with particular field. Submitted papers should meet the internationally accepted criteria and manuscripts should follow the style of the journal for the purpose of both reviewing and editing. Our mission is

- In cooperation with our business partners, lower the world-wide cost of research publishing operations.
- Provide an infrastructure that enriches the capacity for research facilitation and communication, among researchers, college and university teachers, students and other related stakeholders.
- Reshape the means for dissemination and management of information and knowledge in ways that enhance opportunities for research and learning and improve access to scholarly resources.
- Expand access to research publishing to the public.
- Ensure high-quality, effective and efficient production and support good research and development activities that meet or exceed the expectations of research community.

Scope of Journal of Engineering and Applied Sciences

- Engineering Mechanics
- Surveying
- Modeling & Simulations
- Manufacturing Technologies
- Metallurgy
- Electronic Communication Systems
- Mining & Minerals
- Applied Sciences
- Chemical Engineering
- Tube Wells & Pumps
- Construction Materials
- Fluid Mechanics & Hydraulics
- Thermodynamics
- Refrigeration & Air-conditioning
- Automatic Control Systems
- Agricultural Machinery & Equipment
- Mechatronics
- Public Health Engineering
- Hydrology
- Structures

ANNOUNCEMENT
Call For
Research Papers
online publishing

ARPN Journal of Engineering and Applied Sciences

Q2 Engineering (miscellaneous)
best quartile

SJR 2018
0.22

powered by scimagojr.com

i x

Publish with IEEE OJEMB

ojemb.embs.org

a Gold Open Access Journal for services from IEEE Engineering in Medicine & Biology articles biomed includin

OI



ARPN Journal of Engineering and Applied Sciences

[Home](#)

[Archive](#)

[Submit Paper](#)

[Author Guidelines](#)

[Editorial Board](#)

[Publication Fee](#)

Editorial Board

Editor-in-Chief: Engr. J. K. Tarakzai (PAKISTAN)

#	Editors	Country
1	Prof. Dr. R. J. Godwin	UNITED KINGDOM
2	Prof. Dr. Erik Valdemar Cuevas Jimenez	GERMANY
3	Prof. Dr. Hamou SADAT	FRANCE
4	Dr. Mohammad Aminul Islam	JAPAN
5	Prof. Dr. Kui Fu Chen	CHINA
6	Prof. Dr. M. Ashraf Chaudhry	NEW ZEALAND
7	Prof. Dr. A. Sermet Anagun	TURKEY
8	Prof. Dr. Ashraf Mohamed Hemeida	Saudi Arabia
9	Prof. Dr. Krishna Murari Pandey	INDIA
10	Prof. Dr. Magdy A. Ezzat	EGYPT
11	Prof. Dr. Roberto Brighenti	ITALY
12	Dr. Anurag Misra	INDIA
13	Prof. Dr. Adel M. ALIMI	TUNISIA
14	Prof. Dr. Arun Kumar Gupta	INDIA
15	Prof. Demetrios V. Bandekas	GREECE
16	Prof. Dr. Bensafi Abd-El-Hamid	ALGERIA
17	Dr. Rajanish K. Kamat	INDIA
18	Prof. Dr. Asma Thamir Ibraheem	IRAQ
19	Prof. Dr. Sylejman Hyseni	KOSOVO
20	Prof. Dr. Haider Zaman	Saudi Arabia
21	Prof. Dr. Debojyoti Mitra	INDIA
22	Prof. Dr. Pandian VASANT	MALAYSIA
23	Prof. Dr. Prakash MMS Kinthada	INDIA
Associate Editors		
1	Dr. Dongning Li	USA
2	Dr. Suheyla Yerel	TURKEY
3	Dr. Guoxiang Liu	USA
4	Dr. Nadeem Anjum	PAKISTAN
5	Engr. Malini Sarah Philip	NORWAY
6	Dr. K.V.L.N. Acharyulu	INDIA
7	Engr. Mohammad Khalily Dermany	IRAN
8	Dr. Lamyaa- Gamal Eldeen Taha	EGYPT
9	Dr. OM Prakash Singh	INDIA
10	Engr. Seyyed Mohammad Reza Farshchi	IRAN
11	Dr. Muhammad Imran Din	PAKISTAN
12	Dr. José Carlos Páscoa Marques	PORTUGAL
13	Engr. Fawwaz Jinan Jibrael Jabri	IRAQ
14	Dr. Kanad Ray	INDIA

15	Dr. Shamsuddin Shahid	MALAYSIA
16	Engr. Naveenji Arun	INDIA

arnpjournals.com
of Ethics

[Publishing Policy](#)

[Review Process](#)

[Code](#)



[Home](#)[Archive](#)[Submit Paper](#)[Author Guidelines](#)[Editorial Board](#)[Publication Fee](#)**Title:** Design of electrically small top loaded antennas for GPS applications**Author (s):** M. Venkata Narayana, Habibulla Khan, P.V.N. Lakshmi Durga, N. Sirisha, R. Praveen Kumar Reddy and Y. Chandan Krishna

Abstract: The design of small high frequency antennas continues to be a challenge while maintaining required bandwidth and low quality factor. Numerous methods are proposed to reduce the quality factor for small antennas. According to Wheeler and Chu limitation on quality factor the design should be in a way that the fields inside the spherical volume should be diminished. Generally for small antennas reactance will be very high. In this project we want to implement top loading approach to decrease Q value and tune the antenna at desired frequency. In this approach we used top loading for antenna in order to reduce its reactance. The top loading techniques which we implemented in this paper are loading using inductive loading, cap hat loading, and umbrella loading for helical antennas using ANSYS HFSS 13.0. The frequency of this antenna is designed at 1575.42 MHz which is operating frequency for GPS. GPS is used for tracking purposes. Q factor is greatly reduced by using these design approaches.

[Full Text](#)**Title:** Modeling and evaluation of solar photovoltaic emulator based on Simulink model**Author (s):** Ahmad Saudi Samosir

Abstract: This paper presents the modeling and simulation of Solar Photovoltaic Emulator utilizing Buck Converter under MATLAB/Simulink software. The proposed model is designed using SimPower toolbox of Simulink block libraries. The characteristics of Photovoltaic Emulator model was tested by varying the value of load and considering the effect of irradiance and temperature variation. The output characteristics of Photovoltaic Emulator model is verified by comparing to the characteristics of the actual PV module. The Shell SP75 PV module is chosen as a reference for this simulation. The proposed Photovoltaic Emulator was found to be valid and accurate for any irradiance and temperature variations.

[Full Text](#)**Title:** Exploring the electronic applications of graphene mixed polymer films using LabVIEW**Author (s):** A. Deepak, R. V. L. Gowrinath, M. Dinesh, Anup Kumar and P. Shankar

Abstract: This work reports the possibility of using graphene based polymer film instead of solid state resistor in Wheatstone bridge circuit. Wheatstone bridge circuit containing graphene based polymer film as one of its resistor were connected to a microcontroller and interfaced with computer using LabVIEW. Output is obtained graphically to measure the voltage drop and the resistance across the graphene based polymer film. Simulated values of voltage drop and resistance across graphene based films were compared with both theoretical calculations and practical values.

[Full Text](#)**Title:** Knowledge sharing through internalization process of pair programming in student's academic projects**Author (s):** V. Venkatesan and A. Sankar

Abstract: Students continue to struggle with learning to program, for reasons that the hypothesis is not solely cognitive. This study contributed for better understanding of important knowledge sharing activities to construct student's learning skills during internalization process through pair programming. The pair programming is one of the very important pedagogical approaches that can enhance students' abilities in the area of computer programming. Knowledge sharing in pair programming can be improved with the guidance of lecturers or teaching assistants and also increasing the frequency of programming activities between the student pair members. In the academic setup, based on few set of experiments, we found that students who used pair programming produced better programs, confident in their solutions, and enjoyed completing the assignments more than students who programmed alone. Pair programming improves the design ability, reduces time taken to do their academic mini-projects and it increases the knowledge and programming skill of the pair members. This experimental study represents the results of the knowledge sharing during pair programming exercise carried out with sixty Master of Computer Applications students who are engaged in developing small applications as a part of their Mini-project during their II year at PSG College of Technology, during the odd semester of 2014.

[Full Text](#)**Title:** On new spatial filters using abstract cellular complex

Author (s): G. Sai Sundara Krishnan and N. Vijaya

Abstract: In this paper, new-type Mean and Median spatial filters, to reduce various noises on images based on the notions of Abstract Cellular Complex (ACC) are proposed. The proposed Mean and Median filters using ACC are implemented through MATLAB. The experimental results showed that the performance of proposed filters are better than the standard Mean and Median filters in terms of the quantitative measures.

[Full Text](#)

Title: Biofuel production from nyamplung oil using catalytic cracking process with Zn-HZSM-5/ γ -alumina catalyst

Author (s): Agus Budianto, Sumari Sumari and Kartika Udyani

Abstract: Biofuel is one of alternative energy to solve the problem of increasing energy needs. Research on the production of biofuels from nyamplung oil is very interesting to do. This research studied the production of biofuels from nyamplung oil through catalytic cracking process. A catalyst of a Zn-HZSM-5 / γ -alumina was used in this study. The research aims were to study the composition of nyamplung oil, to get characteristic of the Zn-HZSM-5 / γ -alumina catalyst, and to study the effect of temperature and composition of the catalyst toward biogasoline, biodiesel, and bioekerosene selectivity in biofuel production. Experiments were carried out in a fixed bed reactor containing the catalyst by adjusting various temperatures and catalyst compositions. The results showed that the use of Zn-HZSM-5 / γ -alumina (1:2) catalyst produced biofuel with biodiesel selectivity of 73.86% on the reaction temperature of 450 to 550 °C. While the use of the Zn-HZSM-5 / γ -alumina (1:1) catalyst generated biofuel with a biogasoline selectivity of 54% at the reaction temperature of 500 to 550 °C.

[Full Text](#)

Title: VHF/UHF amplitude scintillation observed by the low-latitude ionospheric tomography network (LITN)

Author (s): Dessy Francisca, Ernest Macalalad, Edgar Vallar, Maria Cecilia Galvez, Lung-Chih Tsai and Tung Yuan Hsiao

Abstract: Electron density irregularities in the ionosphere that cause rapid fluctuations in radio signals or scintillation has been studied using the Low-Latitude Ionospheric Tomography Network. The network uses Ionospheric Tomography System (ITS) receivers to retrieve VHF and UHF scintillation data from August 2008 to February 2011. Amplitude scintillation, which mostly occurred at the equatorial anomaly peak, varied with local time, solar activity and magnetic activity. Moreover, night-time scintillation occurred predominantly around local midnight (2100-0200 LT), while most of the daytime scintillation occurred at 0900-1500 LT. Generally, the scintillation occurred under quiet magnetic condition and the occurrence increases as the solar activity increases.

[Full Text](#)

Title: A review of low level visual features for a content based medical image retrieval system

Author (s): B. Jyothi, Y. Madhavee Latha and P. G. Krishna Mohan

Abstract: The advancement in medical Technology has resulted in a huge number of medical images which are stored in a data base for future purpose. It is very imperative to build an effective retrieval system which browse through entire database in diagnosing the various diseases, helping the therapeutic process and in supporting the medical decision making process. Content based Image Retrieval (CBIR) assists in retrieving the required medical images from a huge database on the basis of their visual features like shape, color and texture. Medical images are generally represented in gray level rather than color. Feature extraction plays a important role in an ever-increasing the performance of the medical image retrieval system. This paper presents a various multiple feature extraction techniques for effective content based medical image retrieval system.

[Full Text](#)

Title: Mud utilization of Lapindo as soil stabilization materials that contain salt clay

Author (s): Gati Sri Utami

Abstract: Lapindo mud containing silicate (SiO_2) that can function as a filler and lime (CaO) as a binder between the particles. Previous research in the use of these materials, may be used as, a substitute material of cement, to mix concrete manufacture. While in this study, Lapindo mud is used as, a substitute material lime to stabilize clay soils containing salt. Soil samples were taken from the area Sumenep, then mixed with mud Lapindo 10 %, 20 %, 30 %, 40 %, 50 %. Results of this study, up to 50 % concentration slurry liquid limit value decreased 16.67 % and plasticity index, 73.73 % decline of the native land. Test compaction up with a mixture of 40 %, the solid based on the increase of the value of γ_{dmax} , γ_{dmax} native land at 1.42 kg / cm^3 be 1:56 kg / cm^3 , which means an increase of 11.43 %. CBR test up to 30 % Lapindo mud mixture , 9.02 % CBR value is including the category of value CBR is good enough as a land base and an increase of 44.55 % from the original soil . Direct shear test Lapindo mud up to levels of 40 %, the value of the shear stress increased by 40.25 % of the original soil. Free press test until the Lapindo mud levels of 40%, the value of free compressive stress 2.03kg / cm^2 very rigid categories and an increase of 39.04 % from the original soil. And to test free swelling up to levels of 50 % Lapindo mud, with a 24 -hour immersion, the value of development decreased by 63.64 %. So in general it can be said that the levels of Lapindo mud more than 50 % effective in stabilizing the clay in Sumenep area to reduce the potential for development, while raising the level of Lapindo mud carrying capacity is a maximum of 40 %.

[Full Text](#)

Title: The effect of additional materials concrete using the sand with high levels mud on deflection and flexible stress on concrete beams

Author (s): Dewi Pertiwi

Abstract: Structure of concrete blocks consist of concrete and reinforcing steel that work together to carry the load acting on the beam. Besides that the steel reinforcement where the use of materials to make concrete is also noteworthy. On the implementation of the field often found sand used for concrete mixes are not eligible. Among these are the levels of sludge that is more than 5 %, so that when it is used to mix concrete sand must be washed first. In this study, researchers will examine whether such additives affect the deflection and bending stress on concrete beams using sand with high mud levels. Tests on the flexural strength of concrete beam in the laboratory by making seven variations of the beam with a size of 20 x 20 x 60 cm, which consists of a variation of 1 is the beam that uses sand Lumajang, variation 2 is beam by using sand Mojokerto, Variation 3 is the beam by using Mojokerto sand plus 15 % fly Ash, variation 4 is a beam that uses sand Mojokerto plus 15 % additive substance, variation 5 is beam by using sand Jombang and variation 6 is a beam that uses sand Jombang plus 13 %. Variation 7 is a beam that uses sand Jombang plus 13 % other additives. The result showed that the concrete beams using sand Jombang with additional material 13 % additive substances able to carry a maximum load of 15,500 kg, with a maximum deflection of 5.1 mm, the bending

stress of 504 kg / cm² and bending moment of 472 500 kgcm. Concrete beams using Jombang sand with the addition of additive 13 % experienced significant improvement to flexural testing at age 28 days.

[Full Text](#)

Title: Performance analysis of biogas stoves with variations of flame burner for the capacity of biogas 1 m³ / day

Author (s): Syamsuri, Suheni and dan Yustia W. M.

Abstract: Natural Resources on earth are very abundant one of Natural Resources is Fuel. But the last few years the energy is a crucial issue in the world. One alternative is biogas energy. Biogas is a viable energy used technically, socially, and economically mainly to solve the energy problems in rural areas. In the present study, aims to identify and analyze the performance of the biogas stove. In this study, will be tested various forms burner i.e. regular shaped burner, Cyclone 1, and Cyclone 2. The results showed that the power of a cyclone burner biogas stove shape is higher than that using a biogas stove burner usual form. As for the efficiency of biogas stoves shape cyclone burner 2 is higher than the efficiency of biogas stoves that use a form of ordinary burner. From another aspect, namely the mass of the steam generated by the cyclone burner type 2 is greater than the other burner.

[Full Text](#)

Title: Sequential injection analysis - lab at valve (SIA-LAV) for chromium speciation by colorimetric method using H₂O₂ oxidizing agent and 1, 5-diphenylcarbazide complexing agent

Author (s): Indah Ardinarsih, Akhmad Sabarudin and Hermin Sulistyarti

Abstract: Chromium commonly presence in two different oxidation states, the Cr(III) which is an essential micro-element in living body, and also Cr(VI) which is toxic though in a trace level. Because of its different character for each species, determination of total chromium in water did not provide precise information for its toxicity. Meanwhile, many speciation methods had been developed. In this study, speciation chromium had been done by flow reaction system Sequential Injection Analysis Lab-At-Valve (SIA-LAV) modified by presence of Lab-At-Valve for maximized reaction process. Its determination based on complexed-reaction between 1,5-diphenylcarbazide (DiPC) complexing agent with Cr(VI) that formed Cr(VI)-DiPC complex which can be determined by colorimetric method in 548 nm. Total Chromium level could be achieved by oxidized Cr(III) by H₂O₂ in alkaline solution, so that Cr(VI) produced by an oxidation process along with Cr(VI) that naturally presence in the artificial samples reacted with DiPC, afterward, the formed Cr(VI)-DiPC determined as total chromium by the same colorimetric method. The optimization of this method was conducted by testing several parameters. Based on the optimization result, the optimum condition obtained: H₂O₂ concentration 10-5 M and volume 20 µL, DiPC concentration 2x10⁻⁵ M and volume 50 µL, the sample volume 60 µL and the delay time 10 seconds, flow rate to detector 25 µL s⁻¹. The detection limit of Cr(VI) and Cr total were 0.0089 mg/L and 0.0103 mg/L, respectively, and Cr(III) was 0,0043 mg/L. The Chromium speciation by SIA-LAV method outlined above allows the simple, sensitive, rapid and cost-effective analysis for chromium speciation, the Cr(III) and Cr(VI). This result suggests that this method is prospective method to be used for monitoring of chromium species in fresh water.

[Full Text](#)

Title: Design of modified explicit pulse data-close-to-output flip-flop

Author (s): A. Sathishkumar, S. Saravanan and R. Sakthivel

Abstract: Flip-flops (FFs) are the basic storage elements used extensively in all kinds of digital designs. In particular, digital designs nowadays often adopt intensive pipelining techniques and employ many FF-rich modules such as register file, shift register, and first in- first out. In this paper we proposed a low power consumed and less area pulse triggered flip-flop. This design uses 23 transistors this reduces the area complexity by 3 transistors comparing with existing ep-DCO. The new flip-flop can save up to 74% of the energy with the same speed as that for the existing ep-DCO and can save up to 69% of the energy with the same speed as that for the CDFP.

[Full Text](#)

Title: Fine-grained access of personal health record in cloud computing

Author (s): A. V. K Shanthy

Abstract: Cloud computing is used broadly in various services which maintain Personal Health Record (PHR). It is an emerging Health-centric model of patient health information interchange. Personal Health Record (PHR) information can be stored in a third party server i.e.Cloud server. The most important issues are fine-grained access, cryptographically enforced data access control, scalability in key management and efficient on-demand user revocation. We need to provide the security for the cloud based PHR information. This paper mainly concentrates on the multiple data owner scenario and divides the user into multiple security domains that significantly reduces the key management problems. A high level security of patient privacy is improved simultaneously by developing Multi-Authority Attribute Based Encryption (MA-ABE). We have a tendency to enhance the already existing format of PHR knowledge (template) into a secure format (PDF), GIF, DOC and set access privileges. Before taking a key to decrypt the PHR record in multiple owner scenarios it should raise some security questions on PHR owner.

[Full Text](#)

Title: Web services oriented architecture for dynamic evolution of communication with embedded systems

Author (s): Smt. J. Sasi Bhanu, A. Vinaya Babu and P. Trimurthy

Abstract: The HOST is Computer system that needs to be situated at a remote location preferably connected through internet for communicating with an embedded system which is meant for monitoring and controlling a safety or mission critical system. The communication between the HOST and the embedded system must be dynamically evolvable if the changes to the communication system must be effected while the embedded system is up running. The main issue that must be addressed while attempting to implement dynamically evolvable embedded system is to ensure that the entire system must be light weight due to the availability of limited resources with the embedded systems. Implementing the ES software related to syntax, semantics, online testing and communication components along with components that are required to make the entire system dynamically evolvable is the issue that can be addressed through use of WEB services related technologies. Architectural frameworks are required to explain how the entire dynamic evolution system can be implemented through use of WEB services oriented technologies. This paper is aimed at determining various web services oriented architectures and selecting the best that suits the dynamic evolution of an embedded system.

[Full Text](#)

Title: Identification and counteractions to attacks of malefactors in the automated working system

Author (s): Krotov L. N., Krotova E. L. and Bogdanov N. V.

Abstract: Article is devoted to the hot topic of identification of the malefactor in the automated computer system. In the article, standard models of the system of identification of users are described, and methods of optimization and increase of functional capabilities of the similar system are offered. Main areas of work: statistical techniques, wavelet transformation, reduction of load of the computer system by reduction of volumes of the expert knowledge bases checking legality of the operations which are carried out by the user by means of transfer of these functions for the self-training monitoring system of current status of system with use of statistical decisive rules. In the article, the subject of development of modern valuation methods of crypto firmness of the enciphering mechanisms used in cryptographic protocols using Edlmana-Lipton's model is touched.

[Full Text](#)

Title: Corrosion behaviour of boron carbide reinforced aluminium metal matrix composite

Author (s): Sridhar Raja K. S. and Bupesh Raja V. K.

Abstract: Cast aluminium A356 is most widely used in automobiles, marine and aircraft structures. The metal matrix composite was prepared by varying the weight percentage of reinforced boron carbide particle with A356 alloy by stir casting technique. The corrosion behavior of the composite was studied by salt spray test and the corrosion rate was evaluated by calculating the weight loss in the material. It is observed that A356-B4C composite exhibited excellent corrosion when immersed in 5% NaCl solution. The SEM image of the composite also shows that the particle gets corroded surrounding the reinforced particle.

[Full Text](#)

Title: Comparative study and implementation of multi-objective pso algorithm using different inertia weight techniques for optimal control of a CSTR process

Author (s): A. Jayachitra and R. Vinodha

Abstract: In this paper, different Inertia weight techniques in Particle Swarm Optimization algorithm (PSO) have been compared to search for the optimal PID controller gains for a Continuous Stirred Tank Reactor (CSTR) process. The optimization problem considered is highly nonlinear, complex with multiple objectives, wide operating range and constraints. The efficiency of PSO algorithm lies in the suitable selection of Inertia weight (w) to provide a balance between global exploration and local exploitation which in turn ensures the convergence behaviour of particles. The standard PSO algorithm has premature and local convergence phenomenon when solving complex optimization problem. The proposed approach is efficient in achieving stable convergence characteristics, good computational efficiency and capability to avoid from local optima. In the present study an attempt has been made to review some of the inertia weight techniques. Simulation results demonstrate that Adaptive Inertia weight Particle Swarm Optimization (AWPSO) technique is superior to all PSOs considered with various Inertia weight methods under both single objective and multi-objective functions.

[Full Text](#)

Title: The modeling of the effect by paddy straw fibers on the cover of land surface as a slope erosion controller

Author (s): Abdul Rivai Suleman

Abstract: This research aims to the modeling of the effect by paddy straw fibers on the cover of land surface as a slope erosion controller. This study is testing in the laboratory by using USLE (Universal Soil Loss Equation) model as a comparison to determine the amount of the reduction of the erosion rate that occurs, both on the land without the covering or covering. Research conducted with 3 variations in the intensity of rain that is 50 mm/hour, 100 mm/hour and 120 mm/hour and use artificial rainfall with a Rainfall Simulator. The results of this research show that the rate of erosion on soil that was given in the form of straw fibers cover layer of the paddy with the covering percentage is 30% dry weight or 38,7 gr/m² has decreased when compared with the rate of erosion occurring on the ground without covering. The magnitude of the rate of erosion that occurred in the covering percentage is 30% dry weight of straw mulch or 38,7 gr/m² averages of 17,068% against the rate of erosion on the ground without covering. In other words, that the rate of erosion on soil without cover will be reduced (decreased) by an average of 82,932% if the land is given a cover layer of paddy straw fibers with a percentage of 30% or covering a dry weight of 38,7 gr/m². Similarly, the rate of erosion on land given the paddy straw fibers cover layer with the covering percentage respectively 60% and 90% dry weight or each 145,1 gr/m² and 354,8 gr/m² also has decreased when compared with the rate of erosion occurring on the ground without covering. The magnitude of the rate of erosion that occurred on land given the covering 60% dry or heavy 145,1 gr/m² on average by 7,216% and 90% cover on a layer or severe drying 354,8 gr/m² on average by 4,392%. In other words, that the rate of erosion on soil without cover will be reduced (decreased) by an average of 92,784% on the cover of 60% and an average of 95,608% on the cover of 90%. On the rain intensity of 50 mm/hour, the erosion rate prediction equation that obtained is: $E = 3,0273488 e-0,1191688(MJ/S)$, On the rain intensity of 100 mm/hour, the erosion rate prediction equation that obtained is: $E = 6,4748371 e-0,0824717(MJ/S)$, and similarly, on the rain intensity of 120 mm/hour, the erosion rate prediction equation that obtained is: $E = 18,4374973 e-0,0984739(MJ/S)$.

[Full Text](#)

Title: Artificial neural network for traffic noise modeling

Author (s): Francis Cirianni and Giovanni Leonardi

Abstract: Noise is one of the most prevalent sources of environmental pollution, and vehicular traffic noise is considered one of the most invasive type of pollution and often the most intrusive of all. The trend of noise pollution modeling varies from the smart result of classic regressive models to the performance of many assessment models based on mathematical expression, genetic algorithms and neural networks. In this study, multilayer feed forward back propagation neural network has been developed to predict vehicular traffic noise in urban area. The proposed ANN model has been used to predict the equivalent continuous sound level (Led) in dB (A). The model input parameters are the characteristics of the vehicular traffic flows (total vehicle, percentage of heavy vehicles and average vehicle speed) and the typology of the roads (width of the roadway). The predicted Led from neural network approach and the regression analysis have also compared with the filed measurement. The results show how the neural network approach provides better performance than the classical solution based on statistical analysis.

[Full Text](#)

Title: Design and analysis of interleaved non-inverting buck boost converter for PV module

Author (s): P. Vijayapriya, A. Thamilaran, Akshay Kumar Jain, Alakshyender Singh and D. P. Kothari

Abstract: With the increasing focus on renewable energy especially solar energy, there is an ever increasing demand for cost effective and more efficient buck boost converters. This study presents the analysis and control design techniques for a Non Inverting Buck Boost Converter with Interleaved technique. The converter has been then integrated with a Photo-Voltaic (PV) module with varying output voltage to give fixed 24V DC converter output. The performance of the specified buck boost converter has been compared with conventional converters like Cuk and SEPIC converters.

[Full Text](#)

Title: Effect of moulding water content on geotechnical properties of rice straw ash stabilized expansive soil

Author (s): Akshaya Kumar Sabat, Swapnaranee Mohanta and Satyapira Swain

Abstract: Effects of moulding water contents on some geotechnical properties of an expansive soil stabilized with optimum (20%) amount of rice straw ash (RSA) have been discussed in this paper. Standard Proctor compaction, unconfined compressive strength, soaked California bearing ratio, hydraulic conductivity and swelling pressure tests were conducted on expansive soil-RSA mixes, by preparing the samples at maximum dry density but having five different moulding water contents, Optimum moisture content (OMC), and dry and wet sides of OMC. From the test results it is found that moulding water contents have significant effects on the geotechnical properties of this stabilized expansive soil.

[Full Text](#)

Title: Spider webs as natural samplers

Author (s): Ibrahim Rilwanu Yalwa and Kamaluddeen Suleiman Kabo

Abstract: Spider webs collected from the indoor and outdoor of 120 sampling sites of 10 zones of Kano Municipality were analysed for manganese and iron by the use of Atomic Absorption Spectrophotometry (AAS), after digestion in the mixture of concentrated nitric acid and hydrogen peroxide. The analysis of the webs showed different levels of the metals in the indoor and outdoor samples with means and standard deviations of 273.33±133.98 and 378.33±159.06 µg/g, for manganese indoor and outdoor respectively, then 3083.33±1314.00 and 4200.00±1656.00µg/g for iron indoor and outdoor respectively. These variations in concentrations have been attributed to emissions from dust particles, motor vehicle/industrial emissions and other activities in the metropolis. Analysis of the webs also showed large differences between the sites which could be attributed to the geology and human activities in each locality. Spider webs analysis has thus proved to be accumulators and therefore useful indicators of pollutants of the environment from which they were collected, hence can be used as natural samplers.

[Full Text](#)

Title: Industry simulation model of the production and sale of petroleum products

Author (s): Dulat Nurmashevich Shukayev and Zhanar Beibutovna Lamasheva

Abstract: This paper presents a generalized simulation model of the oil refining industry for analyzing the effect of variability and randomness of demand and supply on the industry's performance. The use of a simulation and analytical model for planning near-term production growth will facilitate the calculation of key parameters and identification of the most appropriate means of using resources and increasing output. We have created a functional diagram of the production and sale of petroleum products as a system that reflects both production and information management functions. In order to describe and analyze the performance of the system, we created an econometric model with the recursive structure of relations. We have also developed an operational algorithm for simulating the production and sale of petroleum products.

[Full Text](#)

Title: Indoor location estimation utilizing Wi-Fi signal based on bayesian approach

Author (s): L. I. Idris, N. M. Z. Hashim, A. S. JA'afar, A. Salleh, N. R. Mohamad and K. A. A. Aziz

Abstract: The uses of detection location technology such as GPS and A-GPS have increased by day. However, this technology cause inefficient for indoor environment detection. This is due to the multipath fading and disability of signal to penetrate most of building materials. This study will focus on indoor location estimation which utilizes available signal which is Wi-Fi. Bayesian approach algorithm and MATLAB software are used to estimate the location in order to analyze indoor location and positioning via Wi-Fi by using one of the method named fingerprints. Location fingerprints is a technique of positioning that compares measured of Received Signal Strength (RSS) data to a database of expected values to estimate the location. The performance of Bayesian approach was evaluated and it has greatly performed in this location with low percentage of error. For the future works, the software can be improved by considering the user is in moving mode. It is worthwhile to explore the big variations in historical RSS information as to enhance the system estimation. A MATLAB coding which can automatically measure the RSS value of each access point should be considered in order to make the location estimation calculation easier.

[Full Text](#)

Title: Single phase thirteen level inverter with reduced number of switches using different modulation techniques

Author (s): M. Satheeswaran, A Ramesh Babu and K. Selvamuthukumar

Abstract: The main objective of proposal of this topology is to get the output with reduced Harmonics and to improve the efficiency with reduced number of switches. Multi-Level Inverter (MLI) Performance has been evaluated for three different modulation technique Trapezoidal pulse width modulation (TPWM), Sinusoidal Pulse width modulation (SPWM), 1/6th Third order Harmonic injection technique (1/6th THIPWM). The parameters Total Harmonic distortion (THD), Efficiency, power utilisation is compared for all three techniques using MATLAB/Simulink and to identify the best suitable modulation technique.

[Full Text](#)

Title: Topology control issues in wireless sensor networks (WSN) for intelligent transportation systems (ITS)

Author (s): R. Ramya, G. Saravanakumar and S. Ravi

Abstract: Topology issues have received more and more consideration in Wireless Sensor Networks (WSN). While WSN applications are generally optimized by the given underlying network topology, another trend is to optimize WSN by means of topology control. A number of approaches have been identified in this area, such as topology directed routing,

cooperating schemes, sensor coverage based topology control and network connectivity based topology control. A good number of the methods have proven to be able to offer an improved network topology for traffic monitoring and communication concert for intelligent transportation systems with extended system lifetime. In this paper, we present a full analysis of the studies in this area.

[Full Text](#)

Title: Freeman chain code route length optimization using meta-heuristic techniques for handwritten character recognition

Author (s): Dewi Nasien, Fakhrol Syakirin Omar, Aini Najwa Azmi and Deni Yulianti

Abstract: Chain code is used as representation for an image in form of sequence of directional codes along the border or structure line. Issue arises during its extraction when the line has branches and the sequence must be continuous; no restarting at any junction is allowed. This paper presents a chain codes extraction of Thinned Binary Image (TBI) from upper-case Centre of Excellent for Document Analysis and Recognition (CEDAR) dataset using Meta-heuristic techniques. There are six methods in Meta-heuristic techniques that called Differential Evolution (DE), Particle Swarm Optimization (PSO), Genetic Algorithm (GA) and Ant-Colony Optimization (ACO), Harmony Search Algorithm (HSA) and Simulated Annealing (SA). In the feature extraction, Freeman Chain Code (FCC) was used as data representation that uses 8-neighbourhood directions. However, the FCC representation is dependent on the route length and branches of the characters' node. These six methods are used to find the shortest route that consumed minimum computational time. The experimental result shows that the route length and computation time using DE, PSO, GA, ACO, HSA and SA. Comparing to five other techniques, the results revealed that SA has the shortest chain code length and lowest computational time with 1,856.13 and 0.07 second, respectively.

[Full Text](#)

Title: Missing river discharge data imputation approach using artificial neural network

Author (s): M. R. Mispan N. F. A. Rahman, M. F. Ali, K. Khalid, M. H. A. Bakar and S. H. Haron

Abstract: The issue with missing data in hydrological models are very common and it occurs when no data value was stored during observation. In modelling, the missing data can affect the conclusion that can be drawn from the dataset. This paper presents the study on Levenberg-Marquadt back propagation algorithm in predicting missing stream flow data in Langat River Basin. Data series from the upper part of Langat River Basin were applied to build the Artificial Neural Network model. The result indicated good performance of the model with Pearson Correlation, $r = 0.97261$ for training data and overall data shows $r = 0.91925$. The study reveals that Levenberg-Marquadt back propagation algorithm for ANN can simulate well in the daily missing stream flow prediction if the model customizes with good configuration.

[Full Text](#)

Title: Memory requirements for hardware implementation of the H.264 decoder modules

Author (s): Karthikeyan C. and Rangachar

Abstract: To address the increasing demand for higher resolution and frame rates, processing speed (i.e. performance) and area cost need to be considered in the development of next generation video coding. Context-based adaptive binary arithmetic coding (CABAC) is the major entropy-coding algorithm employed in H.264/AVC. In this paper, subinterval reordering is proposed for the arithmetic decoder to increase the processing speed and to lower the frequency of memory access. Modification of the motion vector difference (MVD) context selection is proposed to reduce memory requirements and speed up the memory access. These above two methods and architecture optimizations are non-standard compliant and this proposed work is incorporated using buffers and registers for temporary storage and processing of the data. The speed of operation is improved by more than 50% with respect to normal operation.

[Full Text](#)

Title: Assessing the suitability of information technology in supporting knowledge sharing in Islamic banks in Malaysia

Author (s): Abdusalam A. A. Abuazoum, Nurdiana Binti Azizan and Nursilah Binti Ahmad

Abstract: Today, Islamic banks (IB) are starting to understand the relevance and importance of knowledge sharing. They are also beginning to appreciate knowledge as the most significant and valued asset that leads to organizational performance. Hence, promising motivational factors are expected to be helpful in emphasizing the need for employees to share not only crucial knowledge but also new knowledge to further ensure that the Islamic banking industry possesses the competitive edge they seek. This study aims to compare the use of IT to support KS behavior between staff members in conventional banks that have included Islamic banking in their system (CBs) and IB in Malaysia. The methodology in this study involves connecting two types of data when the researcher realizes the need to collect additional data after analysing the first set of data. The second phase of the research, which is based on the results of the first phase, is marginal, supportive, and intended to explain the initial results. The research findings provide useful information and help deepen the understanding of banks about motivating their employees' tendencies to engage in knowledge sharing practices. Applying Shariah texts for implementation in Islamic banking services is also best.

[Full Text](#)

Title: Metamodel for software solutions in computed tomography

Author (s): Vitaliy Mezhyuev

Abstract: Metamodeling approach is widely used now to produce software for general purposes. This paper expands "classical" metamodeling approach to the design of software for mathematical modeling. We define the metamodel to solve different problems in computed tomography. The proposed approach was applied for the reconstruction of the structure of three-dimensional objects on a system of their traces on mutually perpendicular planes. It was also used for the generation of software intended for the search of illegal items during customs control.

[Full Text](#)

Title: Experimental study the use of chitosan-coated activated carbon (CCAC) to reduce the content of metal Fe the produced water

Author (s): Yustia Wulandari Mirzayanti

Abstract: In this paper explain about levels of iron precipitate Fe (OH) in the high produced water causing corrosive properties and affect precipitation the channel pipe. Fe bacteria also cause odor and bad taste in the water. The aim from this research is want to know how the effect of the use of activated carbon, chitosan and chitosan-coated activated carbon

(CCAC) to absorb metal ions Fe in produced water. The study was conducted by the method of adsorption in batch with initial concentration in produced water Fe 27.34 ppm. 90 minutes contact time and adsorbent mass varies, 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, and 30 grams. The results showed that the CCAC adsorbent mass weighing 18 grams can reduce the metal ion content of Fe in the produced water up to 93%, Chitosan with a mass of 24 grams adsorbent capable of up to 83.9% while the activated carbon is only capable of amounting to 65.3% by mass of adsorbent 30 grams. The model used is the adsorption isotherms of Langmuir and Freundlich adsorption isotherms to determine the appropriate model in the use of adsorbent CCAC. Langmuir adsorption isotherm equation linearized equation ($y = 0.4816x + 0.6294$) with $R^2 = 0.9956$ whereas the adsorption isotherms Freundlich equation ($y = 0.1347x + 0.1164$) with $R^2 = 0.9813$.

[Full Text](#)

Title: The engineering method of calculation of the remaining life of the bus body safe operation on the basis of estimation of its corrosion deterioration

Author (s): Ovchinnikov N. A., Kalmikov B. Y., Stradanchenko S. G., Kozyreva E. A. and Chefranova O. V.

Abstract: The article is devoted to the solution of practical problems in the field of buses passive safety and particularly to the determination of passenger vehicles service limits according to the safety conditions and the body structural strength. The authors have developed a step-by-step strategy of distribution of a blow general energy on the bus pillars taking into account irregularity of loading on axes. The authors have calculated the breaking load for the body material possessing ideal elastoplastic properties. The authors have calculated the predictable moment of section resistance for the body material taking into account the corrosive deterioration of its elements during operating time years. The remaining life of the bus body safe operation on the basis of the estimation of its corrosive deterioration is proved.

[Full Text](#)

Title: Correction bias error tooth flank of a helical gear generated by CNC gear shaving machine

Author (s): Van-The Tran

Abstract: On CNC shaving machine, the tooth flank of work gear can be crowned longitudinally by varying the plunge motion of shaving cutter. However, which will induce a bias error on tooth flank of the shaved work gear. In this paper, therefore, we propose a new CNC shaving method by modifying work gear rotation angle and without varying the plunge motion of shaving cutter during the gear shaving process that can be reduced the bias error of the tooth flank on shaved work gear. A numerical example is presented to illustrate and verified the merits of the proposed CNC gear shaving method in longitudinal crowning to obtain the tooth flank of work gear surface without bias error.

[Full Text](#)

Title: Comparison of various ripple carry adders: A review

Author (s): Jimin Cheon

Abstract: As portable multimedia and communications applications emerge, the need for low power, small area, and low delay time digital circuits becomes more prominent. Addition process is the most used operation in any DSP because addition is involved in all other mathematical operations. Therefore, adders design is considered critical because it influences the performance of the system in terms of power and delay. In this paper, we introduce various ripple carry adder in terms of static CMOS logic, dynamic CMOS logic, and others.

[Full Text](#)

Title: Chemical composition identification of compounds in coal after a disbursement process

Author (s): Atus Buku, Sudjito Soeparman, I. N. G. Wardana and Slamet Wahyudi

Abstract: The purpose of this study was to observe the chemical compounds composition in coal after a liquefaction process. Based on the test results, it is obtained some of the compounds contained in liquid coal. The dominant compound is Naphthalene, benzene and methyl groups. This compound is a hydrocarbon compound which allows to be used as a fuel.

[Full Text](#)

Title: Multi orientation performance of feature extraction for human head recognition

Author (s): Panca Mudjirahardjo, Rahmadwati, Nanang Sulistiyanto and R. Arief Setyawan

Abstract: The main component for head recognition is a feature extraction. One of them as our novel method is histogram of transition. In this paper we evaluate multi orientation performance of this feature for human head detection. The input images are head and shoulder image with angle of 315°, 330°, 345°, 15°, 30° and 45°. We use SVM classifier to recognize the input image as a head or non head, which is trained by using normal orientation (0°) images. For comparison, we compare the recognition rate with the existing method of feature extraction, i.e. Histogram of Oriented Gradient (HOG) and Linear Binary Pattern (LBP). The experimental results show our feature more robust than the existing feature.

[Full Text](#)

Title: The influence of thermal barrier coating on the combustion and exhaust emission in turpentine oil powered DI diesel engine

Author (s): S. Sivaganesan and M. Chandrasekaran

Abstract: Several methods of coatings are used to protect various structural engineering materials from corrosion, wear, and erosion, and to provide lubrication and thermal insulation. Of these, Thermal barrier coatings (TBCs) play the most important role in coating of internal combustion engines particular to the combustion chamber. Insulation of the combustion chamber components of low heat rejection (LHR) engines can reduce the heat transfer between the gases in the cylinder and the cylinder wall and thus increase the combustion temperature. This study concentrates on low heat rejection (LHR) engine in which yttria stabilized zirconia (YSZ) are coated to acquire the thermal barrier for the piston crown, cylinder head and valves which will vary depends upon the functional graded material (FGM). A layer of aluminum oxide coating is used to conduct extensive experiments in a single-cylinder Kirloskar TV 1 engine with every piston crown, cylinder head and valves are coated with a layer of ceramic, which consists of zirconia and yttria with varying of thick compositions. This study comprises about diesel blended with turpentine oil which is used in Engine performance measurements. Therefore the characteristics of emissions and combustion were analysed before and after

the application of FGM coatings onto the piston crown of cylinder head and valves. To acquire more improved engine performance, cylinder pressure measurements were taken which provides direct comparison to cylinder pressure; maximum pressure and heat release diagrams between are figured to exhibit the base line which is coated with FGM.

[Full Text](#)

Title: An environmentally friendly solvent mix for asphaltene deposit removal

Author (s): Okafor Henry Elochukwu and Hisham Khaled Ben Mahmud

Abstract: Conventional benzene, toluene and xylene (BTX) solvents have been successfully applied for remediation of asphaltene problems during crude oil production and processing. However, BTX solvents have low flash point, high acute toxicity and low biodegradability, and therefore, considered non-environmentally friendly. Consequently, stringent environmental laws are continuously enacted to restrict the applications of such solvents. This paper investigates the utilization of environmentally benign solvents derived from natural and renewable precursors to dissolve and disperse asphaltene deposits. A composite mixture of methyl ester oleate and ethanol was examined in a solvent and co-solvent synergistic function to dissolve and disperse asphaltene. The solvent blend possesses favourable health, safety and environmentally friendly characteristics such as high flash point (78°C) and high biodegradability (98%). Results show that the composite solvent gives better dissolution and dispersion of asphaltene deposits when compared with the respective performance of methyl ester oleate and aromatic xylene. Further adsorption studies was conducted and experimental data validated by Langmuir and Freundlich models, confirms a favourable adsorption of methyl ester oleate and methyl ester oleate/ethanol mix of asphaltene.

[Full Text](#)

Title: Generator maintenance scheduling in a deregulated environment using hybrid differential evolution algorithm

Author (s): G. Balaji, R. Balamurugan and L. Lakshminarasimman

Abstract: In this paper, a new approach for preventive maintenance of generating units in a competitive market environment is proposed. The objective of the generator maintenance scheduling (GMS) problem is to find the precise time interval for maintenance of power generating units with an objective criterion of maximizing the profit of individual generation companies (GenCo's) present in an electricity market. The problem of scheduling of generating units for maintenance is formulated as a mixed integer optimization problem. Differential Evolution (DE) algorithm is suitably modified to handle the integer variables present in the GMS problem. The integer variables are the control variables that denotes the starting period of each generating unit for carrying out maintenance work. The lambda iteration approach is incorporated into the DE procedure in order to assists DE in finding the accurate starting period for maintenance of power generating units. This paper presents a hybrid differential evolution (HDE) to solve maintenance scheduling problem in a power system. The performance of the proposed algorithm is validated by considering 22 units test system. Numerical results obtained by the proposed HDE method are compared with hybrid particle swarm optimization (HPSO) algorithm. The test results reveal the capability of the proposed HDE algorithm in finding near optimal maintenance schedule for the GMS problem under competitive market environment.

[Full Text](#)

Title: Characteristics of limiting devices of electric power use Triac based microcontroller

Author (s): Tjahja Odyanto and Nasrullah Jamaludin

Abstract: In fact in the household, electrical power coming from a network of PLN (The state electricity company) is limited by MCB (Miniature Circuit Breaker) which is a current limiting devices made of bimetallic that works based on the current through the bimetal. When the electric current exceeds the nominal current MCB, the MCB will trip. While the measurement of electrical energy is still wearing KWH Meter analog / disc. But along with the times and technology it was developed KWH digital meter that also serves as an automatic current limiting in general KWH meter installed in each home where every house electric subscribe to PLN. The problem is if the subscription is the occupants of a dorm room with the electrical load is relatively small (only in one room only) so that when mounted KWH Meter (contractual power) per room then it will be too big electricity subscription fees. As the evaluation to limit electrical power per room then used Delimiter Tools Electricity With Triac- Based Microcontroller that serves to limit the supply of electrical power to each room in accordance setting the maximum power fed through the keypad. The final result shows if the presence of a load on one or several rooms not exceed 350 VA setting point, the flow of electrical current still flows (Triac ON). Whereas if the presence of a load on one or several rooms exceeds the setting point of 350 VA, then the flow of electric current disconnected (OFF Triac).

[Full Text](#)

Title: A survey on low compression ratio diesel engine

Author (s): Bridjesh P., Arunkumar G. and Mohanamurugan S.

Abstract: A review on the behaviour of the low compression ratio diesel engine is presented in this work. To incorporate new strategies which improve the performance of the diesel engine, the dynamic interaction between engine subsystems and their impact on combustion phenomenon has to be retrieved. Several studies have investigated the impact of compression ratio on the performance of diesel engine and its implications on the emissions. In general, diesel runs at higher compression ratios. At higher compression ratios, the NOx emission is high even though brake thermal efficiency is high. Low compression ratio technology can be the solution to this problem. It is proposed that the reduction in compression ratio would be beneficial to reduce the NOx emissions, thermal and mechanical stresses on the components of the engine. The main objective of this investigation was to understand the impact of lowering the compression ratio on the brake thermal efficiency and brake specific fuel consumption on the diesel engine by reducing the compression ratio from 17.5:1 to 13.7:1 in two steps by using thicker head gaskets. The test results revealed that as the compression was lowered, the NOx emission got reduced with a little penalty in HC and CO. The brake thermal efficiency is as well reduced and brake specific fuel consumption was increased when compared with the standard compression ratio of the engine.

[Full Text](#)

Title: A microcontroller based led sunphotometer with RF data acquisition

Author (s): Cesar A. Llorente, Benison S. Ongsypping, Paolo Gabriel P. Casas, Matthew Lewis C. Chan, Glenn Michael San Pedro, Edgar A. Vallar and Maria Cecilia D. Galvez

Abstract: A microcontroller based four-channel LED sunphotometer system with RF transceiver system was successfully developed in this study. The control and data acquisition was done wirelessly using a Zigbee RF Transceiver Module. The RF transceiver module was connected to the sun tracking mount and to a portable Personal Computer. Sun tracking was done using a quadrant photodiode for feedback control and a mathematical algorithm for tracking the sun for low-sunlight intensity situations. High correlation coefficients were obtained when the data obtained from the four LED

channels of the system was compared with a commercial four channel SP02 sunphotometer. With this system, the sun tracking mount can be placed anywhere without the need for long wires as long as there exist a line of sight between the two RF transceiver modules.

[Full Text](#)

Title: An optimized geographic routing protocol for VANETs

Author (s): Nithya Darisini P.S., Santhiya Kumari N. and Bolla Karthikeya

Abstract: Vehicular Ad Hoc Network (VANET), a subset of Mobile ad hoc networks, primarily focuses on traffic safety but now-a-days much research is focused on integrating VANETs with internet. With infrastructure based VANET communication, even connectivity could be established with internet. Effective communication between two nodes within a VANET or with an infrastructure unit is assisted by routing protocols. Hence routing plays a vital role in data communication. Most of the routing protocols of VANET follow greedy approach. Many greedy routing protocols have been proposed by eminent researchers. The performance of these greedy routing protocols depends on the recovery strategy adopted by them. This paper presents a novel approach of applying cartographic concepts to enhance the performance of greedy protocol by minimizing the hop count of the path in perimeter mode using curve simplification algorithm. The results show significant reduction in the number of hops required to deliver data to the destination when compared with GPSR protocol.

[Full Text](#)

Title: Characterization of industrial filtration systems for fine particle

Author (s): Youngjin Seo

Abstract: Environmental regulation for fine particle in Korea is based on the emitted mass per unit volume. Thus, industrial plants that emit large quantities of dust are not concerned with fine particles such as PM (particulate matter) 2.5 and PM 10; as fine particles, compared to large particles, do not cause a significant effect on the total emitted mass. However, fine particles must be controlled, as there are increasing concerns about these particles worldwide. In this study, removal efficiency for fine particles by industrial filtration systems was experimentally measured. The most common industrial filtration system is a bag filter, with two different types of materials characterized in terms of the efficiency. Based on numerous experiments, the removal efficiency of glass fiber material was superior to that of polyester material. In addition, several experiments were later conducted to explain these results.

[Full Text](#)

Title: Analysis of slotted microstrip antenna with partial substrate removal and defected ground structure

Author (s): Sarvam Rameswarudu and P. V. Sridevi

Abstract: This article presents the design and analysis of a slotted microstrip antenna on defected ground structure. The proposed antenna consisting of defected ground structure at lower part and defected substrate on the upper part of the design. Parametric analysis with change in dimensional characteristics of the antenna is done using HFSS tool to optimize the antenna model for prototyping. The antenna performance is analyzed with respect to the reflection coefficient, bandwidth, radiation pattern and current distribution and presented in this work. The proposed antenna is resonating at dual band and meeting the requirements of the communication systems with considerable gain in L, S and C-Band.

[Full Text](#)

Title: Effect of solar ventilation on air conditioning system performance of the car parked under sun light

Author (s): Sudhir C. V. and Jalal Marhoon Al Dhali

Abstract: Summer ambient temperatures in Sultanate of Oman are well known to be higher as commonly seen in other GCC countries. During summer, cars parked directly under the sun with window glass raised up, experience a very high temperature rise inside its cabin. Current research paper reports the experimental studies carried out on a parked car installed with an indigenously designed and developed cabin ventilation system powered with Solar PV energy. The experiment was carried on chosen vehicle parked at a unique direction and location exposed to day long sunlight at Muscat for considerable period of time. The experimental investigation showed that the vehicle cabin temperature was lower when ventilation system was turned on. Investigation showed that, with the ventilation system, the time taken to cool down vehicle cabin air temperature to the acceptable limit was significantly lower. With developed ventilation system the car cabin temperature reached to the comfort level much quicker, typically lesser than the half of the time compared to those values tested without ventilation system. Thus indicating, the power saving potential of the developed system as the desired level of thermal comfort can be achieved within the shorter period of time. The reduction in time taken to cool down the cabin temperature to the acceptable limits has direct two fold effects; firstly, the fuel consumption for cooling purpose is reduced and secondly increased thermal comfort level inside the cars cabin. However, the temperature drop pattern was not similar all around the cabin, due to the varied level of cabin sunlight exposure. Temperature drop at the front end of the car was lower than in middle and rear of the car. It was noted that when the ventilation system was turned on, the temperature inside the car was nearly 100C lesser compared to cabin temperature without ventilation system.

[Full Text](#)

Title: Analysis of stress intensity factor of Al7075-T651 plate with cracked hole- A constant crack length method

Author (s): A. Sivasubramanian and G. Arunkumar

Abstract: The paper deals with analysis of Stress Intensity Factor (SIF) of Al7075-T651 plate modeled with two dimensional Through Crack. The crack is modeled in the plate with constant crack length and its stress intensity factor is studied under various loading conditions. In this method, the crack length is kept constant and the tensile load acting on the model is varied to study the effect of the load on the crack. The 2-Dimensional model is generated with crack length and they are subjected to different tensile load. The Stress Intensity factor is calculated for each tensile load. The change in stress intensity factor with change in tensile load is studied and the impacts in all crack models are studied. Also the single crack emanating from the hole and cracks from adjacent hole towards one another is studied.

[Full Text](#)

Title: Biometric high secure and cost effective finger vein authentication system for ATM

Author (s): Kumaresan R., Senthilkumar S. and Karthick C.

Abstract: Finger vein recognition is a method of biometric authentication that uses pattern recognition techniques based on images of human finger vein patterns beneath the skin's surface. Finger vein recognition is one of many forms of biometrics used to identify individuals and verify their identity. Finger Vein ID is a biometric authentication system that matches the vascular pattern in an individual's finger to previously obtain data. The technology is currently in use or development for a wide variety of applications, including credit card authentication, automobile security, employee time and attendance tracking, computer and network authentication, end point security and automated teller machines. The demand for simple, convenient, and high security authentication systems for protecting private information's stored in mobile devices has steadily increased with the development of consumer electronics. The personal information's can be protected in the form of biometrics which uses human physiological or behavioural features for personal identification. In our proposed system, Finger Vein Recognition System using template matching and Implementation using Matlab shows that the finger vein authentication system offers the following adverse features such as cost effective and more secure and accurate level of authentication to performs well for user identification.

[Full Text](#)

Title: Comparison of GPS commercial software packages to processing static baselines up to 30 km

Author (s): Khaled Mohamed Abdel Mageed

Abstract: The objective of this paper is to present a comparison between three of GPS commercial software packages, namely Trimble Business Center TBC, Leica Geo Office LGO, and Topcon Magnet MGT, for processing GPS static baselines up to 30 km. The study was based on statistical analysis of the discrepancies between every two software packages for the output of baseline vectors in Easting, Northing, and Ellipsoidal height, for 14 GPS static baselines ranging from 2 to 30 km, where these baselines were processed using TBC, LGO, and MGT. The results supported by statistical analysis showed that the 3d positional discrepancies dP3d between TBC and MGT has a mean value of 31 mm and 8 mm standard deviation; while the 3d positional discrepancy between TBC and LGO has a mean value of 25 mm with 6 mm standard deviation; finally the 3d positional discrepancy between MGT and LGO software has a mean value of 31 mm with 9 mm standard deviation. These findings are about 3 ppm in the 3d positional discrepancy, which can be considered insignificant in the daily GPS topographic survey works. However, in case of monitoring activities using GPS static technique, it is recommended to use the same GPS software to process the static data to overcome any discrepancies due to using more than one GPS software.

[Full Text](#)

Title: Research on the effectiveness of prediction models in the securities market

Author (s): Siham Abdulmalik Mohammed Almasani, Valery Ivanovich Finaev and Wadea Ahmed Abdo Qaid

Abstract: The article describes the methods and models of prediction in the case of the stock market. There are different methods for assessing and predicting in the case of the stock market, which are widely used in practice in the present. In this paper, we used the model of Moving Average Convergence/ Divergence, prediction model based on a neural network, model of autoregressive integrated moving average (ARIMA) for prediction. We identified the conditions of the use the models as indicators in the case of the market, show examples of application models on the data of the closing prices for the exchange rate from dollar USD to ruble in Russia. In this article analyzes the disadvantages of these models and the causes of these deficiencies. The materials characteristics in this article are analyzing the practical orientation of prediction models in the case of the stock market and interpret the results of mistaken prediction.

[Full Text](#)

Title: Effect of wellbore storage on the vertical well pressure behavior with threshold pressure gradient in low permeability reservoirs

Author (s): Yu Long Zhao, Freddy Humberto Escobar, Ahmad Jamili, Guiber Olaya-Marin and Alfredo Ghisays-Ruiz

Abstract: An additional pressure gradient is needed in certain low permeability oil formations to enable fluid flow to overcome viscous forces. That minimum pressure gradient has been referred to as the threshold pressure gradient; TPG. This effect is accentuated with the presence of wellbore storage effects. A new model involving wellbore storage effects is developed and presented here along an interpretation technique so the TPG can be easily and accurately estimated from transient pressure analysis and it was successfully tested by means of a synthetic test.

[Full Text](#)

Title: Development of hybrid thermoelectric and photovoltaic power generation

Author (s): Mohd Shawal Jadin, Nur Asyikin Setapa and Amir Izzani Mohamed

Abstract: Hybrid photovoltaic and thermoelectric systems more effectively convert solar energy into electrical energy. Two sources of energy are used in this project. One of the energy is solar energy that converts radiant light to electrical energy. The other one is heat energy, which converts heat energy into electrical energy. Therefore, this project will utilize both of the solar radiation and heat from the sun as to generate more electricity. The aim of this project is to build a hybrid system that will increase the efficiency of the power generation system. In this research, the output power of the hybrid is equal to the sum of the maximum output power that produced separately from the individuals of the PV module and TE generator devices. The maximum output power that can be generated was up to 99.27 watts respectively. Overall, by using hybrid PV-TE generator system, the output that can be generated is better than the individual system.

[Full Text](#)

Title: Invariant manifold for extended nonholonomic double integrator systems

Author (s): Z. M. Zain, M. R. Arshad, M. M. Noh, D. Pebrianti, N. M. Zain and K. A. A. Rahim

Abstract: Nonholonomic under actuated systems are typically modeled as highly nonlinear ones, which becomes obvious as the dimension of the system increases. Since this system cannot be stabilized by a static continuous feedback with constant gains, there are several control methods by using a canonical form up to now such as a chained form, a power form, a goursat normal form and a double integrator model. In this paper, we consider extended nonholonomic double integrator systems obtained by extending the Brockett nonholonomic integrator in order to expand the application of under actuated control to control the system using invariant manifold approach.

[Full Text](#)

Title: Time-current characteristic curve prediction for directional over current relays in interconnected network using artificial neural network

Author (s): Osaji Emmanuel, Mohammad Lutfi Othman, Hashim Hizam, Nima Rezaei and Muhammad M. Othman

Abstract: The desired accuracy level of the nonlinear time-current characteristic curve prediction of each overcurrent protective relay can best be obtained from the practical coordination scheme data, applied for the optimal prediction of the relay operation time, rather than empirical data application as mostly seen in most computational applied method for the neural network training and relay operation time prediction. This paper presents a global optimal determination of relay operational parameters settings for time dial setting (TDS) and plug setting (PS) as apply for the time-current characteristic curve prediction for each relay in a propose IEEE 9 bus test system for optimal determination of individual relay response time to fault within its protection zones. A propose hybrid genetic algorithm with artificial neural network (GA-ANN) technique is propose for the prediction of the time-current characteristic curve obtained from global accurate operational parameter settings of each relay to short circuit fault. The GA is applied for global optimal operational parameter determination for each relay by solving a modified objective function (MOF) equation for accurate training data extraction. These valid obtained operation parameters are supplied as training inputs data for the training of ANN to predict accurately the time-current characteristic for each relay. The level of obtained accuracy of the nonlinear time-current characteristic curves will predict accurately the operation time of each relay to different fault current level with minimum mean square errors (MSE) obtained from the applied Levenber-Maequardt algorithm as compared with the obtained outputs from other two applied ANN nonlinear function fitting training algorithm.

[Full Text](#)

Title: IR thermography application for vacuum leak detection of absorption chiller in petrochemical plant

Author (s): Mohd Nasrul Muhaimin Mohd Taib and Kamarul Hawari Ghazali

Abstract: Vacuum pressure is the main factor of sustaining absorption chiller performance and reliability. Any leaks reduce chiller machine capability to produce chilled water supply that comply with petrochemical plant demand and temperature requirement. This study explores possibilities of IR thermography application as a systematic detection method of vacuum leak at absorption chiller. The method combines basic process knowledge of absorption chiller and IR thermography theory in order to identify and verify vacuum leak location. It also considers requirement and demand of petrochemical plant operating nature that requires quick and reliable leak detection method. From experimental result, it shows that IR thermography can be applied as vacuum leak detection method provided that special consideration need to be made on surface emissivity and temperature gradient between target surface and ambient environment.

[Full Text](#)

Title: Design, application and comparison of passive filters for three-phase grid-connected renewable energy systems

Author (s): Mojgan Hojabri and Mehrdad Hojabri

Abstract: Second and third-order passive filters (LC and LCL) are interesting filters to use for grid-connected PWM inverters. Because of the stability problems of these filters around resonance frequency, series and damping resistor can be add to an LCL filter. However, the resistor value has impact on the filter respond, voltage and current harmonic distortion and filter power loss. In this paper, the mathematic characteristics of LC, LCL filter, series and parallel damping LCL filters will be described with their design to apply in 3-phase PV grid-connected inverter. And, simulations have down to validate the theoretical analysis of the filters on filter performance, power quality and filter power loss for 3-phase grid-connected renewable energy system application.

[Full Text](#)

Title: Motor speed controller for differential wheeled mobile robot

Author (s): Yeong Chin Koo and Elmi Abu Bakar

Abstract: The movement of a wheeled mobile robot (WMR) is provided by motors, however, it is hard to control and predict the motors speed. A cascade Proportional, Integration, and Derivation (PID) controller is presented in this study to achieve the purpose of motors speed controlling. In order to test the controller, a differential drive wheeled mobile robot (DWMR) platform is used. The platform is integrated with decision making algorithm (DMA) for the case of wall-following to test the capability of the controllers in different situations. Through the results illustrated, it shows that the cascade PID controller promises a good performance with low average error in controlling the motors to reach the desired speed.

[Full Text](#)

Title: An optimal electric machine control system design used in plug-in hybrid electric boat

Author (s): Muhamad Zalani Daud, Koay Zeng Kin, J. S. Norbakyah and A. R. Salisa

Abstract: The hybrid system is increasingly important in waterborne transportation due to an increase in fuel prices and people's awareness of climate change. Hybrid system is basically a combination of an internal combustion engine and an electric machine (EM). In this paper, an optimal design of EM, that is, the brushless direct current motor for plug-in hybrid electric boat is introduced. The EM model is developed in Matlab/Simulink SimPowerSystem environment together with the closed-loop feedback PI controller. By using a power demand curve as a reference for the model, the optimal performance of the machine is obtained by using the particle swarm optimization. The results of optimal control parameters of the system are compared with those of the trial and error method. It has been found that the proposed optimal system design can improve the machine performance significantly.

[Full Text](#)

Title: An assembly sequence planning approach with a multi-state gravitational search algorithm

Author (s): Ismail Ibrahim, Zuwairie Ibrahim, Hamzah Ahmad and Zulkifli Md. Yusof

Abstract: Assembly sequence planning (ASP) becomes one of the major challenges in product design and manufacturing. A good assembly sequence leads to reduced costs and duration in the manufacturing process. However, assembly sequence planning is known to be a classical NP-hard combinatorial optimization problem; assembly sequence planning with many product components becomes more difficult to solve. In this paper, an approach based on a new variant of the Gravitational Search Algorithm (GSA) called the multi-state Gravitational Search Algorithm (MSGSA) is used to solve the assembly sequence planning problem. As in the Gravitational Search Algorithm, the MSGSA incorporates Newton's law of gravity and the law of motion to improve solutions based on precedence constraints; the best feasible sequence of assembly can then be determined. To verify the feasibility and performance of the proposed approach, a case study has been performed and a comparison has been conducted against other three approaches based on Simulated Annealing (SA), a Genetic Algorithm (GA), and Binary Particle Swarm Optimization (BPSO). The experimental results show that the proposed approach has achieved significant improvement in performance over the other methods studied.

[Full Text](#)

Title: Observation of transient luminous events (TLEs) in Pekan
Author (s): Chan Hwee Geem, MohdShawal Jadin and Amir Izzani Mohamed

Abstract: Transient Luminous Events (TLEs) are classified as a type of lightning events that occurs above a thunderstorm. It is a very fast event that is hardly seen by the naked eyes and happened in a very short period of time. So, a high frame rate capturing device is required in order to capture the scenes of TLEs. This paper reveals a study to verify the occurrences possibility of TLEs in Malaysia by selecting a simple and suitable device to detect and capture the event. There are various types of TLEs such as Elves, Sprites, Halos, Blue Jets, and Gigantic Jets that differs in height within atmosphere. Experimental studies are made to observe Elves and Sprites in Malaysia partially in Pekan, Pahang. The event is being traced using amplified antenna with noise filter and a data acquisition (DAQ) module used to interface between antennas and personal computer (PC) aided with online data logging device to perform a live characteristic recording through PC software. Verification of the obtained TLEs data will be carried out by comparing them with data recorded by Department of Meteorology Malaysia.

[Full Text](#)

Title: Classification of gender by using fingerprint ridge density in northern part of Malaysia
Author (s): S. F. Abdullah , A. F. N. A. Rahman and Z. A. Abas

Abstract: This paper describes on how we can use the fingerprint ridge density to classify the gender in people living in northern part of Malaysia. Ridge density is the number of digital ridges per unit area and it is claimed varies according to sex, age, and population origin. The main objective of this study is to test the truth of the relationship between the fingerprint ridge densities and the gender of a person born and lives in Malaysia as until now, no work on such study has been reported among the population. The sample of this study consists of 50 participants coming from the age group of 18-60 year old and consists of 25 males and 25 females. All the respondents had been properly explained about the objectives of the intended study and the consent had been taken before their fingerprints collected. The fingerprint images that taken manually will be going through the image pre-processing phase using a MATLAB software before the ridge of the fingerprint from two topological areas, radial and lunar can be counted and the mean can be calculated. The results show that fingerprint ridges of less than 12 ridges/25mm² is more likely belong to a male respondent while fingerprint ridges of more than 14 ridges/25mm² is more likely to be from a female respondent. From the result, we can conclude that in Malaysia too, woman tends to have a greater ridges density compared to man. It shows similar trends in sex difference as the other studies of the past conducted on other races in other countries and we can conclude that the trend is universal among all races in the world. From this conclusion, we know that the ridges density is highly trusted to be one of the best criteria for feature extraction in gender classification and this will inspire further research of other classification of feature extraction in gender determination by using a fingerprint.

[Full Text](#)

Title: A sizing tool for PV standalone system
Author (s): Mohd Shawal Jadin, IntanZalikaMohd Nasiri, Syahierah Eliya Sabri and Ruhaizad Ishak

Abstract: This project aims to develop a software for sizing a standalone photovoltaic (PV) systems. The proposed tool has the capability to allow the user to employ meteorological data such as ambient temperature, irradiation data, and peak sun hour (PSH) in designing the PV system. Usually, a micropower system is designed to serve a specific load demand, in this work, the stand-alone PV is modeled with a particular load profile to ensure that the system meets required energy demand. The developed tool is used to determine the feasibility of the stand-alone system in terms of PV size and the estimated total power production. The tool developed with a built in database which stores different types of PV panels, batteries, charge controllers and inverters. The proposed sizing tool was validated based on the real data implemented on the case study for a residential buildings.

[Full Text](#)

Title: Optimal load frequency control in single area power system using PID controller based on bacterial foraging & particle swarm optimization
Author (s): Hong Mee Song, Wan Ismail Ibrahim and Nor Rul Hasma Abdullah

Abstract: In this paper, meta-heuristic optimization based on Particle Swarm (PSO) and Bacterial foraging (BFO) has been used to determine the optimal values of the proportional-integral-deviation (PID) controller for the load frequency control. Single area power system has been designed as a model network for MATLAB-Simulink simulation. The comparison has been done between the conventional PI controller and PID controller tuned by Particle Swarm and Bacteria Foraging optimization technique. Based on time settling, transient and overshoot analysis, it can be concluded and profoundly proved that PID tuning by BFO technique is better than PSO technique and conventional PI controller.

[Full Text](#)

Title: A comparison of distribution static synchronous compensator (DSTATCOM) control algorithms for harmonic elimination
Author (s): Nor Hanisah Baharudin, Tunku Muhammad Nizar Tunku Mansur, Syed Idris Syed Hassan, Puteh Saad, Rosnazri Ali and Musa Yusup Lada

Abstract: This paper evaluates the performance of Distribution Static Synchronous Compensator (DSTATCOM) using a Voltage Reference Configuration (VRC) and the Instantaneous Power Theory (PQ) control scheme for power quality improvement in three-phase three-wire distribution system. It is used for harmonic elimination according to IEEE-519 standards under nonlinear loads. The Voltage Reference Configuration (VRC) is a simpler and robust control scheme for extracting reference current signals. The performance of the control schemes are simulated and analyzed under MATLAB environment with its Simulink and PSB set toolboxes.

[Full Text](#)

Title: EEG-BASED aesthetics preference measurement with 3D stimuli using Wavelet transform
Author (s): Lin Hou Chew, Jason Teo and James Mountstephens

Abstract: This study investigates on aesthetics preference measurement of human using electroencephalogram (EEG) for virtual motion 3D shapes. The 3D shapes are generated using the Gielissuper formula in bracelet-like shapes. EEG signals were collected by using a wireless medical grade EEG device, B-Alert X10 from Advance Brain Monitoring. Wavelet transforms were used to decompose the signals into 5 different bands, alpha, beta, gamma, delta and theta. Linear Discriminant

analysis (LDA) and K-Nearest Neighbor (KNN) were used as classifiers to train and test different combinations of the features. Classification accuracy of up to 82.14% could be obtained using KNN with entropy of beta, gamma, delta and theta rhythms as features from channels Fz, POz and P4.

[Full Text](#)

Title: Performance of palm shell activated carbon as an alternative adsorbent for reclamation of used transformer oil

Author (s): Sharin Ab Ghani, Nor Asiah Muhamad and Hidayat Zainuddin

Abstract: The objective of this study is to investigate the effectiveness of three types of adsorbents, namely Fuller's earth, bentonite and palm shell activated carbon, on the reclamation of used transformer oil samples. Fuller's earth is an industrial bleaching earth that is commonly used as an adsorbent in the reclamation process, whereas bentonite and palm shell activated carbon are alternative adsorbents that are relatively new in the field. In this study, the reclamation process is carried out on the used transformer oil samples five times, and the effectiveness of the adsorbents after the first, third and fifth reclamation cycle is examined. The relative content of dissolved decay products (DDP) for each sample before and after the reclamation process is determined using UV-Vis spectroscopy. In addition, the breakdown voltage test is performed to measure the dielectric strength of each sample under an applied electric field in accordance with the ASTM D6802 and MS IEC 60156:2012 standards. The reclamation process conducted in this study complies with the BS EN 60422:2013 and IEEE Std 637-1985 (R2007) standards. The results show that both bentonite and palm shell activated carbon adsorbents reduce the relative content of DDP by twice the value achieved by Fuller's earth, particularly during the first and third reclamation cycles, while simultaneously enhancing the dielectric strength of the reclaimed oil samples. The results also show that the use of palm shell activated carbon gives the highest percentage of enhancement in the breakdown voltage test, with a value of 57.14% after the fifth reclamation cycle. Based on the results of this study, it can be concluded that palm shell activated carbon is a promising alternative adsorbent for reclamation of used transformer oils, which diversifies the uses of palm oil products in Malaysia.

[Full Text](#)

Title: Computational intelligence technique for static VAR compensator (SVC) installation considering multi-contingencies (N-m)

Author (s): Mahaletchumi A/P Morgan, Nor RulHasma Abdullah, MohdHerwan Sulaiman, Mahfuzah Mustafa and Rosdiyana Samad

Abstract: This paper discusses about a new approach based on Evolutionary Programming (EP) optimization technique for installation Static VAR Compensator (SVC) considering multi-contingencies (N-m) which occurred in the power system. The proposed technique determines the optimum sizing in order to reduce the total transmission loss in the system and this would be the objective function of the transmission system network. In addition, Static Voltage stability Index (SVSI) was used as tool to indicate the location that to be installed into the system. A computer program was written in MATLAB. The design program tested on IEEE 30 Bus-RTS. Finally, comparative studies made between EP and Artificial Immune System (AIS).

[Full Text](#)

Title: Development of vision-based handicapped logo recognition system for disabled parking

Author (s): Mohd Sahdan Bin Abd Ghani, Chee Kiang Lam and Kenneth Sundaraj

Abstract: This paper describes the development of a handicapped logo recognition system for disabled parking access control. The system is proposed to solve the current community issue which irresponsible able-bodied drivers abuse disabled parking space at area such as hospitals, hotels, shopping centres, public transport stations and residences. The idea of this development is to provide a vision-based automatic recognition system to identify handicapped motorists who displays handicap sticker on the front windscreen of their vehicle. The proposed logo recognition system has been developed by applying template matching method in machine vision to identify handicapped logo. The results of this study show that the developed system can detect the handicapped logo accurately and it can be implemented into the automatic parking access system in helping the handicapped motorists to preserve their special privilege in parking facility.

[Full Text](#)

Title: Matrix converter: A review

Author (s): Nur Wahidah Basri, Hamdan Daniyal and Mohd Shafie Bakar

Abstract: Matrix Converter (MC) fundamentals and operation is described throughout this paper. This covers topological characteristics, MC types and basics of operation, implementation of discrete semiconductors as bidirectional switches, commercially available bidirectional switches modules packaging, bidirectional switches commutation schemes based on current and voltage direction as well as modulations strategies of MC based on related publications.

[Full Text](#)

Title: Energy efficient channel selection framework for cognitive radio wireless sensor networks

Author (s): Joshua Abolarinwa, Nurul Mu'azzah Abdul Latiff, Sharifah Kamilah Syed Yusof and Norsheila Faisal

Abstract: Advancements in the field of cognitive radio technology have paved way for cognitive radio-based wireless sensor networks. Energy and spectrum efficiencies are two biggest challenges facing wireless sensor networks. This has impacted immensely on the network lifetime and performance. On the other hand, spectrum channel is scarce and limited. Hence, there is urgent need for energy efficient utilization of the scarce spectrum in cognitive radio wireless sensor networks. In this paper, we propose a flexible solution by reinforcement learning to address the problem of energy efficiency associated with channel selection in cognitive radio wireless sensor networks. A simple learning algorithm was developed to improve the secondary user throughput, channel availability in relation to the sensing time and energy efficiency. Comparing the results obtained from simulations with other non-learning channel selection methods-random channel assignment and dynamic channel assignment, the proposed learning algorithm produced up to 30% better performance in terms of throughput and energy efficiency. This signifies that, for better performance, intelligent learning is required in cognitive radio wireless sensor networks.

[Full Text](#)

Title: A comparative study of stress and brainwave characteristic between breast feeding and non-breast feeding women

Author (s): Najidah Hambali, Nabilah Humaidi, Zunairah Haji Murat and NurIdora Abdul Razak

Abstract: Exclusive breastfeeding is important not only for the women's health but also to children's brain development since breast milk can give positive impact for their brain development. The approach that has been used in this study aims to compare the stress level and brainwave characteristic between breastfeeding (BF) and non-breastfeeding (NBF) women. The stress level measured using the Perceived Stress Scale (PSS) questionnaire by Sheldon Cohen. In addition, the brainwave signals were recorded for 25 of breastfeeding women and 25 of non-breastfeeding women using wireless Electroencephalogram (EEG). Then, the recorded EEG signals were analyzed using readily available Brainwave Balancing Index (BBI) system. The outcomes presented the Brainwave Balancing Index (BBI), brain hemisphere dominance and the correlation of PSS and BBI between BF and NBF women. The outcomes presented BBI of BF women were more balanced, compared to before and during breastfeeding session. While the majority of NBF women were recorded with balanced BBI although all of them were high in stress. Majority of BF women were recorded with right brain dominance and some of them had changed the dominance throughout the three sessions. In contrast for NBF women, most of them presented with left brain dominance. Statistical analysis resulted there were no significant correlations between PSS and BBI of BF women for all three breastfeeding sessions and also for NBF women.

[Full Text](#)

Title: Biochip development for biological cells manipulation using DEP

Author (s): Siti Nursyahirah Ahmad Latfi and Fahmi Samsuri

Abstract: Biochip is a technology platform that has become the medium of researchers in carrying out the analysis of biological cells such as sorting, trapping and screening of biological within a few seconds. To conduct analysis on biological cells, appropriate manipulation techniques are required. In this research, a Dielectrophoresis force (DEP) manipulation technique was used by applying non-uniform AC electric fields generated by the microelectrodes designed. For carrying out on one of the main objectives of this study, COMSOL Multiphysics 4.4 software was used in this study in which the ring planar microarray microelectrodes pattern was designed to investigate the distribution of the electric field resulting from the microelectrodes designed. Results show the highest electric field strength occurs at the end of the microelectrode tip at the same time the lowest electric field region can be seen at the microcavity centre. Cell trapping may also occur in the central part of the micro-cavities with negative dielectrophoresis (nDEP) in which cells will become interested in the low electric field.

[Full Text](#)

Title: A thermograph image extraction based on color features for induction motor bearing fault diagnosis monitoring

Author (s): Norliana Khamisan, KamarulHawari Ghazali, Aufa Huda Muhammad Zin

Abstract: In this study, an approach of extraction analysis for bearing fault diagnosis of rotating machinery based on thermogram investigation using color features is proposed in this paper. This research was proposed since condition monitoring and motor failures are great concern in industries. Early fault detection in machineries can avoid production lost and reducing maintenance costs. Therefore, in this work, infrared thermography (IRT) is used as a tool to detect early sign for bearing fault since this infrared thermography (IRT) is one of the most effective non-destructive testing techniques of condition monitoring and fault diagnostics. By using this infrared thermography (IRT) technology, the information of machine condition can be analyzed. In the present study, 300 thermal images are used in this simulation process whereby the images are classified into two classes namely normal and abnormal. The first class consists of 150 images normal bearing while another 150 images denote abnormal bearing class. SURF feature-based algorithm, RGB color space and active contour segmentation are employed in this paper in order to process and differentiate between normal and abnormal bearing image by means of color features called statistical technique. The experiment results indicate that this statistical features of RGB color space able to distinguish the differences between normal and abnormal features of bearing in machinery system.

[Full Text](#)

Title: A visual perception survey: Seeing eye-to-eye at nuclear chromatin of non-neoplastic cervical squamous epithelial cells

Author (s): Jing Rui Tang, Nor Ashidi Mat Isa and Ewe Seng Ch'ng

Abstract: Subjective judgment of individual pathologists in visual perception of nuclear chromatin of cervical squamous epithelial cells is well known. Nonetheless, chromatin pattern of cervical squamous epithelial cell forms one of the diagnostic criteria in determining whether such cells have undergone neoplastic transformation. In such background, this study investigates agreement among pathologists regarding visual perception of nuclear chromatin of non-neoplastic cervical squamous epithelial cells. A survey of 20 non-neoplastic cervical squamous epithelial cell images captured from Thinprep slides with chromatin regions detected at 5 sensitivity levels by Fuzzy C-Means clustering technique was constructed. This survey was distributed to 10 pathologists. Cohen's and Fleiss' Kappa tests were performed to investigate inter-observer agreement on the sensitivity levels that best represent the visual perception of the chromatin of each image. Agreement between every two pathologists ranges from poor to moderate (Cohen's Kappa values less than 0 to 0.43). The overall agreement among ten pathologists is poor with Fleiss' Kappa value=-0.0163. The grand mean sensitivity level for the chromatin detection is 3.725, with the standard deviation of 0.378. Agreement between every two pathologists in perceiving the chromatin of non-neoplastic cervical squamous epithelial cells is fairly low. Nonetheless, on average, the sensitivity level 4 represents the most sufficient level of chromatin detection among all pathologists. This sensitivity level 4 could be set as the optimum level for algorithmic comparison between non-neoplastic versus neoplastic cells in future work.

[Full Text](#)

Title: COLREGS-compliant path planning for riverine autonomous surface VESSEL

Author (s): Jian Hong Mei, M. R. Rizal and Jing Rui Tang

Abstract: International Regulations for Preventing Collisions at Sea (COLREGs) is marine traffic rules for all vessels working in water environment. It is not only essential for human navigated ships but also for Autonomous Surface Vessel, since it should behave same way to other ships when encounters other ships for collision avoidance. This paper presents an artificial potential field method to guide the ASV cruise in the river and be able to avoid obstacles. The repulsive potential is modified to ensure that the evasive manoeuvre complies with COLREGs. The recover manoeuvre is also achieved to make the ASV fast return back to its original path. The simulation results illustrate that the proposed approach is effective for obstacles avoidance and path planning for ASV navigation in riverine environment.

[Full Text](#)

Title: Thermal detection of water saturation spots for landslide prediction

Author (s): Aufa Zin, Kamarul Hawari and Norliana Khamisan

Abstract: Nowadays, we heard many serious issues about landslide phenomenon in Malaysia. It became serious when landslide phenomenon affects human's life. It causes human injury, loss of life and economical problem. There are a few factors

that caused landslide but the main factor is heavy rain. Hence, to solve this issue, this study investigates a new method to detect spots of high water saturation which is integrated with a thermal camera system to provide early detection of landslide. The thermal camera is selected because it provides accurate predict where landslide going to occur. Thermal camera can be used to detect spots of high water saturation which is a key component that contributes to landslide activity. The technique of neural network is used to classify the image of water saturation. The analysis is done using 40 samples. It was tested to classify the data into two groups which are low water saturation and high water saturation.

[Full Text](#)

Title: Implementation of passive infrared sensor in street lighting automation system

Author (s): N. L. Ramli, N. Mohd Yamin, S. Ab Ghani, N. Md. Saad and S. A. Md Sharif

Abstract: This paper presents a smart street lighting system which provides a safe night time environment for all road users and pedestrian. The main objectives are to build an automation system of street lighting using a low-cost microcontroller which is Arduino and to achieve energy-saving. Light Emitting Diode (LED) is represented as the light module. This system is controlled according to the specific mode. These modes are controlled by two sensors which are Light Dependent Resistor (LDR) and Passive Infrared (PIR) sensor. This system can automatically turn on and off the lights according to traffic flow. This system operates during the night and the focus is only for the one-way road at a junction. Street light will be on when only there is road user otherwise, it will turn off. This design can save a great amount of electricity or energy consumption compared to conventional street lights that keep alight during nights. Moreover, the maintenance cost can be reduced and lifespan of the system will increase. As the result, the system has been successfully designed and implemented as a model system.

[Full Text](#)

Title: Abnormality detection and localization using modified SFM

Author (s): Wan Nur Azhani W. Samsudin, Kamarul Hawari Ghazali

Abstract: Social Force Model (SFM) is commonly used in crowd analysis. In this paper, modified SFM is proposed to detect and localize the abnormality in crowd scene. This task is done by estimating the interaction forces in image frames based on SFM theory. The algorithm is jointly used with optical flow, which provides flow vector to be used in particle advection. The moving particles are treated as a main cue instead of particle tracking. Some modifications of SFM algorithm has been proposed here in order to capture the particles which carry significant information of the crowd. The interaction forces are being selected based on Fisher's equation. The computed interaction forces determine the synergy between the advected particles, whereby high magnitude of interaction force has high possibility of abnormal behaviour happened.

[Full Text](#)

Title: Performance analysis of smart antenna based on MVDR beamformer using rectangular antenna array

Author (s): Suhail Najm Shahab, Ayib Rosdi Zainun, Nurul Hazlina Noordin, Ahmad JohariMohamad, Omar Khaldoon A.

Abstract: The performance of smart antenna system greatly relies on the beamforming technique that forming the main lobe beam pattern to the desired user direction and place null in the direction of undesired interference source. This paper investigates the implementation of Minimum Variance Distortionless Response (MVDR) Adaptive Beam-Forming (ABF) algorithm on Rectangular Antenna Array (RAA) is discussed and analyzed. The MVDR ABF technique performance is studied in accordance with varying the number of array elements, spacing between the array elements, the number of interference sources, noise power level, and the number of snapshots. The MVDR performance is compared on the basis of output radiation pattern and SINR. Computer simulation results show that the performance of the MVDR improved as the number of elements get more. This mean MVDR strongly depends on the number of the element. 0.5? is considered the best spacing between adjacent antenna elements, the performance degraded as the noise power label increased, and more accurately resolution occurred when the number of snapshots increased.

[Full Text](#)

Title: Particle swarm optimization and least squares estimation of NARMAX

Author (s): S. M. Abdullah, A. I. M. Yassin and N. M. Tahir

Abstract: SI process consist of three steps; structure selection, parameter estimation, model validation. This paper compared method of Particle Swarm Optimization (PSO) and Linear Least Squares solution methods (LLS) (Normal Equation (NE), QR decomposition (QR) and Singular Value Decomposition (SVD)) for parameter estimation using polynomial NARMAX models. The comparison was tested on Flexible Robot Arm (FRA) dataset. Our analysis suggests that the PSO algorithm is comparable to other established algorithms for LLS parameter estimation in terms of model fit accuracy and information criteria (Akaike Information Criterion (AIC), Final Prediction Error (FPE) and Model Descriptor Length (MDL)). Additionally, the PSO algorithm was found to slightly improve the correlation tests relative to other LLS tested algorithms.

[Full Text](#)

Title: Immersion ultrasonic inspection system for small scaled composite specimen

Author (s): Raiminor Ramzi, M.F. Mahmood and Elmi Abu Bakar

Abstract: Ultrasonic testing is a common Non-Destructive Test (NDT) technique used especially in flaw detection for various material such as metal, plastic and composite. However, detecting flaw on a composite material is likely more difficult because of its non-homogenous characteristics. An ultrasonic scanning unit is developed in previous research focusing at the inspection on a composite material. In this paper, the improvement and modification to the system is revised and discussed in term of system configuration, specification, controls and also inspection results. The major improvement is made on the heart of the machine as the scanning mechanism is changed from using an air-coupled transducer to an immersion transducer. Current immersion transducer used is 2.25MHz which is highly recommended for a composite material. A combination of Arduino board and a self-developed graphical user interface (GUI) are used in order to control the position of the transducer and to run the inspection process. The data is acquired from pulse receiver to the computer for further data processing and interpretation. The machine is tested with fibre glass composite laminates (FGCL) sample with holes as artificial defect.

[Full Text](#)

Title: Protection technique for transient over voltage due to capacitor bank switching in distribution systems using high pass FI

Author (s): S. G. Mohammad, C. Gomes, M. Z. A AbKadir, Jasronita Jasni, M. Izadi

Abstract: Switching transients, generated during energizing and de-energizing operations of capacitor banks can damage the capacitor itself and other sensitive components in the network. To reduce such effects, this study suggests a High Pass Filter (HPF) transient limiter to provide low impedance at the instant of capacitor energizing, thus, allowing the switching transients to decrease effectively. In addition, this study covers different operational cases to find suitable methods or techniques that can be used to limit the impact of capacitor transient switching. The simulation which was based on an electrical network model in low voltage (LV) power systems (0.415 kV) was modeled using Power System Computer-Aided Design (PSCAD) software, focused on the peak transient magnitude, event duration and switching frequency. The results are presented in detail. The outcome of this study can serve as an essential guidance for manufacturing technologists as well as electrical engineers in addressing and developing capacitor banks, thus solving transient switching issues for low voltage systems.

[Full Text](#)

Title: Real time implementation of first order model reference adaptive control (MRAC) without integral on regulating temperature of glycerin bleaching process

Author (s): Mohd Hafiz A. Jalil, Mohd Nasir Taib, M. H. Fazalul Rahiman, Rohaiza Hamdan and Mohd Hezri Marzaki

Abstract: This paper presents the design and implementation of model reference adaptive control (MRAC) on temperature regulation of glycerin bleaching process. The established first order MRAC design based on Lyapunov approach is considered. For developing robust MRAC performance, simple modification has been made by removing the integral term on the adaptation rule of MRAC in order to prevent the controller from windup phenomenon. The performance analysis of the controller was carried out using standard transient analysis with 2% band, while mean square error (MSE) is used for steady state analysis. Initially, the performance of MRAC without integral was analyzed via simulation scheme and followed by real time implementation afterward. Both of the results, from the simulation and real time execution, indicate the effectiveness of this modification towards the performance of MRAC. Also, it offers robust performance throughout temperature regulation of glycerin bleaching process. A comparative study with real time performance of PID with back calculation anti windup controller denote that MRAC without integral is capable to provide better performance on regulating temperature of glycerin bleaching process.

[Full Text](#)

Title: Feasibility study of matrix bridge configuration for a WEC power take-off system

Author (s): A. Z. Annuar and D. Findlay

Abstract: We present a DC link matrix configuration for the hydraulic-based wave energy converters (WECs) working in array. The feasibility study is made to addressing important issues in the power security and power stability of the WECs's DC link network. The electrical models of the proposed matrix bridge configuration were developed in MATLAB/Simulink environment to test the ability of the network for power aggregation among WECs. The simulation results is observed where the proposed configuration has demonstrated its effectiveness in providing power flow path which is needed for the stability and security of the interconnected networks.

[Full Text](#)

Title: A new hybrid simulated Kalman filter and particle swarm optimization for continuous numerical optimization problems

Author (s): Badaruddin Muhammad, Zuwairie Ibrahim, KamarulHawari Ghazali, KamilZakwanMohd Azmi, Nor Azlina Ab Aziz, Nor Hidayati Abd Aziz and Mohd Saberi Mohamad

Abstract: Inspired by the estimation capability of Kalman filter, we have recently introduced a novel population-based optimization algorithm called simulated Kalman filter (SKF). Every agent in SKF is regarded as a Kalman filter. Based on the mechanism of Kalman filtering, which includes prediction, measurement, and estimation, the global minimum/maximum can be estimated. Measurement process, which is required in Kalman filtering, is mathematically modeled and simulated. Agents communicate among them to update and improve the solution during the search process. Inspired by the bird flocking, particle swarm optimization (PSO) has been introduced in 1994. In PSO, a swarm of agent search the global minimum/maximum by velocity and position updates, which are influenced by current position of agent, current position of agent, personal best, and global best of the swarm. In this research, SKF and PSO are hybridized in such a way that PSO is employed as prediction operator in SKF. The performance of the proposed hybrid SKF-PSO algorithm (SKF-PSO) is compared against SKF and PSO using CEC2014 benchmark dataset for continuous numerical optimization problems. Based on the analysis of experimental results, we found that the proposed hybrid SKF-PSO is superior to both SKF and PSO algorithm.

[Full Text](#)

Title: GA-SVC based search applied for optimization of image features subset in quality estimation system of bulk green coffee bean

Author (s): Radi, Muhammad Rivai and Mauridhi Hery Purnomo

Abstract: This research aims to develop a quality estimation system of bulk coffee grain based on machine vision technique that was mainly focused on finding the best subset of image feature combination. The subset was defined as the minimum number of features for achieving the reasonable level of identification or interpretation. For this purpose, a heuristic searching method based on genetic algorithm (GA) was applied to find the best feature subset from 26 image features extracted from gray channel (9-color features and 17-co-occurrence-based-textural features). The GA with binary code chromosome was designed with a support vector classifier (SVC)-based fitness function which also played as pattern recognition software for such developed-machine vision system. The experiment was started with data collection of image samples captured by a constant illumination of 200 lux of an imaging system. Besides varied the sample (7-grades for Arabica and 8-grades for Robusta), the study also evaluated some preconditioning treatments for the initial image. With a constant population of 80 chromosomes, the selection step was performed until the 20th generation with standard genetic operations (selection, crossover, mutation, elitism), the algorithm was able to obtain an optimal feature subset consisting in average number of 5-7 features for all tested data sets. Evaluation on the analysis result shows that the best identification level was achieved from directly image processing (without preconditioning). By the pre-processing step, a quality estimation system based on selected feature subset was potentially able to estimate the quality of green coffee beans in bulk with accuracy of 86% for Arabica and 87% for Robusta coffee.

[Full Text](#)

Title: Optimization of neural network architecture for the application of driver fatigue monitoring system

Author (s): Earn Tzeh Tan and Zaini Abdul Halim

Abstract: Apart from heart disease and stroke, road crashes are identified as the top killer in Malaysia, claiming an average of 19

deaths per day in 2014. The majority of these traffic fatalities are attributed to the human errors, such as fatigue driving. Current law enforcement on speed and alcohol cannot effectively tackle the driver fatigue issues. In order to overcome the aforementioned critical scenarios, an embedded electronic monitoring system is proposed to alert the driver when there is a tendency of the driver falling asleep. In this paper, the study focus on the development of artificial neural network (ANN) based classifier to recognize whether the driver falls into fatigue condition. Typically, a ANN model consists of more than one parameter, e.g. number of hidden neurons, different type of activation functions, learning algorithms and etc. Instead of trial an error approach, a design of experiment (DOE) technique called factorial design is employed to investigate in details the contribution of the above factors towards the prediction accuracy of the constructed ANN model. Among the investigated factors, the learning algorithm and activation function has a significant effect ($p < 0.05$) on the ANN prediction performance. Throughout the study, the best optimized ANN architecture achieves 94.7% of fatigue detection accuracy.

[Full Text](#)

Title: Simultaneous computation of model order and parameter estimation for ARX model based on multi-swarm particle swarm optimization

Author (s): Kamil Zakwan Mohd Azmi, Zuwairie Ibrahim and Dwi Pebrianti

Abstract: Simultaneous Model Order and Parameter Estimation (SMOPE) is a method of utilizing meta-heuristic algorithm to iteratively determine an optimal model order and parameters simultaneously for an unknown system. SMOPE was originally introduced using Particle Swarm Optimization (PSO). However, the performance was worse than conventional ARX. Hence, the objective of this paper is to introduce a new computational model of the SMOPE which employs multi-swarm strategy in original SMOPE to diversify the search moves of meta-heuristic algorithm when searching for the best mathematical model. Experiments are performed on six system identification problems. The obtained results prove that incorporating the multi-swarm approach is a good idea to improve original SMOPE.

[Full Text](#)

Title: Early development of embedded fatigue monitoring system based on heart rate

Author (s): Earn Tzeh Tan, Zaini Abdul Halim and Vincent Kok

Abstract: The seriousness of road traffic injuries had been aware by public since the past decades. Nevertheless, it is very difficult to avoid driver fatigue or drowsy driving while fatigue is suspected to be the primary cause in more than 20% of road fatalities. In this article, an embedded based detection system is proposed to alert the driver when drowsiness or driver fatigue is detected. The conducted statistical analyses in this study show that the normal heart rate of a person is significant difference when he/she falls in fatigue. Thus, the framework of the proposed system uses heart rate as the classification feature for the fatigue detection. In overall, the proposed system consists of an Arduino UNO microcontroller integrated with a pulse sensor, GPS module, and GSM module. The measured heart rate from the pulse sensor is further processed with programmed Artificial Neural Network (ANN) algorithm and a warning SMS is sent with current GPS location when fatigue was detected. From several conducted testing and evaluations, the functionality of the developed system is verified and the mean accuracy achieved for the recognition of fatigue is 94%. In summary, the study reveals that besides of vision solutions, classification based on biometric signal can be an alternative approach for fatigue detection and the proposed framework has a potential to reduce the occurrence of road crashes due to drowsy driving.

[Full Text](#)

Title: A new mechanical application for flat-roof water ponding indicator system via Xbee protocol

Author (s): M. F. Abdullah, A. I. Che-Ani, S. Setumin, N. M. Tawil and A. I. Che Ani

Abstract: The development of a new mechanical application for a flat-roof water ponding indicator system via Xbee protocol is presented in this paper. The mechanical application manipulates variable resistance, which is used as a sensor. The proposed system integrates hardware and software subsystems. The hardware system design involved sensor integration using a potentiometric transduction circuit and was used to develop an interface for an analog-to-digital converter. The water ponding indicator system, a software subsystem, was developed using a programmable integrated circuit by converting the output from potentiometric circuit into water level using a look-up table, which helps convert digital data into the desired reading. The data are displayed through a computer using Xbee protocol. A prototype of the new mechanical application for flat-roof water ponding indicator system via the XBee Protocol was successfully developed. The mechanical sensor application reported changes in water level. The linearity and peak voltage of the output voltage for experimental result for output voltage is at 99%. This system offers possibilities for building surveyor practitioners to continuously monitor flat roofs for water ponding.

[Full Text](#)

Title: Attitude control of quadrotor

Author (s): Nurul Amirah Ismail, Nor Liyana Othman, Z. M. Zain, Dwi Pebrianti, Luhur Bayuaji

Abstract: This paper presents the attitude behaviour of quad-rotor by using an LQR controller. The performance of the LQR controller is compared to a PD controller. The controller is designed by using mathematical approaches and the results are obtained through the MATLAB simulations in the term of settling time and overshoot percentage.

[Full Text](#)

Title: Actinide composition analysis of light water reactor (LWR) for different reactor condition of burnup and cooling time

Author (s): Sidik Permana, Abdul Waris, Mitsutoshi Suzuki and Masako Saito

Abstract: Actinide production from spent nuclear fuel has being intensively monitored and controlled by the IAEA, to ensure all nuclear materials, nuclear fuel facilities including fuel reprocessing facilities are used only for civil and peaceful purposes. Spent nuclear fuel (SNF) from nuclear facilities such as from commercial reactors becomes one of the important issues in term of reducing environmental impact and fuel sustainability as well as nuclear non-proliferation point of view when those SNF materials can be recycled and utilized as "new" fuel loaded into the reactors. Several discharged fuel burnup and decay time effects which are used to evaluate those effect to actinide production of element compositions based on spent fuel of light water reactor (LWR) type have been evaluated in this present study. Those fuel burnup value are varied from 33 GWd/t up to 60 GWd/t and several decay times or cooling times process from 1 years to 30 years cooling time are also evaluated. The results show that actinide composition of each element and isotopic element have their own trend during reactor operation as burnup parameter and during cooling time process after the reactors are stop. Actinide element production is increasing with increasing burnup level except for uranium production which is decreasing as well as heavy metal in total production is also decreasing. Decreasing uranium production is estimated from reduction number of U-235 for fission reaction and it converts to fission product and capturing neutron by U-238 will convert to neptunium, plutonium up to curium. In case of longer cooling time, each

actinide element is increasing except for plutonium and curium which show a decreasing trend for longer cooling time. Cooling time process is based on half-lives of material which can be estimated that decreasing plutonium and curium during cooling time process caused by some isotopes of those element have shorter half-lives.

[Full Text](#)

Title: Compressed ECG biometric using cardioid graph based feature extraction

Author (s): Fatema-tuz-Zohra and Khairul Azami Sidek

Abstract: In this paper, a Cardioid graph based feature extraction technique is applied to perform compressed Electrocardiogram (ECG) biometric. To the best of our knowledge, Cardioid graph based method has not been implemented on compressed ECG before. Another merit of this methodology is that no decompression of the compressed ECG signal is necessary before the recognition step. The QRS complexes obtained from the ECG signal is compressed using Discrete Wavelet Transform (DWT), followed by the Cardioid graph retrieval procedure. Compression is performed in three decomposition levels and with the first two Daubechies wavelets. Classification is conducted on all the three levels using Multilayer Perceptron (MLP) Neural Network. Maximum compression of 87.5% is achieved with an accuracy rate of 93.75%. For compression rate of 85%, the identification rate obtained is 98.75%. The same highest recognition rate of 98.75% is attained both with non-compressed and compressed data. The classification accuracy rates suggest that compressed ECG biometric with Cardioid graph based feature extraction is feasible and is capable of producing a robust biometric system.

[Full Text](#)

Title: Collaboration in multi-robot systems

Author (s): Marwan A. Badran, Md. Raisuddin Khan, Siti Fauziah Toha and Zulkifli Zainal Abidin

Abstract: Multi Robot System (MRS) is one of the most important research areas in the field of Robotics and Artificial Intelligence. The study of Multi Robot Systems may take many aspects; therefore, it is useful to study the Multi Robot Systems from a specific point of view to get a more focused idea. In this paper, we present a review of the recent trends in Multi Robot Systems research by focusing at the collaborative aspect. Furthermore, we address the structure of Multi Robot Systems, their applications and the techniques and algorithms used in the collaborative MRS.

[Full Text](#)

Title: Correlation immunity and resiliency of boolean functions from Haar domain perspective

Author (s): H. M. Rafiq and M. U. Siddiqi

Abstract: The strength of any conventional cipher system relies on the underlying cryptographic Boolean functions employed in the system. The design of such systems requires that the employed Boolean functions meet specific security criteria. Two of such criteria are the correlation immunity and resiliency of a given Boolean function. To determine whether such criteria are met, a designer needs the help of spectral transform tool and in this case the Walsh spectral transform. Most of the cryptographic criteria have been generalized in terms of the Walsh transform. In this paper, we present an alternative view of such criteria from the Haar spectral transform point of view. The Haar along with the Walsh are the two methods considered suitable for representing Boolean functions. The paper exploits the analogy between the two transforms to derive the Haar general representation of the correlation-immunity and the resiliency security criteria. The paper presents the Haar-based conditions on which a given Boolean function should meet to be considered correlation-immune of order k (CI(k)) or resilient of order k (R(k)). In addition, the paper presents a Haar-based algorithm for testing correlation-immunity of an arbitrary Boolean function including experimental results related to the algorithm. The results in this presentation are based on a simulation study of the Haar-based algorithm in comparison to its Walsh-counterpart. The results portray the computational advantage of the Haar method over the Walsh approach for the correlation-immunity measure. The paper includes as well, a discussion on the worst-case scenario with advantages and flexibility of the Haar method in conjunction with the lower order Walsh transform. A summary of the work is then presented in the conclusion of the paper.

[Full Text](#)

Title: Fabrication and characterization of poly (Ethylene Oxide) for photo-electronic devices

Author (s): Iraj Alaei, Souad A.M. Al-Bat'hi and Iis Sopyan

Abstract: Ionic conducting polymer thin films consist of poly (ethylene oxide)-chitosan blend, ammonium iodide NH₄I and iodine crystal I₂ were prepared by solution cast technique at room temperature. To improve the mechanical properties of the polymer thin film, chitosan (C₆ H₁₁ NO₄) is added to the electrolyte, ammonium iodide (NH₄I) is added to supply charge carrier and iodine crystal (I₂) added to provide redox couple. From the complex impedance plot, the bulk resistance R_b was determined and the conductivity of the thin film was calculated. The highest conductivity was observed for the polymer blend containing, 45 wt % ammonium iodide which yield at (1.18±0.7) × 10⁻⁵ S cm⁻¹ by Impedance spectroscopy. Optical characterization of the highest conducting PEO and chitosan ionic conductor shows at the corresponding wavelength, 330 nm that the thin film has a band gap of 3.7 eV. The polymer thin films were smooth, flexible and transparent. Thin film polymers are more favourable for photo-electronic applications.

[Full Text](#)

Title: Low voltage distribution level three terminal UPFC based voltage regulator for solar PV system

Author (s): Md. Nasir Uddin, M. M. Rashid and N. A. Nithe

Abstract: This paper, propose a Three-terminal Reduced DC Bus Capacitance Unified Power Flow Controller (UPFC) for Low Voltage (LV) distribution Networks with High Photovoltaic (PV) penetrations. The device is shown capable of voltage regulating and correcting phase unbalance voltages that can be produced by high levels of distributed photovoltaic (PV) generation. The device is also capable of Power factor improvement (PFI) and correction, regulating the zero, positive and negative sequence voltage in LV distribution Networks and neutral or zero sequence current compensation. Instantaneous reactive power theory shows The power of DC Bus capacitor will fluctuate at twice mains frequency during unbalanced operation. The Real and Instantaneous power balance of Unified Power Flow Controller (UPFC) can be maintained by allowing the shunt input converter to draw a small negative and positive sequence current. The Instantaneous Power balance with negative sequence current allows a hundred-fold reduction in the value of DC bus capacitance which allows long life polypropylene or ceramic capacitors to replace of electrolytic capacitor in this application.

[Full Text](#)

- Title:** Hydrophobic organosilica coating on steel and aluminium
- Author (s):** Mahmood M. H., Suryanto and Sopyan I.
- Abstract:** Superhydrophobic organosilica was fabricated from Tetraorthosilicate (TEOS) as the precursor using a simple sol gel technique and treated by using perfluoroalkylsilane. The super hydrophobic silica has been coated on steel and aluminium surface and was characterised based on the silica content on the coating. The results show that the highest contact angle achieved is 108 degree and all the coating has more than 90 degree water contact angle. Since the contact angle is lower than 150 degree, it only managed to get hydrophobic surface instead of superhydrophobic surface. The high contact angle is believed due to presence of air pocket between water and solid surface that enhance by the roughness of the coating. In addition, water contact angle and surface roughness step up with increasing silica content in the coating. The water contact angle of the coating surface can be predicted using the following equation $WA=89.39+0.975SR$ for steel and $WA=83.20+1.097SR$ for aluminium substrates, where WA is water contact angle and SR is surface roughness.
- [Full Text](#)
-
- Title:** Markov chains analysis and mechanism of migration in Indonesia in the period 1980-2010
- Author (s):** Mustofa Usman, Faiz A. M. Elfaki, Yusuf S. Barusman, Widiarti and Ayu Sofya
- Abstract:** The aims of this study are to find the Markov Chain model for the migration in Indonesia, to find the properties of the transition probability matrices, to find the stationary probability, and to find the behavior of the mechanism of the migration in 1980,1990, 2000, 2010 and the combined data from 1980 to 2010. In the Markov Chain model the states are Sumatra, Jawa, Kalimantan, Sulawesi, and Maluku and Papua and are abbreviated as S, J, K, SL and OI respectively. From the transition probability matrices, the states are communicated to each other and irreducible. From the results of analysis, there are similar stationary probability within the states Jawa, Sulawesi and Maluku and Papua, but slightly change in the Sumatra and Kalimantan. From the stationary probability results it shows that in the long run that the stationary probability of migration enter Sumatra decrease from 0.3895 in 1980 to 0.2720 in 2010. On the other hand, the stationary probability of migration enter Kalimantan increase from 0.0726 in 1980 to 0.1537 in 2010. From the analysis of mechanism of migration in 1980, 1990, 2000 and 2010. Jawa becomes the main destination of migration from other islands. The people from Sumatra, if they migrate high probability they will migrate to Jawa. On the other hand, the people from Jawa, if they migrate high probability they will migrate to Sumatra. The people from Kalimantan, if they migrate high probability they will migrate to Jawa or Sulawesi in 1980 and in 2010, but high probability only to Jawa in 1990 and in 2000. The people from Sulawesi, if they migrate high probability they will migrate to Jawa, Kalimantan or Maluku and Papua in 1980 and in 1990, but in 2000 and in 2010, high probability they will migrate to Kalimantan and Maluku and Papua. The people from Maluku and Papua, if they migrate high probability they will migrate to Sulawesi or Jawa.
- [Full Text](#)
-
- Title:** Design of rectangular microstrip patch antenna using stepped cut at four corners for broadband/ multiband application
- Author (s):** Waheeb Salim Abdulrab, Md Rafiqul Islam and Mohamed Hadi Habaebi
- Abstract:** Design of rectangular microstrip patch antenna (RMPA) using stepped cut at four corners for broadband/multiband application is presented in this paper. Stepped cut at four corner technique is used in order to increase the bandwidth and gain of the antenna. Design and simulation of Modified rectangular microstrip patch antenna are done by CST Microwave Studio software. Four stages are presented for the proposed broadband MRMPA design. The first stage is a single mode RMPA and by increasing steps at the corner of the patch antenna a dual band, multiband and broadband are obtained. As the steps are increased, the antenna's operating bandwidth is also enhanced. The frequencies ranges of this design vary from 900MHZ to 3.5 GHz. Hence this design can be used for GSM (900MHz/1.5GHz), WiFi (2.4GHz), LTE (2.6GHz) and WiMax (3.5 GHz) applications.
- [Full Text](#)
-
- Title:** Modeling and analysing the cutting forces in high speed hard end milling using neural network
- Author (s):** Amin M. F. Seder, Muataz Hazza F. Al Hazza and Erry Y. T. Adesta
- Abstract:** High speed hard end milling is one of complex and costly shape machining compared to other machining processes. In high speed end hard milling, the tool wear or breakage are mostly happened due to the cutting forces which lead. In this research, the influencing of cutting speed, feed rate and depth of cut on cutting forces have been analyzed and modeled using the artificial neural network approach using experimental data. The experiment was conducted using high speed end milling of AISI D2 cold work tool steel material hardened to 52 HRC under dry cutting condition. The measured data have been used to train and validate the outputs. The artificial neural network (ANN) has been used for modeling and predicting the cutting forces using the JMP software. The new model shows high accuracy compared the measured forces.
- [Full Text](#)
-
- Title:** Mathematical modeling and simulation of induction generator based wind turbine in Matlab/Simulink
- Author (s):** Md. Rasel Sarkar, Sabariah Julai, Chong Wen Tong, Ong Zhi Chao and Mahmudur Rahman
- Abstract:** In recent years, wind turbine has becoming a satisfactory alternative for electrical power generation by fossil or nuclear power plants, because the environmental and economic benefits. Still, try to improve wind turbines output and make them more commercial and reliable. Wind energy utilization is an improvisation on technology of wind turbine. It is estimated that, within the next two to three decades, wind energy technology will be durable for power generation. This paper presents mathematical model and simulation of Wind turbine based on induction generator. For the modeling we consider drive train, asynchronous or induction generator (IG). The presented model, dynamic simulation and simulation results are tested in MATLAB/SIMULINK. Also this work covers the variable wind speed and pitch angle observation. Difficulties parts of wind turbine are analyzed.
- [Full Text](#)
-
- Title:** Radio resource scheduling in LTE-Advanced system with carrier aggregation
- Author (s):** Mohammed Abduljawad M. Al-Shibly, Mohamed Hadi Habaebi and Md. Rafiqul Islam
- Abstract:** This study attaches the downlink radio resource allocation problem in the LTE-Advanced system by introducing an enhanced cross component carrier proportional fair algorithm. The importance of the study comes from the fact that almost all prior studies were not able to create a balance between the throughput and fairness of the system to optimize its efficiency. Therefore, this study attempts to overcome this difficulty by proposing an enhanced cross component carrier proportional fair algorithm in order to maximize the system throughput while at the same time

maintaining fairness of radio resource allocation among all UEs. The simulation results show that the proposed algorithm exceeds the previous studies, which involves that the enhancement of the algorithm manages to guarantee a balance between increasing the average system throughput and maintaining good fairness among all UEs.

[Full Text](#)

Title: Utilization of Malaysian low grade iron ore as medium for ammonia decomposition

Author (s): Nur Ezzah Faezah Othman, Hadi Purwanto and Hamzah Mohd Salleh

Abstract: Hydrogen has been regarded as the new energy source due to its cleanliness, fast energy cycle and convenience of energy conversion. Hydrogen storage and transportation difficulties have become major drawbacks in hydrogen economy. Conventional process of steam reforming produces large amount of CO as byproduct. Thus, ammonia has attract worldwide attention as new alternative for hydrogen storage as ammonia decomposition yields H₂ and N₂ as byproduct without any CO emissions. Low grade ore is used as medium for enhancing ammonia decomposition. This paper presents the study of low-grade iron ore as medium for ammonia decomposition. Malaysian low-grade iron ore was taken as the raw material in this experiment. Ammonia decomposition over iron ore medium were studied at temperature of 500-700°C. The nitriding potential of ore was also studied.

[Full Text](#)

Title: A case study on preparation, stability and physical properties of water in diesel emulsion

Author (s): Mohammed Yahaya Khan, Z. A. Abdul Karim and A. Rashid A. Aziz and Isa M. Tan

Abstract: Water in diesel emulsion is often considered as an alternative fuel for IC engines in order to achieve fuel economy and pollution reduction through microexplosion phenomenon. Physical properties of the emulsion play a significant role in achieving the phenomenon of microexplosion. In this work, water in diesel emulsions was prepared containing 9%, 12%, 15% and 18% water. The emulsions were stabilized by mixing two different nonionic surfactants to get HLB values of 4.97 and 6.31. It was observed that the effect of hydrophilic and lipophilic balance value, amount of water and surfactant dosage has an impact on the stability and other characteristics of water in diesel emulsion. Surface tension of WiDE stabilized with 15% surfactant dosage was found to be increasing with increase in water content. Density of emulsions was increased with increase in water. Almost 50% reduction in sulphur was observed with WiDE compared to diesel. Stability of the emulsion was found to be increased with increase in surfactant concentration. Emulsion droplets stabilized with 15% and 18% water content with proportionate surfactant dosage was recorded lower Sauter mean diameter compared to WiDE with 9% and 12% water proportion.

[Full Text](#)

Title: Low power 64-bit carry select adder using modified exnor block

Author (s): Srinivasa Raghavan B., Bhuvana B.P. and Kanchana Bhaaskaran V. S.

Abstract: Addition process plays an important role in nearly all the digital circuits and it remains an integral part of all the arithmetic operations, such as the multiplication, division and subtraction, to name a few. The carry select adder (CSLA) is one of the fastest adders preferred in the processors. This paper presents a novel SQRT CSLA using the XNOR block that operates at low power and utilizes less area. The structure is verified for operation and validation using 1) a standard full adder structure and 2) using an 18T transistor full adder. The 64-bit CSLA architecture has been used as a test bench. Three types of adder structures, namely, SQRT CSLA, SQRT CSLA with BEC-1 and SQRT CSLA with half adder (HA) blocks have been taken for comparison against the proposed SQRT CSLA with XNOR blocks. The logic and circuit level modifications of the implementations using the standard full adder and 18T adder modules made in terms of the logical flow of addition process realize reduction in the number of transistors used. The validation of the circuit design is made using exhaustive simulations, inclusive of operations at various process corners and compared with the counterpart circuit architectures. The 32nm PTM technology models have been employed in the design simulations using Cadence® Virtuoso tool.

[Full Text](#)

Title: Design and development of a computer aided diagnosis (CAD) system for segmentation of brain tumor

Author (s): Gopi Karnam and Ramashri Thirumala

Abstract: Application of image processing for diagnosis is a very crucial link in having effective treatment modalities. Different imaging modalities have resulted in accumulation of huge volume of information and has subsequently increased the burden on radiologist. There is an ever pressing need for having a tool for aiding the radiologist in diagnosis. The Magnetic Resonance Imaging is particularly a important tool for diagnosis of brain tumor. The image processing techniques can be off immense help in identifying the tumors in analyzing the tumor. In this paper we have presented a tool for aiding the diagnosis of Brain Magnetic Resonance Images (MRI). The tool is presented in the form of a Graphical User Interface (GUI) that is capable of processing, analyzing and segmenting MRI images. Two segmentation approaches namely K means segmentation and Watershed are implemented as a part of this tool. The tool also has provision for quantification of the segmented region and evaluation of the segmentation approaches.

[Full Text](#)

Title: Babycare alert system for prevention of child left in a parked vehicle

Author (s): K. N. Khamil, S. I. A. Rahman and M. Gambilok

Abstract: As science and technology has advancing to be part of our lives, most of everyday applications are now connected to each other virtually. By incorporating the IoT technology into child safety division, this part is worth investigating into. With hectic lifestyle, some parents have a tendency to leave their children inside the parked vehicle. The research is to design a notification or an alert to parents by using the most essential device that everyone has at least have one, smartphone. The design consists of two main parts which are safety pad and keychain alarm device. For the first part, the safety pad consists of load sensor to sense the presence of child inside the child car seat and notify parents through smartphone. For the second part, the keychain alarm devices use Radio Frequency (RF) transceiver that will act as backup safety features for children in case when the parents' smartphone is missing or run out of battery. This device will activate the warning alarm when parents walking outside the RF signal range of the safety pad. The system was successfully used the most important tech gear and indirectly adds this BabyCare safety function to the smartphone.

[Full Text](#)

Title: Responsiveness GPS data capture AR drone 2.0 against factor weather, temperature and wind speed

Author (s): Giva Andriana Mutiara

Abstract: AR Drone 2.0 is a miniature unmanned aircraft equipped with pressure sensors that can make drone steady vertically with a certain height. Pressure sensor uses ultrasound sensors to stabilize drone at an altitude of less than 6 meters. IMU sensor consists of a 3-axis gyro sensor, 3-axis accelerometer sensor, 3-axis magnetometer sensor. AR Drone 2.0 is also equipped with HD resolution camera with 30 fps 720p installed onboard. The unavailability locator, become an extension features that were examined in previous research. The use of GPS is the basic idea of research that trigger the appearance of a challenge on the integration GPS with the CPU on the AR Drone, and wireless communications to transfer the data location to the base station. The challenges of GPS extension is realized through the integration of microcontroller Arduino Pro Mini, U-blox GPS modules NEO 6-M, the radio module APC220. Furthermore, in this research, the design of the extension of the GPS module will be tested the level of responsiveness against the weather, temperature and wind speed.

[Full Text](#)

arpnjournals.com
Process

Code of Ethics

Publishing Policy

Review



BIOFUEL PRODUCTION FROM NYAMPLUNG OIL USING CATALYTIC CRACKING PROCESS WITH Zn-HZSM-5/ γ ALUMINA CATALYST

Agus Budiarto¹, Sumari Sumari² and Kartika Udyani¹

¹Department of Chemical Engineering, Adhi Tama Institute of Technology, Surabaya, Indonesia

²Department of Chemistry, State University of Malang, Malang, Indonesia

E-Mail: budi_2050@yahoo.com

ABSTRACT

Biofuel is one of alternative energy to solve the problem of increasing energy needs. Research on the production of biofuels from nyamplung oil is very interesting to do. This research studied the production of biofuels from nyamplung oil through catalytic cracking process. A catalyst of a Zn-HZSM-5 / γ -alumina was used in this study. The research aims were to study the composition of nyamplung oil, to get characteristic of the Zn-HZSM-5 / γ -alumina catalyst, and to study the effect of temperature and composition of the catalyst toward biogasoline, biodiesel, and bioekerosene selectivity in biofuel production. Experiments were carried out in a fixed bed reactor containing the catalyst by adjusting various temperatures and catalyst compositions. The results showed that the use of Zn-HZSM-5 / γ -alumina (1:2) catalyst produced biofuel with biodiesel selectivity of 73.86% on the reaction temperature of 450 to 550 °C. While the use of the Zn-HZSM-5 / γ -alumina (1:1) catalyst generated biofuel with a biogasoline selectivity of 54% at the reaction temperature of 500 to 550 °C.

Keywords: biofuel, fixed bed, nyamplung oil, Zn-HZSM-5, γ -alumina.

INTRODUCTION

Indonesia's National Energy Policy set out in Presidential Decree No.5/2006 suggests that the government should accelerate the implementation of the use of alternative energy to substitute fossil fuel. The use of biofuels as an energy source is driven by more than 5% in 2025 [1]. Real conditions showed that increasing environmental concerns and depletion of world oil reserves pose a great demand to find alternative sources of replacement of petroleum-based fuels, including diesel and gasoline fuels [2]. Many scientists began researching to find a new kind of energy that is cheap, easy and environmentally friendly sources of energy [3]. One of them is vegetable oil. The vegetable oil can be converted into biodiesel by esterification or transesterification process [2, 4, 5, 6, 7] produces esters of alkyl biodiesel. Completion of the combustion characteristic of alkyl ester is done by forming biodiesel ozonide [8]. Vegetable oil also can be converted into biofuel by cracking that produces a wider product of biofuels [1, 9, 10, 11, 12, 13, 14, 15].

Biofuel has many advantages compared with alkyl biodiesel ester. The advantages of this product are the biofuel is in the form of liquid fuel that is similar to the conventional diesel oil components [16] and can be produced from a variety of vegetable and animal oils. However, it is more interesting if it is derived from plants that can be cultivated well in Indonesia. Nyamplung oil is non-edible oil so that it has a potential alternative fuel to replace the use of gasoline, kerosene, and diesel fuel. The production of biofuels from plants such as palm oil had been extensively studied using zeolite as a catalyst in the

process of cracking [13, 14, 17]. HZSM-5 zeolite had a good properties and performance in the cracking process.

Another challenge of the use of zeolite catalysts in the form of solid acid in a catalytic cracking reaction is still little use for cracking various typical plant oils in Indonesia. Most reactions involving cracking of oil will reduce the ability of the catalyst active site due to the coke formation. This effect can be reduced by changing the operating parameters of the reaction process, for example by increasing pressure and decreasing temperature conversion and cracking [18]. The use of different raw materials require accurate information about the condition of cracking operations for various raw materials to produce these biofuels

Nyamplung oil is very attractive as a raw material for producing biofuels instead of fossil fuels because it has a yield of 73 wt%, environmentally friendly plant oils, the production continues to grow. Nyamplung oil has been used as a substitute for diesel fuel for fishing boat engines in Madura Indonesia. However, fishermen, who applied this oil nyamplung, complain because the engine is hot and quickly broken. Nyamplung oil is triglycerides that is very viscous and needs to convert into biodiesel or biofuel. However, the obstacle of biofuel production process requires a catalyst, especially in the catalytic cracking process. Previous research on the catalyst using a zeolite-based catalyst and HZSM-5 showed good results in the production of this biofuel, but the use of this catalyst had a drawback in the low yield of resulting liquid fraction [13]. Research to improve the selectivity of the catalyst HZSM-5 had been carried out by Roesyadi *et al.* by modifying the catalyst HZSM-5 by adding metals Ni, Cu, or Zn. The



results showed an increase in yield of gasoline but lowers kerosene and diesel. For instance, the use of the catalyst Zn/HZSM-5 provides the yield of 29.38% gasoline, 12.86% kerosene, and 4.78% diesel fuel [14]. However, these catalysts had not been tested on nyamplung oil. Research to improve product selectivity and catalyst life has also been performed by Bhatia et al. showed that the coating of the catalyst become a catalyst alumina composites using certain salt can protect the catalyst active site and improve the catalyst morphology [17].

Researchers considered that the preparation of new catalyst of zeolite-based catalysts impregnated with Zn or γ -alumina can increase the selectivity and improve the catalyst morphology. It can protect the active sites of the catalyst so that it will have a longer catalyst life. This study focused on the influence of Zn and γ -alumina impregnation on the characteristics of the resulting catalyst. The resulting catalyst was also tested to produce biofuels from nyamplung oil in micro bed reactor.

Another study of HZSM-5 and MCM-41 catalysts on cracking palm oil and its performance had also been conducted. Conversion of palm oil obtained was 80 to 100 wt% where the fractional yield of gasoline 38 to 47 wt% obtained from composite catalyst. The resulting catalyst had selectivity to the formation of aromatic organic liquid product [19]. The use of zeolite-based catalysts are very effective recognized for palm oil cracking process into biofuel, however, it was deactivated by coke formation. Deactivation of ZSM-5 is due to the loss of the active sites [20]. Formation of composites catalyst can be expected to protect the active sites of catalyst. The addition of alumina in the composite catalyst increases its hydrothermal stability due to the changes on surface morphology [17].

Research on a modified zeolite catalyst preparation of natural zeolite from Blitar Indonesia had been done by Budianto *et al.* This research aims were to study the process of making the modified zeolite and examine these catalysts on converting methane and determine the best selectivity. The study was conducted with two general phases namely the process of changing the natural zeolite to be modified zeolite and testing of modified zeolites as catalysts in converting methane. The results showed that the initial characteristics of natural zeolite Blitar was a mordenite that was changed to a Cristobalit after be modified. The catalyst testing results revealed that the optimum temperature of converting methane was 300°C with a 15.78 wt% conversion but the optimum selectivity of acetylene happened at temperatures of 500°C with conversion of 1.1 wt% [21].

Study the type of reactor for catalytic cracking of oil into biodiesel had been done by Tamunaidu [22]. In this study, catalytic cracking of palm oil into biofuels had been studied using REY catalyst in fixed bed reactor at atmospheric pressure. The effects of reaction temperature (400 to 500 °C), catalyst/palm oil ratios (5 to 10) and

residence time (10 to 30 s) were studied to produce bio-premium and gas fuel. Experimental design used to study the effects of operating variables above were the result of the conversion of palm oil and hydrocarbon fuels. Response surface methodology used to determine the optimum value of operating variables in order to produce the maximum fraction of bio-gasoline in the liquid product obtained.

Beside having the advantages in the form of biofuels cracking process, the catalyst of HZSM-5 has a drawback, particularly thermal stability and its deactivation due to the formation of coke on the cracking process that closes the active sites of catalyst. Composite catalyst of HZSM-5/alumina (CZA) and Al-MCM-41/alumina (CMA) had been successfully synthesized and tested for catalytic cracking activity in the production of biofuels from palm oil characterized by structure, acidity, and surface morphology. The addition of alumina in the composite catalytic improve the hydrothermal stability due to the changes on surface morphology. Deactivation of the catalyst was studied by getting time on the data value by varying the ratio of catalyst to oil palm 8 to 16. The results showed that the presence of alumina with low concentrations may increase the hydrothermal stability and lowers the acidity of the composite. Changes in the structure of the porous composite was considered less susceptible to the formation of coke resulting in lower deactivation rate. The addition of alumina on HZSM-5 is beneficial in terms of better stability and lower shutdown without affecting the results produced gasoline fraction [17].

EXPERIMENTAL SET-UP

This research was conducted by the development of preparation methods of the catalyst Zn-HZSM-5/ γ -alumina, determining the character of catalysts, and tested for catalytic cracking reactions to produce biofuel from nyamplung oil. Nyamplung oil extracted from nyamplung seeds using compression process. Nyamplung seeds inserted into a tube equipped with a piston and pressed with a hydraulic pump. Nyamplung oil was analyzed using GC-MS to determine the composition of its compound. Materials used for this study were Zn-HZSM-5 / γ -alumina synthetically, water glass, alum / $\text{Al}_2(\text{SO}_4)_3 \cdot 18 \text{H}_2\text{O}$, HCl 10M, NH_4Cl 2M, distilled water, hydrogen gas, zinc chloride, alumina, nitrogen gas, and nyamplung oil.

Equipment used for the preparation of the catalyst were autoclave and furnaces equipped with a thermocouple and temperature indicator, stainless steel pipe, thermometer, hotplate, stirrer, pressurized micro bed reactor, stand and clamps. While the resulting catalyst characterized by using the Brunauer Emmett Teller (BET) apparatus. The equipment series used in the cracking nyamplung oil process into biofuel was presented in Figure-1.



RESULTS AND DISCUSSIONS

Determination of nyamplung oil composition

Extraction results showed that one kg of nyamplung seeds produced 825 ml nyamplung oil. The result of nyamplung oil analysis using GC-MS was revealed at Figure-2. There were some peaks on the chromatogram of nyamplung oil at the retention time of 46.703, 50.092, 60.461, 61.846, and 66.599. It shows that

there are some compounds in nyamplung oil. The results of the analysis showed that the nyamplung oil contains palmitic acid, octadecanoic acid etc. as written at Table-1.

Characterization of catalysts

The catalyst was proved as Zn-HZSM-5 / γ -alumina (1:1) with surface area of 112.385 m²/g, pore volume of 0.019 cm³/g, pore diameter of 35.235 Å, Zn content of 4.55% of mass and Si/Al mole ratio of 24.3.

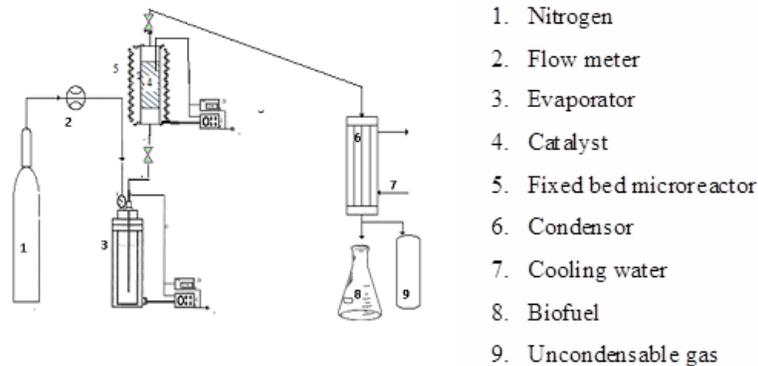


Figure-1. Equipment series of catalytic cracking.

Table-1. Composition of of Nyamplung Oil.

No.	RT/ min	Chemical name	Composition
1	46.703	Palmitic acid	12.426
2	50.092	Octadecanoic acid	54.716
3	60.461	T-butyl 2,5 dihydro 5 oxo furan 2-Y lidine) methyl-3,4 - dimethyl 1 H-pyrole carboxilate	12.953
4	61.846	4 cyclohexil-2-methyl-1(4 methylphenyl)-6-phenyl-5 (3prophynil)-1-2-dihydropyrimidin	1.793
5	65.999	1-phenyl-3methyl-5-(ethoxycarbonyl)-7-(4-methylphenyl)amino pyrazalo (3-4-D)(1,3 Diazepine)	18.112
	RT= Retention time		

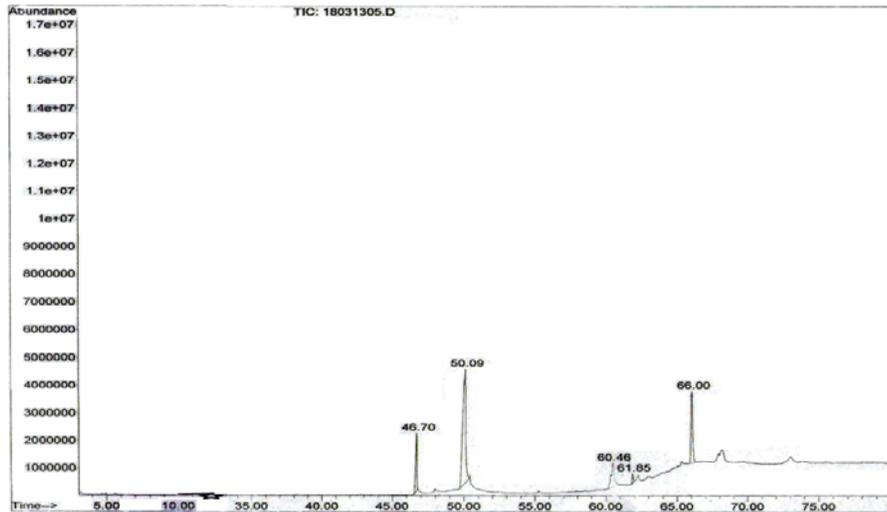


Figure-2. Chromatogram Nyamplung oil using GC-MS.

Characteristics of biofuels

Effect of reaction temperature on biogasoline production by cracking process of nyamplung oil was presented at Figure-3. It can be seen that the composition ratio Zn-HZSM-5/ γ -alumina (1:1) provides a stable yield of 49.19 to 54.30 wt% in the temperature range of 350 to 550 °C. It might occur because the active site of the catalyst Zn-HZSM-5 was protected by γ -alumina. The yield of biogasoline in this study was higher than that of

cracking hazelnut oil using catalyst Zn-HZSM-5 [1]. It was also higher than the yield of cracking using catalyst CoMo/ γ -Al₂O₃ when used the same sample that reached 31wt% [15]. Figure-3 also shows that the use of the catalyst Zn-HZSM-5/ γ -alumina (1:2) affects the yield of the biofuel. It tends to fall at the temperature rise. This occurred because the high concentration of γ -alumina cause cracking product tend to form biodiesel fractions.

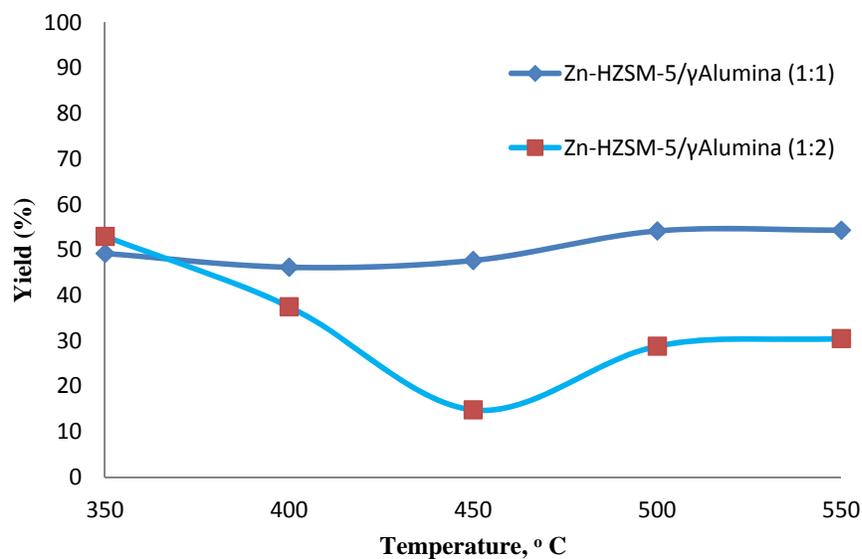


Figure-3. Effect of reaction temperature on selectivity of biogasoline on cracking process of nyamplung oil using catalyst Zn-HZSM-5/ γ Alumina (1:1).

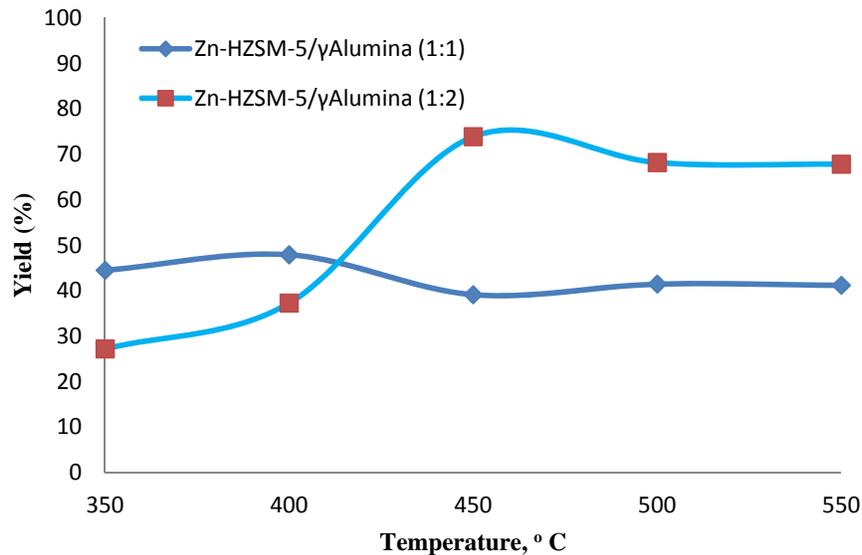


Figure-4. Effect of reaction temperature on selectivity of biodiesel on cracking process of nyamplung oil using catalyst Zn-HZSM-5/ γ Alumina (1:2).

Figure-4 shows the relationship between temperature of cracking nyamplung oil to the yield of biodiesel using catalyst Zn-HZSM-5/ γ -Alumina (1:1) and Zn-HZSM-5/ γ -Alumina (1: 2). Based on the diagram, it shows that the optimum temperature for producing biodiesel achieved at 450°C. At the temperatures of 350 °C biodiesel yield was 27.20 wt% then increased to 73.86 wt% at a temperature of 450°C, but afterward it slowly decreases until reaches 67.82 wt% at a temperature of 550 °C. The phenomenon might occur due to the rising temperature could increase the active site of catalyst, but

at the temperatures higher than 450 °C the active sites of catalyst was decrease. This occurrence showed similarity with the type of HZSM-5 and Cu-HZSM-5 catalyst were used for palm oil cracking in producing biodiesel [14] and the use of Zn-HZSM-5 catalyst for palm oil cracking to produce biofuel [13]. The catalyst of Zn-HZSM-5/ γ -Alumina (1:1) tend to be stable against temperature. The stability might happened because of a balanced composition of active sites of Zn-HZSM-5 and γ -Alumina that more resistant to temperature rise.

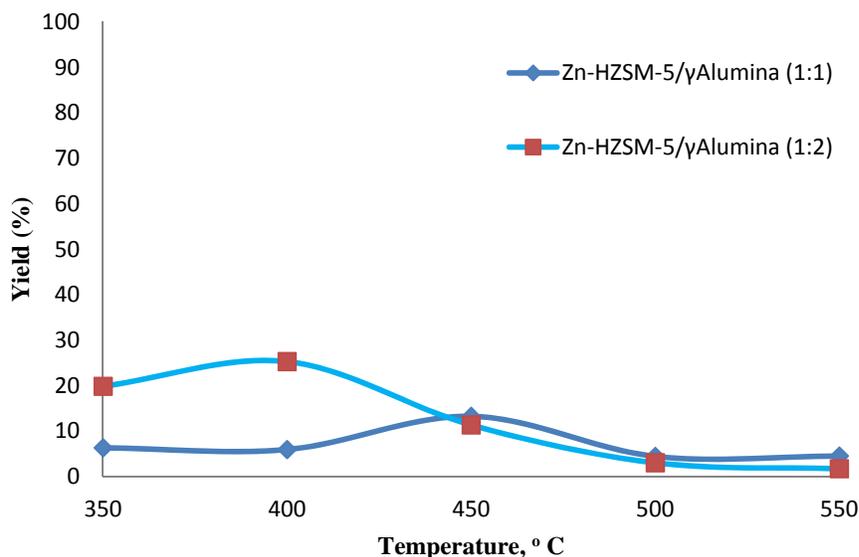


Figure-5. Effect of reaction temperature on the yield of biokerosene at various catalyst composition.

Actually biokerosene fraction was undesirable in the biofuel preparation. Its use has been replaced by liquefied petroleum gas (LPG) in Indonesian market. Figure-5 shows the relationship between temperature processes to biokerosene yield. The catalyst of Zn-HZSM-5/γ-Alumina gave biokerosene yield in the range of 20 to 3 wt%. This study showed conformity with the use of CoMo / γ-Al₂O₃ catalysts in producing biofuel from oil nyamplung where biokerosene yield reached 17.3 wt% [15].

CONCLUSIONS

The catalyst Zn-HZSM5/γ-Alumina can be used for cracking nyamplung oil into biofuel. The catalyst composition Zn-HZSM5/γ-Alumina affect selectivity of biogasoline and biodiesel production. The use of Zn-HZSM-5/γ-Alumina catalyst (1:1) to produce biofuels had high selectivity to biogasoline and biodiesel of 54% and 41% respectively, while Zn-HZSM-5/γ-Alumina (1:2) to produce biodiesel had high selectivity of 73.86%. Temperature also affects the biofuels obtained. At high temperature the selectivity product of biodiesel and biogasoline higher than that of at low temperature. The best selectivity of biodiesel production when it used catalyst composition of Zn-HZSM5/γ-Alumina (1:2) performed at temperatures of 450-550°C was 73.86%. While biogasoline selectivity of 54% was obtained on the composition of the catalyst Zn-HZSM-5/γ-Alumina of 1:1 which is operated at the temperature of 500-550°C.

ACKNOWLEDGEMENTS

The author acknowledged to associate lectures and the crews of Energy Engineering Laboratory (Tri Utami dan Dody Kusuma), Adhi Tama Surabaya Institute of Technology.

REFERENCES

- [1] Agus Budianto, Danawati Hari Prajitno and Kusno Budhikarjono. 2014. Biofuel Production from Candlenut Oil Using Catalytic Cracking Process With Zn-HZSM-5 Catalyst. ARPJ Journal of Engineering and Applied Sciences. 9(11): 2121-2124.
- [2] Leung D.Y.C, Xuan Wu, M.K.H. Leung. 2010. A review on biodiesel production using catalyzed transesterification. Applied Energy. 87: 1083-1095.
- [3] Sumari Sumari., Achmad Roesyadi, Sumarno Sumarno. 2013. Effect of ultrasound on the morphology, particle size, crystallinity and crystallite size of cellulose, Scientific Study and Research Chemistry and Chemical Engineering, Biotechnology, Food Industry. 14(4): 229-239.
- [4] Bhale P. V., Nishikant V. Deshpande, Shashikant B. Thombre. 2009. Improving the low temperature properties of biodiesel fuel. Renewable Energy. 34: 794-800.



- [5] Demirbas A. 2003. Biodiesel fuels from vegetable oils via catalytic and non-catalytic supercritical alcohol transesterifications and other methods: a survey. *Energy Conversion and Management*. 44: 2093-2109.
- [6] Agus Budianto, Anis Widiyanto, dan Anis Maghfiroh. 2003. Pembuatan Biodiesel dari Crude Palm Oil (CPO) dengan Proses Esterifikasi dengan Kondisi Basa. *Prosiding Seminar Nasional Rekayasa Kimia Dan Proses*, ISSN:1411-4216, pp. F.3.1 - F.3.7
- [7] Kandedo J, Lee, K.T. and Bhatia, S. Biodiesel Production From Palm Oil Via Heterogeneous Transesterification, *Biomass And Bioenergy*. 33, pp. 271-276.
- [8] Bismo S. 2005. Sintesis Biodiesel Dengan Teknik Ozonasi: Ozonolisis Etil Ester Minyak Sawit Sebagai Suatu Bahan Bakar Mesin Diesel Alternative. *Jurnal Teknik Kimia Indonesia*. 4(1): 175- 182.
- [9] Farouq A., Twaiq A., Mohamad R., Bhatia S. 2004. Performance of Composite in Minyak Sawit for the Production of Liquid Fuels and Chemicals. *Fuel Processing Technology*. 85, pp. 1283-1300.
- [10] Charusiri W. dan Vitidsant T. 2005. Kinetic Study of Used Vegetable Oil to Liquid Fuels over Sulfated Zirconia. *J. Energy and Fuels*. 19, pp. 1783-1789.
- [11] Masuda T., Kondo Y., Miwa M., Shimotori T., Mukai SR., Hashimoto K., Takano M., Kawasaki S. and Yoshida S. 2001. Recovery of useful hydrocarbons from palm oil waste using ZrO Supporting FeOOH catalys, *Chemical Engineering Science*. 56, pp. 897-904.
- [12] Farouq A., Twaiq A., Mohamad R., Bhatia S. 2004. Performance of Composite in Palm oil For the Production of Liquid Fuels and Chemicals, *Fuel Processing Technology*. 85, pp. 1283-1300.
- [13] Agus Budianto, Danawati H Prajitno, Achmad Roesyadi, Kusno Budhikarjono. 2014. HZSM-5 Catalysts for Cracking Palm Oil to Biodiesel: A Comparative Study With And Without Pt And Pd Impregnation. *Scientific Study and Research Chemistry and Chemical Engineering, Biotechnology, Food Industry*. 15(1): 081-090.
- [14] Roesyadi A, Danawati H P, N. Nurjannah, Santi D S. 2013. HZSM-5 Catalyst for Cracking Palm oil to Gasoline: A Comparative Study with and without Impregnation, *Bulletin of Chemical Reaction Engineering and Catalysis*. 7(3): 185-190.
- [15] Rismawati Rasyid, Adrianto Prihartantyo, M. Mahfud, Achmad Roesyadi1. 2015. Hydrocracking of Calophyllum inophyllum Oil with Non-Sulfide CoMo Catalysts. *Bulletin of Chemical Reaction Engineering and Catalysis*. 10(1): 61-69
- [16] J.D. Adjaye, NN Bakhshi. 1995. Catalytic conversion of a biomass-derived oil to fuels and chemicals I: Model compound studies and reaction pathways, *Biomass and Bioenergy*. 8(3): 131-149.
- [17] Bhatia S, Mohamed, A.R., Noor A.A.S. 2009. Composites as Perengkahan Catalysts in the Production of Biofuel from Palm Oil: Deactivation Studies. *Chemical Engineering Journal*. 155, pp. 347-354.
- [18] Gosselink J.A.R. van Veen, in: B. Delmon, G.F. Froment (Eds.). 1999. *Catalyst Deactivation*. Elsevier, Amsterdam. pp. 3-16.
- [19] Twaiq Mohamed, A.R., Bhatia S. 2004. Performance of Composite Catalysts in Palm Oil Cracking For The Production of Liquid Fuels And Chemicals. *Fuel Process Technol*. 85: 1283-1300.
- [20] Rautiainen E, Pimental R, Ludvig M and Pouwels C. 2009. Deactivation of ZSM-5 Additives In Laboratory For Realistic Testing, *Catalysis Today*. 140, pp. 179-186.
- [21] Agus Budianto, Endang Purwanti, Marta M., dan Retta D.M. 2005. Pengaruh Suhu Konversi Terhadap Proses Konversi Metana Dengan Katalis Zeolit Termomodifikasi. *Jurnal IPTEK, Media Komunikasi Teknologi*. 8(3), ISSN No 1411-7010, pp. 111-122.
- [22] Tamunaidu P. 2006. Biofuels Production From Crude Palm Oil and Used Palm Oil Using a Transport Riser Catalytic Reactor, Master thesis, Universiti Sains Malaysia, Malaysia.