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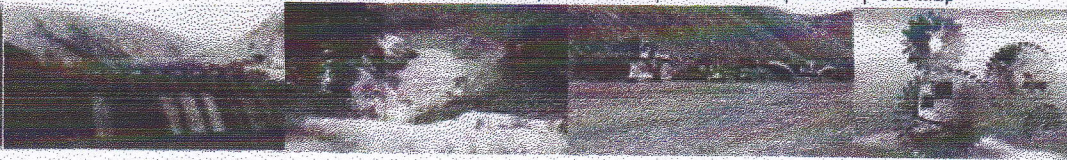
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Title: Self balancing unicycle controlled by using Arduino

Author (s): Suliana Ab Ghani, Muhammad Ikram Mohd Rashid, Mohd Herwan Sulaiman, Mohd Khomaini Mohd Noor, Norazian Subari and Noor Lina Ramli

Abstract: This paper presents an exploratory evaluation on how to build an electric unicycle vehicle controlled by using the Arduino board development. For electric unicycle, it will move forward when the user lean their body forward and vice versa. The discussion is majorly includes the way to achieves the stability with the help of the latest electronic sensor technology called gyroscope and accelerometer. The gyroscope will read any changing of angle while the accelerometer is used to detect any changing of acceleration the unicycle exerts. As both sensors tend to produce noise and disturbance, Kalman Filter that will combine the data from both sensors is applied to produce a better and accurate data. All the information is then processed by Arduino IDE software that acts as the brain of the unicycle system and to determine the unicycle action based on the information received. The data outputs then are analyzed by displaying them on "Serial Chart" software that will creates a line chart based on serial monitor set on Arduino IDE. This software helps the researcher to observe any unwanted noise in the data and perform a correction upon the problem. Moreover, the discussion are also includes on how to use "SketchUp 8" software to design the unicycle body frame. All the considerations in the sketching then are used for real hardware making that used high power electrical machine. By taking all the measurement, the experimental results confirm that the resulting system meets the design goal which to design an electric unicycle controlled by using Arduino and to create a stable electric unicycle with the latest technology.

Full Text

Title: Design of 1μbar resolution pressure measurement and display ASIC for MEMS capacitive pressure sensor and implementation using FPAA and FPGA

Author (s): P. Eswaran, S. Malarvizhi and S. Sivasankar

Abstract: This paper proposed the design and implementation of 1μbar resolution pressure measurement ASIC (Application Specific Integrated Circuit) processing circuit for MEMS capacitive pressure sensor using FPAA (Field Programmable Analog Array) and FPGA (Field Programmable Gate Array). ASIC is designed to measure a pressure from altimeter for the range of pressure from -100 mbar to 900 mbar. It has analog signal processing circuit and digital processing circuit, and its prototype is implemented in FPAA and FPGA respectively. Capacitance to Voltage (C-V) and Capacitance to Frequency (C-F) conversion techniques are used to measure the change in capacitance from MEMS pressure sensor. Simulation of the circuit is carried out in Anadigm tool and Xilinx v6.1. Prototype ASIC model is implementation is carried our using AN231E04 (FPAA) and Xilinx Spartan 3AN (FPGA). The implementation result shows 309 mV/pF and 35 kHz/pF sensitivity for C-V and C-F technique respectively. The frequency from C-F is computed in FPGA, and measured pressure is displayed in mbar with 1μbar resolution.

Full Text

Title: Form grinding for rotor lobe surfaces of twin screw compressor on horizontal CNC grinding machine

Author (s): Van-The Tran

Abstract: Most rotors of twin-screw compressors are ground by a horizontal form grinding machine. A mathematical model of the rotors generated on horizontal form grinding machine is needed to establish. Therefore, this paper constructs a coordinate system for the screw rotor form grinding and connected it to a horizontal five-axis form grinding machine to simulate lobe profile of ground male and female rotors. A numerical example is implemented to verify the correctness of the established mathematical model of the form grinding machine. The normal errors of tooth surface on the male and female rotors are negligible.

Full Text

Title: Generalized Scattering Matrix method for analysis of cascaded uni-axial discontinuities

Author (s): Chaabane Faten, Benzina Hafedh, Elmir Mabrouk Lassaad and Jun Wu Tao

Abstract: In this paper we present a Generalized Scattering Matrix (GSM) approach using Mode Matching Method (MMM) for characterizations of cascaded uni-axial discontinuities in rectangular waveguides. An analysis of single, double and multiple step discontinuities for rectangular waveguides loaded of ferrite magnetized longitudinally is obtained. To validate the result of (MMM), another analysis is carried out by using commercial software, namely HFSS. There is a good agreement between the calculated scattering (S) parameters and these obtained with HFSS.

Title: Performance analysis of reactive routing protocols in Mobile Ad Hoc Network using Ns2

Author (s):   Mustaf Tariq, Hareth Fareed and Raed Alsaqour

Abstract: The Mobile Ad Hoc Network (MANET) is a group of portable points establishing an immediate network without stationary topology. In this network, every node behaves in dual purpose once work like router then works as a host at the same time. Furthermore. The ability of nodes to leave or connect in the network in an easy manner. To establish efficient connection inside the network, we used routing protocols to explorer paths among nodes. The guarantee of finding optimum path formation between couples of nodes is the primary goal of the routing protocol. The MANET routing is a complicated mission that imposes to improve several diverse routing protocols in MANETs. Our main goal of this paper is to examine and differentiate the performance of two reactive routing protocols, Ad-hoc on demand Distance Vector (AODV) and Dynamic Source Routing (DSR) in MANET. We applied two performance metrics, average throughput and average end-to-end delay. We make simulation study based on Network Simulator (NS) version 2.35 to test the mentioned performance metrics of the routing protocols by varying the packet size and number of nodes. The final analysis with realistic outcomes shows that AODV has better performance than DSR in terms of throughput whereas DSR is better for the low average end-to-end delay.

Title: Application of heuristic techniques and effect of process parameter on turning and facing operation- A review (2010-2015)

Author (s):   R. Babu, D. S. Robinson Smart, G. Mahesh and Joses Jenish Smart

Abstract: In highly competitive and rapidly changing scenario of manufacturing industries, nowadays the selection of machining operation, process parameters and application of optimization techniques plays a major role to increase the quality of a product. To achieve the quality product, the machining process parameters such as the cutting speed, depth of cut, feed rate, tool angle, type of lubrication used etc plays a major role. This paper gives an overview and the comparison of the evolutionary optimization techniques to optimize machining process parameter of both turning and facing operation in CNC and conventional lathe. Recent heuristic techniques are considered for optimization purpose, Response Surface Methodology (RSM) Genetic algorithm (GA), simulated annealing (SA), Particle swarm optimization (PSO), Ant colony optimization (ACO) and artificial bee colony (ABC) algorithm. Literature found that RSM and GA were widely applied by researchers to optimize the machining process parameters. The proposed research was beneficial for industries to determine the optimal cutting parameters in order to minimize the costs incurred and improving productivity of manufacturing firms and improve the quality of the process and product.

Title: Electronic switch on MOS transistors with low voltage drop and low current leakage *

Author (s):   Ruslan Dombrovskiy, Alexander Odnolko, Mikhail Pavlyuk, and Alexander Serebryakov

Abstract: The paper considers a way to minimize the voltage drop of electronic switch on field-effect transistor (FET) in open state. It explains the advantage of using field-effect transistor for constructing electronic switch. The paper has also shown the influence of an output current of the gate of transistor on its conductivity. It compares the well-known electronic switch architectures, which are put equal to the common area. It also offers the architecture with a small magnitude of voltage drop in open state and low leakage current in closed state. The paper shows the results of open state electronic switch resistance simulation and also leakage current in closed state.

Title: Hall integrated plate research and simulation

Author (s):   Yury Goryachkin, Alexander Odnolko, Mikhail Pavlyuk and Alexander Svistunov

Abstract: The article analyzes an opportunity of the rectangular form Hall plates' application, formed within the CMOS XFAB process with the XT018 µm design rules as a part of IC with linear output. The Hall plate simulation in TCAD was carried to optimize the design and size. It is shown that the Hall plate width W and length L balance is within 1.25 W/L <1.5. The Hall plate simple model was offered and the formula for Hall voltage was developed, explaining the Hall voltage saturation phenomenon with ratio W/L > 1.5.

Title: Probabilistic periodic review system to determine minimum and maximum inventory replenishment levels in acme company

Author (s):   Anastasia Lidya Maukar, Ineu Widaningsih and Andreas Pratama Putra

Abstract: The spare parts inventory management plays an important role of maintenance schedule and prevention of equipment failure. However, the difficulties are met, where there are events where some spare parts arrive late to the warehouse which will cause stock-outs. It is found that inventory control users applied a deterministic approach through rough approximation to determine the minimum and maximum amount for each part. Actually, spare parts are different than regular items in terms of its tendency to follow probabilistic model. The aim of this research is to propose an inventory management for fast-moving spare parts. Power Approximation and Brown's method in the periodic review inventory model are employed to determine the best possible amount of the desired minimum and maximum parts in stock. The service level is also used in order to maintain the proper amount of safety stock needed to prevent further stock-outs. As a result, Brown's method generates a 66% lower stock out reduction than the power approximation method. It also can reduce the total cost for as much as 47.76% from the current total cost.

Title: An efficient skull stripping algorithm using connected regions and morphological operation

Author (s): Shijin Kumar P. S. and Dharun V. S.

Abstract: Many diseases can be diagnosed by using segmentation and classification based on neural networks. The efficiency of the classification algorithm and the final output depends on the quality of input image. The input image may not have the fine qualities to produce a perfect output. In such scenario pre-processing plays an important role in the improvement of overall quality of the image. In this paper we propose various preprocessing steps that can be used in the framework for fully automatic tissue classification of Brain MR (Magnetic Resonance) images. Contrast enhancement and skull stripping are the preprocessing steps explained in this paper. A novel skull stripping algorithm is proposed and experimental results are illustrated. Skull stripping improves the efficiency in detecting tumors and other abnormalities in brain. The proposed skull stripping method is based on connected regions and mathematical morphology. Experiments are conducted on T1-weighted MR images obtained from radiopedia medical image database.

Title: Secure energy tradeoffs with low power consumption in data transmission of Wireless Sensor Networks

Author (s): S. Venkataramana, G. P. S. Varma and P. Seetha Ramaiah

Abstract: Sensitivity of the Wireless Sensor Networks (WSN) is the main emerging concept in real time application for data transmission and other operations in process of networks. Security in WSN is challenging issue in recent network applications in design and implementation. A new extremely scalable key organization plan for Wireless Sensor Network. For that objective, we create use, for the very first time, of the unital style concept. We assume to extend protocol hierarchy best trade off results in data communication with parameter selection in wireless sensor networks. With a rapid progress of numerous applications in Wireless Sensor Networks (WSNs), performance evaluation and analysis techniques face new challenges in energy efficiency area in WSN applications. One of the key issues is to perform the security trade-off and energy efficiency analysis. In this paper, the energy analysis module for the QoP-ML (quality of protection modeling language) is proposed by means of which one can analyze the influence of various security levels on the energy consumption of a protocol.

Title: The efficiency improvement of belt conveyor intermediate drive traction effort

Author (s): Trufanova I. S. and Lavrenko S. A.

Abstract: This article describes the options for increasing traction of the belt conveyor intermediate drive. The functioning principle of intermediate linear drive with pressure rollers has been described, formulas for calculating the values of traction effort have been provided, also comparative graphs, which shows the efficiency of using intermediate drive in various conditions, have been given.

Title: A new hybrid sub-block partition scheme of PTS technique for reduction PAPR performance in OFDM system

Author (s): Yasir Amer Jawhar, Mustafa Sami Ahmad, Raed Abdul kareem Abdul hasan, Shipun Anuar Hamzah and Khairun Nidzam Ramli

Abstract: The orthogonal frequency division multiplexing (OFDM) technique is regarded as one of the transmission techniques cardio fate, which will depend on it for the next generation of mobile communications systems because the existing features in this system. On the other hand, the important obstacle faced by OFDM system in practical applications is Peak to Average Power Ratio (PAPR). PAPR is one of the major drawbacks of the OFDM system because it leads the system devices to run out of the scope of the linear region of these devices, thus gives an increase to the non-linear region distortion, which affects and changes the superposition of the signal spectrum resulting degeneration in performance. So that, it is an important to reduce the PAPR value to be more receptive in real applications. Partial transmits sequence (PTS) one of the better techniques, which is proposed to solve the higher PAPR problem. The PTS technique divides the input data into several sub-blocks to reduce the autocorrelation between the sub carriers, compute Inverse Fast Fourier transforms for each sub-block, rotates the sub-blocks with rotation factor and then combines the sub-block for transmitting. In this paper, the new sub-block partition method is proposed by combining two traditional sub-block partition method (adjacent and pseudo-random) to reduce the higher PAPR performance. The performance of the new method is investigated by using various sizes of the subcarrier. The new method achieved better performance to reduce the PAPR value than the conventional sub-block partition interleaving (IP-PTS), adjacent (AP-PTS) and pseudo-random (PR-PTS). MATLAB software is used for comparing the new sub-block partition scheme and the other three traditional sub-block partition schemes. The simulation result appears the superiority of the new method to reduce PAPR performance with each number of the sub carriers compared with ordinary methods.

Title: High altitude operations with piston engines power plant design optimization, turbo-charging, turbo matching, efficiency and serial arrangement optimization

Author (s): Luca Piancastelli, Leonardo Frizziero, Simone Pica and Giampiero Donnici

Abstract: Low BSFC (Brake Specific Fuel Consumption) and flat-altitude-rating make piston engines ideal choice for altitudes up to 20,000m-65,000ft. These propulsion systems are more complex than traditional applications that are normally limited to 5,000-7,000m (16,000-23,000ft). In fact, the air propulsion (propeller or fan), the air intake, the fuel system, the turbo charging, the exhaust and the cooling system take part to the design optimization process. An integrated design is strictly necessary. At high altitudes, the intake air is taken from high-pressure areas into an alternate, extremely optimized, path. In propeller systems, a diffuser is usually positioned in the lower part of the aircraft. It converts kinetic energy into pressure. In fan systems, a little amount of "high pressure" air is taken from the high-pressure area of the fan. In lower power units, automotive-derived turbochargers can achieve the required pressure ratio. However, this option is limited by the maximum amount of volumetric flow rate. Moreover, automotive turbocharger housings have to be redesigned to use low-weight inconel alloys instead of heavier cast-iron. A complete redesign of the high pressure turbocharger (the unit

closer to the engine manifold) can achieve pressure ratios from 8:1 to 10:1. This expensive process increases the power to mass ratio of the propulsion system. For higher power rating over about 200 kW axial compressor- turbine assemblies derived from small turbo shafts can be used as a turbo charging unit. In this case the burner is substituted by the piston engine. Especially for diesel engines, the advantage lies in the efficiency (BSFC). In fact, the maximum temperature reached in the diesel combustion chamber is about 4200K and the air flow is much lower than traditional turbo shafts. Hybrid and turbo compound solutions are also possible. The exhaust and the intake of the piston engine have to be redesigned. However, the requirements of low weight, high reliability and long endurance HALE (High Altitude Long Endurance) UAVs (Unmanned Aerial Vehicle) requires further work on this specific subject.

Full Text

Title: C. F. D. analysis of micro hydro turbine unit: A case study

Author (s): Priyabrata Adhikary, Pankaj Kr Roy and Asis Mazumdar

Abstract: Small or micro hydropower projects (SHP or MHP) are emerging as solution for sustainable, eco-friendly, long term and cost-effective water or renewable energy resource for future. According to the International Energy Agency (IEA), approx. 22% (2008) of the world's populations, living without access to electricity, 85% of whom live in rural areas. Of the 1.5 billion people in the world who have no access to electricity, India accounts for over 300 million. Such an energy situation for the poor villagers is unacceptable. It is possible to achieve universal energy access in the foreseeable future, and modern renewable energy technologies can play a crucial role in achieving this goal. This paper describes design and development of low cost micro hydro turbine (converted from commercially available water flow meter) effective for hilly and/or rural area as basic electricity home systems (3-12V and 3-10W) for rural and/or hilly area electrification. Water flow rotates the turbine rotor inside stator whose speed of rotation changes with the different rate of flow of water. To the best of the author's knowledge these novel approach for CFD ANALYSIS of micro hydro turbine are absent in renewable energy or water resource or fluid mechanics literature due to its assessment complexity.

Full Text

Title: Voltage sag improvement by particle swarm optimization of fuzzy logic rule base

Author (s): Absal Nabi and N. Albert Singh

Abstract: In this paper improvement in voltage sag by using PSO optimized fuzzy controller is described. Dstatcom is the FACTS device used in voltage sag improvement. Particle swarm optimization (PSO) is used to optimize the if then rules of the fuzzy controller. In this system a Dstatcom is placed in a three phase system to control the voltage sag. A fuzzy controller is designed to control the output of Dstatcom. The whole system is simulated using MATLAB Simulink. The fuzzy controlled Dstatcom output is compared with a PI controlled Dstatcom output. The system without Dstatcom is also simulated using MATLAB Simulink. The fuzzy controller rules are optimized using particle swarm optimization and the results are also compared with other systems.

Full Text

Title: Compact serrated notch band mimo antenna for UWB applications

Author (s): M. V. Reddiah Babu, Sarat K. Kotamraju, B. T. P. Madhav, S. S. Mohan Reddy, G. V. Krishna, M. V. Giridhar and V. Sai Krishna

Abstract: A compact UWB antenna is been designed to notch Wi-Max (3.3GHz-3.7GHz) and W-LAN (5.15GHz-5.85GHZ) operating bands. The antenna comprises of two square slotted monopoles with serrated edges on the patch surface and T-shaped stub as defected ground structure. Coplanar waveguide feeding is used in the antenna structure at two ports with the impedance of 50 ohms. Both simulation and measurement are done to study the antenna parameters like return loss, radiation-characteristics, impedance matching and isolation between the two ports. To enhance isolation a slot is cut on the T-shaped ground surface. Two inverted L strips are added on either sides of the ground plane and a slot cut on the ground plane finally form T-shape defected ground structure. The proposed antenna notches two application bands in the UWB range with low mutual coupling which makes the antenna a suitable model for desired applications.

Full Text

Title: Durability properties of high performance concrete using industrial byproducts

Author (s): A. Jayaranjini and B. Vidivelli

Abstract: This paper presents the results of durability properties of M30 grade high performance concrete with industrial byproducts. In this study the cement and fine aggregate is partially replaced by industrial byproducts. A total of 5 different concrete mixes were considered in this study. The durability and non-destructive tests were conducted on 75 concrete cubes and 15 concrete cylinders. The test results showed that the mix having partial replacement of cement by 10% silica fume and 10% metakaolin with partial replacement of fine aggregate by 20% bottom ash exhibit better performance in terms of durability. As a result of non-destructive tests conducted before and after the durability tests the same mix exhibit better performance in terms of quality. The investigation shows that there is an enhancement in durability and quality of concrete for the mix having partial replacement of cement by 10% silica fume and 10% metakaolin with partial replacement of fine aggregate by 20% bottom ash.

Full Text

Title: A novel concept of Security Authentication as a service to enhance RFID based manufacturing

Author (s): Irfan Syamsuddin

Abstract: RFID plays a significant role in todays manufacturing automation. Automatic identification as fundamental characteristic of RFID enables manufactures to reduce cost and time which in turn let them increasing total productivity. However, security is still regarded as a serious issue to entirely deploying RFID for whole identification processes of manufacturing systems. This paper proposes a new insight on how to tackle the security problem by taking into account cloud computing technology to current RFID based manufacturing system. After careful review on related literature, hash chain authentication protocol in different approaches were chosen as the viable option to address the problem. Using cloud computing paradigm, a novel cloud based RFID manufacturing system powered by hash chain authentication protocol is conceptualized from the perspective of Security Authentication as a Service.

Title: Search-based dynamic identification of induction motors

Author (s): Alexander Vladimirovich Nesterovskiy, Veniamin Georgievich Kashirskikh, Valery Mihailovich Zavyalov and Irina Yuryevna Semykina

Abstract: An applicability of the results of search-based dynamic identification of induction motors is considered for determination of non-measurable parameters and variables, characterizing the operated motors state. Evaluation is done using the simplified model of motor. Justification of the model's assumed simplification is given herein. Mathematical models of motor state and testing section for dynamic and static modes of operation are described. Some of the research results and their comparison with results obtained by other methods are given. Real-time information is the basis for induction motor drives improvement. It can be applied for monitoring and control of electric motor state, functional diagnosis and protection against emergency conditions. Moreover, the dynamic identification results can be used at the stage of electric motors acceptance tests with their individual data identification, as well as process quality monitoring during manufacture or maintenance procedures.

Title: Analysis of variants of differential torque control applied to induction motor with short-circuited rotor

Author (s): Andrey Edwardovich Evstratov, Valery Mihailovich Zavyalov, Alexander Vasilyevich Grigoryev and Irina Yuryevna Semykina

Abstract: The article discusses the existing control methods of an induction motor electromagnetic torque and offers the new control method, called differential torque control. The authors present a few options of the differential control algorithm and carry out their analysis in a various induction motor operation modes. Analysis provides a physical interpretation of the results and contributes to the formation of proposals to improve the algorithms. The research substantiates the adjustment parameters of the algorithms and estimates the torque control quality. The computer simulation confirms the high quality of the proposed method of differential torque control as compared to the direct torque control.

Title: Technical evaluation of the wind resource in Venezuela

Author (s): Marisabel Contreras- Vielma and Victor Vasil'evich Elistratov

Abstract: Venezuela is a country with large reserves of fossil fuels, and it's estimated that resources from renewable energies are also large enough. Nevertheless, the technical evaluation of the majority of these resources has not been sufficiently investigated, particularly eolic resources. In this article, we present the analysis of the wind flow based on different climate data sources, as well as a preliminary technical evaluation of the wind resource, in order to identify those areas susceptible for the development and implementation of wind power. The results presented here are theoretical considerations of the technical potential of wind powered energy in the country, which might be considered as a preliminary study in order to formulate projects aimed at obtaining electrical power from wind energy. The results show that there are many places that have excellent wind resources; however, the major energetic potential of wind flows is located along the coast, with values in excess of 5500 MWh/km², mostly in the Falcon, Zulia, Sucre and Nueva Esparta states.

Title: End-users personalization potentials and factors towards Effective Housing Occupancy: Malaysian development perspective

Author (s): Isa A. A., Jusan M. B. M. and Afgani Y. E.

Abstract: This study investigated end-users personalization potentials and factors contributing to efficient housing occupancy that are embedded in the Housing Occupancy Model (HOM). These factors were sourced through literature review, policy documents along with experts' opinions till consensus was reached on five factors, which are: personalization, satisfaction, environmental condition, attitude towards occupancy and subjective norm to occupancy. Thereafter, an instrument based on Structural Equation Model (SEM) was designed and administered to a total of 247 respondents. Subsequently, the inter-relationships between and within these factors were tested and fully investigated towards developing a valid HOM. Therefore, the results obtained indicating that the probability (p-value) of Chi-square value is 0.011 for 'satisfaction' in the prediction of occupier intention is therefore supported. The value obtained for 'environmental condition' in the prediction of occupier intention is 0.242 which is above the supporting threshold range of 0.01-0.0985, hence is not supported. Sequentially, the value of 0.962 obtained for 'subjective norm to occupancy' in the prediction of occupier intention is highly out of range, whereas a value of 0.006 is supported for 'attitude towards occupancy' in the prediction of occupier intention. 'Personalization' in the prediction of occupier intention obtained a value of 0.012 which is thus significantly supported. 'Attitude towards occupancy' in the prediction of subjective norm to occupancy with value of 0.135 is not supported. However, < 0.001 value for 'personalization' in the prediction of satisfaction is highly significantly supported. The outcome of this HOM will help in effective public housing delivery and occupancy among the low and middle-income earners. In addition it will be beneficial to policy makers, academicians and professionals in arriving at sustainable housing decisions relating to occupancy issues in Malaysia and other developing economies.

Title: Video key frame extraction through wavelet information scheme

Author (s): C. P. Shirley, A. Lenin Fred and N. R. Ram Mohan

Abstract: Face recognition has been one of the most important areas of research in the field of computer vision and video pattern recognition due to its broad range of profitable and a law enforcement request. The highly realistic demand on face recognition remains a subject of extensive research. The face recognition has shown success for high quality images under controlled circumstances, but video based face recognition is hard to attain analogous level of performance. The work region of key frame extraction is so extensive and effective technology. Many techniques for video key frame extraction have been report in so far. The existing 3-D face models provides enough viewpoint variation to carry out stereo motion but was not effective with single ultra high resolution camera for key extraction on both wide and narrow angle tasks. To overcome the above mentioned issues, Key frame Extraction using Wavelet Information (KEWI) scheme is developed to use in video summarization. In KEWI extracting key frames, two consecutive frames namely the Discrete Wavelet

Transform changed and then the differences of the detail components (i.e. eyes, scars, moles in the face) are estimated. In KEWI, if the diverse value of successive pair is superior when compared to the threshold value, the last frame of the pair is considered as a key frame. Experimental results show that the KEWI scheme easily detects the images using the ground-truth dataset of 1000 videos with expected objective group labels. The experimental performance of KEWI scheme is evaluated in terms of discriminative level, energy consumption, cumulative accuracy, verification rate and key extraction of face region efficiency.

Title: PAPR reduction technique using combined DCT and LDPC based OFDM system for Underwater Acoustic Communication

Author (s): R. M. Gomathi and J. Martin Leo Manickam

Abstract: Underwater acoustic sensor networking (UWASN) system are playing an imperative role to establish the communication in underwater for various of the ocean applications, such as surveillance, ocean pollution monitoring, oceanographic data collection, assisted - navigation, natural exploration and resource managements etc. The environment of underwater is much different from terrestrial environment. The Radio frequency (RF) signals used by Terrestrial sensor networks (TSN's) can only propagate a few meters in the ocean due to the high dense salty in water. Some of the main challenges in under water communication are low date rate, propagation delay, high bit error rate and limited bandwidth. In our system, combined discrete cosine transform (DCT) and Low density parity check (LDPC) based orthogonal frequency division multiplexing (OFDM) is proposed for Underwater Acoustic Communication. In conventional of OFDM system, along with the orthogonality property the DCT structure is added which provide the advantages of improved computational speed and reduced size. LDPC can provide a reliability using less power than a OFDM system without LDPC. This proposed system, uses DCT along with LDPC, reduces the higher Peak to average power ratio (PAPR), better noise immunity and better Bit error rate (BER) performance than conventional OFDM system, with low implementation cost. The computer simulation results prove the improved performance than existing system.

Title: Study of sediment distribution for handling sedimentation in Jeneberang estuary Makassar south sulawesi province

Author (s): Abdul Rivai Suleman, Hamzah Yusuf and Hairil Abdi Hasanuddin

Abstract: Jeneberang river has an important role to control flood in Makassar and Gowa. The estuary is an area of expenditure river water, especially during flood discharges it is a result of a great number of sediment transportation from upstream that will undergo a huge deposition, so the function is not able to performed optimally, especially during flood discharge and partly transported to the beach around the estuary such as, Tanjung Bunga beach and Barombong beach. This study aimed to analyze the type of sediments based on diameter 50 (D50) and the distribution of sediments and how to handle it. The methodology of sediment sampling was conducted directly in the field based on the point of the review that had been determined as data acquisition. Furthermore, sediment samples were analyzed in the laboratory to determine the type of sediments and the distribution. The type of sediments obtained with the number of the review point 6 (six) location of the material, there were 7,56% gravel material, 73,43% sand, 3,47% clay, and 18,05% silt. Based on those sediment types, Jeneberang estuary categorized in the form of a coast as type of a sandy beach and distribution of the size sand grain is equal because the average value (So) is 1,286 located between 1,0 and 1,5 (1,0 = So = 1,5). The alternative treatment is divided into two ways, there are short-term and long-term treatment whereas in the short-term ways is done by doing dredged and for long-term treatment is done by making jetty that pointed out.

Title: Fuel gas production through low-temperature catalytic pyrolysis of flax shives

Author (s): E. M. Sulman, Yu. Yu. Kosivtsov, A. I. Sidorov, A. A. Stepacheva and Yu. V. Lugovoy

Abstract: A study of low-temperature catalytic pyrolysis flax shives. The relevance of research is related to the need to waste management of agricultural production. Wastes from the production of flax granulated into granules of 5... 25 mm. As the catalyst used silica-alumina materials and zeolites. The use of silica-alumina natural materials as the additions to a flax tow matrix allows improving structural (strength, porosity) and sorption characteristics (sorption rate) of the molded compositions and can serve as a catalyst during their subsequent thermal conversion. The introduction of a certain amount of mineral additions improves the processability of the molding process; the mass plasticity rises and the initial molding moisture decreases by 10 ... 15% approximately.

Title: Underground mining of multiple seam of coal

Author (s): Andrey Alexandrovich Sidorenko, and Vladimir Viktorovich Ivanov

Abstract: The objective of the research is choosing and finding rational parameters of preparation and development of multiple seams of coal under the conditions of their cross-impact. Categories of adjacent seams interaction and their specifics were considered. Examples of wrongful and good impact of adjacent seams development were shown. Adjacent seams interactions being especially complex and with severe consequences were specified. The need to take into account the cross-impact of adjacent seams during mining high gas-bearing formations of seams was noted, as de-stressed zones creation causes high increase of gas permeability of the rock mass and growing methane release into workings from the stripped areas. The analysis was made of the research results on adjacent seams interaction during coal seams development in the USA made by the National Institute for Occupational Safety and Health. The reasons for adjacent seams mining difficulty were shown. Upon the analysis of Russian and foreign experience of adjacent seams development, the conclusions were made on the level of impact of various mining geological and mining engineering factors, and recommendations were given on mining planning and choosing mine workings location. Further research directions were determined, required to improve efficiency and safety of mining in the course of adjacent seams development.

Title: Review on attitude estmation algorithm of Attitude Determination System

Author (s): Mohd Zamri Hasan, Amran Ahmed, Abu Hassan Abdullah, Sazali Yaacob, Shamshul Bahar Yaakob, Muhd Hafizi Idris and Md Azlin Md Said

Abstract: Attitude Determination System (ADS) is a process to determine the attitude of a satellite by using on board sensors and attitude estimation algorithms to determine the orientation of the satellite which is relative to inertial reference frame such as Earth reference frame. The ADS is consists of an attitude sensor which provides the attitude and orbital position of the satellite to the Attitude Control System (ACS). This paper presents a comprehensive review of attitude estimation algorithms in an ADS and its application in satellite control sub-systems to increase accuracy, robustness and efficiency of attitude estimation. Deterministic methods such as QUEST, FOAM, and TRIAD, recursive method (utilizing algorithm) such as EKF, UKF, PF and several improvement algorithms are discussed. ADS sensors including sun sensor, magnetometer, star tracker, earth horizon and gyro are also discussed. Several suggestions to improve the estimation algorithm of ADS also discussed in this paper.

Full Text

Title: High altitude operations with piston engines power plant design optimization: The diffuser critical design

Author (s): Luca Piancastelli, Leonardo Frizziero, Simone Pica and Giampiero Donnici

Abstract: Low BSFC (Brake Specific Fuel Consumption) and flat-altitude-rating make piston engines ideal choice for subsonic flight at altitudes up to 20, 000m-65, 000ft. These propulsion systems are more complex than traditional applications that are normally limited to 5, 000-7, 000m (16, 000-23, 000ft). In fact, the air propulsion (propeller or fan), the air intake and the cooling system take part have huge volumes. Therefore, their design influences vehicle aerodynamics as a whole. The cooling system is an integral part of aircraft design. As assessed from WWII design heritage, the cooling duct can be a static subsonic ramjet: the Meredith cooling duct. At high altitudes, the Meredith duct air is taken from high-pressure areas into an alternate, extremely optimized, path. This path should end with a nozzle in a low pressure, high turbulence area of the aerial vehicle. In subsonic ramjet cooling ducts, the "static compressor" or diffuser is the most critical part. In fact the maximum compression ratio is below 1.5. Its efficiency highly influences the total thrust and the cooling efficacy of the duct. The Meredith duct should be embedded in the fuselage or in the wing to avoid excessive external drag. Only the air intake is positioned outside. In propeller systems, the intake is positioned in the lower part of the aircraft at about 2/3 of the wing chord, where the pressure reaches its maximum. In propeller systems, the high altitude engine intake can be positioned at the end of diffuser to increase the engine boost. In this way the turbo machinery mass and volume is reduced and the power to mass ratio of the propulsion system is increased. In fan systems, higher pressure is present inside the fan duct. In this paper, the preliminary design of the cooling duct is introduced. However, a CFD/wind tunnel optimization is strictly necessary to achieve a fully effective system. In any case, the requirements of low weight, high reliability and long endurance HALE (High Altitude Long Endurance) UAVs (Unmanned Aerial Vehicle) requires further work on this specific subject.

Full Text

Title: Mechanical behavior of modified Al-Si-Cu-Mg alloy and reinforced with SIC under ambient to elevated temperature

Author (s): T. Jayakumar and K. Annamalai

Abstract: The Al-Si-Cu-Mg alloy as potential high temperature materials for automobile industry, the mechanical properties of alloy was inspected at distinctive temperatures from ambient to 350 °C. Al-Si-Cu-Mg alloy was made by stir casting technique. Microstructural studies showed that sensibly uniform distribution of silicon particles. It was found that the tensile behavior of alloy was decreasing with increasing of temperature. The effect of temperature on tensile behavior of the alloy had been surveyed and it revealed that behavior of Al-Si alloy changed from ductile to brittle mode with extension of temperature condition.

Full Text

Title: Solving non-linear damped driven simple pendulum with small amplitude using a semi analytical method

Author (s): M. C. Agarana and M. E. Emetere

Abstract: In this paper, we present a semi analytical solution for a damped driven pendulum with small amplitude, by using the differential transformation method. We begin by showing how the differential transformation method applies to the non-linear dynamical system. The method transformed the differential equation governing the motion of the pendulum into its algebraic form. The results obtained are in good agreement with the solution in the literature. The results show that the technique introduced is easy to apply to such dynamical system.

Full Text

Title: Automated policy based remote attestation in trusted computing

Author (s): A. Saravanan, M. S. Irfan Ahmed and S. Sathya Bama

Abstract: With the rapid development of Internet and technologies, e-business flourished in almost all organisations. Progressively, organisations need to exchange and share data amidst their users as well as with other organisations. This data is often sensitive or confidential, and access to it desires to be secured. In this circumstance, trusted computing came in to existence which is a new security solution proposed by the Trusted Computing Group (TCG). It targets to provide an effective framework that allows distributed systems to ensure each other's integrity and trustworthiness. Several architectures exist to determine whether a remote system is trusted and to protect disseminated data. However, many approaches are static, inexpressive, or undermines the system security. This paper proposes an effective mechanism for remote attestation in trusted computing using automated policy negotiations that allows us to prove the integrity of a system.

Full Text

Title: An evaluation of ACI code deflection methods of RC slab

Author (s): Hussam K. Risan

Abstract: The performance of structures under normal service loads refer to serviceability limit states which is concerned with the uses and occupancy of structures. The magnitude of deflections is the main considering of serviceability. In the present study, the finite element method was used to find the instantaneous deflection of reinforced concrete two-way homogenous solid reinforced concrete slab which is experimentally tested by Piotr. Fully material nonlinearity for both

concrete and rebar was conducted firstly by considering plastic deformation, yielding and cracking. Secondly nonlinear simplified cracking method was implemented according to ACI 318-05 Chapter nine. Finally the stiffness modifier method which is mentioned in Chapter ten of ACI 318-05 for immediate deflection was also used based on reducing the flexural rigidity of the slab by the ratio of 0.25 of the total rigidly. The present work was observed that the instantaneous deflection recorded throughout the precisely modeling finite element method is strongly underestimated at ultimate loading level. While, the nonlinear simplified cracking method gave a slightly overestimated immediate deflection value at same load level. Finally the stiffness modifier method significantly underestimated the immediate deflection at also ultimate load level. It only caught the experimental deflection values at load level of 32 kN/m2 when the rebar slightly over yielding.

Full Text

Title: Feature reduction using locally linear embedding for classification muscle fatigue

Author (s): Mohamed Sarillee, M. Hariharan, Anas M. N., Omar M. I., Aishah M. N. and Q. W.Oung

Abstract: The aim of this work was to classify muscle condition (non-fatigue and fatigue) using a mutil-modal system. In order to realize this aim, electromyogram (EMG), mechanomyogram (MMG) and acoustic myogram (AMG) signals were recorded from activated muscle during isometric contraction from 20 healthy volunteers. Sixteen features were extracted from each recorded myograms (EMG, MMG and AMG) and concatenated to form a feature set with 48 features. Feature reduction using Locally Linear Embedding (LLE) was proposed to select best discriminative features to enhance the classification of muscle condition. k-nearest neighbor (k-NN) classifier was used and obtained highest accuracy of 93.50% after applying LLE.

Full Text

Title: Robust and efficient diagnosis of cervical cancer in pap smear images using textures features with RBF and kernel SVM classification

Author (s): S. Athinarayanan and M. V. Srinath

Abstract: Classification of medical imagery is a difficult and challenging process due to the intricacy of the images and lack of models of the anatomy that totally captures the probable distortions in each structure. Cervical cancer is one of the major causes of death among other types of the cancers in women worldwide. Proper and timely diagnosis can prevent the life to some level. Consequently we have proposed an automated trustworthy system for the diagnosis of the cervical cancer using texture features and machine learning algorithm in Pap smear images , it is very beneficial to prevent cancer, also increases the reliability of the diagnosis. Proposed system is a multi-stage system for cell nucleus extraction and cancer diagnosis. First, noise removal is performed in the preprocessing step on the Pap smear images. Texture features are extracted from these noise free Pap smear images. Next phase of the proposed system is classification that is based on these extracted features, RBF and kernel based SVM classification is used. More than 94% accuracy is achieved by the classification phase, proved that the proposed algorithm accuracy is good at detecting the cancer in the Pap smear images.

Full Text

Title: Mathematical model of human rhythmic activity on steel floor slab

Author (s): G. Gajalakshmi, J. Abbas Mohaideen, K. Srinivasan and P. Thiyagarajan

Abstract: Analyzing vibration concert of civil engineering structures due to human induced rhythmic loading is more and more critical aspect of design process of structures such as sports amphitheaters used for pop/rock concerts, floors accommodating fitness Centre and aerobic classes, and foot over bridges used as viewer walkways during social events like fireworks demonstrations. This paper is to investigate the dynamic analysis of steel floor when subjected to human rhythmic activities (Jumping) and to frame a mathematical model based on the parameters related to the properties of steel materials. The investigated structural model is taken as a steel typical floor bay of a similar steel floor like Industrial steel structure, a wide-ranging parametric study is developed concentrating on the determination of the steel floor peak accelerations because of human rhythmic activities. This paper is concerned with the dynamic study of a Steel floor slab of size 3m x 24m. The analysis is done using ANSYS. The human rhythmic activity is been lead on the slab and the Modal and Harmonic analysis are carried out. The outcomes are associated with IS 800-2007 code recommendations. A recent progress presented in this paper is a step towards more systematic and realistic using SPSS, mathematical models of group/crowd rhythmic loading that can be used to simulate more reliably dynamic response.

Full Text

Title: Hydraulic analysis of a recycled technological water supply network

Author (s): Ioan Sarbu

Abstract: Modern industry uses large quantities of water for production processes and requirement to water quality is higher and higher. Technological water supply of few industrial enterprises often put complicated issues in terms of consumption to users. In this paper a hydraulic analysis model of a recycled technological water supply network is developed. Based on this model a computer program was elaborated, which is expected to be implemented in a computer control and monitoring centralised system. The results of this program are used to taking decisions that ensure optimal operation of the network with a high reliability of service and with low energy consumption. The numerical results of a practical application for studied issue show the operational efficacy of proposed computational model.

Full Text

Title: Reduction of earth grid resistance by addition of earth rods to various grid configurations

Author (s): S. D. Buba, W. F. Wan Ahmad, M. Z. A. Ab Kadir, C. Gomes, J. Jasni and M. Osman

Abstract: Achieving low earth grid resistance is highly desirable in power distribution substations design. However, due to variation of soil resistivity from one location to another, it is not possible to obtain the same value of low earth resistance at all locations. Changing earth conductor dimensions such as cross sectional area and length may lower earth resistance. In this paper, six different earth grid configurations have been used to study the effect of adding vertical earth rods to the grid periphery and at all grid conductor intersections of each configuration with the aim of reducing the overall grid resistance. Three grids were designed with compression ratio of 1, while the other three had a compression ratio of 0.8. Results

indicated that for grids with compression ratio of 0.8 and with earth rods at all conductor intersections, the grid resistance was lower than those with a compression ratio of 1. It was also found that, the resistance of all grids with a compression ratio of 0.8 were lower than those with a compression ratio of 1.

Title: Business process re-engineering of logistics system in pharmaceutical company

Author (s): M. Dachyar and G. Novita

Abstract: Logistics system has an important role for pharmaceutical companies, because logistics system regulates the flow of material from ordering material to shipping finished good. In order to reduce delays that occur in the shipping process or finished goods distribution, pharmaceutical companies need to implement a better logistics system management. This study was developed with methods of business process reengineering to achieve significant process improvement. IDEF0 is used to map and analyze logistics systems through ICOM functions (input, control, output and mechanism) and to design the new logistics system. Results of this research is the design of the new process through a strategy that is obtained from the analysis of the problems occurred. To verify the effectiveness of the proposed improvements, a simulation model is built using iGrafx. The simulation output shows a decreased time process by 7.55 days and efficiency 7.93% in the logistics system.

Title: Investigating the effects of different types of winding and different patterns on efficiency and removing harmonics and torques in induction machine

Author (s): Jafar Khalilpour

Abstract: This paper presents an analysis about the effects of different windings and their patterns on efficiency, joule losses, winding coefficient etc. in induction machines. The main purpose is to select an appropriate winding in motors in order to improve efficiency, removing destructive harmonics, decreasing joule losses, increasing winding coefficient and torque. In this analysis, different windings with different patterns are investigated and compared.

Title: Characteristics of soil test sediments stabilized with Portland cement and fly ash

Author (s): Hamzah Yusuf, Nursamiah and Hasriana

Abstract: The study aims to determine the bearing capacity of the soil stabilized with Portland cement and fly ash as well as obtaining the mixing percentage of stabilizing agent to increase the bearing capacity of the soil. Soil testing sediment of dredging at Bili-Bili DAM is conducted with several characteristics properties, they are: testing the water content, bulk density, density, limits of Atterberg, sieving and testing of minerals and chemicals, while density testing is used for fly ash and Portland cement, then the process of stabilization or mixing. The variations of the mix: Soil sediments, cement (5%, 10%, 20%), fly ash (2.5%, 5%, 10%), then mechanical testing which consists of compaction, CBR, and unconfined compressive strength. The results of properties testing of water content, bulk density, specific gravity, are 97.13%, 1.61 g / cm3, and 2,51gr / cm3. In addition to the mineral and chemical content testing is to determine the content of the soil sediment, fly ash, and the mix between them. The test results of CBR and Unconfined Compressive Strength show that the variations in soil sediments (native) compared with the variation of mixture with the addition of Portland cement and fly ash have higher value than the soil sediment (original) and keep increasing up to a variation of a mixture of 20% Portland Cement + 10% fly ash. From these results, it can be concluded that the value of the soil bearing capacity of sediment dredged at DAM Bili-bili without stabilization Portland Cement and Fly Ash obtained CBR value and Unconfined compressive strength (UCS) are quite low, but with the stabilization of Portland cement and fly ash CBR value and Free Compressive Strength (UCS) have increased continuously with the addition of the composition of the Portland cement and fly ash. Where the greatest value of CBR and Unconfined Compressive Strength Portland Cement stabilization are at 20% and 10% fly ash.

Title: Comparative analysis of photovoltaic fed Wind driven induction generator with battery and grid connected hybrid wind driven PMSG-photovoltaic system

Author (s): N. Venkatesh and M. Nandhini Gayathri

Abstract: Hybrid Wind-solar stand-alone renewable energy systems is consider as more economical and reliable one than the stand-alone system with the single sources of wind and solar. Two different requirements storage capacity systems has been calculated in Hybrid system. The first main requirement of the storage capacity for supplying the Real and Reactive Power when there is no availability of solar energy and wind Resources. The second Main Requirement of the storage capacity which is used to supplying Reactive power only to the induction Generator when there is no availability of solar power. The calculations of storage capacity under different condition could satisfying the constraint for maintaining the Zero Loss of power supply probability (LPSP) and for improving the life of the battery bank system. A renewable resource such as the solar wind etc. offers clean, abundant energy. However if the Demand of power increases the Power failures gets increased so the renewable energy can be used to provide the constant Loads. Maximum power point tracking (MPPT) controller is necessary for ensuring the output of PV power generating systems at the maximum output power as possible. Distributed Generators based on Wind and Solar Requires a New Power electronics interface and controlling strategy for improving the efficiency and quality of Power in Hybrid systems. Distributed Generator system based on Single Source has been considered unreliable due to the harmonizing nature of the resources. PMSGs is commonly employed in such Hybrid schemes where they might not require reactive power support. Where areas PMSGs to be directly driven with wind-turbine system which avoids a gear box arrangement and do not require any maintenance. Permanent magnet synchronous generator has been received much attention because of its self-excited property which might leads to high power factor and high efficiency.

Title: Chitosan coated and non-coated composite scaffolds based on poly (caprolactone) (PCL) and hydroxyapatite (HA)

Author (s): Alireza Lari and Naznin Sultana

Abstract: Tissue engineering (TE) scaffold is an artificial structure that is implanted in our body on which tissue grows to solve the problem of a missing or damaged organ. A wide range of biomaterials can be used to produce the TE scaffolds. This study reports the comparison of chitosan coated and uncoated three-dimensional composite scaffolds composed of Hydroxyapatite (HA) and polycaprolactone (PCL)) via thermally induced phase separation (TIPS) and freeze-drying method. Three types of the scaffolds, namely, PCL and PCL/HA were coated with hydrophilic chitosan polymer. Characteristics such as wet ability, morphological structure and water uptake in coated and non-coated scaffolds were studied and compared using a contact angle, a Scanning Electron Microscopy (SEM), an Energy Dispersive X-Ray (EDX). The composite scaffolds were porous and had interconnected pore structures. The range of pores were differ from several to a few hundred microns. The coated layer improved the wet ability of composite scaffolds. These results shows that the chitosan coated composite scaffolds were more favourable for TE application than their uncoated counterparts.

Full Text

Title: Breast cancer diagnosis based on feature extraction by hybrid of k-means and Extreme Learning Machine Algorithms

Author (s): S. Chidambaranathan

Abstract: Cancer is the most dreadful disease and breast cancer is the most commonly diagnosed disease. Automated disease diagnosis has gained substantial research interest these years. In this paper, a breast cancer detection algorithm that relies on different geometrical features of the image, k-means and Extreme Learning Algorithm (ELM) is proposed. The experimental results of the proposed algorithm are satisfactory in terms of detection accuracy and time complexity.

Full Text

Title: Experimental investigation of turbocharger mapped by datalogger in I. C. engine

Author (s): Badal Dev Roy, R. Saravanan, R. Pugazhenthi and M. Chandrasekaran

Abstract: This research article focused a new representation of the compressor performance mapping oriented for turbocharger characterization with the help of simulation and the data logger. The ultimate aim of this mapping methodology is to facilitate to the engine simulation models and to interpolate data from turbocharger with test bench comfortably. The data-logger used to search for adapting the best choice of matching turbo charger for the speculative requirements with the expected performance. The data observed from the data logger used for real time data for the turbocharger matching the compressor, which superimposed with the engine operating point on compressor maps in terms of pressure ratio and mass flow for the different road conditions. A conjectural, simulated result compared with the test bed results and adopting turbo charger based on matching the performance. The parameters such as mass flow rate, engine speed, operating pressure ratio considered for the best matching of the turbo charger for the respective engine. The compressor map is also used to depict the matching the performances.

Full Text

Title: Low power CODEC circuits for ultra portable devices

Author (s): Udara Yedukondalu, A. Jhansi Rani, P. H. S. Tejo Murthy and Srinivasarao.Udara

Abstract: The working of the CODEC circuit is to run the battery based portable devices with some of the design constraints, and thereby improving the designing metrics like power, area. The present work object at designing a combined encoder and decoder circuits (CODEC) which is useful in low power devices by modifying the delay buffer, clock gating circuits, multiple bus width consider as single bus width of the encoding and decoding circuits. The synthesis, digital fabricated physical design implemented in SOC encounter tool using 45nm technology. Comparisons were made between the 32 bit and 64 bit codec designs with power, area, timing and error estimation. Results are procured exposition a high performance improvement in the conventional CODEC system when compared with design metrics and power consumption.

Full Text

Title: Design of a quadcopter autopilot system to take aerial photography for remote sensing applications in agriculture

Author (s): Luong Vinh Quoc Danh, Truong PhongTuyen and Nguyen Tang Kha Duy

Abstract: This paper presents the design and test of an autopilot control system of quadrotor helicopters for collecting aerial images in agriculture applications. The designed system is built based on the Naza-M Lite flight control system with a GPS module. A Texas Instruments Stellaris EK-LM4F120XL module is employed as the main control unit for managing the autopilot mode and other vital functions. This system also includes a ground station playing a key role to transmit/receive the airplane's GPS coordinates via RF links. Initial experimental results show that the quadcopter can fly along the planned flight routes on the Google Maps. The designed quadcopter is equipped with a 5-Mpixels camera capable of taking aerial photos of rice fields at specified locations. Taken aerial images processed using the Normalised Difference Vegetation Index (NDVI) technique can provide farmers with information about photosynthesis status of plants. Optimizing performance of the control system to improve stability and increase flight times of the quadcopter will be the main topic of our future work. The system is expected to be a suitable solution for taking aerial photography to assess growth and development status of large-scale rice fields and fruit plantations.

Full Text

Title: Recent approaches and Applications of non-intrusive Load Monitoring

Author (s): I. Abubakar, S. N. Khalid, M. W. Mustafa, Hussain Shareef and M. Mustapha

Abstract: The Appliance Load Monitoring is vital in every energy consuming system be it commercial, residential or industrial in nature. Traditional load monitoring system, which used to be intrusive in nature require the installation of sensors to every load of interest which makes the system to be costly, time consuming and complex. Non intrusive load monitoring (NILM) system uses the aggregated measurement at the utility service entry to identify and disaggregate the appliances connected in the building, which means only one set of sensors is required and it does not require entrance into the consumer premises. We presented a study in this paper providing a comprehensive review of the state of art of NILM, the different methods applied by researchers so far, before concluding with the future research direction, which include automatic home energy saving using NILM. The study also found that more efforts are needed from the researchers to apply NILM in appliance energy management, for example a Home Energy Management System (HEMS).

Title: A study on the optimization of leakage and friction with piston dimples for a compressor

Author (s): I. S. Hwang and Y. L. Lee

Abstract: Improving compressor efficiency is essential in refrigeration cycles. Some factors leading to poor compressor efficiency are suction and discharge loss, friction, leakage, and heat insulation. This study developed a model capable of predicting leakage and friction, and introduced dimples to pistons. Optimum dimples that minimize leakage and friction were identified.

Title: Solar powered wireless monitoring system of environmental conditions for early flood prediction or optimized irrigation in agriculture

Author (s): Paolo Visconti, Patrizio Primiceri and Cosimo Orlando

Abstract: This paper describes the design and realization of a smart electronic system, based on a Wireless Sensor Network, for wide-area monitoring of availability level and rapid changes of the water presence in the monitored soil, in order to guarantee, depending on application, early flood prediction, water savings in the optimized farmland irrigation as well as waste reduction and optimal use of water resources where its availability is low. The designed sensor node, equipped with a small PV panel to recharge the Li-Ion battery for feeding the entire system, by means of the different embedded sensors, is capable of detecting environmental parameters, the solar radiation level and soil temperature and moisture (i.e. water volume content) values. The sensors communicate with a central processing unit located on board, the ESP8266 SoC module, used both as data processing unit and as Wi-Fi transceiver to receive/transmit sensors data; the user near a sensor node, by a tablet or smart phone with an appropriate app, can collect information provided from sensors and share them with all users who use the same app, through peer to peer Wi-Fi or other internet connection.

Title: Vibration fault detection and classifaction based on the FFT and Fuzzy logic

Author (s): Latiff L. A., Yousif I. Al Mashhadany, Aminudin Bin Haji Abu and Abidulkarim K. Ilijan

Abstract: Vibration fault exhibit a multifaceted and nonlinear behavior generation in rotated machines, for example in a steam turbine (ST). Vibration fault (VF) is collected in the form of acceleration, velocity, and displacement via the vibration sensor. This fault damages the turbines if it strays into the danger zone. This paper first models the VF in a time domain to transfer the frequency domain via an FFT technique. The signals were applied to the fuzzy system to be used by the VF for classification via sugeno and mamdani Fuzzy Inference System (FIS) to generate the signal that will reflect the VF in the event it is embedded into the protection system. The Membership Function (MF) sets depends on practical work in a power plant, and the ISO is interested in ST vibration zones. The outcomes of the sugeno fuzzy property is the generation of stable and usable signals that can be used within the protection system, mostly owing to its efficiency in detecting vibrational faults. The results from this work can be utilized to prevent VF from generating on ST via increased processing that will feed signals for ST controls.

Title: Study on land characteristics at Mamminasata bypass road

Author (s): Sumarni Hamid Aly

Abstract: The study aimed is to analyze the land characteristics at Mamminasata bypass road plan area in Gowa Regency. In determining the population and land owner sample, the bypass road plans is divided into three segments based on land use spatial plan of Gowa Regency, South Sulawesi Province. The conclusion of this study is a change on land characteristics for all of three segments in the area of Mamminasata bypass road construction, i.e. Patalasang, Borongpala'la, and Timbuseng villages. The characteristic change of land is agricultural in the form of fields, gardens, dry lands into housing and offices areas, which led to increase the land values. This is demonstrated by the growth rates of taxable value (NJOP) per square meters significantly in the period of 2012 to 2014 with an average of 140%. The increase of NJOP followed by Polynomial Model orde-2 with the R2 determination value from 0.95 to 0.97.

Title: Modelling international technology transfer process: Evidence from Libyan information and communication industry

Author (s): Ali Hassan and Md. Yusoff Jamaluddin

Abstract: This study suggests a model that describes the TT process of importing the foreign advanced technology by information and communication technology companies (ICT) and related SME's projects in Libya. The past relevant technology transfer models are reviewed in order to investigate and sort out the most influential international TT factors. These factors are believed to influence the transfer process effectiveness. The suggested model was based on a thorough literature review on a TT studies and the variables which extracted and modified from the past investigated models are classified as factors and sub-factors in a conceptual ICT industry context. These factors defined as TT government support initiatives, transferor characteristics, transferee characteristics, TT environment, learning centres and their respective sub-factors (variables) and outcome factor TT achievements. A questionnaire that conducted recently in the TT process in the Libyan ICT industry was utilized to verify the model. Major statistical techniques are applied to analyze the questionnaire data. These approaches included descriptive statistic and inferential statistics. The model factors and sub-factors are reformed by utilizing exploratory factor analysis (EFA). In addition, the significance of direct and indirect interrelationships between model factors was determined through confirmatory factor analysis (CFA).

Title: Fault diagnostic methods for wind turbine: A review

Author (s): A. Joshuva and V. Sugumaran

Abstract: Wind energy is one of the important renewable energy resources because of its reliability due to the maturity of the technology, relative cost competitiveness, good infrastructure which is obtained without any constraint. These wind energies are converted into electrical energy with the help of wind turbine to produce power. To harvest more electrical yield, the wind turbine must be bigger. Due to its large structure, periodic failures are inevitable. Maintenance of such large structure can be cumbersome. The wind turbines must be checked every now and then to enhance security, to minimize down time, to recurrence of sudden breakdowns with related to enormous maintenance and logistic expenses and to give a maximum potential output power generation. Structural health condition monitoring (SHCM) and fault diagnosis methods (FDM) are used to evaluate the damage which has occurred in wind turbine. This review gives comprehensive information on FDM and SHCM of a wind turbine.

Full Text

Title: Absorption spectrum analysis of extracted natural dyes using different solvents for photovoltaic application

Author (s): N. S. A. Rashid, S. Suhaimi, M. M. Shahimin, M. H. A. Wahid and N. A. M. Ahmad Hambali

Abstract: The third generation of photovoltaic technology uses organic and inorganic dyes, to generate photo excited electrons, from which energy can be harvested. In dye sensitized solar cells (DSSCs), the dyes, which act as a sensitizer, harvest the sunlight and convert the solar energy to electrical energy. The usage of organic dyes was proposed as an alternative since it is a cheaper substitute, simple preparation methods and able to produce acceptable efficiency. This paper is aimed to investigate the absorption spectrum of extracted natural dyes of DSSCs by using different types of solvent; ethanol and deionized (DI) water. From the experiment, the relationship between the type of solvent used and the efficiency of the DSSCs to absorb more sunlight is investigated. Beside, the relationship between the extraction temperatures with its corresponding absorption spectrum is crucial to examine the optimum temperature for the dye. In this study, DSSCs were assembled by using extracted natural dyes from five different plants, which are Oxalis Triangularis, Roselle, Bawang Sabrang, Ardisia, and Mango using a very simple extraction technique. The extracted dyes were characterized using a spectrophotometer in the range between 400nm to 700nm. To find the optimum temperature of extracted dye, the dye is heated at different temperatures, which is room temperature, 50°C, 75°C and 100°C. In DI water solvent, the absorption peak of Bawang Sabrang is about 400nm while for Roselle is about 500nm. As for Ardisia and Oxalis Triangularis, it found that the peak absorption is at 550nm. Plus, the absorption peak of Mango is about 450nm. The absorption peak of Bawang Sabrang in ethanol is about 400nm while for Roselle is about 530nm. For Ardisia, the absorption peak is about 540nm. Plus, the absorption peak of Mango and Oxalis Triangularis is about 450nm and 420nm respectively. Besides, the temperatures also affect the efficiency and stability of DSSCs. From the experiment that has been conducted, most of the extracted dye in DI water solvent at temperature 50°C, shows the highest peak of absorption spectrum. While in ethanol solvent, the highest peak of absorption spectrum is at 100 °C.

Full Text

Title: Placement of shared space out side the low income flats building in the context of behavior and culture

Author (s): Ratna Darmiwati, Happy Ratna S. and Purwanita Setijanti

Abstract: Surabaya as the second biggest city in Indonesia with big population has a great economic potential land that is the center of development of eastern Indonesia. This condition has become the main attraction for job-seekers from rural are as which contributes to the urbanization rate that makes untidiness in some corners of the city. This high urbanization rate which was difficult controlled by the government that is limited funds, facility and infrastructure. The developed housing and residential places in Surabaya were not affordable for low-income job-seekers. As a result most of them occupy a shelter rather than a home which causes the emergence of the many slum places. To overcome this problem, the state of government do rejuvenation to many slum areas and move the residents who live in squatter, that can be developed by itself. The culture of togetherness among low-income-society brought to participate in the life of them. The research objective is to study how the right placement of the appropriate shared-space of environment flatsand to formulate the basis of favorable treatment, and do not transfer the people to other places. So that an affordable and appropriate housing for the low-income-society can be provided.

Full Text

Title: The processing's automation of digital documents for hypertext scientific library

Author (s): Alexey Alexandrovich Nedelkin, Valery Alexandrovich Titov, Elena Ivanovna Tikhomirova and Yuliya Dmitrievna Romanova

Abstract: The problem of processing of considerable number of digital images of the electronic copies of scientific works which contain the text in the automatic mode for formation of scientific works' electronic copies and formation of digital scientific library on the basis of the site of university is investigated in the work. The experience of creation and the use of hypertext electronic library resources is analysed and generalized in the work. The basic concepts which differentiate the ideas of the traditional and electronic document for more exact characteristic of hypertext technologies in education are given. The ways and methods of the solution of complex challenges of the automated transformation of the scanned images to an electronic format are shown. The approaches for the improvement of the quality of the scanned materials are described.

Full Text

Title: Design Ultra Wideband microstrip antena with single polarity and switch polarity

Author (s): Rudy Yuwono, Dandy Budi Kusuma and Erfan Achmad Dahlan

Abstract: This research will explain the design of microstrip antenna with Ultra Wideband frequency that can be applied to all devices which worked on this frequency. The antena has capability for single polarity and switch polarity. The design of this antenna begins with theoretical calculations and antena parameter extraction using CST and then finally fabrication.

Full Text

Title: Effect of fly ash filler quantity on electrical properties of silicone rubber insulator material

Author (s): Ikhlas Kitta, Salama Manjang, Wihardi Tjaronge and Rita Irmawaty

Abstract: This paper describes research on the effect of the amount of filler (fly ash) in high voltage insulator material of silicone rubber for its electrical properties. Fly ash is used as a filler material because this material is cheap, readily available, and efforts to utilize waste from coal fire power plants. Tests conducted on various amounts of fly ash that is loaded in silicone rubber. The test material is made in 4 (four) forms of FA20, FA30, FA40 and FA50. The electrical properties were measured in the form of relative permittivity, dielectric strength, and surface resistivity. The standard used in this study is ASTM standard. The results of this study indicate that the value of the relative permittivity of silicone rubber increases with increase of filler quantity (fly ash), but decreased after aging. Likewise, increased quantity of fly ash on the silicone rubber made the breakdown voltage and the surface resistivity becomes larger.

Full Text

Title: Effective intrusion detection system design using genetic algorithm for MANETs

Author (s): R. Thanuja and A. Umamakeswari

Abstract: Wireless networks nowadays play an important role in day today's life. Every person wants to use the wireless networks for their daily routine work. The number of attacks seems to be increasing in nature day by day in Mobile Adhoc Networks (MANETs). In this paper we are going to design a three stage hybrid framework for IDS/IPS for MANETs. A new hybrid IDS/IPS is designed using evolutionary based scheme using genetic algorithm that is used to detect unknown types of attacks. The anomaly based technique will learn new patterns when abnormal traffic characteristics are observed in the network. This method is designed in such a way it can able to detect not only signature based attacks but also capable to detect unknown attacks in MANETs.

Full Text

Title: A simulation study of proxy mobile IPv6 (PMIPv6) protocol

Author (s): Farouk Abdul Jalin and Raed Alsaqour

Abstract: Proxy Mobile IPv6 (PMIPv6) protocol was developed through the concept of Network-based Local Mobility Management (NetLMM). IP mobility features previously developed in various other mobility protocols are based on the host. Mobile Node (MN) needs to perform the process of signaling to the network topology involved when roaming to other locations and this scenario has caused problems including the need to implement the complex configuration of host mobility for signaling exchange conditions and route update. Accordingly, the PMIPv6 protocol gets rid of the burden to install mobility stack on MN. A number of mobility management protocols have been proposed for this purpose other than PMIPv6 such as Mobile IPv4 (MIPv4), Mobile IPv6 (MIPv6), Fast Mobile IPv6 (FMIPv6), and Hierarchical Mobile IPv6 (HMIPv6). However, various weaknesses were found in the implementation of mobility management protocol such as packet overhead, latency delivery and lack of support for data access optimization. In addition, analysis of previous studies found that the implementation of mobility protocol introduced high signaling cost, handover delays and the probability of failure of delivery. This paper aims to study investigates the performance of PMIPv6 protocol. Network Simulator (NS) version 2.29 is used to perform PMIPv6 protocol over UDP (User Datagram Protocol) and TCP (Transmission Control Protocol) traffics. The results of the study shown the performance of the PMIPv6 protocol under handover delay, packet delivery ratio and throughput performance metrics.

Full Text

Title: Performance of Gasoline/LPG bi-fuel engine of manifold absolute pressure sensor (MAPS) variations feedback

Author (s): Muji Setiyo, Budi Waluyo, Willyanto Anggono and Mohammad Husni

Abstract: Liquefied Petroleum Gas (LPG) is an alternative fuel in spark ignited premix combustion engine and emissions from LPG engines are lower than those in gasoline engines. This article presents a novel method of changing the ignition curve in an LPG/Gasoline bi-fuel engines which still use the converter and mixer models. The goal of this research was to get the best engine power in fuel operating mode both gasoline and LPG. It is known that the gasoline and LPG have different properties, especially burning speeds. In order to obtain optimum engine performance in both fuels, there should be two ignition curves, one for gasoline and the other for LPG. A circuit Simple Electronic Spark Module (SESM) was applied to manipulate the feedback voltage from a Manifold Absolute Pressure Sensor (MAPS). In the gasoline mode when idle, feedback from the MAPS was 1.4 volts. In this study, the standard ignition curve was maintained for the gasoline operation mode, whereas, in the LPG operation mode, feedback from MAPS was varied at 1.4; 1.2; 1.0; 0.8; and 0.6 volts at idling respectively. The Toyota 5A-FE engine was tested on a chassis dynamometer to confirm the performance of the circuit. Test results show that the feedback of 0.8 volts produced the best power when the engine running on LPG.

Full Text

Title: Performance evaluation of various Genetic Algorithm approaches for knapsack problem

Author (s): A. Syarif, Aristoteles, A. Dwiastuti and R. Malinda

Abstract: Knapsack Problem (KP) is known as one of optimization problems that has taken great interest of researchers. It has been applied for many practical applications. Since it belongs to the class of NP-hard problems, most of researchers reported heuristic methods to solve it. Those include Branch and Bound, Greedy Algorithm, Genetic Algorithm and Dynamic Programming. In this paper, we focus on the performance evaluation of various Genetic Algorithm (GA) approaches to solve Knapsack Problem. We developed four different GA approaches with different strategies. The first, random penalty GA (rpGA) uses random strategy to generate chromosome and penalty strategy to handle infeasible chromosome. The second, directed penalty GA (dpGA) uses directed strategy to generate chromosome and penalty to handle infeasible chromosome. The third, random repairing GA (rrGA) uses random strategy to generate chromosome and repairing strategy to handle infeasible chromosome. The fourth, directed repairing GA (drGA) uses directed strategy to generate chromosome and repairing strategy to handle infeasible chromosome. In order to investigate the performance of those algorithms, we have done several numerical experiments by using different size Benchmark test problems given in literature. The effectiveness and the efficiency of the methods are also evaluated by varying GA parameters. Based on our experiments, it is shown that drGA was the best performance to give optimal solution within reasonable computational time.

Full Text

Title: A band notch rectangular patch UWB antenna with time domain analysis

Author (s):   Manimaran Nagalingam and S. K. A. Rahim

Abstract: Design and construction of band notch micro strip Ultra-wideband (UWB) antenna is proposed. As the WLAN 802.11a operates ranging from 5.15GHz to 5.35GHz and 5.725GHz to 5.825GHz. In contrast, HIPERLAN/2 operates ranging from 5.15GHz to 5.35GHz and 5.47GHz to 5.725GHz. Therefore, a band notched filter is required in order to reduce potential interferences between the UWB antenna and WLAN or HIPERLAN/2 bands. The proposed UWB antenna has capability of notching these operating frequencies approximately around 5GHz to 6GHz. The antenna parameters in frequency domain analysis have been investigated to show its capability as an effective radiating element. Furthermore, time domain Gaussian pulse excitation analysis in UWB systems is also demonstrated in this paper. As a result, the simulation results demonstrated reasonable agreement with the measurement results and good band notched ultra-wideband linear transmission performance has also been achieved in time domain.

Full Text

Title: Compression method in digital hologram using wavelet transform to enhance the quality of display media

Author (s):   Trifajar Yurmama Supiyanti and Ucuk Darusalam

Abstract: Digital hologram as the promising technology for 3D display media to support mobile development have faced the major problem in compression method. Since the large amount of spatial-frequency component from the object must be represented digitally as an information. In this paper, we propose a method for compression method applied in digital hologram. The method implements a wavelet transform on the recording and reconstruction process that capable to compress an object and fringe pattern into smaller the file size but without loss or degrade the quality of image. This method has benefit among other that offers high resolution of the reconstructed image. From the simulation, compression in the object using wavelet transform before recording process can reduce the file size to be stored in computer significantly where the score is 73.9 %. The quality of reconstructed image enhances where the grayscale distribution increases to higher level.

Full Text

Title: Developing features of water faucet by using User Centered Design approach

Author (s):   Hartomo Soewardi and Verdianto Pradana

Abstract: Water faucet is a tool to set the water flow that installed in various places. This tool becomes an important facilities in human daily activity. However, there are still some weakness in the existing design especially on use. It was indicated with any complaint from the customer about easy to damage, less innovative, and uncomfortable use. The purpose of this study is to redesign the water faucet which can satisfy user requirement such that complaint will be reduced. Concept of User-Centered Design was used as basis of design and axiomatic design method was also used to determine the design parameter based on user criteria and functional requirements. Survey was conducted to identify the attribute users was looking for. Statistical analysis was conducted to test the hypotheses developed. Results of this study show that the new design of water faucet proposed is valid to meet the users need at 5% significant level that are easy to use, unique, robust and ergonomic.

Full Text

Title: The effect of filler content and particle size on the impact strength and water absorption of epoxy/cockle-shell powder (anadora granosa) composite

Author (s):   Halimatuddahliana Nasution, Addriyanus Tantra and Tommy Arista P.

Abstract: An environmental issues which has become major concern in composite field is the main reason to develop replacement of synthetic filler with natural filler. In this research, the effect of filler content and particle size of cockle-shell powder in epoxy on the impact strength and water absorption of the composite were studied. Epoxy resin was used as the matrix, and cockle-shell powder was used as filler with variation of filler content viz. 10, 20, 30, 40 and 50% (wt.) and the particle sizes were varied from 50, 110, to 170 mesh. The composite was prepared by using compression moulding, and was tested to obtain impact strength and water absorption. The results showed that the highest improvement of the impact strength was occurred on the incorporation of 30% (wt.) and 170 mesh of cockle-shell powder. This was supported by the scanning electron microscopy (SEM) characterization result. It was also revealed that the water absorption was significantly increased as the particle size of the filler was increased.

Full Text

Title: Friction and wear of amorphous carbon coated stainless steel under Palm Methyl Ester contained diesel oil

Author (s):   Zahrul Fuadi, Takanori Takeno, Koshi Adachi, Muhammad Tadjuddin and Mohd Iqbal

Abstract: The popularity of plant-based biodiesel has been increasing nowadays. The methyl ester from various resources, such as Palm Methyl Ester (PME), are mixed with petroleum diesel and sold as biodiesel oil. On the other hand, amorphous carbon coatings have also been applied to mechanical components to improve the friction and wear performances such as those used in fuel injection system. This paper discusses the effect of PME and PME-contained diesel oil on friction and wear of amorphous carbon coated stainless steel balls sliding against stainless steel disk. The tests were conducted using a ball on disk tribometer at severe loading conditions. The results show that the wear of amorphous carbon coated ball decreases significantly with the increase of PME concentration in the diesel oil. When the tests were conducted in PME 100% oil, the wear scar diameter reduces 50% for a-C coated ball and 30% for a-C:H coated ball, compared to the wear scar diameter in pure petro diesel oil. Although clear differences in friction coefficients could not be seen, the results indicated that PME contribute to the reduction of wear of the coated ball, drastically. According to this results, the non hydrogenated carbon coating is more suitable to be used in PME contained diesel oil.

Full Text

Title: Heart sound monitoring system

Author (s):   Hadrina Sh-Hussain, MM Mohamad, Chee-Ming Ting, Raja Zahilah and H.Hussain

Abstract: Cardiovascular disease (CVD) is among the leading life threatening ailments. Under normal circumstances, a cardiac examination utilizing electrocardiogram appliances or tools is proposed for a person stricken with a heart disorder. The logging of irregular heart behaviour and morphology is frequently achieved through an electrocardiogram (ECG) produced by an electrocardiograph appliance for tracing cardiac activity. For the most part, gauging of this activity is achieved through a non-invasive procedure i.e. through skin electrodes. Taking into consideration the ECG and heart sound together with clinical indications, the cardiologist arrives at a diagnosis on the condition of the patient's heart. This paper focuses on the concerns stated above and utilizes the signal processing theory to pave the way for better heart auscultation performance by GPs. The objective is to take note of heart sounds in correspondence to the valves as these sounds are a source of critical information. Comparative investigations regarding MFCC features with varying numbers of HMM states and varying numbers of Gaussian mixtures were carried out for the purpose of determining the impact of these features on the classification implementation at the sites of heart sound auscultation. We employ new strategy to evaluate and denoise the heart and ECG signal with a specific end goal to address specific issues.

Full Text

Title: A preliminary assessment for the presence of a crushing plant in Lampung Timur regency

Author (s): Kusno Isnugroho, David C. Birawidha and Yusup Hendronursito

Abstract: This paper aims to preliminary assessment for the presence of a crushing plant in Lampung Timur regency. Evaluation of this project included technical aspect and financial aspect. Tehnically, Marga Tiga district selected as the project location, caused of a lot of raw material and lack of competitor in this district. Hypotec reserves of basalt rocks in Marga Tiga district reach 8 milion tons. Single togle jaw crusher chosen as due; simple in construction, low maintenance, high productivity and can be produced locally. The installed capacity of the crushing plant unit is 20 m3/hour, with production size of 2-3 cm, 1-2 cm, and finess than 0.5 mm. Calculation of financial aspect obtained 4 years for payback period; positive Net Present Value (NPV) 1,109,106,085; 1.46 of profitability index; and 24.08% of Internal rate of return (IRR). The presence of a crushing plant in Lampung Timur regency is feasible and competent to be run. The presence of this unit will create very beneficial multiplier effect for development in the region.

Full Text

Title: Study on machinability effect of surface roughness in milling kenaf fiber reinforced plastic composite (unidirectional) using response surface methodology

Author (s): H. Azmi, C. H. C. Haron, J. A. Ghani, M. Suhaily, A. B. Sanuddin and J. H. Song

Abstract: The surface roughness factor (Ra) of a milled kenaf reinforced plastic are depending on the milling parameters (spindle speed, feed rate and depth of cut). Therefore, a study was carried out to investigate the relationship between the milling parameters and their effects on a kenaf reinforced plastic. The composite panels were fabricated using vacuum assisted resin transfer molding (VARTM) method. A full factorial design of experiments was used as an initial step to screen the significance of the parameters on the defects using Analysis of Variance (ANOVA). If the curvature of the collected data shows significant, Response Surface Methodology (RSM) is then applied for obtaining a quadratic modelling equation which has more reliable in expressing the optimization. Thus, the objective of this research is obtaining an optimum setting of milling parameters and modelling equations to minimize the surface roughness factor (Ra) of milled kenaf reinforced plastic. The spindle speed and feed rate contributed the most in affecting the surface roughness factor (Ra) of the kenaf composite.

Full Text

Title: A study on reactive power allocation for electrical power distribution system with low voltage profile

Author (s): Lukmanul Hakim, Umi Murdika, Herri Gusmedi and Syamsuri Zaini

Abstract: Due to its long feeder line with high R/X ratio, a distribution system suffers from low voltage profile at its load nodes. This work studies reactive power allocation for this type of problem. A linear programming-based optimal power flow is proposed to solve this problem by finding minimal amount of installation of new reactive power support devices while maintaining voltage at each load bus within the ±5% deviation. The proposed approach was tested on 11-bus test system and a real-world distribution feeder in Indonesia with 119 buses and 106 load points. This actual feeder experiences voltage magnitude below the 0.95 p.u limit. Simulation results show that some load points of this feeder require installation of new reactive power support devices to maintain their voltage to be above the 0.95 p.u. limit.

Full Text

Title: Synthesis and characterization of MCM-41 from coal fly ash for tapioca wastewater treatment

Author (s): Darmansyah, Hens Saputra, Simparmin br. G., and Lisa Ardiana

Abstract: The present study reports a green synthesis method for ordered MCM-41 materials from coal fly ash at room temperature during 24 h of reaction with Si/Al ratio 40, 50, and 60 using cetyltrimethylammonium bromide (CTAB) as template. The surfactant was removed by calcination at 550°C for 4 hours with heating rate 1°C/minute. The material properties of calcined MCM-41 was characterized by XRD, SEM, and BET. The MCM-41 material was applied as an adsorbent in the tapioca wastewater treatment. The XRD analysis results showed that the Si/Al ratio influence the crystallinity of product. The crystallinity of MCM-41 was increased by increasing Si/Al mole ratio. The obtained MCM-41 adsorption capacity for tapioca wastewater treatment was 15.92 mg/g.

Full Text

Title: Electrospun-based fibrous scaffold for cardiovascular engineering applications: A review

Author (s): Nur Syazana and Irza Sukmana

Abstract: Heart failure is a major cause of mortality and morbidity occurring in human population all over the world. Heart transplantation following heart failure is difficult to achieve due to limited availability of organ donor supply. Transplantation of a complete engineering tissue of heart and artificial blood vessel remains a dream. However, tissue engineering research field provides opportunity to fabricate bioactive scaffold to support the function of defective tissue or organ, through the development of bio-composite scaffolds construct. The construct that match the chemical, mechanical, biological

properties and extracellular matrix morphology of native tissue could be suitable for supporting heart recovery after the failure. This study aims to report current development and future potential on using electrospun-based scaffold. The challenge and opportunity on developing and using electrospun bio-composite scaffolds will also highlight.

Full Text

Title: Redefining folded plate structure as a form-resistant structure

Author (s): Albertus Sidharta Muljadinata and AM. Subakti Darmawan

Abstract: Folded plate structures should be redefined as form-resistant structures in which the folded-plate action is a combination of transverse and longitudinal beam action[1] p.264. The early generation of folded plate structure is marked with true folded plate structures. As the number and the variety of building form increases, classification based on form took place and being developed. This leads to confusion and false interpretation of folded structures. The confusion is shown from building examples. Roofing with either steel or pre-stressed concrete trusses were classified as folded structures. Origami could lead to another confusion, because it could be applied either as a building structure or as a non-structural member, such as ceilings and awnings. Based on the case of Sydney Opera House, and on other misleading folded structure building examples, a conclusion to stop the usage of the term "folded structures" has been recommended. Another recommendation is to separate building form categories from building structure classification.

Full Text

Title: Comparison of PM10 pattern and PM2.5 carbonaceous fraction from episodic and non episodic period of peat land wildfire

Author (s): Haryono S. Huboyo, Syafrudin, Yusuke Fujii and Susumu Tohno

Abstract: The peat land wildfire in Indonesia was periodically occurs even in non-ENSO period thus may pose health risk to the inhabitants each year. During non episodic peat land wildfire, we measured PM2.5 using 2 sets of PM2.5 samplers combined with secondary data from fixed monitoring station for ambient PM10. We compare the data with previous study on episodic wildfire in this peat land area. EC and OC concentrations in PM2.5 were determined using a thermal/optical carbon analyzer with IMPROVE-A protocol. The pattern of PM10 during episodic peat land wildfire can reach more than ten times of PM10 standard (24 h). This is may pose health risk since this high concentration may persist during one month or more. While during non episodic wildfire the ambient PM10 showed moderate fluctuation. During episodic burning period, the ambient atmosphere are enriched by OC1 and OC2 fraction, while in non episodic burning, fraction of OC2, OC3 as well as OC4 shows higher level than OC1. Based on EC ratio analysis the char-EC in biomass burning shows higher than soot-EC leading to dominant fraction of low temperature elemental carbon originated from biomass burning.

Full Text

Title: Local geology condition of Bengkulu city based on Seismic Vulnerability Index (Kg)

Author (s): Nanang Sugianto, Muhammad Farid, and Wiwit Suryanto

Abstract: Local geology condition has become one of the most parameters which affected damage level of earthquake. Local geology condition can be analysed based on the value of Seismic Vulnerability Index (Kg). The areas with high vulnerability index is estimated to have high probability of deformation an earthquake happened. Seismic vulnerability index of Bengkulu city has obtained by horizontal vertical spectral ratio (HVSR) analysis of sixty-seven micro-tremor recordings data that was installed on each geology formation types. Based on analysis result show that the seismic vulnerability index of Bengkulu city relatively heterogeneous in spite of on similar geology type. This variation was influenced by the thickness of sediment layer and the violence level of ground on the site. In general, the highest Kg value is on the alluvium terraces (Qat) about 0.01-10.26 and the lowest Kg value is on Reef Limestone (Ql) about 0.05-0.35. Distribution of seismic vulnerability index has compatibility with the soil surface condition visually. The highest Kg value of Bengkulu city was only obtained on alluvium terraces which was estimated to have softer structure (visual observation showed the former swamp), and it had thicker sediment layer (based on f0 value) than the other type of geology. This result showed that alluvium terraces has higher probability of deformation when an earthquake than others, such as the occurrence of high resonance effect, the strengthening of earthquake vibration and liquefaction. The safest area in Bengkulu city was identified on Andesit (Tpan) geology formation type.

Full Text

Title: Radon and Thoron mapping to delineate the local-fault in the way Ratai geothermal field Lampung Indonesia

Author (s): Nandi Haerudin, Karyanto, and Yudi Kuntoro

Abstract: The Survey in the area of geothermal Way Ratai Lampung has been conducted to measure the concentration of Radon and Thoron. The Radon detector RAD 7 used to get field data. The measurement points are 70 stations. These were taken with 200 m - 400 m spacing stations which cover an area of 10 km2. Study area covered four hot spring geothermal manifestations namely Bambu Kuning, Padok, Margodadi and Way Asin. The aim of this study is to determine the local fault based on the profile of Radon concentration. The observation data were taken in 15 minutes for each station measurement to obtain the value of the Radon concentration accurately. After the Radon concentration values are obtained, it made a contour map. The peaks of contour were connected by a line to get the delineation of the local fault. The result showed three lineament anomalies through geothermal manifestations that indicating as the local fault, namely F1, F2, and F3. The first delineation fault (F1) connected Bambu Kuning and Margodadi hot springs in the northwest to southeast direction. The second (F2) connected Padok and Way Asin hot springs in the southwest to northeast directions. The third (F3) passed Margodadi hot spring in the same direction with F2. Based on the Radon to Thoron ratio, F1 and F2 were suggested as the fault that extends to depth. Both are suggested as the conduit of geothermal fluid.

Full Text

Title: The Analysis of Signalling Process of the Services in Integrated IMS

Author (s): Melvi, A. Ulvan, O. Damayanti and H. Pranoto

Abstract: This paper presented the analysis of communication process and determine the performance parameters of integrated IMS, i.e., jitter, max delta, and delay. An IMS core network testbed based on Open IMS Core is developed, in which the clients have access through wired LAN and WiFi access points. The characteristics and performance of both access

methods are compared and studied. The Open IMS Core served clients well and produce communication processes in accordance with the SIP standards of RFC 3261. Based on the results of comparison testing using wired LAN and WiFi access points, it can be concluded that the QoS through wired LAN access fulfilled the QoS requirements and recommendation of standards set by the ITU-T, whereas the QoS through WiFi access does not meet the ITU-T standards.

Full Text

Title: Performance of carbide tool in high speed turning of Ti-6Al-4V ELI under conventional coolant and minimal quantity lubrication

Author (s): C. H. Che Haron, M. A. Sulaiman, J. A. Ghani, M. S. Kasim and E. Mohamad

Abstract: The purpose of the study is to evaluate the tool life performance of uncoated carbide and the quality of machined surface, focusing on roughness surface values in high speed turning of titanium alloy, Ti-6Al-4V extra low interstitial (ELI), under minimal quantity lubrication (MQL) and conventional coolant. The cutting parameters were arranged using the Box-Behnken design of experiment. Meanwhile the cutting parameters; cutting speed, vc (120, 170, and 220 m/min), feed rate, f (0.1, 0.15, and 0.2 mm/rev), and depth of cut, ap (0.4, 0.5, and 0.6 mm) were applied. The effects of two types of coolant were observed and the results shown that the cutting tool turned under MQL has a longer tool life (25%) and leads to reduce surface roughness of machined surface (30%) compared with that turned under the conventional coolant condition. It was proven that the MQL condition is a good alternative in replacing the conventional coolant.

Full Text

Title: Effect of surfactants and grafted copolymer on stability of bentonite particles dispersion in brine system

Author (s): Abdelazim Abbas Ahmed, Ismail Mohd Saaid, and Nur Asyraf Md Akhir

Abstract: A major issue for the oil and gas industry is the production of high water from many fields due to massive water injection. Reducing the water production while improving oil recovery from these fields is a key challenge. Polymer gel has been widely used to shut off water-producing zones, but it is not suitable for high temperature reservoirs (> 100 °C). Recently, developing a thermally stable plugging agent has posed a challenge for oil and gas business. The aims of the present study are to investigate the stability and aggregation rates of 0.1% w/w bentonite particles dispersion in the brine system (1% w/w NaCl) at various conditions. The main objective is to select an effective and suitable method for stabilizing of bentonite colloids for possible propagation in porous media to plug high permeable zones (thief zones). The effects of surfactants (cationic/anionic), and grafted poly (N-isopropyl acrylamide-co-acrylic Acid) on the bentonite colloids aggregation kinetics and stabilities were investigated. In this study, a series of bentonite dispersions stability tests were conducted using light transmission and backscattering measurements by Turbiscan. Time evolution of turbidity was employed to define colloids aggregation rates. The study revealed that surfactants and polymer grafted bentonite had significant impacts on the stability of bentonite particles dispersion. It was observed that anionic surfactant (SDS) has more tendency to stabilize the particles compared to cationic surfactant. However, both surfactants have shown unstable dispersion in 1% NaCl. Also, increasing SDS surfactant concentration decreases aggregation and migration rates, whereas cationic surfactant (DTAB) exhibits an opposite phenomenon. It was also observed from the Turbiscan measurements that the aggregation and sedimentation dynamics fell into two patterns, slow and rapid coagulations. Under studied conditions, grafted bentonite effectively showed excellent dispersion stability.

Full Text

Title: Mapping of potential areas tsunami prone in Bengkulu city

Author (s): M. Farid, Sunarto and Wiwit Suryanto

Abstract: Bengkulu city including tsunami-prone areas. This study aims to calculate the level of tsunami hazard in the Bengkulu city. The risk level is calculated based on the height from sea level (h), the distance from the shoreline (x), distance from the nearest river (s), the condition of geomorphology (k), the number of buildings per square kilometer (p), and the value of the peak ground acceleration (a). All variables are measured with the rules of research. Tsunami will continue to be a threat in earthquake prone areas. Threats region more concentrated along the coast and moves upstream as far as 10 kilometers. Tsunami threat is more factual determined by height, distance from the shoreline, distance from the nearest river, and peak ground acceleration. The correlation between tsunami potential score with each variable tends to be linear.

Full Text

Title: Hydrothermal carbonization kinetics of sugarcane bagasse treated by hot compressed water under variabel temperature conditions

Author (s): Dewi Agustina Iryani, Satoshi Kumagai, Moriyasu Nonaka, Keiko Sasaki and Tsuyoshi Hirajima

Abstract: This study investigated kinetics of hydrothermal carbonization (HTC) decomposition reaction of sugarcane bagasse treated with hot compressed water under varied temperature in range 200-300 °C. Experiments were carried out using a batch type reactor with a temperature controller. Characterization results showed that the decomposition reaction was influenced by temperature and reaction time. Degradation of hemicellulose's began at 200°C (3 min) and was completed at 240°C (5 min) to form arabinose and xylose. Cellulose started to decompose at 240°C (5 min) and was completely degraded at 270°C (20 min). Lignin decomposed at temperature range 200-300°C, and produced aromatic and phenolic compounds. The kinetics calculation for decomposition reactions such as hydrolysis and dehydration reactions are adopted as the heterogeneous reaction model. The model assumes that solid particle is cylindrical shape and this size is shrinking with reaction (cylindrical shrinking core model). Results of calculation indicated that the reaction is controlled with the diffusion through product layer. From these calculation and the results of decomposition mechanism can be explained as follows: (i) hydrothermal carbonization cellulose and hemicellulose's are decomposed preferentially and un-reacted lignin part to be diffusion layer. (ii) the hydrolysis and dehydration reaction started at 200°C and 240°C respectively and reaction rate increased with increasing temperature.

Full Text

Title: Development of portable 10- stages Marx generator

Author (s): Ahmed S. Eljugmani and M. S. Kamarudin

Abstract: High-voltage pieces of equipment are often placed in open air and are often exposed to lightning strike as well as surge voltage. They sustain high-surge voltage during lightning phenomena. To achieve better protection of all power equipment and to obtain quality power supply, high-surge voltages should be simulated and tested in the above said equipment in laboratories. Marx generator is the most commonly used generator. This generator produces lightning impulse voltages of 1.2/50 μs duration. This paper describes the development of a low cost, effective, and portable compact 10-stage Marx generator capable of producing lightning impulse voltages of up to 25 kV. This generator can be used by small-scale industries and academic institutions to demonstrate impulse voltages and to test insulators of lower rating in the laboratory. The duration of the waveform, i.e., front and tail time, can be controlled by varying the values of front resistor and tail resistor. In this paper, an attempt has been made to evaluate the performance of a practical 10-stage Marx generator with the simulated model. Simulation is performed by using OrCAD PSpice software, and a single-transistor fly-back transformer drive circuit is made and used as the main high-voltage DC source. Simulation outcomes are compared with the hardware. Simulation and experimental results show agreement.

Full Text

Title: Channel estimation for Amplify-And-Forward relay network in high Doppler spread

Author (s): M. Fazle Rabbi and Kamarul Hawari Bin Ghazali

Abstract: In this paper time varying channel estimation method is proposed for relay based network. Specifically, pilot symbol assisted channel estimation method is presented for Amplify-and-Forward (AF) relay network using Orthogonal Frequency Division Multiplexing (OFDM) system in high mobility environment. The channel links among mobile user, relay station and base station are assumed to be time and frequency selective. The time variation of the channel is approximated by Basis Expansion Model (BEM). After formulating an appropriate system model for OFDM based relay network, two types of pilot patterns, known as block pilot and mixed pilot, are introduced for channel estimation purpose. Least square and minimum mean square error estimators are used to estimate the BEM coefficients. Using simulation it has been shown that, the channel estimation using mixed pilot symbols suffers from the inter carrier interference while block pilot based estimation can be more effective in high Doppler spread scenario.

Full Text

Title: Angle modulated simulated Kalman filter algorithm for combinatorial optimization problems

Author (s): Zulkifli Md Yusof, Zuwairie Ibrahim, Ismail Ibrahim, Kamil Zakwan Mohd 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 estimation-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 and measurement process, every agent estimates the global minimum/maximum. Measurement, which is required in Kalman filtering, is mathematically modelled and simulated. Agents communicate among them to update and improve the solution during the search process. However, the SKF is only capable to solve continuous numerical optimization problem. In order to solve discrete optimization problems, the SKF algorithm is combined with an angle modulated approach. The performance of the proposed angle modulated SKF (AMSKF) is compared against two other discrete population-based optimization algorithms, namely, binary particle swarm optimization (BPSO) and binary gravitational search algorithm (BGSA). A set of traveling salesman problems are used to evaluate the performance of the proposed AMSKF. Based on the analysis of experimental results, we found that the proposed AMSKF is as competitive as BGSA but the BPSO is superior to the both AMSKF and BGSA.

Full Text

Title: Self-exciting capacitor circuit for a low-power, low-speed single-phase induction generator

Author (s): Hari Santoso, Rini Nur Hasanah, Budiono Mismail and I. Nyoman Gde Wardana

Abstract: It is not easy to generate voltage in a low-power, low-speed induction generator without initial voltage on its excitation capacitor. A special circuit needs to be designed to create an initial charging of capacitor if it is to be used for pico/microhydro power generation in remote area. During start-up process, the resulted waveform of capacitor current is almost always of damped sinusoid because the energy transferred between capacitor and inductor is continuously decreasing and becoming heat losses in the resistor. Highly damped of current is not desired as there will be no enough charges remaining to initiate the voltage and power generation. Experiment results indicate that it needs at least the amplitude reduction up to about 20% after five cycles - being equivalent to 0.1 second for a 50-Hz system frequency - to obtain a successful starting-up of the low-power, low-speed single-phase induction generator considered in this paper.

Full Text

Title: MR damper controllers for vehicle airbag replacement

Author (s): N. Dhanaletchmi, Farrukh Hafiz Nagi and Agileswari K. Ramasamy

Abstract: Vehicle crashes continues to occur despite all the human efforts to prevent them resulting in injuries and loss of lives. The implementation of air bags has been shown to offer passenger safety in a collision. However, premature deployment of air bag has resulted in fatalities and injuries to drivers and front seat passengers. In this study, a Magnetorheological (MR) damper is used as a replacement of air bag in vehicles to serve as a protective system. MR damper is a smart damping device which can be programmed to dynamically absorb shocks and high impact force when used in application such as passenger cars. In this paper, the implementation of MR damper in reducing the impact force on driver during frontal car crash is studied through MATLAB simulation. The current air bag model in MATLAB has been replaced with the designed MR damper to study the impact force on the driver. In this paper two control techniques; a conventional Proportional Integral and Derivative (PID) and Fuzzy Logic Control (FLC) controllers are proposed for MR damper current control. The performances of the controllers were analysed based on efficiency to minimize Fd, damping force of MR damper system during the crash de-acceleration. Simulation results proved that Fuzzy based MR damper system yields better results compared to PID based MR damper system.

Full Text

Title: Control of DC motor external resistor starter by using armature current decay sensing technique

Author (s): S. Yusof, H. Daniyal and M. R. Mohamed

Abstract: Advancement of AC motor over last 100 years coupled with regular maintenance requirement of a DC motor has made DC motor become unpopular to be widely used in modern industries. Even so, for industries that require high torque output and variable speed, DC motor is still in demand. Nonetheless, reducing high starting current is a challenge. This paper discusses control strategies for reducing high starting current to a considerable safer value, i.e. at least 3 times of full load torque. In doing so, a set of external resistance is applied to the armature winding of DC motor and equipped with the automatic control switch. The value of carried load torque determines the execution of control switch, thus resulted in reduction of start-up period with minimum losses and improves the efficiency of forward-reverse control. The results suggested that no ill effect on speed smoothness and torque load carrying capacity during starting time.

Full Text

Title: Real-time finger hand movement capturing via a data hand glove

Author (s): A. I. Che-Ani, A. Othman, N. Hamzah, A. D. Rosli, R. Baharudin and M. F. Abdullah

Abstract: This paper presents a real-time and non-destructive method for capturing finger hand movement via a hand glove. From previous research, a major limitation appears to be limited portability due to presence of cloth support and less accuracy due to poor calibration (a tedious, non-automatic process). The proposed finger hand movement capturing system is capable to detect finger hand movement via hand glove that is attached with flex bend sensor at each finger hand respectively. The calibration of the hand glove is done automatically when wearing the hand glove by using linear regression method. The data from the hand glove can be stored and monitored at real time via GUI system. The finger hand movement is captured based on the flex sensor output as the resistance increase proportionally when the sensor is flexed. The output voltage of the flex sensor represents the degree of the finger's bending. A prototype of the hand glove attached with the flex sensor has been developed and the result shows that the flex sensor has more than 90% linearity on the performance of the hand glove. In addition, the wireless communication used in this system reduced cables attached to the hand glove which give more portability in using the system.

Full Text

Title: Two-steps implementation of sigmoid function for artificial neural network in field programmable gate array

Author (s): Syahrulanuar Ngah, Rohani Abu Bakar, Abdullah Embong and Saifudin Razali

Abstract: The complex equation of sigmoid function is one of the most difficult problems encountered for implementing the artificial neural network (ANN) into a field programmable gate array (FPGA). To overcome this problem, the combination of second order nonlinear function (SONF) and the differential lookup table (dLUT) has been proposed in this paper. By using this two-steps approach, the output accuracy achieved is ten times better than that of using only SONF and two times better than that of using conventional lookup table (LUT). Hence, this method can be used in various applications that required the implementation of the ANN into FPGA.

Full Text

Title: The effect of Alpha Binaural Beat on frontal ESD Alpha Asymmetry on different gender

Author (s): Norhazman H., Mohamad Zaini N., Taib M. N., Kama Azura Othman, Sani M. M., Jailani R. and Omar H. A.

Abstract: This paper describes the study of the effect of Binaural Beats tone on Alpha and Beta sub bands of different gender in three situations namely Doing Nothing, Listen to Noise and Post Binaural Beats. Binaural beats has been renowned worldwide for its ability to entrain our brainwaves into desired state i.e. relax state. In this research, the frequency of the Binaural Beats tone used is Alpha 9 Hz and the EEG feature, Energy Spectral Density (ESD) is utilized. ESD provides information on distribution of energy of an energy signal per unit bandwidth as a function of frequency. ESD is derived from the power spectral density or PSD. The ESD feature is used to compute the Frontal ESD Alpha Asymmetry. Hence, the ESD pattern is observed in both genders in the three said conditions. 39 subjects consists of 17 males and 22 females involved in the research. From Shapiro-Wilk Normality Test, the box plot showed that females are easier to be effected by the noise with the percentage decrement in the Frontal ESD Alpha Asymmetry value is 4.2% as compared to only 1.9% in male. However, emotionally, female shows that they are easier to be alleviated from stress as the percentage of Frontal ESD Alpha Asymmetry value increases 6.5% as compared to male 4.7%.

Full Text

Title: A review on photovoltaic array behavior, configuration strategies and models under mismatch conditions

Author (s): Ali M. Humada, Mohd Herwan Bin Sulaiman, Mojgan Hojabri, Hussein M. Hamada and Mushtaq N. Ahmed

Abstract: A review of the algorithms for pursuing the PV configuration methods within non-uniform conditions is implemented in this study. As has been exposed, there are many methods of distinguishing and PV alignment techniques that strive for mitigating the effect of mismatch conditions (which include the rapid and unbalance changing of the weather conditions like the radiation and temperature) on the PV system. Nonetheless, in this research they are grouped as Series Parallel (SP) interconnection, Total Cross Tied (TCT) interconnection, and finally Bridge Linked (BL) interconnection technique. In contrast to the BL and SP, in the TCT there is a substantial reduction in mismatch losses that occur due to partial shading, beside to it has greater reliability comparable with others interconnections. Furthermore, the focus of this research is also to review modeling the PV arrays under mismatch conditions. A way to decrease the mismatch effect on the PV modules discussed in this study. Also, the challenges might face these reconfiguration methods and PV modeling has been illustrated and presented. Finally, this study can be considered as a valuable indication for those who are interested in PV modeling and reconfiguration.

Full Text

Title: Gravitational Search Algorithm: R is better than R2?

Author (s): Mohamad Nizam Aliman, Khairul Hamimah Abas, Muhammad Sharfi Najib, Nor Azlina Ab. Aziz, Mohd Saberi Mohamad and Zuwairie Ibrahim

Abstract: Gravitational Search Algorithm (GSA) is a metaheuristic population-based optimization algorithm inspired by the Newtonian law of gravity and law of motion. Ever since it was introduced in 2009, GSA has been employed to solve various optimization problems. Despite its superior performance, GSA has a fundamental problem. It has been revealed that the force calculation in GSA is not genuinely based on the Newtonian law of gravity. Based on the Newtonian law of gravity, force between two masses in the universe is inversely proportional to the square of the distance between them. However, in the original GSA, R is used instead of R2. In this paper, the performance of GSA is re-evaluated considering the square of the distance between masses, R2. The CEC2014 benchmark functions for real-parameter single objective optimization problems are employed in the evaluation. An important finding is that by considering the square of the distance between masses, R2, significant improvement over the original GSA is observed provided a large gravitational constant should be used at the beginning of the optimization process.

Full Text

Title: Distance evaluated simulated Kalman filter for combinatorial optimization problems

Author (s): Zulkifli Md Yusof, Zuwairie Ibrahim, Ismail Ibrahim, Kamil Zakwan Mohd 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 estimation-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 and measurement process, every agent estimates the global minimum/maximum. Measurement, which is required in Kalman filtering, is mathematically modelled and simulated. Agents communicate among them to update and improve the solution during the search process. However, the SKF is only capable to solve continuous numerical optimization problem. In order to solve discrete optimization problems, a new distance evaluated approach is proposed and combined with SKF. The performance of the proposed distance evaluated SKF (DESKF) is compared against two other discrete population-based optimization algorithms, namely, binary particle swarm optimization (BPSO) and binary gravitational search algorithm (BGSA). A set of traveling salesman problems are used to evaluate the performance of the proposed DESKF. Based on the analysis of experimental results, we found that the proposed AMSKF is as competitive as BGSA but the BPSO is superior than the both DESKF and BGSA.

Full Text

Title: Improving order management system in pump industry

Author (s): M. Dachyar and Listya Zufri

Abstract: Order management process is one of supply chain management process, which has an important role related to the customer satisfaction and profit of the company. The company should reengineering their business process to compete with other company and responsive to customer needs. IDEF0 and Business Process Reengineering (BPR) method is used to map, review, and analyze existing business process. In this research, the existing and new business process design is simulated using Igrafx and the result shows process time reduced by 16, 66%.

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Anggono, Willyanto

Universitas Kristen Petra, Department of
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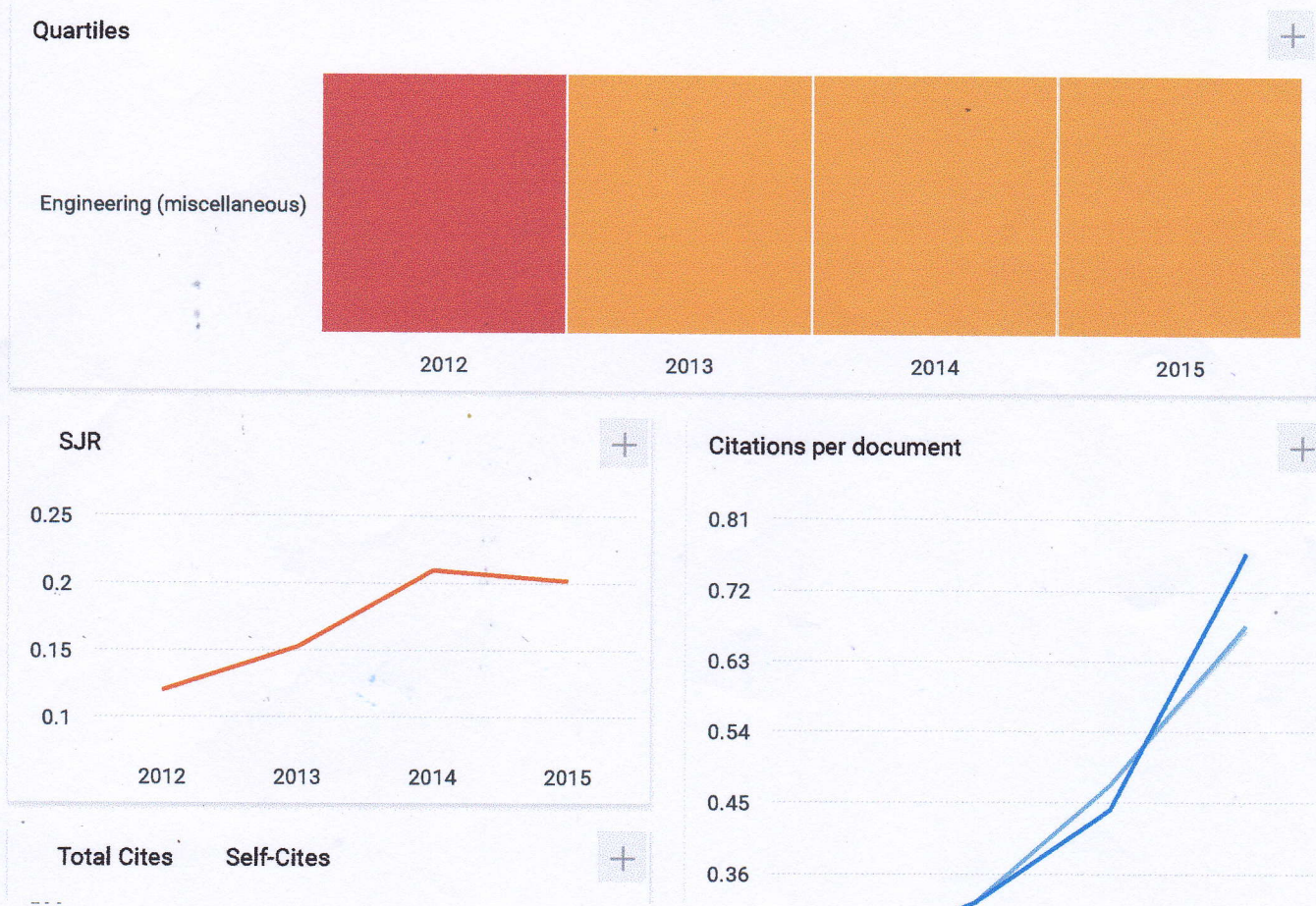
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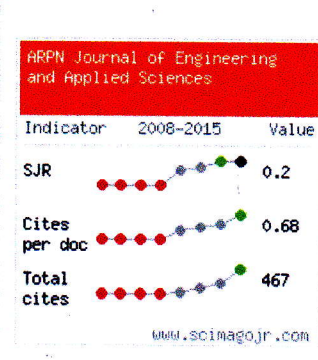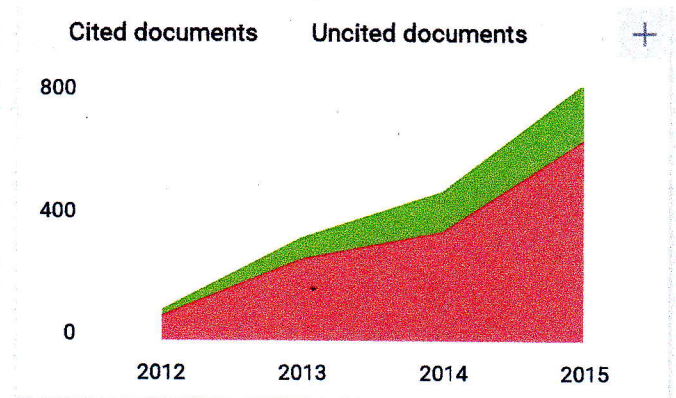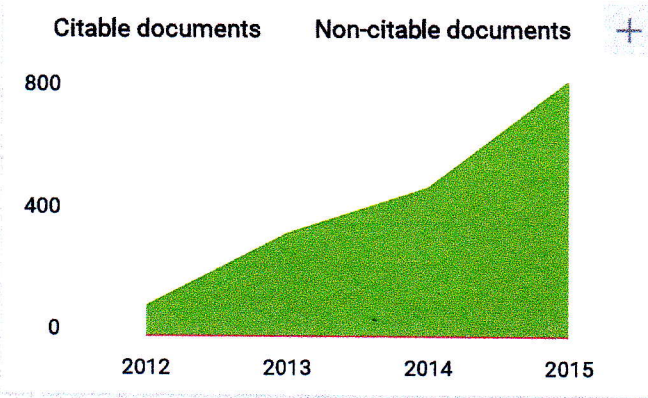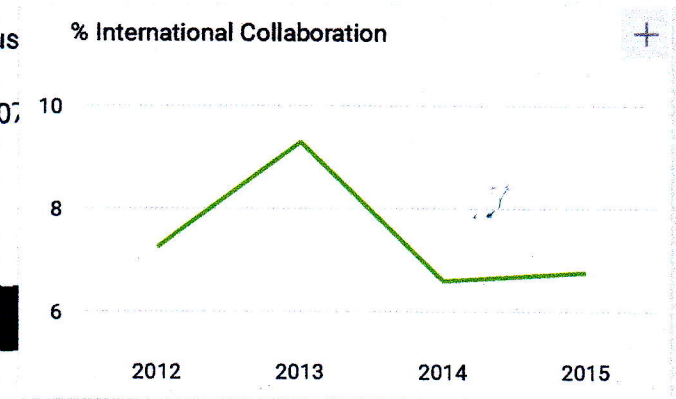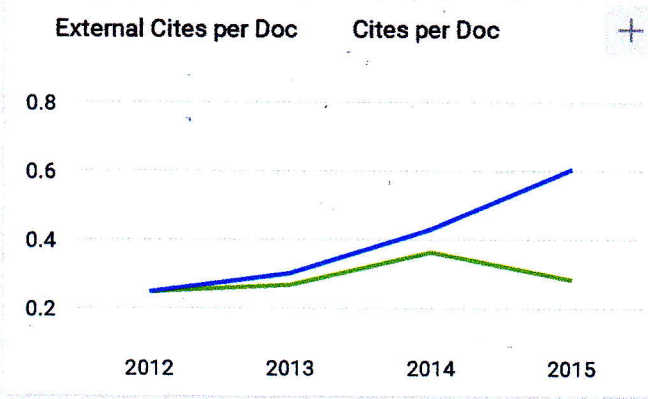
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PERFORMANCE OF GASOLINE/LPG BI-FUEL ENGINE OF MANIFOLD ABSOLUTE PRESSURE SENSOR (MAPS) VARIATIONS FEEDBACK

Muji Setiyo[1], Budi Waluyo[1], Willyanto Anggono[2] and Mohammad Husni[3]
[1]Department of Automotive Engineering, Muhammadiyah University Magelang, Magelang, Indonesia
[2]Department of Mechanical Engineering, Petra Christian University, Surabaya, Indonesia
[3]Department of Autotronic, Vocational Education Development Center, Malang, Indonesia
E-Mail: willy@petra.ac.id

ABSTRACT

Liquefied Petroleum Gas (LPG) is an alternative fuel in spark ignited premix combustion engine and emissions from LPG engines are lower than those in gasoline engines. This article presents a novel method ofchanging the ignition curve in an LPG/Gasoline bi-fuel engines which still use the converter and mixer models. The goal of this research was to get the best engine power infuel operating mode both gasoline and LPG. It is known that the gasoline and LPG have different properties, especially burning speeds. In order to obtain optimum engine performance in both fuels, there should be two ignition curves, one for gasoline and the other for LPG. A circuit Simple Electronic Spark Module (SESM) was applied to manipulate the feedback voltage from a Manifold Absolute Pressure Sensor (MAPS). In the gasoline mode when idle, feedback from the MAPS was 1.4 volts. In this study, the standard ignition curve was maintained for the gasoline operation mode, whereas, in the LPG operation mode, feedback from MAPS was varied at 1.4; 1.2; 1.0; 0.8; and 0.6 volts at idling respectively. The Toyota 5A-FE engine was tested on a chassis dynamometer to confirm the performance of the circuit. Test results show that the feedback of 0.8 volts produced the best power when the engine running on LPG.

Keywords: Bi-Fuel engine, MAPS feedback, SESM, engine performance.

1. INTRODUCTION

Liquefied Petroleum Gas (LPG) is an alternative fuel that is derived from the refining of crude oil or natural gas. LPG consists of propane or butane or a mixture of both. Ethane or pentane is also present in the mixture in small amounts. LPG is the fuel that has all the key properties required for the Spark-Ignition Engine [1].

The main reasons why governments in many countries actively encourage the use of LPG and other alternative fuels are environmental [2]. Emissions of the LPG-fueled engine compared to those from gasoline ones have been studied by many researchers and some of them concluded that emissions from LPG engines were lower than those from gasoline ones[3,4]. Yet, LPG has negative effects on engine performance, fuel economy and engine structural elements when it is used at the same fuel–air equivalence ratios as gasoline [5]. Furthermore, LPG storage displaces 15–20% greater volume than gasoline andits power output decreases by 5-10% [6]. However, for reasons of lower emissions and pricing, LPG is more promising than gasoline.

Now, there are nearly 25 million LPG vehicles used throughout the world, in both private and public transportation such as taxis and buses. However, the use of LPG is still concentrated in a small number of countries including South Korea, Turkey, Russia, Poland and Italy. In the ASEAN region, Thailand has a successful country with a policy where LPG is encouraged as a vehicle fuel, both in the number of vehicles and consumption as shown in Table-1. Thailand outpaces Malaysia, Singapore and other ASEAN countries.

Table-1. The largest LPG markets in 2013 [2].

Country	Consumption (Thousand tons)	Vehicles (Thousands)	Refueling stations
South Korea	3987	2410	1994
Russia	2850	3000	4400
Turkey	2727	3935	10089
Thailand	1775	1020	1090
Poland	1575	2750	5520
Italy	1520	1930	3250
Japan	980	234	1517
Ukraine	821	1500	2750
Australia	813	490	3703
China	730	141	310
Rest of the World	8024	7501	35749
World	25802	24911	70372

To operate vehicles with LPG, either as full-dedicated or bi-fuel (gasoline and LPG alternately operated), only slight modifications are needed in the fuel system [7]. Fuel converter kits have been developed for car fuel systems. The four main types of LPG fuel systems commonly used are converter and mixer, vapor phase injection, liquid phase injection, and liquid phase direct injection [2].

Converter and mixer was the first-generation device for gasoline to LPG conversion and wasa similar to carburetor system. The LPG flows from the converter to

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the intake manifold based on vacuum in the mixer, then LPG is inserted into the engine. It hasexisted since the 1940s and it is still widely used today, especially in vehicles that have not been modified for bi-fuel. Vapor Phase Injection (VPI) system uses a converter such as the first generation with a few improvements. The gas flows from the converter at a higher pressure than that of the old system. The gas is then injected into the intake manifold. Liquid Phase Injection (LPI) system does not use a converter but it provides liquid fuel directly into the fuel rail, like gasoline injection system. This system supplies LPG to the engine in accurate volumes. Liquid Phase Direct Injection (LPDI) system is the most advanced among the others, LPDI uses a high-pressure pump and injector to inject the liquid LPG directly into the combustion chamber. Moreover, losses due to evaporation of LPG in the intake manifold can be eliminated in this system [2].

Among the four of LPG conversion systems, the converter and mixer system is the simplest and can be installed almost in all existing vehicle technologies. Meanwhile, LPI and LPDI models use complex electronic controls and are complicated and not compatible for application in older model vehicles. Along with the market demand, automotive manufacturers have added the LPG fuel system to products marketed in some countries. However, for a country that is developing its infrastructure for gas fuel systems such as Indonesia, the converter and mixer system is the most acceptable. This is becausealmost all existing vehicles are not equipped with the LPG fuel system. The bi-fuel system is also an option so that a car can be operated with two fuels interchangeably. However, the number of LPG filling stations is still limited [2].

Research Octane Number (RON) and burning speedareimportant characteristics in the combustion processes. LPG hasa higher Research Octane Number (112 RON) and a lower burning speed than gasoline. The ignition timing for LPG mode must be advanced in order to obtain the Maximum Brake Torque [8, 9, 10-14]. If the initial reference for gasoline operation is 10ºBTDC, the LPG operation becomes 25ºBTDC, as shown in Figure-1.
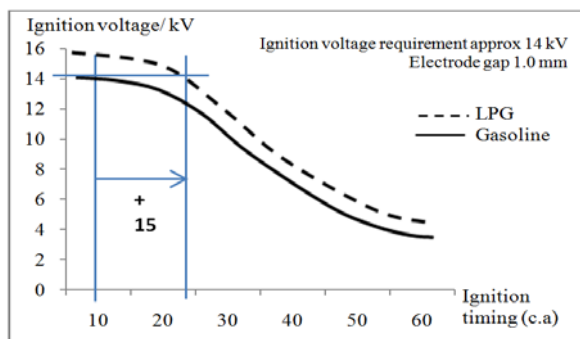

Figure-1. Ignition timing for LPG engine [8].

A testing was conducted with HD-5 liquid propane in a Stock Ford Taurus 3.5 L V6 Eco Boost.This

study reported that the ignition timing could be advanced by 20 degrees in the full load, and the knock limit was not reached at any point. Significantly, a better thermal efficiency was demonstrated with optimized ignition [15]. timing. Previously, Lawankar (2012) also has examined in detail the performance of LPG-fueled SI engines at different compression ratios and ignition timing. The results showed that the ignition timing influenced brake thermal efficiency. It was observed that the efficiency at part and peak was higher at 20ºBTDC for the gasoline-fueled engines and at 30ºBTDC for LPG fueled engine for all of compression ratios [16].

Referring to the previous studies [8, 15, 16], which found that the bi-fuel engines require two ignition curves. If only one ignition curves for gasoline mode available, it will cause a significant power drop when operated in LPG mode. Conversely, if the ignition curve refers to the LPG mode, knocking will occur when using gasoline. To achieve maximum results in both modes of fuel, ignition curves must be changed follow the fuel used. Ignition curves should be able to move forward or backward automatically when the fuel operation is changed, especially during engine acceleration and heavy loads.

The best way to ensure that the ignition is optimized for both fuels is by installing an ignition device, known also as "Dual Curves". It is wired to the ignition system and switches automatically to the LPG or gasoline setting when the fuel switch is activated. They will give more initial advance than that for the gasoline setting when the engine is running on LPG, and as speed increases they will give better performance [17].

Efforts to adjust the ignition curve in LPG, CNG and gasoline engine have been performed [18]. A Timing Advance Processor was applied to manipulate the signals from the ignition coil. The signal is processed further through this device before it is fedback to the Engine Control Unit (ECU). The processor spark advance was also investigated [19] and tested on CNG-fueled engines. This variation in spark requirement is mainly due to the slower speed of flame propagation for natural gas. Another device for controlling ignition curve is called Electronic Spark Advance Variator[20]. Both Timing Advance Processor and Electronic Spark Advance Variator work based on a signal from the ignition coil andtheir disadvantages are during acceleration and heavy loads have not yet been solved.

This article presents a novel method for controlling the ignition timing of bi-fuel engine. The goal is to improve the power loss when running on LPG during acceleration and heavy loads and to maintain power when running on gasoline. The ignition curve can be changed based on information from the Manifold Absolute Pressure Sensor (MAPS). This method is especially used in conventional bi-fuel engines (using the converter and mixer models). This method was named Simple Electronic Spark Module (SESM). The basic principle behind this method is the MAPS sends a feedback signal varying from 4.5-0.5 volts based on intake manifold pressure (101-20.1 kPa). At idling speed for gasoline engines, the feedback

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from MAPS ranges from 1.4 to 1.5 volts which are linear with manifold pressure. When the engine isrunning on LPG, the feedback is lower than 1.4 volts as the engine works at higher intake manifold pressures.

The Total Ignition Timing (TIT) of EFI engines is based on the ECU setting then corrected by engine conditions recorded by sensors. The formula is given as follows: TIT =BIT+AT+CT+BP+MC+CC+UI [9]. Where the 7,7is based on ignition timing from the main ignition table, $7 is air temperature compensation, &7 is coolant temperature compensation, %3 is barometric pressure compensation, 0 & is MAP compensation, && is individual cylinder compensation, and 8, is user selectable input compensation. In advanced ignition curve when running on LPG mode, especially during engine acceleration, the feedback from MAPS is manipulated by simple electronic circuits. The feedback from the MAPS is lowered a few volt before being supplied to ECU. The voltage difference can be set as desired by adjusting the variable resistor. By applying this method, the ECU receives information as though the engine was running at higher intake manifold pressures so that ignition shifts forward. When the engine is returned to gasoline operation, the feedback voltage from the MAPS does not pass through the circuit and returns to the normal ignition curve [9].

2. EXPERIMENT METHODS

The engine used throughout this study was a Toyota 5A-FE that has been modified for a bi-fuel system. The converter used was a Stefanelli 150HP. The engine specification, and LPG/Gasoline bi-fuel engine instalation are presented in Table 2 and Figure-2 respectively.

Table-2. Engine spesification.

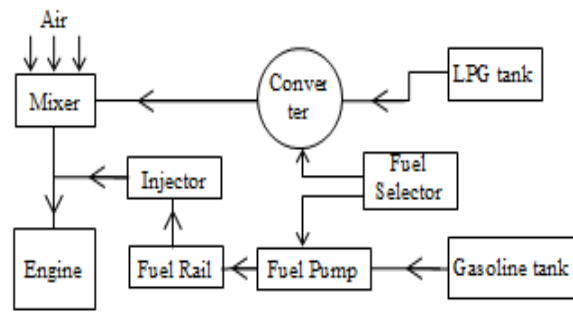| Engine manufacturer	Toyota
Engine model	5A-FE
Cylinders	Inline 4
Capacity	1498 cc
Bore × Stroke	78.7 × 77 mm
Valve mechanism	DOHC, 4 valves per cylinder, 16 valves in total
Maximum power output	77 kw @ 6000 rpm
Maximum torque	135 Nm @ 4800 rpm
Compression ratio	9.8:1
Fuel system	EFI

Figure-2. LPG/Gasoline bi-fuel engineinstalation.

When the fuel selector is shifted to the LPG mode, RL2 is activated so that the feedback voltage from the MAPS will be processed through the circuit. When the operating mode is shifted to Gasoline, RL2 becomes non-active, the feedback voltage from the MAPS will be supplied directly to the ECU. The simple electronic spark module (SESM) shown in Figure-3.
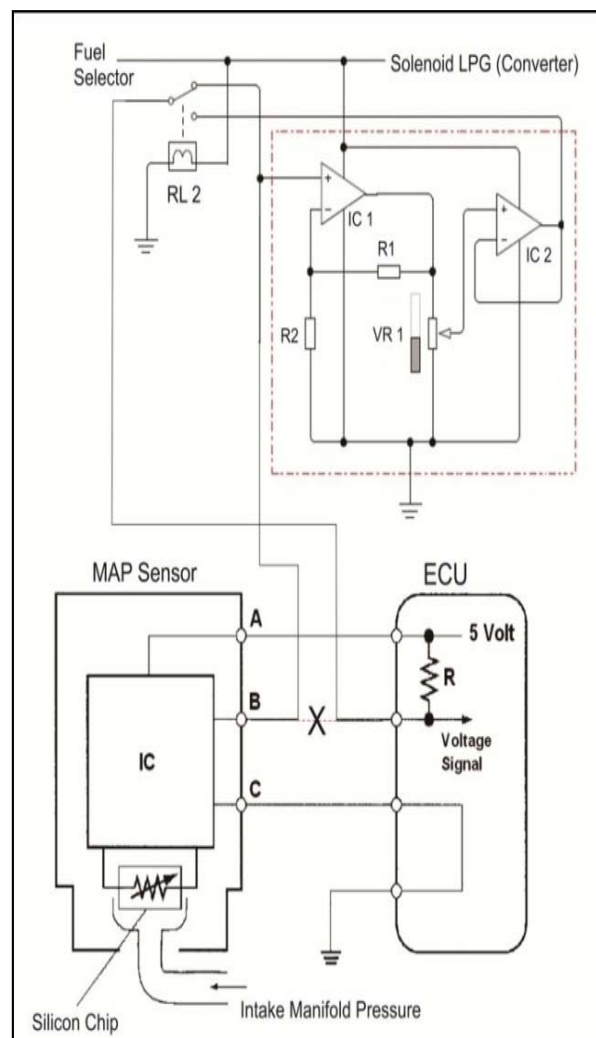

Figure-3. Simple Electronic Spark Module (SESM).

Under the standard conditions and the engine is running on gasoline, the current from ECU to MAPS (A) is 5 volts and feedback from MAPS to ECU (B) is about 1.4 volts at idling (±37 kPa) and increases linearly up to 4.5 volts at 100 kPa. When the engine is running on LPG, the outputs from SESM are set at 0.6; 0.8; 1.0; 1.2; and 1.4 volts at idling. Compared to the data standard, MAPS graph after passing through the circuit is presented in Figure-4.
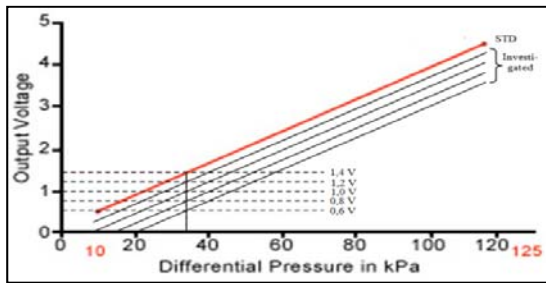

Figure-4. MAPS graphs before and after throught the SESM.

In this study, a Hofmann Dynatest Pro - 260 kW chassis dynamometer was used in a "Program P-Max" menu. This test was used to obtain the engine curve (power and torque). Coast-down test procedure was performed to obtain the actual vehicle characteristics. The vehicle was accelerated from standstill to maximum speed by changing gears smoothly but quickly. Once maximum power had been exceeded, the clutch was disengaged and the engine was allowed to coast-down. During coasting, power loss was constantly determined and the measured parameters of power, velocity, and torque were obtained. The experimental set up for this research is shown in Figure-5.

Figure-5. Experimental set up.

3. RESULTS AND DISCUSSIONS

In this study, the engine powerwas set from 1500 to 6000 rpm. A series of tests showed that the MAPS feedback control (which meant changing the ignition timing) had a major effect on output torque and engine power (Figure-6). In the LPG operation mode and without control of MAPS feedback (V: 1.4), the engine power was very low (Curve 5). It can be clearly seen that the

maximum power only generated 61.5 hp @ 5045 rpm while the gasoline mode was capable of producing 75.4 hp @ 5049 rpm (Curve 6), a decrease of 14.5%. Moreover, at engine speeds below 2000 rpm, there were significant power drops.

When the MAPS feedback was lowered to 1.2 volts in the LPG mode (curve 4) afterpassing through the SESM, maximum engine power increased to 68.6 hp @ 5414 rpm, a difference of only 9% from the gasoline operation mode. The engine gave good performance at high rpm, but still performed poorly at low rpm. The good results were obtained at the MAPS feedbacks of V:1.0 and V:0.8 (curves 3 and 2) with a graphic power that was nearly coincident, but the V:0.80 was better than V:1.0. Although the maximum power was not been able to match that of the gasoline engine, the results are in accordance with the theory given by Bosch (2010) [8].

When the MAPS feedback was lowered again to 0.6 Volts (Curve 1), the maximum power declined. This confirms the results achieved by Lawankar [16]. Additionally the power loss by applying of SESM was only 4%. While in the Ceviz paper [6], the power losses due to the LPG application were approximately 5-10%.
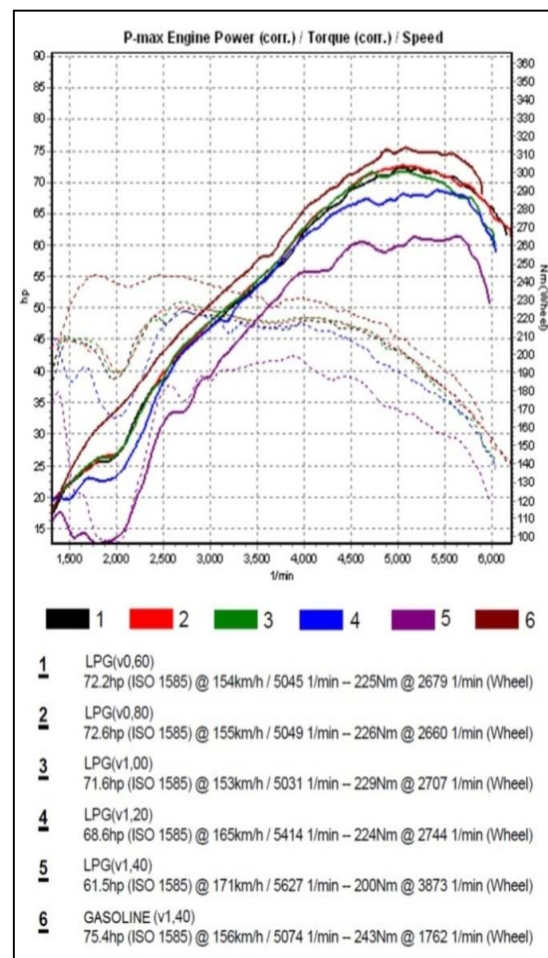

Figure-6. The effect of MAPS feedback to engine power at various MAPS feedback.
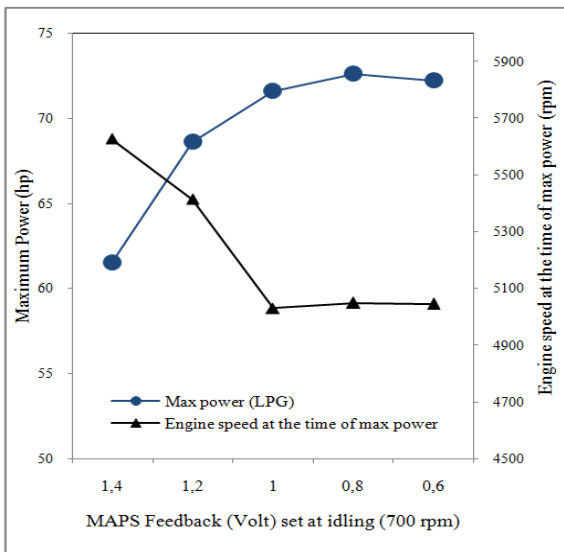
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Figure-7. The effect of MAPS feedback on maximum power in the LPG mode.

The effect of MAPS feedback on maximum power when running on LPG is presented in Figure-7. Engine speed at maximum power is also presented to confirm the working conditions of the engine. Maximum power rose significantly when the MAPS feedback lowered to 1.2 Volts and then 1.0 Volt. The maximum power was also obtained at lower rpm than MAPS feedback set at 1.4 volts. Furthermore, the best maximum power occured when the MAPS feedback was set at 0.8 volt.

4. CONCLUSIONS

A Simple Electronic Spark Module (SESM) to control the ignition timing for bi-fuel engine could produce better engine performance in the two modes of fuel, LPG and gasoline, especially during acceleration and heavy loads. When the engine is running on LPG and the MAPS feedback changes from 1.4 to 1.0 volts and has a significant effect, although in the range of 1.0 to 0.6 volts showed almost the same results, the best maximum power occured when the MAPS feedback was set at 0.8 volt. In conclusion, the power loss in bi-fuel engines when running on LPG can be corrected by manipulating the MAPS feedback before it is supplied to the ECU.

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