Proceeding
IC - STAR 2015

The 1st International Conference on Science, Technology and Interdisciplinary Research 2015

Proceeding of The 1ˢᵗ International Conference on Science, Technology and Interdisciplinary Research 2015

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Preface

The 1st International Conference on Science, Technology, and Interdisciplinary Research (IC-STAR) 2015 took place in Bandar Lampung, the capital city of Lampung Province, Indonesia, between September 21 and 23, 2015. IC-STAR is an interdisciplinary international conference covering research and development in the field of engineering, life and applied sciences, medical and biomedical engineering, agriculture engineering and food sciences.

There were 144 pre-registered authors submitted their work in the conference. The submission was divided into regular full papers, short papers (work in progress), extended abstracts, and posters. After the double blinded peer-review process, the scientific committee of IC-STAR 2015 accepted and hosted 112 original research papers for oral presentation, and 6 posters. Due to inattentive reason, conclusively, the official IC-STAR abstract proceeding included 81 papers and 5 posters.

During the conference, 6 distinguish keynote speakers gave their speech and presentation of their state-of-the art works in the 2 keynote sessions. In addition, 14 parallel sessions were held in order to advance and contribute to specific research areas in the field of arranged sections. The parallel sessions composed into 44 paper contributions and 5 posters in Engineering section, 7 contributions in Agriculture and Food Sciences, 12 contributions in Medical and Biomedical Engineering, 18 contributions in Life and Applied Sciences.

IC-STAR 2015, in its inaugural arrangement, aims at creating a forum for further discussion on interdisciplinary fields of interest between academia, researchers, and their counterparts in government and industrial sectors. The objectives were to disseminate and discuss the advancements in understanding of Science, Technology and Interdisciplinary Research and their innovations. Also to gather stakeholders from academia, research institutes and industries for sharing their innovative and sustainable ideas, collaboration and networking opportunities. Therefore, the call for paper was addressed to scholars and/or professionals in the relevant fields. Furthermore, papers focused on issues of education were also welcomed along with papers regarding the science and engineering as long as the disciplines were intersected each other.

We would like to thanks the Faculty of Engineering, University of Lampung, who hosted the conference, also all members of committees, institutional partners, affiliated journals, sponsors, and ladies and gentlemen of authors and participants who have been contributed in the IC-STAR 2015.

See you again in IC-STAR 2016

Dr. Ing. Ardian Ulvan
IC-STAR 2015 Conference Chair

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	Prof. Eko Supriyanto - Universiti Teknologi Malaysia, Malaysia Title: Affordable Healtcare Technologies for South East Asian People
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SECTION 1 : ENGINEERING

Interdisciplinary Research Activities on Disaster Prevention and Mitigation at Kobe University by Forming Collaboration COE

Prof. Atsushi Iizuka [1,a]

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Abstract. Disaster prevention and mitigation researches are essentially interdisciplinary and have to be practical. The ultimate objective of the researches is to protect lives and living spaces from natural hazards and their contents widely vary from scientific areas to social affairs; i.e. emergency disaster rescue and life-saving, evacuation, shelter, crisis management, damage estimation, victim care during recovery and reconstruction, resilient living infrastructure, industrial infrastructure, temporary housing and reconstruction residential development, disaster tolerant promotion, methods of volunteer support, disaster preparation, damage estimation, hazard maps, disaster prevention education and so forth. How can the linkage and cooperation be realized between them? How can they be made converge on the ultimate objective? Here, introduced is a trial made to achieve the interdisciplinary researches at the stage of the disaster prevention and mitigation COE at the Kobe University Research Center for Urban Safety and Security, which has been established through collaboration with AICS, JAMSTEC and E-Defense with cooperation from the Kobe City Office, the Hyogo Prefectural Government and Kobe Shimbun (newspaper publisher).

Keywords : disaster, prevention, mitigation

Mechanical Characterization of Cells Exposed to Mechanical Loading

Prof. Toshiro Ohashi[1,a]

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Abstract. Vascular endothelial cells in vivo are exposed to complex mechanical forces including fluid shear stress, cyclic stretch and hydrostatic pressure. These mechanical forces are important factors in endothelial cell remodeling. So far, a lot of efforts have been done to study the effects of mechanical stimuli on cell remodeling; however, little is still known of how mechanical forces are transmitted through cells to activate intracellular signaling cascades leading to alterations in cell functions. To further address this issue, it should be required to know intracellular mechanical environment including mechanical properties of subcellular structural components such as actin filaments, nucleus and so forth. The objective of this talk is to present recent findings related to cell biomechanics, introducing mechanical tests of cell body as well as intracellular organelles.

Analyses of Mobile Positioning Data

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Abstract. Progress in the field of information sources, their digitization, visualization and analytical data extraction makes possible to enhance data about society behavior, demographic characteristics, etc. Mobile devices apart from their main purpose to support and provide various applications to their users also in parallel generate a big amount of signaling data that reflect the devices' usage and movement in a network. Due to high penetration and massive usage of mobile devices, these devices become then a unique source of information describing the behavior of users in space and in time. Positioning data allows data owners (mobile operates) to develop and to provide new innovative services that can be used in decision-making processes. In this talk, we will discuss how mobile users can be classified and mapped into an area of interest based on mobile positioning data. Furthermore, a utilization of such data to detect people traveling in public transport like busses and trains, and to determine where people get on and get off will be outlined.

Keywords : mobile, positioning data

The Utilization Of Sorghum Rod Powder As Filler To Enchance Mechanical Strength In Bioplastics Synthesis

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Abstract. This research aimed to utilize sorghum as a filler rod using variations of sorghum starch-chitosan formulations-filler with 10 wt% glycerol as a plasticizer. The physical and mechanical characteristics of bioplastics then analyzed by using Low Density Polyethylene (LDPE) as a reference. Variation of sorghum starch-chitosan formulations used were 10:0, 9.5:0.5, 8.5:1.5, 7.5:2.5, 6.5:3.5 and 5.5:4.5 (w/w), variations of the addition of sorghum stem powder filler were 0.25:0.5:1 g with gelatinization temperature on 95 , stirring speed of 375 rpm and temperature drying in an oven was 60 for 11 hours. Starch granule was sieved in 63 micron and stirred for 35 minutes. The best conditions obtained by variation of formulation starch: chitosan 7.5:2.5 (g/g) with 0.25 g filler addition and best tensile strength test was 13.9957 Kpa.

Keywords: bioplastic, filler, glycerol, modulus young, sorghum starch

Radiometric Correlation to Sulphur and Iron Content at BM-179 Kalan-West Kalimantan Uranium Ore

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Abstract. The research aims to determine the correlation radiometeric against sulphur and iron content and its association with uranium content of BM-179-Kalan-West Kalimantan's uranium ore. The sample selection method using a ROS tool–NF-SPP; enrichment of sulfide minerals using flotation preparation; Iron content determination using with AAS-Spectr-AA-20(λ=248.3 nm) analysis; uranium content through spectral uranyl-Br-PADAP (λ=574 nm) analysis; sulphur content determined by ESCHKA modification method. Results of the study is a linear correlation between the radiometric uranium content to follow the equation y1=3,5408x+1867.3; sulphur content decreased with radiometric increasing with the equation y1=-0,8345x+18926; iron content decrease to radiometric increase with the equation y2=-1,351x+31261. Increased sulphur content followed by iron content increase with trendline y1 = 1,3175x2 + 5601. The results can be found that the ore will have a high uranium content with a minimum sulphur content in radiometric $\geq$ 4000 cps, and a high uranium content with a minimum iron content at radiometric $\geq$ 6000 cps.

Keywords: BM-179-Kalan uranium ore, ESCHKA, radiometric correlation, iron, sulphur.

Masterplan Road Network In The Border Region Of Nunukan Regency Of The North Kalimantan Province

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Abstract. The formation of the North Kalimantan Province especially Nunukan Regency, as one of the efforts in organizing the regional solutions in order to optimize the public service because it can shorten the span of control of the Government, making it more efficient and effective. Based on this, the need for adequate of traffic infrastructure andfacilities are necessary. The infrastructure and facilities in the form of network access roads and bridges in the whole transport system. Road and bridge infrastructure are essential for the realization of national development activities that support the development of production and services. It also support the development of a region to realize the harmony of region growth, urban and rural holistically organized, environmentally sustainable, and empower communities.

Keywords: Master Plan, Roads, Bridges, Nunukan, North Kalimantan

Local Geology Condition of Bengkulu City Based on Seismic Vulnerability Index (Kg)

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Abstract. Conditions of local geology is one of the parameters that affect the level of damage caused by earthquake. The level of damage caused by the earthquake can be analyzed based on the value of the seismic vulnerability index (Kg). Seismic vulnerability index has a relationship to the local geology conditions such as the thickness of the sediment layer by f0 and a solidity level of sedimentary structures represented by magnitude of the amplification factor.Seismic vulnerability index is obtained from the square of the amplification factor (A0) divided by the resonant frequency (f0). Amplification factor and resonant frequency are obtained by using HVSR analysis. Micro-tremors data are the ground vibrational response from sixty six seismic station that installed on each type of geological formation Bengkulu City. Based on the results of the analysis show that the seismic vulnerability index of Bengkulu city relatively is heterogeneous inspite of the same type of geology. In general, the highest Kg value of the Bengkulu city is on the type of geology Alluvium terraces (Qat) ranged 0,01-10,26which is contained in the districts of TelukSegara, RatuSamban, GadingCempaka and coastal districts of RatuAgung. The lowest value is on the Reef Limestone (Ql) ranged from 0.05 to 0.35. Two types of these geological formations are classified in sedimentary rocks that are in the old quarter and the coastal zone, but the highest Kg value is only obtained on the type of Alluvium terraces (Qat) which is estimated to have a softer structure (visual observation showed the former swamp) and has a thick sediment layer (according f0 value) compared to the other types of geology.

Keywords: local geology condition of Bengkulu city, HVSR analysis, seismic vulnerability index

Strengthening of Confined Rectangular and Circular Reinforced Concrete Columns with Supplemental Pen-Binder and Fiber Reinforced Polymer (FRP)

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Abstract. One of the important requirements for earthquake resistant buildings associated with confinement is the use of seismic hook (135-degree hook) in hoop or confining reinforcement for reinforced concrete (r/c) column elements. However, installation of confining reinforcement with 135-degree hook is not easy. Therefore, in practice many construction workers apply confining reinforcement with 90-degree hook or, even with double C configuration (code non-compliance) because of the ease of its installation, if compared with that with the 135-degree hook (code compliance). Based on some research and some records of recent earthquakes in Indonesia, the use of the code non-compliance confining reinforcement for reinforced concrete columns produced structures with poor seismic performance. This paper presents the results of experimental study with an objective to develop an additional element expected to improve the effectiveness of concrete columns confined with non-compliant confining reinforcement or modification confining reinforcement. The additional element, named pen-binder, is used to hold the non-compliant confining reinforcement at place. The effectiveness of this additional element in improving the performance of some configuration of non-compliance confining reinforcement in columns under axial concentric was comprehensively investigated in this study. A total of 15 column specimens were tested, with 170 mm x 170 mm in cross section for rectangular columns, 190 diameter for circular columns and 480 mm in height. The main test variables were configurations of confining reinforcement, type of strengthening (pen-binder and FRP), and shape of cross section (rectangular and circular). Axial concentric test results showed that the use of steel pen-binder and FRP for confining reinforcement significantly improve the strength and ductility.

Migration in The Rural Impact (Case Study: Bulupitu and Sepanjang village, Malang Regency, Indonesia)

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Abstract. Indonesia has long experiences for rural community development that have not only positive impact on social and economic but also have negative impact. One of the impacts of the failure of rural development is migration from rural area to urban area or to another country as international migration. This paper tries to identify the impacts of migration in the rural area. We use evaluative and qualitative analysis and implement correlation analysis for the analysis of remittance in two villages in Gondanglegi district, Malang Regency Indonesia. Base on the analysis, we found that the impact of remittance in Bulupitu village and Sepanjang village are different. In Bulupitu village remittance influence both of economic and infrastructure aspect. Economic variables are consists of transportation ownership, house ownership, and land ownership; and infrastructure are water access, telecommunication ownership, and religion building/mosque. In the Sepanjang village, the impact of remittance is only has impact on the economic aspects (house ownership, and land ownership).

Keywords: evaluative, qualitative, correlation, and variables.

Ba0.5Sr0.5TiO3 based Photodiode Application as Light Sensor for Automatic Lighting Control Switch

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Abstract. Photodiode that was made from ferroelectric material, Barium Strontium Titanate (BST), was used as light sensor for automatic lighting control switch. BST based photodiode was placed in one leg of wheatstone bridge circuit to increase the sensor sensitivity. When light strike into the BST based photodiode sensor, the electric current flow through the BST sensor is increase. The electric current that flow through the BST sensor will also flow through the wheatstone bridge resistor at the same leg. This cause the voltage of the leg to increase otherwise the other leg"s voltage will remain not change. This different voltage of the wheatstone bridge circuit output will then amplified by differential amplifier circuit. The op-amp used for the differential amplifier is TL-074 general purpose op-amp. The amplification of the differential amplifier is set to 27x. The output of the differential amplifier will then compared with a reference voltage by op-amp voltage comparator to get digital output: logic „High" for dark condition dan logic „Low" for daylight condition. Output from op-amp voltage comparator then feed to NPN transistor to drive a single pole double throw relay. The normally open output of the relay is connected to fluorescent lamp, so the lamp will turn on when dark and turn off when daylight condition. As a result, lighting switch can be controlled by BST sensor. The switch will turn on when less light intensity strike the sensor and turn off when the light intensity strike the sensor is increase.

Keywords: Photodiode, BST, light sensor, automatic switch, op-amp

Compression Method for Digital Hologram using Wavelet Transform: Quality Enhancement for 3D Display Media

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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 ammount 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 increase to higher level.

Keywords : digital hologram; wavelet transform; 3D display; image compression.

Regulation of 12-pulse Rectifier Converter using ANFIS-based Controller in a HVDC Transmission System

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Abstract. High voltage direct current (HVDC) transmission is a better prospect choice compared to high voltage AC transmission. The HVDC is able to apply higher voltage level and without any reactive power losses. By supporting power electronic technology, the HVDC is simpler and cheaper to be realized. So, the problem in the HVDC system is how to control power flow in rectifier converter device effectively. In this research, regulating of firing delay angle is proposed by ANFIS-based controller (ANC) in 12-pulse rectifier. The ANC is applied because computation of the ANC is more effective than Mamdani fuzzy controller computation. The ANC is trained by data learning in off-line mode. In normal operation, the maximum transmitted power by the HVDC is on 1.0 pu with voltage and current DC at 1.0 pu when the firing delay angle at the value of 26▯. Also,the ANC is able to compensate temporary short-circuit fault.

Keywords: ANFIS, controller, firing delay angle, HVDC, rectifier.

Reaction Kinetics of Acetic Acid and Ethanol Esterificationcatalyzed by ZSM-5 Catalyst

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Abstract. Kinetics of esterification of acetic acid and ethanol use solid catalyst ZSM-5 has been studied in this research. Experiments were carried out in a batch reactor, reactant ratio of sulfuric acid and ethanol 1:2, stirring at 1000 rpm, reaction time in 150 minutes and catalyst concentration 6 g/L. Variable varied is reaction temperature of 308oK to 348oK. Reaction kinetics data obtained use Matlab 7.8 software. From the experimental results, the greatest conversion is obtained at temperatures of 348oK is 70.16%. Activation energy obtained from the calculation of 28,566.8 J/mol with reaction kinetics of data are:

kr = 163.5306exp - 28,566.8 RT

The experimental data were compared with data from the calculation of Matlab is used to see the approach of the model used. It can be concluded that the modeling approach used in accordance with the experimental data.

Keywords: acetic acid, ethanol, esterification, reaction kinetics, ZSM-5 catalyst.

Design of The Innovative Clothes Dryer by Using "Triz" Approach

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Abstract. The global warming produces the erratic weather changes. This weather changes can have an impact on some activities of human life. One of them is difficulties to dry the wet clothes. Because of the weather was changed disorderly between rainy and no rain. This paper presents a design of the indoor clothes dryer so that the drying process will be more effective and more efficient in any condition. Teoriya Resheniya Izobreatatelskikh Zadatc (TRIZ) methods is used to improve a design of products based on contradictive attributes that users require. A paper based survey was conducted to identify the attributes of product and design parameter was determined subjectively to design a new clothes dryer. While statistical analysis was conducted to test the hypothesis developed. Results of this study shows that the indoor clothes dryer is effective and efficient in use at 5% significant level which includes six attributes. There are size, affordable price, durable material, type of heater, the capacity of the dryer, and a time drying process.

Keywords: Clothes Dryer, TRIZ, effective, efficient

Is Sea Level Change Caused Huge Coastal Erosion in The Northen Part of West Coast of Bengkulu Province?

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Abstract. Until now, the west coast of the province of Bengkulu is suffered by coastal erosion with speeds up to 2.5 m/yr, experiencing a serious damaged beach in advanced stage. Besides, up to now what the causes of coastal erosion is not known clearly, whether caused by climate change or tectonic factors.This study aims to identify the causes of coastal erosion in Bengkulu comprehensively. The study begins by observing changes in sea level by utilizing satellite altimetry. The period data is processed for 7 years, starting from 2004 to 2011. The result showed that there is a change in sea level on an annual basis, but it not too significant. The rate of sea level changes from 6 point observations using simple modeling (linear trend) is 1.09 to 1.18 mm/y. Furthermore, if we use simple linear model incorporating annual season parameter, the rate of sea level change reach to 1.16 to 1.28 mm/y. From comparison between simple modeling and simple linear model incorporating annual, we can observe that sea level change at the interval is not seen significant difference. We observed that the rate of sea level change is still relatively smaller than the rate of global sea level change. In order to obtain more better and accurate sea level change estimation, it still required the addition of a period of observation data. Need more accurate model so that the model can explain the data of sea level changes in the territorial waters of Bengkulu. However, for instant, it can be concluded that sea level change in coastal region of Bengkulu is not a major cause of coastal erosion.

Keywords: Coastal Erosion, Sea Level Change, Climate, tectonics

A 2D Inversion Modeling Of Diffusion-Convection Radon To Determine The Depth Of The Reservoir In The Way Ratai Geothermal Field

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Abstract. Counted radon measurements have been done in the area of geothermal Way Ratai southern Lampung. Measurements using a Rad7 detector from Durridge Inc. The aim of this study is to determine the fault zone and the depth of the reservoir based on the profile of counted radon on the surface. Radon in soil gas is sucked by electric pump and subjecting it into detection chamber and it's concentration is measured by solid alpha detector. Measurements were taken in 3 times for each measurement point to obtain an accurate value of the radon concentration. When the radon concentration values are obtained, then it made a contour map. Contour peaks connected by a straight line to get the delineation of the fault zone. Sliced line of cross section perpendicular to the fault zone delineation is made for input data modeling. Source of radon is associated as reservoir. The depth of reservoir is obtained by the 2D inverse modeling of Radon diffusion-convection.

Redefining Folded Plate Structure as a Form-resistant Structure

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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.296. 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. 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 as either a building structure or as a non-structural member, such as ceilings. 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.

Keywords: Architecture, Building Structure, Construction, Folded Plate Structure, Form-resistant Structures.

Urban Community Behavioral on The Traffic Light and Implementation of Intelligence Traffic Control System

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Abstract. Behavioral of Urban communities in relation to the traffic light settings, especially in intersections have nearly the same conditions. In some studies explained that, customs of the people for a foul on the timing of traffic lights lit tends to increase. Situation often occurs when the red light is still lit, motorists, especially two-wheeled vehicle has passed, and tend not to care about the existing traffic regulations. This situation especially at peak hour it will cause congestion. Lack of discipline is the main cause of violations in intersections traffic lights. On the other hand, the application of intelligent traffic light control, requiring a high level of discipline of the user traffic. Such controls would make the timing of traffic lights in accordance with the density of vehicles on the road condition goals. If a road junction has a density greater then automatically, the timing of the green light is given a longer portion on the road compared to the other destinations. Intelligent traffic control system is so programmed to accurately provide time to switch the provision of traffic lights and at the same time the camera will capture images of traffic violators and send the results to the police station for further action by giving fines. The study methodology was conducted using a literature review and field research including data collection through questionnaires to drivers of vehicles and so on compared to conditions after the implementation of the System Control Intelligent Traffic Lights. Initially known to cause chaos because there is a change traffic light setting, but after that there will be changes with increasing discipline of the rider. There is an increasing trend compared to the previous discipline. This will be a positive impact in case the application traffic police strictly enforce sanctions for speeding tickets indiscriminately. The Location Research is in Depok as Urban City, near Jakarta.

Keywords: Camera Control, Riders discipline, Traffic Lights Control, Influence on Behavior and Community.

Rock Resistivity Studies as Indicators of Seawater Intrusion in the Coastal Areas Bandar Lampung

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Abstract. In the last decade there has been a growth in population and industry rapidly in the Lampung Bay coastal area. The case causing exploitation of groundwater rising rapidly. This phenomenon can causing negative impact on the quantity and quality of groundwater, including a decrease in groundwater level, greater the fluctuation, the decline in quality of groundwater and seawater intrusion in some areas. Seawater intrusion occurs because the hydrostatic balance between groundwater and seawater in coastal areas disrupted. This study aims to detect and map the seawater intrusion that occurred in coastal areas Bandar Lampung with resistivity method, to determine which areas have been indicated in the intrusion of seawater. With this study, it is known the extent of the area that has been affected by seawater intrusion. Also obtained models that describes patterns of seawater intrusion spread into horizontal and vertical directions based on study of rock resistivity research area.

Keywords: coastal area, groundwater, hydrostatic balance, resistivity, seawater intrusion.

Mapping The Potential Areas Prone Tsunami in Bengkulu City

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Abstract. Bengkulu city is one area in Sumatra Island that has high risk tsunami disaster. For the moment, Bengkulu city has not tsunami hazard map based on a research that is approved by a research institute. The aim of this study is to calculate the level of tsunami hazard in all the districts in Bengkulu city. The level of tsunami risk is calculated based on the height of the sea surface (h), the distance from the shoreline (X), the distance from the nearest river (Y), geomorphology condition (k), beach shield trees (p), and the value of maximum ground acceleration (α) , Altitude above sea level is measured using a GPS that has been calibrated. Measuring the distance from the shoreline performed by using Google Earth maps with scale approach. Condition of coastal geomorphology and beach shield trees are registred in accordance with the facts in the field. The maximum ground acceleration is calculated based on data from historical earthquakes during the last 100 years using Kanai attenuation equation. Result of the study indicates that all the districts in Bengkulu city has a very high risk tsunami. Suprisengly, with a value of $\alpha> 500$ gal if an earthquake occured under the sea, there will be opportunity10 m tsunami height.In addition, if an earthquake strikes under sea water with a value of $\alpha> 800$ gal, the tsunami height will be increased by two times larger. At last scenario, the tsunami up to 30 m can reach Bengkulu city if a fault breaks under sea water with peak ground accelaration of more than 1000 gal.

Keywords: Bengkulu city, Earthquake, Peak Ground Acceleration, Tsunami

K-Means Analysis in Mapping Concept Based on Geographic Information System

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Abstract. Mapping concept is clustering of geographical locations. For example, mapping of vacant land for building construction in an area.The absence of these system make difficulties in identifying and observing vacant land. Mapping concept is based on Geographic Information Systemwhere to cluster sub-area and land mapping used k-means method from clustering technique.In this research, the land mapping wasclustered into 3 clusters (C3) based onquantity category (plenty, mediocre, few) by using occupied land variable and vacant land size variable of each area. Clustering result showed 38 items in cluster 1, 4 items in cluster 2, and 17 items in cluster 3.

Keywords: Clustering, mapping, land, GeographicInformation System, K-Means

Dynamics Of A Re-Parametrization Of Two Dimensional Map

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Abstract. The discussion of two dimensional mapping in this paper is based on a member of a family of system derived from a $\Delta\Delta$-sine Gordon equation introduced by J.M. Tuwankotta in 2005. By replacing the role of integrals and parameter in a system of difference equations, we will generate a new mapping and compare the properties of the new mapping with the original one, i.e. measure preserving property, their symmetries and reversing symmetry. Furthermore, the dynamics of the new mapping is analyzed.

Keywords : Re-parametrization, two dimensional mapping, measure preserving property, posses- sion of symmetries, reversing symmetries

Characterization of Methyl Ester Obtained from Nanochloropsisocculata and Tetraselmischuiiby using In-Situ and Conventional Method

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Abstract. Maximum Fatty Acid Methyl Ester (FAME) yield of Nannochloropsisoculata and Tetraselmischuiiusing variation of catalyst concentration was investigated. Research began with culturing microalgae and then was proceeded with oil extraction to obtain 60 grams of dried microalgae. Three variations of NaOH catalyst concentrations have been applied for each method, they are 1.5, 2.0, and 2.5% of microalgae oil weight in transesterification process. Yield of FAME in each microalgae species from in-situ method was not been determine because of impurities content in the product. In conventional method, yield of FAME was 88.50% with 2% NaOH catalyst concentration on Nannochloropsisoculataand 82.31% with 2% NaOH catalyst concentration onTetraselmischuii. The highest content of the methyl esters isundecanoic acid methyl ester in Nannochloropsisoculata and palmitic acid methyl ester in Tetraselmischuii.

Keywords: FAME, Nannochloropsisoculata, Tetraselmischuii, transesterification, yield.

Effect of Surfactants, Ph and Grafting Polymer on Stability of Bentonite Particles Dispersion in Brine Systems

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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. There are three reasons why bentonite has been selected in this study. Firstly, bentonite has a high tendency to swell when it comes in contact with water. Secondly, it is thermally stable, the same way other silicate-based materials are. Finally, it is an environmentally friendly alternative. Although, the applications of bentonite for underground earth sealing and grouting are not new, its application in the oil industry as in-depth fluid diversion is in its infancy. The aims of the present study is to investigate the stability of bentonite particles in brine system (1% NaCl) at various conditions. It is of major importance to determine aggregation rate and stability of bentonite particles, since particle flocculation and cake formation may occur at sand face during injection and prevent particles propagation into high water channeling zones. The effects of surfactants (cationic/anionic), solution pH and grafted poly(N-isopropylacrylamide-co-acrylic Acid) on bentonite colloids aggregation kinetics and stabilities are investigated. In this study series of stability tests were conducted on original bentonite particles and modified bentonite (surfactants/polymer) particles dispersions. The study revealed that surfactants, pH and polymer grafted bentonite had significant impacts on stability of bentonite particles dispersion. It was observed that anionic surfactant (SDS) has more tendency to stabilize the particles compared to cationic surfactant. Also increasing surfactant concentration increased stability but unstable at higher concentrations 8 mmol/l for SDS and 13.7 mmol/l for DTMB. This was suggested due to reducing repulsion forces between particles by cationic surfactant. The same behavior was also observed in the zeta potential measurements. The aggregation rate decreased with increasing solution pH. It was also observed from the Turbiscan measurements that the stability and sedimentation rate were improved in the following order grafted polymer >SDS> DTMB > origin bentonite in 1 % NaCl solution.

Keywords: Bentonite, grafted polymer, pH, surfactants, Stability

Episodic and Non Episodic Period Peat Land Wildfire: Pm10 Pattern and Pm2.5 Carbonaceous Fraction

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Abstract. The peatland wildfire in Indonesia was periodically occurs even in non-ENSO period thus may pose health risk to the inhabitants each year. During non episodicpeatland 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 peatland 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 peatland 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.

Keywords: biomass burning, organic carbon, elemental carbon, char-EC, soot-EC.

The Effect of Filler Content and Particle Size on The Impact Strength and Water Absorption of Epoxy/Cockle-Shell Powder (Anadoragranosa) Composite

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Abstract.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 occured on the incorporation of 30% (wt.) and 170 mesh of cockle-shell powder. This wassupported by the scanningelectron microscopy (SEM) characterization result. It was also revealed that the water absorption was significantly increased as the particle size of the fillerwas increased.

Keywords:Cockle-shell Powder, Epoxy Resin, Impact Strength, Water Absorption

Making Photodiode Based on Ba0.5Sr0.5TiO3 Thin Film on Type-p Si (100) Substrat with Chemical Solution Deposition (CSD) Method

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Abstract. Ferroelectric thin film has been used in variety of applications for electronic and optical electricity. The nature of a type of electronic ferroelectric dielectric especially of a polarized spontaneosly and internal polarisasi have the ability to change. One of the material could be used in making a thin film is barium strontium titanat (BST) that has very high dielectric as well as the high stroge capacity. BST can be made using simple device, with a cheaper cost and in a relatively short time. BST material has the potensial to replace SiO2 in the Metallic Oxide Semiconductor (MOS). Among the ferroelectric material, Barium Strontium Titanate (BST) is very intersting ferroelectric material because it has a low optical loss , high dielectric constants and charge stoge capacity, so it can be used as a Dynamic Ferroelectric Random Acess Memory (DRAM) with capacity of piezoelectric and piroelectric properties and allows pieroelectric BST used for sensors applications. Instrumentations used on this reserch are Sartonius BL6100 type analitic scale, spin coating, UV-Vis Ocean Optics USB4000 Spectroscopy, VulcanTM-3000 Furnace and Branson 2510 Ultrasonic. And material used is barium asetat [Ba(CH3COO)2, 99%], strontium asetat [Sr(CH3COO)2, 99%], titanium isopropoksida [Ti(C12O4H28), 97.999%], 2-metoksietanol [H3COCH2CH2OH, 99%], etanol 96%, aquades, substrat Si(100) type-p. Thin film preparat being used is type-p Si(100) substrat that cut with glass cutter with size 1 cm2. Next The Substrat washing with used aquades during 30 seconds. The making of Ba0.5Sr0.5Tio3 solution that growthed on the type-p Si(100) substrat surface was done with Chemical Solution Deposition (CSD) method, that mixing of barium asetat, strontium asetat and titanium isopropoksida with used 2-metoksietanol C3H8O2 as solvent. Ba molar faction is 0.5 and Sr is 0.5. Then the solution was mixed by ultrasonic during 90 seconds for produce homogen BST. Next, The BST solution was dripped on the type-p Si (100) substrat and turn with spin coating during 30 seconds with speed 3000 rpm. BST thin film process on type-p Si (100) substrat was done 3 times with the time between process are 30 seconds. Annealing process was done with vulcanTM-3000 furnace that aim to diffused BST solution on the type-p Si (100) substrat physically with given of heat. Annealing Process with temperature 850 oC will produce different BST thin film characterisation in crystal structure, thickness and particle size. BST Annealing process was done on temperature 850 oC during 22 hours with 1.67 ^{o}C/ second temperature increasing speed . Photodiode based on BST on type-p Si(100)

Substrat surface characteristic, on the test with Ketley 2400 I-V meter, show that photo diode is sensitive to light (Dark room : 2 Lux, Light room : 400 Lux). That is a junction p-n with energi thermal as a process annealing with temperatur 850 oC that is thin film is BST type-n dan substrat Si(100) type-p

Keyword: Photo diode, thin film , BST , CSD , I-V.

A Band Notch Rectangular Patch UWB Antenna With Time Domain Analysis

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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 op-erates 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 an-tenna parameters in frequency domain analysis have been investigated to show its capability as an effective radiating element. Furthermore, time domain Gaussian pulse excita-tion analysis in UWB systems is also demonstrated in this paper. As a result, the simulation results demonstrated rea-sonable agreement with the measurement results and good band notched ultra-wideband linear transmission perfor-mance has also been achieved in time domain.

Keywords: Ultra Wide Band (UWB), FR4, Microstrip, Patch Antenna, Frequency Domain, Time Domain, Gaussian Pulse.

Designing Direct Current Electric Circuit for Foster Creative Thinking

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Abstract. This paper aim to produce a design of direct current electric circuit teaching aid for foster creative thinking. The indicator of Creative thinking skill that measured is solving problem with different way. This study is research and development with instructional development model Four-D, but report in this study only until stage design direct current electric circuit. Consider from literature study identified that direct current electric circuit teaching aid from materials that are available in electronic store was needed for foster student's creative thinking. And then, produced a design of direct current electric circuit teaching aid with instruction to foster creative thinking.

Keywords: Teaching Aid, Electric Circuit, Creative thinking

Smart Monitoring Data Centre Base on Mini Single Board Computer BCM 2835

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Abstract. A data center managers must be able to provide excellent service to customers in electricity and internet connection. Electrical and Internet problems must be maintained properly, and its quality must be monitored at any time, in order to carry out preventive and corrective measures in the event of disruption or unconditional incident. This study makes an online system that can monitor electrical quantities, temperature and bandwidth in building data centers that can be accessed by the building manager to then be able to be taken against these conditions. PC single board Broadcom BCM2835 SoC, ARM11767JZF-S 700 MHz processor (Raspberry Pi model B) is a major component used in this study. Raspberry Pi serves as an interface to get the data of electrical quantities, temperature and bandwidth as well as save data. From the results monitoring of 3-phase electrical system at a data center "Unit Pelayan Teknis-Teknologi Informasi dan Komunikasi-Universitas Lampung" (UPT-TIK-UNILA) shows that phase voltage tends to be stable in 200 V to 230 V. The lowest voltage occur when peak load at 11 am to 2 pm, because of the tendency of the use of equipment electricity at that time. For temperatures, the result shows higher temperature in the day at 10 am until 1 pm, because of the influence of the outdoor temperature. While bandwidth usage increase during working hours at 8 am to 4 pm, which indicates the number of users is still focus in daylight.

Keywords: Smart monitoring, Magnitude Electrical, Temperature, Bandwidth, Raspberry Pi, Data Centre

Hydrothermal Carbonization Kinetics of Sugarcane Bagasse Treated by Hot Compressed Water under Variabel Temperature Conditions

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Abstract. Biomass is one of the energy resources that can be derived from all of earth's living matters such as growing plants. Biomass has potential for use as an alternative transportation fuel, a feedstock for chemical products and power generation. It is abundant, renewable and environmentally friendly. Among agricultural wastes, sugarcane bagasse has the potential to be transformed into energy and chemicals. In order to utilize of this biomass effectively, the behavior and mechanism of hydrothermal carbonization of sugarcane bagasse were studied. In this study, we investigate kinetics hydrothermal carbonization of sugarcane bagasse treated with hot compressed water under varied temperature in range 200-300 °C. Experiments were carried out using a batch reactor with a temperature controller. Characterization results showed that the decomposition reaction was influenced by temperature and reaction time. Degradation of hemicellulose 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 are decomposed preferentially and un-reacted lignin part to be diffusion layer. (ii) the hydrolysis and dehydration reaction started at 200ºC and 240ºC respectively and reaction rate increased with increasing temperature.

Application Brain Wave for Wheel Robotic Movement Using Mindflex

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Abstract. Brain is made up of billions of brain cells called neurons, which use electricity to communicate with each other. The combination of millions of neurons sending signals at once produces an enormous amount of electrical activity in the brain, which can be detected using sensitive medical equipment (such as an EEG), measuring electricity levels over areas of the scalp. The combination of electrical activity of the brain is commonly called a brainwave pattern.

The experiments conducted at the beginning of this study use a wheel robotic, which is by only moving the wheel robotic to turn left, right and forward. Mindflex is a kind of device which can transmit the brain wave. The process of learning starts by setting mindflex on the head to read the brain wave. The data from the brain wave are processed in the computer so that therequired value of the wave is transferred to the wheel robotic to move it forward, turn left and right according to the mind's instruction.

The result of training or learning of brain wave was determined by its threshold, which was then repeated 50 times until it obtained 62% accuracy. The software used on microcontroller Arduino was C program language.

Keywords : Wheel Robot, Brain wave

Smart City – Smart Mobility : A Conceptual Framework Of City Development Through Open Data

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Abstract. Sumatra is set as one of the economic corridors in the Masterplan for Acceleration and Expansion of Indonesia's Economic Development Program, and in particular the development of the Sunda Strait National Strategic Region becomes one of the economic activities. Apart from being a center of economic movement, the cities included in the Sunda Strait National Strategic Region also become the center for government, where the interaction between the government and city community is happening intensively. Thus, the development and the construction of cities included in the national strategic area is appropriate to use a "Smart City" approach, which is a modern, integrated and comprehensive. This paper focuses on the analysis of the prospective existences in the smart mobility dimension. Identification of technical requirements needed in the implementation of the infrastructure, data centers, and applications will be done by using open data concept.

Keywords: smart city, smart mobility, open data, MP3EI, KSNSS

A Study on Reactive Power Allocation for Electrical Power Distribution System with Low Voltage Profile

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Abstract. This work proposes a formulation of linear programming-based optimal power flow for electric power distribution systems in rectangular coordinates. Different from many approaches which utilize voltage in phasor coordinate, in this research, a formulation in rectangular coordinate is employed. Reactive power allocation problem in distribution system is taken as case study. A feeder test system is constructed to test feasibility of the proposal. This test system consists of 11 buses and is derived from an actual feeder. Before optimization, one of the buses suffers from a low voltage. After optimization, this situation is corrected by installing a new reactive power device at the respective as suggested by the proposed method. The obtained result is validated using the conventional Newton-Raphson power flow method. Simulation shows the feasibility of the proposed method in a simple test system under heavily loading condition and low voltage profile.

Keywords: distribution system, reactive power allocation, linear programming

Private Finance Initiative (PFI) and Privatisation in the Malaysian Infrastructure Projects: A Theoretical Review

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Abstract. The Private Finance Initiative (PFI) is a way of creating Public-Finance Partnerships (PPPs) by funding public infrastructure projects with private capital, whilst privatisation is defined as the transfer of activities and function of public sectors to the private sector that only applies to the government enterprise and the implementation of new project by public sector. Although the demand of PFI and privatisation are significantly increasing for the better quality of work and value-for money from public sector and private sector, they are facing challenges of restructuring of the national economic and financing. In addition, the insufficient guidelines on how both PFI and privatisation should be dissimilarly implemented plus with limited fund by the public sector and financing problem by the private sector have reduced the services and the efforts of ideally implementing both the PFI and privatisation in the Malaysian infrastructure projects. Hence, this paper aims at reviewing the differences of implementation between PFI and privatisation in the Malaysian infrastructure project. It is expected that the finding of this study will propose proper guidelines of the different implementation between PFI and privatisation construction in better managing PFI and privatisation in the Malaysian construction industry. The findings are in line with National Key Result Areas (NKRA) to achieve the on-time delivery of construction projects, create opportunity of financial and business services where the Malaysian construction industry will positively develop and become one of the best-performance industries via on-time delivery of infrastructure projects.

Keywords: Malaysia, Private Finance Initiative (PFI), Privatisation, Infrastructure Projects.

Vocational High School E-Learning Readiness: A Survey for Industrial Knowledge Transfer

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Abstract. Indonesia requires highly skilled workers to support and sustain high economic growth. However, in recent years youth unemployment remains high. The high unemployment rate is attributed to the lack of skills of vocational school graduates. The skills of these graduates do not match the technologies used in the industry. Astra Manufacturing Polytechnic (Polman Astra) aims to remedy the issue by initiating a blended learning program to transfer industrial knowledge for vocational school (SMK) teachers in Greater Jakarta. A descriptive study was conducted to SMKs in North Jakarta to understand school readiness level to implement the program. Furthermore, the research also analyzes the teacher perception of industrial knowledge. Following the questionnaire results, the study reveals that the schools surveyed are generally ready to implement e-learning but require further training. Further results indicate that exposing teachers to industrial knowledge is crucial in order to keep up with the technologies of the industry.

Keywords: highly skilled workers, vocational education, industrial knowledge, blended learning, e-learning readiness.

A 2D Inversion Modeling of Diffusion-Convection Radon to Determine the Depth of the Reservoir In the Way Ratai Geothermal Field

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Abstract. Counted radon measurements have been done in the area of geothermal Way Ratai southern Lampung. Measurements using a Rad7 detector from Durridge Inc. The aim of this study is to determine the fault zone and the depth of the reservoir based on the profile of counted radon on the surface. Radon in soil gas is sucked by electric pump and subjecting it into detection chamber and it's concentration is measured by solid alpha detector. Measurements were taken in 3 times for each measurement point to obtain an accurate value of the radon concentration. When the radon concentration values are obtained, then it made a contour map. Contour peaks connected by a straight line to get the delineation of the fault zone. Sliced line of cross section perpendicular to the fault zone delineation is made for input data modeling. Source of radon is associated as reservoir. The depth of reservoir is obtained by the 2D inverse modeling of Radon diffusion-convection.

Keywords: radon measurement, delineation, fault zone, diffusion, convection

Developing Features Of Water Faucet By Using User Centered Design Approach

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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.

Keywords: Easy to use, ergonomic, unique, user-centered design, water faucet.

Study on Machinability Effect of Surface Roughness in Milling Kenaf Fiber Reinforced Plastic Composite (Unidirectional) Using Response Surface Methodology (RSM)

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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 modeling equation which has more reliable in expressing the optimization. Thus, the objective of this research is obtaining an optimum setting of milling parameters and modeling 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 fiber reinforced plastic composite.

Keywords: Kenaf composite, milling. Surface roughness, full factorial design of experiments, RSM.

Friction and Wear of Carbon Coated Stainless Steel under Palm Methyl Ester Contained Diesel Oil

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Abstract. The use of palm methyl ester (PME) mixed with bio-diesel fuel is increasing rapidly. On the other hand, amorphous carbon coatings have also been applied to mechanical components such as those in fuel injection system in order to improve their friction and wear performances. In this research, a ball on disk tribometer was used to investigate the effect of PME on friction and wear of two types of amorphous carbon coatings deposited on stainless steel balls. The tests were conducted at severe loading conditions inside various concentration of PME-contained diesel oil. The results show that for both type of amorphous carbon coatings used, there was significant reduction of wear with the increase of PME content inside the oil. When the tests were conducted in 100% PME oil, the wear reduction were 50% for a-C coating and 30% for a-C:H coating, compared to those conducted in 0% PME diesel oil. Although clear difference in friction coefficients could not be seen, the results indicated that PME contribute to reduction of wear of the ball, drastically. These results suggested that PME are beneficial in reducing the wear of amorphous carbon coated stainless steel material in severe friction condition.

Keywords: Amorphous carbon coating, Palm Methyl Ester, Friction, Wear

Performance of Carbide Tool in High Speed Turning of TI-6AL-4V ELI under Conventional Coolant and Minimal Quantity Lubrication

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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.

Keywords: High speed Turning; Ti-6Al-4V ELI; Minimal Quantity Lubrication (MQL); conventional coolant; and uncoated carbide

Modeling and Simulation of Solar Array Emulator Utilizing Buck Converter with Adaptive Control base on Neural Network

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Abstract. The increasing of world demand for energy resources is a crucial challenge that makes renewable energy sources has gained importance. Solar photovoltaic system is recognized to be at the forefront in renewable energy generation. It can produce direct current electricity when exposed to direct sunlight. Solar photovoltaic are solid state devices that convert the energy of sunlight directly into electrical energy. Solar photovoltaic have several advantages such as pollution-free, low maintenance costs and low operating costs. Their sources of energy, which is derived from solar energy, are also widely available and it is free. Photovoltaic technology is a technology for generating electrical power by converting solar radiation into direct current electricity using semiconductors who have photovoltaic effect. The main component of a PV system is the solar cell, which functions to convert solar energy into direct current electrical energy. In application, several solar cells connected in series and parallel to form a solar module, and several solar modules can be connected in series or parallel to form a Solar Array in order to increase the output power of a solar panel system. When exposed to sunlight, the solar panels will generate the direct current electricity, which is ready to supply power to the load. Because of its energy conversion systems using Photovoltaic technology, the power plant of this type is also called Solar Photovoltaic Power Plant. Actually, Solar PV Power Plant is an appropriate solution to overcome the energy crisis. The photovoltaic system is recognized to be at the forefront in renewable energy generation. Main constraint for the growth of the Solar PV system is the efficiency is relatively low. Therefore, further research towards the efforts to improve the efficiency of photovoltaic system is needed. Many factors that affect the performance of the Solar PV Array system should be investigated. Therefore, Solar Array Emulator is needed to find out how much these factors affect the performance of the solar photovoltaic system. In this paper, a modeling and simulation of Solar Array Emulator utilizing Buck Converter under MATLAB-Simulink software is carry out. This paper presents the modeling and simulation of Solar Array Emulator utilizing Buck Converter with Neural Network Adaptive control. The simulation activity carried out using MATLAB/Simulink software. The Solar Array emulator is realized by controlling buck converter using Adaptive control base on Neural Network Controller with reference from Solar Array model. The Solar Array model was derived from the characteristic equation Solar Cell. The characteristics of Solar Array Emulator model was tested by varying the value of load and considering the effect of irradiance variation. The output characteristics of Solar Array Emulator model is verified by comparing to the characteristics of the

actual PV module. The Sunmodule SW50 poly RMA from SolarWord is chosen as a reference for this simulation. The proposed Solar Array Emulator was found to be valid and accurate for any irradiance variations.

Line Balancing by combining given Work Cell and single tasks, a Small Scale Industry case

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Abstract. A clothing small scale industry produced a kind of trousers that needs operation order of 25 tasks, is lamented that the productivity is not as expected. Through a tracing of production data, the series of operations and the processing time of each operation are determined. Since certain tasks in production floor are using the same machines that could be declared as defined work cells, there are unnecessary waiting time on several point of operations. The company is suggested to combine previous defined work cells with new others by common work cell line balancing. This conditional work cell balancing could increase the efficiency as the man cost and waiting time are reduced. It shows that line balancing idea is still the relevant way to improve such case although other recommendation related with machine layout should still be initiated for better time and distance of material or product transportation in the shop.

Keywords: line balancing, productivity, work cell.

Design of Boiler Controller with LAN Based Data Logger

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Abstract. The steam generator or boiler is an integral component of a steam engine when considered as a prime mover. However it needs be treated separately, as to some extent a variety of generator types can be combined with a variety of engine units. A boiler incorporates a firebox or furnace in order to burn the fuel and generate heat. The generated heat is transferred to water to make steam, the process of boiling. This produces saturated steam at a rate which can vary according to the pressure above the boiling water. The higher the furnace temperature, the faster the steam production. The saturated steam thus produced can then either be used immediately to produce power via a turbine and alternator, or else may be further superheated to a higher temperature; this notably reduces suspended water content making a given volume of steam produce more work and creates a greater temperature gradient, which helps reduce the potential to form condensation. Any remaining heat in the combustion gases can then either be evacuated or made to pass through an economizer, the role of which is to warm the feed water before it reaches the boiler. This paper aims to improve the conventional boiler system into a remote access using web data logger and PLC. The proposed design is expected the process monitoring could be done periodically without any change to the previous operating system. The focus of this research is to design a system of monitoring, control and data storage operation of an industrial boiler, especially on the critical parameters that could potentially cause an accident. Some designing have been done, such as: wiring and control panel connection, PLC programming, Data Logger programming and network configuration. Then, several process associated with burning procedure are water level, pressure steam, temperature and burner combustion monitored and controlled.

SECTION 2 : AGRICULTURE AND FOOD SCIENCE

Bacterial Enzymes with Special Characteristics for Biotechnological Applications

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Abstract. Bacterial enzymes have been extensively studied for their isolation and characterization of their specific properties. The enzymes can be utilized as bio-catalysts to function eco-friendly and economically reactions in bio-processes, compared with the use of chemical catalysts. The special characteristics of enzymes having thermotolerance, tolerance to a varied range of pH, and stability under high salt condition and in organic solvents are isolated and exploited for their industrial applications. Such enzymes have been characterized and have proven their utility in bio-industries such as food, leather, textiles, animal feed, and laundry detergent and in bio-conversion and bio-remediation. Here regio- and enantio- selective bioconversion of aromatic and aliphatic amines by bacterial enzymes and molecular structural analysis of halotolerant mechanism of bacterial hydrolytic enzymes will be introduced.

Performance of Family-Size Biogas-Fueled Generator Set using Biogas Produced from Palm Oil Mill Wastes

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Abstract. Biogas is a renewable fuel capable to substitute a variety of other fuels such as firewood, kerosene, LPG, and gasoline. The purpose of this study was to determine the performance of using biogas to generate household electricity through a generator set engine. The study was conducted from October 2014 until February 2015 in the Lab. Agroindustrial Waste Treatment, Department of Agricultural Technology, Faculty of Agriculture, the University of Lampung. Research was conducted by testing a biogas-fueled generator set with a capacity of 750 W. The biogas was produced from two phases digester system consisted of a wet digester (phase I) and 4 dry anaerobic digesters (phase II). Wet digester system has a capacity of 5 m3 with substrate occupation of around 4 m^3 of palm oil mill effluent (POME) at a feeding rate of 150 L/day. Dry digester system is a batch mode having a capacity of 220 L each. Dry digester used 20 kg of pressed empty fruit bunches (EFB) of oil palm as substrate with inoculum of wet digester effluent. POME and pressed EFB was taken from Bekri palm oil mill of PTPN VII. Biogas produced from the digester system is passed through a flowmeter, then to a biofilter scrubber, and to a storage pouch for generator set testing. Biogas composition was analyzed using a gas chromatograph (Shimadzu GC2014) with TCD detector and zinc carbon column. H2S levels before and after passing through the biofilter is measured using a H2S detector Gastech. Genset testing was performed by varying the load from 100 to 700 W. The results showed that both digester systems are capable of producing biogas at a total of 2.02 m^3/day consisting of 1.91 m^3/day of wet digester and 0.11 m^3/day of dry digester. Biogas containing methane of 56.48% (vol). Biofilter scrubber effectively reduced H2S levels by 96.94%, from 422.02 ppm to 12.91 ppm. Biogas generator showed a good performance during the test, which reached a total of 210 minutes (not continuous). The results also showed that the magnitude of the load affects the specific fuel consumption and thermal efficiency. Specific fuel consumption decreases with the size of the load. Thermal efficiency, on the contrary, increased with the load. At a load of 600 W, the specific consumption of biogas was 0.73 liters of biogas per watt per hour with an effective thermal efficiency reaches 30%.

Keywords: Biogas, POME, pressed-EFB, biogas-fueled genset, electricity

Study on Chemical Soil Properties and Plant Physiology of Aloe Vera L. on Nutrient Stress Condition in Sandy Soil

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Abstract. The research aims to determine the chemical properties of sandysoil and physiological properties of the aloe vera plant in nutrient stress condition. Research has been conducted on sandy soil Kretek Depok subdistrict, Bantul, Yogyakarta. Sandy soil are properties, temperature 31-40°C, 100% light intensity, humidity of 64-75%, rainfall is 1672.5 mm.year-1 . Research was conducted in a Randomize Completely Block Design arranged in factorial experiment with three replication. The first factor were manure dosage (D) consisted of three level, i.e 10 ton.ha-1 (D1); 20 ton.ha-1 (D2) 30 ton.ha-1 (D3). The second factor were dosage of urea (N) consisted of five dosage levels i.e : 0 kg.ha-1 (N0); 150 kg. ha-1 (N1); 300 kg. ha-1 (N2); 450 kg.ha-1 (N3) and 600 kg.ha-1 (N4), comprised 15 x 3 units of combination treatments. Observation variable of soil chemical properties were: the concentration of C organic, organic matter, total N, P, K, Ca and the CEC. The variable of plant physiology properties were: leaf area, chlorophyll content, stomata density, the rate of photosynthesis, respiration, transpiration and proline concentration. Analysis of variance was used and continued with Duncan's Multiple Range Test (DMRT) at the 5% significance level on test the correlation coefficient were calculated. There were no interaction between the treatment on the soil chemical properties,but on the plant physiology. There is no correlation between chemical soil and plant physiology properties but there is a correlation among plant physiology properties.

Keywords: Aloe vera, sandy soil, nutrient stress, physiological properties.

A Preliminary Assessment for The Presence of a Crushing Plant in Lampung Timur Regency

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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.

Keywords: basalt, crusher, IRR, NPV, Lampung Timur,

Food Technopreneur: A Design of New Curriculum in Indonesia's Higher Education

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Abstract. This article describes the curriculum design of a new undergraduate degree program in Food Technology at the Prasetiya Mulya Business School, BSD-Tangerang. The main objective of this undergraduate program is to address the country's need for producing qualified and skilful food technology-trained engineers with entrepreneurial skills. Therefore, one of the program's educational objectives is to build tomorrow's technopreneur leaders. The needs of the students, industries and other stakeholders of this program will also be highlighted in the development of the program educational objectives and program outcomes. Data and analysis of the market survey conducted from both the industry and student perspective will be presented. The curriculum structure of the program to accomplish the program outcomes will also be discussed in this article.

Keywords: Food technology, Food technopreneur, Higher education curriculum, Food industry

Establishing Working Relationship of Food Supplier as Part Ofeffectiveness Food Safety Assessment: Case Study in Indonesia Global Chain Restaurants

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Abstract. Purchasing raw foods materials that are used to make our product must be carefully controlled. Selecting and evaluating the right foods supplier today has become much more critical and complex. Involving process of selecting the right supplier can help many food industries and restaurants meet or exceed regulatory standards, drive customer demand and build a strong brand reputation of quality products. Quality and safety for ingredients, products and packaging are mandatory requirement for every food business, so choosing a good supplier is a critical business decision. Consequently, supply chain team has needed to identify choosing the right supplier, as well as several best practices in the food industry or restaurant. Establishing close working relationships with our foods supplier and provide them high standards also providing feedback as to their performance would be part of effective supplier programs in food safety assessment. Some criteria that should be provide by our food supplier were considered as approved supplier such as purchasing specification, quality system compliance, Regulatory compliance and certificate of analysis. The study found that trust and communication area key element in establishing strong working relationships with foods supplier. Working relationships with foods suppliers have come to be viewed as a competitive advantage for Food Industries and Restaurant who looking for long-term economic success. Trusted food suppliers were described as communicating effectively and demonstrating a willingness to work collaboratively. Foods suppliers who communicate directly and clearly are become more effective in implementation of Food Safety assessment.

Keywords: Foods supplier, Food Safety, Purchasing specification, Quality system compliance and certificate of analysis.

The Influence of Magnetic Field on the Growth of Tomato (Lycopersicum esculentum) Infected with Fusarium Oxysporum

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Abstract. Previous research suggests that magnetic fields can enhance seedling vigor, growth, and the production of tomato plants. This study examines the influence of magnetic field on the growth of tomato infected by Fusarium oxysporum, fungal pathogen that causes fusarium wilt in tomatoes. This study factorial arranged in a stripe split plot design. Factors tested consists of long exposure to the magnetic field, M (control; 7'48 "; II'42" and 15'36 "), how to infect fusarium, F (through soaking the seed and by infecting fusarium through the stem at the age 28 days after sowing, hss), and soaking the seeds, S (soaking and without soaking for 15 minutes before magnetic field treatment). Each unit of experiment was repeated 3 times. Parameters measured were percentage of germination, growth rate based on plant height, fresh weight, and dry weight. Observations were made every week for 35 days. Data were analyzed of variance followed by the least significant difference (LSD) test at α = 1 and 5%. The study results showed that the interaction between the magnetic field and fusarium (MxF), fusarium and soaking (FxS), and the magnetic field, fusarium, and soaking (MxFxS) did not produce a different response on all parameters measured. Differences in response to the treatments derived from the treatment of magnetic field (M), Fusarium (F), and the interaction of the magnetic field treatment x soaking (MXS). Treatment magnetic field (M) he interaction of magnetic fields and soaking (MxS) significantly effect on all parameters measured at each measurement. The treatment of Fusarium (F) significantly effect on germination percentage, fresh weight at 7 hss and dry weight at 28 HSS.

Keywords: magnetic field, fusarium, growth, fresh weight, dry weight

SECTION 3 : MEDICAL AND BIOMEDICS

A Begin of Robot Supported Human Programming

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Abstract. Robot was created to help human in rapid manufacturing, precision work, dangerous activities, rehabilitation and medical assistance. In the last few years, humanoid robots show very advanced ability. They are able to mimic human emotion and even become sleeping partner. The advantages of robot compare to human are abilities to store and search data, use sensors for specific application, and use high level mathematical thinking to solve problem. Combination of robot and human abilities is a part of human programming and will bring human to have better life. Human is a time dependent DNA coded bioenergy symphony. They develop according to time, rule based coded in the DNA and environment influenced bioenergy symphony. As a body system, human has sensing system, processing system and actuating system. The sensing system consists of 4 sense organs and integumentary organs. The data received by sensing system is sent to processing system which is brain via nerve system. Brain will store and process the data and send result to other organs in the body as a response of stimulation given. The output can be a voice, movement or emotion signal, which is executed by human skeletal and muscular system. The stimulation given is influenced by rule based stored in DNA as well as bioenergy from environment. In order to work properly these systems are supported by circulatory system, respiration system, digestive system, urinary system, lymphatic system and endocrine system. Human development is grouped into 8 stages which is infant (0-1 years old), toddler (1-3), small child(3-6), child (6-12), adolescence (12-20), young adulthood(20-40), middle adulthood(40-60) and late adulthood (above 60 years old). There are 3 development domains for each stages which are physical domain, cognitive domain and social-emotional domain. The development domains are interrelated and can be stimulated through physical, education and environmental interventions. These interventions are part of human programming. Human programming consists of three parts which are development domain assessment, intervention formulation and intervention management. In order to formulate intervention for specific target, the human data such as human DNA, brain data, body health information and bioenergy symphony characteristics as well as data base of intervention programs are required. This can be done with support of automation system or robot which has capability to gather human data, formulate intervention, communicate with human, as well as conduct intervention if required. In this talk, a programming method and result for toddler is presented. A smart doll is used as a smart assistant to assess toddler development abilities and conduct some interventions. The intervention data and processing program are managed by online data centre called OSCA Tool. The system has been tested in 34 children under 5 years old including six sub developmental domains: gross motor, fine motor, cognitive, language, self-help and social interaction. Test result

shows that the effectiveness of the system to achieve the developmental target is more than 83% with 95 % system reliability. This result shows that the system is very promising to help human to achieve life target. This is however only "a begin of human programming" for better future mankind and universe sustainability.

Red Blood Cell Profile and Plasma Metal Ion Level of Biodegradable Metal Implant in Mice Animal Model

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Abstract. Biocompatibility of the medical device is important. It can be determined by red blood cell (RBC) profile and metal ion level examination. The purpose of this study was to assess the biocompatibility of biodegradable metal implant through RBC profile and metal ion level. Forty eight male DDY mice were divided into four groups according to the materials: iron wire (Fe), magnesium rod (Mg), stainless steel surgical wire (SS316L) and sham (C). Implants were attached onto the right femoral bone. The result showed there were no significant differences in each RBC profile parameter. Blood plasma metal ion level, a significant increase of iron ion level showed by Fe implant group at day 10, while Mg ion level in all group did not show any significant different at all observation day. As a conclusion, metal implants cause increased levels of iron ions in the blood with no adverse effect on RBC profile.

Keywords : biomaterial, biodegradable metals, blood profile, plasma metals ion, mice.

The Study of Relationship between Physical Fitness and Health Profile to Academic Achievement

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Abstract. A benchmark of success in education is the achievement of maximum learning. The learning achievement is influenced by physiological and psychological aspect. Physiologically physical condition of a person can be seen from the level of fitness. Physical fitness is not only beneficial to health but also has proven positive effect on learning achievement. This study aims to determine the relationship of fitness and health profile and academic achievement. Student participant consisted of 1108 TPB ITB students (695 first semester and 413 second semester) aged 18 years old. Physical fitness tests   use to   2.4 km run-test, to assess body mass index (BMI) use to BMI Calculator, to assess health profile use to questionnaire of National Wellness Institute, academic achievement scores are taken from the end of the semester GPA. The first semester there was a drop groups of female students do not get college GPA after sports exercise, the average GPA of 3:33, became 3:31. In the group male there is a decrease in the GPA after not getting sports exercise, ie an average of 3:31, became 3:28, In the second half of the women's group there was an increase GPA after obtaining sports exercise, from an average of 3:05 became 3:11. In the men's group there was an increase GPA after receiving sports exercise, namely from an average of 3:11 became 3:17. The main finding in this study is that fitness and health profile simultaneously positive effect on student achievement TPB ITB, both in first semester and second semester. Students who have a profile of fitness and good health are more likely to have better learning achievement, regardless of the semester where they get to sports exercise.

Keywords: Fitness, Health Profile, Academic Achievement

The Relationship Between Oteoporosis and Physical Activity, Body Mass Index, Leg Muscle Strength, and Age Groups 40-50, 51-60, 61-70 Years.

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Abstract. This study aimed to determine the correlation between osteoporosis, physical activity, body mass index (BMI), leg muscle strength, and age. The subjects of the study were 113 sample divide into two groups, walking or jogging group and control. The calcaneus bone mineral density (BMD) was measured by ultrasound bone densitometer, physical activity was measured by short IPAQ questionnaire, BMI used the common measurement of height and weight that were subsequently formulated with BMI calculator, and leg strength was quantified with leg dynamometer.

Used SPSS version of 17 with the significance level of 0.05 to determine the relationship between variables of correlation test and the product of moment Pearson. Walking or jogging group has higher BMD than control for both men and women at age group 60-71 years. Leg strength was associated with higher BMD in bivariate model. Physical activity is one of the important factors for maintaining bone density, where the walking/jogging group has the lower incidence of osteoporosis compared to the inactive group. The strength of the legs may be used as an early predictor of a person's bone density levels.

Keywords: Osteoporosis, Physical Activity, Body Mass Index, Leg Muscle Strength.

Hepatitis C Virus Non-Structural (NS) 5B Sequences from Indonesia

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Abstract. Hepatitis C virus (HCV) is a major agent causing liver cirrhosis and hepatocellular carcinoma worldwide. This study aimed to conduct molecular analysis of NS5B sequences of HCV isolates from Indonesia. In total, 360 HCV NS5B sequences from Indonesia were analyzed. Subtype 1a, 1b, 1c, 2a, 2b, 2e, 2f, 3a, 3b, 3k, 4a, 6g, and 6n were observed in 41.9% (151/360), 21.4% (77/360), 11.7% (42/360), 6.4% (23/360), 0.3% (1/360), 2.8% (10/360), 0.3% (1/360), 3.6% (13/360), 0.3% (1/360), 9.2% (33/360), 1.7% (6/360), 0.3% (1/360), and 0.3% (1/360) of HCV isolates from Indonesia, respectively. Several minor mutations related to resistance toward non-nucleoside inhibitors were observed (316N [6.6%; 21/319], 421V [54.5%; 6/11], 445F [63.3%; 7/11], 482L [66.7%; 4/6], 494A [50.0%; 3/6], and 556G [50.0%; 3/6]). The frequencies of 421V, 445F, 482L, 494A, and 556G variants were higher than those in HCV sequences deposited in the Los Alamos HCV database. The results of this study would enrich data of molecular epidemiology and genetics of HCV in Indonesia, which is useful for further effort to develop therapeutic strategies against the virus.

Keywords: HCV, NS5B, mutation, Indonesia

Heart Sound Classification Using Hidden Markov Model

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Abstract. Cardiovascular disease (CVD) is among the leading life threatening ailments [1] [2] .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 electrocardiographic 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.

Keywords : Heart Sound, HMM, MFCC,Heart Murmurs.

Survival Rate, Body Weight, Testicular Morphology and Spermatozoa Viability Post-Chemical Castration by Iron (III) Chloride Hexahydrate Injected in Mice

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Abstract. Chemical castration is a method that can be done easily without surgical intervention in animals. This study was utilized iron (III) chloride hexahydrate (FeCl3.6H2O) in aquabidest solution for chemical castration in mice. Twenty seven adult male mice were divided into 5 groups: FeCl3 20 % (n = 6), FeCl3 10 % (n = 6), FeCl3 5.0 % (n = 6), FeCl3 2.5 % (n = 6) and control NaCl 0.9 % (n = 3). A 0.2 mL of NaCl 0.9 % and FeCl3 various concentrations was injected intra-testicular on each testicle of mice. Survival rate post-castration with LD50 values was obtained at the concentrations between 2.5-5.0 % of FeCl3 groups and 100 % mice survived on the control NaCl 0.9 % group. The testicle organ showed decreasing in size and the concentration of spermatozoa was decreasing followed by increasing concentration of FeCl3 solution after 7 days post-injection compared to controls.

Keywords : chemical castration, iron (III) chloride hexahydrate solution, survival rate, testicle, mice.

Histopathology Study on Biocompatilibility Assessment of Iron-based Biodegradable Metal Implant in Mice

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Abstract.The important aspect of biodegradable metal medical implant is its tissue or body biocompatibility. It can be assessed by histopathology study to observe the tissue reaction. The aim of this study was to assess the biocompatibility of biodegradable metal implant by mean of histopathology study. Four groups of adult male DDY mice were divided into: iron wire (Fe), magnesium rod (Mg), stainless steel surgical wire (SS316L) and sham (C) with forty eight total mice used. Implants were inserted onto the right femoral bone on latero-medial region. The result showed acute inflamation at observation day 1 with no metal product accumulation found. At day 30, foreign body response are found in the implant site of Fe and SS316L groups. Metal products found in a small number at the tissue of Fe group. It can be concluded that different metal implants cause different limited inflammatory reaction and local toxic effect.

Keywords : biomaterials, biodegradable implant, biocompatibility, histopathology, mice.

Cardiac Flow Volume Evaluation of Local Garut Sheep (Ovis ovaries) by Motion Mode Echocardiography Imaging

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Abstract. Local Garut sheep is inherited genetic from Indonesian and very potensial for developof cardiac disease animlas models. This study was aimed to determine cardiac flow volume of Local Garut Sheep through Motion mode echocardiography imaging. five females 2-4 years old of Local Garut sheeps with average body weight 26.4 kg±5.6 were used in study. Echocardiography examination was performed in right parasternal short axis view (RPS SAx) on motion mode (M-mode) using 3.5-5 MHZ. The result showed that the average of end diastole volume (EDV) is 61.83±22.03, end systole volume (ESV) is 21.68±10.80, stroke volume (SV) is 40.13±24.35 and cardiac output (CO) is 5.86±3.74. The value of parameters were larger than the normal values of pedigree sheep. It ca concluded that the average of end diastole volume (EDV), end systole volume (ESV), stroke volume (SV) and cardiac output (CO) of Local Garut Sheep were larger than the normal values of pedigree sheep.

Keywords: cardiac flow volume, Local Garut Sheep, Motion mode echocardiography, cardiac diseases model.

Electrospun-based Fibres Scaffolds for Cardiovascular Engineering Applications: A Review

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Abstract. Heart failure is a major cause of mortality and morbidity occurring in human population all over the world. Heart transplantation following cardiovascular failure is difficult to achieve due to limited availability of organ donor supply. Tissue engineering (TE) of complete heart and artificial blood vessel remains a dream. This research field provides opportunity to fabricate bioactive scaffold supporting the function of defective tissue or organ, through the development of bio-composite tissue construct. The construct that match the chemical, mechanical, biological properties and extracellular matrix morphology of native tissue could be suitable for supporting cardiovascular system after the failure. This study aims to report current development and future potential on using electrospun-based fibers scaffold. The challenge and opportunity on developing and using electrospun bio-composite scaffolds will also highlight.

Keywords: Electrospun fibres, Tissue engineering, Cardiovascular, Scaffolds

The Morphological Study of Filamentous Anchoring System of Myofibrils to Plasma Membrane in Skeletal Muscle

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Abstract. Proper organization of cytoskeleton filamentous structures is critical for establishing the internal architecture of muscle fibers, as well as for maintaining the mechanical integration and stability of the myofibrils and the plasma membrane (sarcolemma). The three major types of filamentous structures in the cytoskeleton are actin filaments, microtubules and intermediate filaments. This study was to uncover the precise spatial relationships of the components of the anchoring structures that connect the sarcolemma to the peripheral myofibrils or intermyofibrils. By comprehensive understanding of the muscular membrane skeleton, the complete picture of how it reinforces the plasma membrane against mechanical stress and how its defects cause the fragility of the membrane will be able elucidated. We examined these subsarcolemmal cytoskeletal components in diaphragm of adult wildtype and mdx (model animal of muscular dystrophy) mice by transmission electron microscopy (TEM). TEM revealed that the transverse and longitudinal anchoring structures along with the subsarcolemmal densities and elongated thin filaments in the subsarcolemmal space might represent the ultrastructural components of the costamere. Actin and intermediate filaments show their presence and integrity as components of the anchoring structures. We also reported a lack of filamentous anchoring structures in mdx mice. These data suggest a morphological model of anchoring system in skeletal. Further study of mdx mice may provide new insights into cytoskeleton organization in skeletal muscle fibers and may contribute to a more comprehensive understanding of how defects cause membrane fragility and muscle wasting.

Keywords: anchoring system, sarcolemma, subsarcolemmal space, cytoskeleton, actin filament, intermediate filament, transmission electron microscopy

Distinct Transduction Profiles in the CNS Resulting from Direct Cortical, Intrathecal or Intravenous Injection of AAV9 Mutant Ataxin1 Injection by DC Resulting in Worsening of Mice Motor Coordination, Purkinje Cell Morphology Defect and Expression of Polyq Aggregates

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Abstract. Using single-stranded adeno-associated virus serotype 9 (ssAAV9) vectors containing the neuron-specific synapsin-I promoter, we examined whether different administration routes (direct cerebellar cortical (DC), intrathecal (IT) and intravenous (IV) injections) could elicit specific transduction profiles in the CNS. The DC injection route robustly and exclusively transduced the whole cerebellum, whereas the IT injection route primarily transduced the cerebellar lobules 9 and 10 close to the injection site and the spinal cord. An IV injection in neonatal mice weakly and homogenously transduced broad CNS areas. In the cerebellar cortex, the DC and IT injection routes transduced all neuron types, whereas the IV injection route primarily transduced Purkinje cells. To verify the usefulness of this method, we generated a mouse model of spinocerebellar ataxia type 1 (SCA1). Mice that received a DC injection of the ssAAV9 vector expressing mutant ATXN1, a protein responsible for SCA1, showed the intranuclear aggregation of mutant ATXN1 in Purkinje cells, significant decrease of calbindin expression, significant atrophy of the Purkinje cell dendrites and progressive motor deficits, which are characteristics of SCA1. Thus, ssAAV9-mediated transduction areas, levels and cell types change depending on the route of injection. Moreover, this approach can be used for the generation of different mouse models of CNS/neurodegenerative diseases.

SECTION 4 : LIFE AND APPLIED SCIENCES

Some Examples of Designing Integrated Heterogeneous Catalyst System

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Abstract. The design and synthesis of particulate materials for new catalyst systems with novel properties remain a big challenge today. Here an attempt has been made to synthesize particulate materials for several heterogeneous catalytic systems, which contain examples from our recent research projects in this area. The particulate catalysts have been designed for single centre catalyst, phase-boundary catalyst, bifunctional catalyst, photocatalyst and chiral catalyst. In our current research, the synthesis of well-aligned titanium dioxide catalyst with very high length to the diameter ratio was also demonstrated for the first time by sol-gel method under magnetic field with surfactant as structure aligning agent.

Keywords : Particulate materials; Heterogeneous catalytic system; Synthesis of titanium dioxide under magnetic field; Liquid-gas boundary catalyst; Bifunctional catalyst;

High Performance Computing and Communication Models for Solving the Complex Interdisciplinary Problems on DPCS

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Abstract. The paper presents some advance high performance (HPC) and parallel computing (PC) methodologies for solving a large sparse complex problem involving the integrated difference research areas. Around 8 interdisciplinary problems will solve accurately on multiple computers communicating over the local area network. The mathematical modeling and a large sparse simulation of the interdisciplinary effort involving the area of science, engineering, biomedical, nanotechnology, software engineering, agriculture, image processing and urban planning. The specific methodologies of PC software under consideration are PVM, MPI, LUNA, MDC, OpenMP, CUDA and LINDA integrated with COMSOL and C++/C. There are different communication models of parallel program, thus some definition of parallel processing, distributed processing and memory types are explained for understanding the main contribution of this paper. The matching between the methodology of PC and the large sparse application are based on the domain of solution, dimension of the targeted area, computational and communication pattern, architecture of distributed parallel computing systems (DPCS), the structure of computational complexity and communication cost. The originality of this paper is to obtain the complex numerical model dealing with a large scale partial differential equation (PDE), discretization of finite difference (FDM) or finite element (FEM) methods, numerical simulation, high performance simulation and performance measurement. The simulation of PDE will perform by sequential and parallel algorithms to visual the complex model in high resolution quality. In the context of a mathematical model, various independent and dependent parameters are identified to present the complex and real manipulated and changed. As an impact, some chemical or mechanical properties can be predicted based on the observation of parameter changes. The methodologies of parallel programs are based on the client-server model, slave-master model and fragmented model. HPC of communication model for solving the interdisciplinary problems above will be analyzed using a flow of algorithm, numerical analysis and the comparison of parallel performance evaluations. As a conclusion, the integrated of HPC, communication model, PC software, performance and numerical analysis are important approaches to fulfill the matching requirement and optimize the solution of complex interdisciplinary problems.

Keywords : High Performance Computing, Communication Models, Interdisciplinary Problems, Mathematical Modeling and Numerical Simulation.

Mitigation of N2O and CH4 Emissions from Corn Field using Urea Granulated with Nitrification Inhibitors and Zeolite

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Abstract. Agriculture accounted considerably to the greenhouse gases emission such as N2O and CH4. The aim of study is assessing reduction of N2O and CH4 emissions from corn field fertilized with urea granulated nitrification inhibitor namely dicyandiamide (DCD) and neem (N) and zeolite as slow release media. The results show that nitrification inhibitors and zeolite is reducing both N2O and CH4 emissions from corn field fertilized. We observed that the application of urea (U) with dicyandiamide (UD), U with zeolite (UZ), U with neem (UN), U with zeolite+neem (UZN), and U with zeolite+ DCD decreased the N2O emissions by 86.73%, 59.65%, 16.38%, 66.85%, and 81.94%, respectively. Therefore, larger reduction of N2O emission in corn field was applied by UD. However, applying UD in field seems enhance CH4 emission 0.95 kg CH4-C ha-1 season-1 compared to other treatments. The observations should be further being tested to an integrated abatement of agricultural nitrogen as well as carbon losses.

Keywords: Corn field, Emission of N2O and CH4, Mitigation, Nitrification inhibitor

Effect of Nitrogen on the Photoluminescence of Graphene Quantum Dots Synthesized by Hydrothermal Route: XPS Study

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Abstract. Graphene Quantum Dots (GQD) with N-rich as additional atom (GQD) was synthesized by hydrothermal process using a citric acid as carbon source and urea as nitrogen sources. The GQD exhibit blue photoluminescence (PL) with independent excitation wavelength. Throught elapse time synthesize, the GQD was investigated by X-ray Photoemission Spectroscopy (XPS). The full scan XPS results showed that N-concentration of GQD was decreasing significantly at maximum PL intensity. Furthermore, the N1s peak was shifted to the higher binding energy. It indicated transient of N configuration in GQD structure. As consequence, the N configuration may affect the PL intensity.

Keywords: GQD, N-configuration, PL intensity, and XPS.

Facile Thermal Decomposition Synthesis of PEGylated Gadolinium Oxide Particles

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Abstract. Paramagneticpolyethylene glycol functionalized gadolinium oxide (Gd_2O_3@PEG) were synthesized by facile thermal decomposition of gadolinium acetate hydrate ($Gd(CH_3CO_2)_3.XH_2O$) precursors in PEG-1000. Here, PEG was used as a solvent, size reducing, and functionalize agent. The advantage of this method is simple and not time and reagents expended process. Surface morphology and chemical composition analysis were performed scanning electron microscopy (SEM) and Fourier transform infrared spectroscopy (FTIR). SEM image of particles showed that agglomeration of particles and FTIR analysis showed that the oxidation of PEG is linked to the Gd_2O_3 surface. Furthermore, the solubility and functionalization behavior of the PEG have success to transfer to the particles at 260oC.

Keywords: Gd2O3, PEG, Thermal Decomposition

Preliminary Study of Synthesis of Porous Calcium Oxide using Spray-Pyrolysis Method with Polystyrene Latex as Template

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Abstract. As the industrial flue gas, SO_2 is dangerous gas which can react with rain water to become acid rain and it can contaminate the environment. To reduce SO_2 from flue gas, FGD (Flue gas desulfurization) agent is developed. CaO and $Ca(OH)_2$ are the most common FGD agent in dry method which have the potential to be developed. CaO powder can be synthesized by spray-pyrolysis method which is relatively simple but it produce powder with low specific surface area resulting in lower ability of SO_2 adsorption. Nevertheless, its specific surface area can be increased by morphological control during the synthesizing process. In this case, polystyrene latex (PSL) is used as template to make porous CaO thus the specific surface area of CaO can increase. From the experiment, porous $CaO/Ca(OH)_2$ powder was successfully obtained which is confirmed by appearing Ca-O and Ca-OH bond measured by FT-IR characterization and porous particle image captured by SEM.

Keywords: CaO, polystyrene, porous, spray-pyrolysis, SO_2

Influence of the Concentration of Ga-Doped On the Structural and Optical Properties of ZnO Thin Films

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Abstract. Zinc oxide (ZnO) is a large bandgap semiconductor with a hexagonal wurtzite structure. This material has energy bandgap about 3.37 eV (300K) with a large exciton energy of 60 meV. ZnO have received much attention and it is a potential materials in transparent conductive oxides (TCO) applications because its low cost, non-toxic, chemical stability and relatively low deposition temperature. TCO play an important role in the electronic industry such as transparent electrodes, window materials for display and solar cells, surface acoustic wave devices, sensors, and electronic transducers. TCO materials such as indium tin oxide (ITO) and ZnO have been widely studied. ZnO has attracted attention as transparent conductive materials because of its high transparency in the visible region and low electrical resistivity. However, the electrical and optical properties of pure ZnO are unstable. In order to develop the properties of ZnO thin films, group III such as B, Al, Ga and in have been doped to ZnO thin films. Ga dopant produces high-quality n-type ZnO because Ga atoms cause little distortion of the ZnO lattice. The ionic radius of Ga is larger than that of Al ion and covalent length of Ga-O is nearly to Zn-O, so that the addition of Ga to the ZnO crystal is expected to make the high-quality of ZnO crystal structure. The sputtering process is the method commonly used to deposition of Ga doped ZnO thin films. In this work, the direct-current (dc) magnetron sputtering process was used to deposition Ga doped ZnO thin films. We investigated the effects of the concentration of Ga-doped on the structural and optical properties of the ZnO thin films. ZnO:Ga thin films were deposited on corning glass substrates by homemade DC magnetron sputtering technique. Ga2O3 (99.999%) and ZnO (99.999%) powder was mixed and pressed as a source target with total mass of 10 gram. The Ga doping was varied at 1, 2 and 3% in present work. The diamater of the target was 2.5 cm. Corning glass substrates were cleaned with aceton and methanol solution using ultrasonic bath for 15 minutes. The substrate temperature, sputtering power, and deposition time were kept constant at 400oC, 30 W and 60 minutes, respectively. The argon gas pressure was fixed at 500 mtorr. The crystal structure properties of the films were analyzed by X-ray diffraction with   radiation (1.5406 Å). The optical properties was measured by ultraviolet (UV-Vis) spectrocopy. XRD patterns of ZnO:Ga films deposited on corning glass substrates with different Ga-doped concentration have been found. All samples showed (002) peaks. The films deposited at 1 and 2% Ga-doped concentration exhibit a strong (002) peak and

a weak (004) peak. However, the films deposited at 3% Ga-doped concentration have a weak (101) peak. The ZnO:Ga deposited films are polycrystalline with peak oriented along the (002) plane. In other words, the wurtzite-type crystal structure of ZnO could be formed to produce the ZnO:Ga films at 1 – 3% Ga doped concentration. It indicated that the grains of the films were strongly oriented along the c-axis of the wurtzite structure. The XRD pattern demonstrated that crystallinity of the film was improved with increasing Ga-doped concentration from 1 to 2%, but the peak (002) intensity is of the samples deposited at Ga doped 3% significantly decreased with increasing Ga concentration. The (002) peak of the film prepared at 2% Ga-doped concentration is the highest among the samples. It revealed that the ZnO:Ga film deposited at 2% Ga-doped concentration has the highest crystallinity of any film produced at Ga-doped between 1-3%. The XRD patterns also shows, no diffraction Ga_2O_3 phase were detected. Nevertheles, it is believed that Ga atoms substitute Zn in hexagonal lattice and form Ga-O bond. It can be explained that Ga atoms are ionized into Ga^{3+} and subsitute Zn^{2+}, which makes the c-parameter shorter due to the fact that ionic radius of Ga is smaller than that of Zn. Transmittance of the ZnO:Ga thin films prepared at different Ga-doped concentration as a function of the wavelength in the visible region have been investigated by UV-Vis spectrometer. The average optical transmittance of all films is around 80% in the visible region. The calculated valued of optical band gap (Eg) of ZnO:Ga films deposited at 1 – 3% Ga-doped concentration has been done. The minimum optical bandgap (3.25 eV) could be found at 2% Ga-doped concentration. The obtained optical gap for each samples are 3.30, 3.25 and 3.28 eV for 1, 2, and 3% Ga-doped concentration. It is shown that the argon pressure has no effect significantly on optical bandgap of ZnO:Ga.

Histopathology of Gill of Pangasius Sutchi Infected with Aeromonas Hydrophila and Are Cured Using Curcumin

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Abstract. This study aims to understand the histological structure of gill of Pangasius sutchi that is infected with Aeromonas hydrophila and treated with Curcumin has been conducted on February to April 2015. There were 3 treatments applied. The treated fishes were infected with A. hydrophila (0.1 ml of 109 of A. hydrophila culture) and then were immerse in 3 different concentrations of Curcumin, they were T1 (0.5 g/l); T2 (0.7 g/l) and T3 (0.9 g/l) for 5 minutes/ day for a 2 weeks period. The negative control were fishes that were not receive any treatment, while the positive control were fishes that were infected with A. hydrophila, and were not treated with Curcumin. Fish organ (gill) were processed for histological studied (formalin fixed, alcohol series, HE stained and 6 sliced. The result showed various types of damage such as necrosis, hemorrhage, fused lamella, loss of epithelium on the secondary lamella and oedema. Based on data obtained, it can be concluded that immersion of fish in Curcumin is able to cure A. hydrophila infection on fish.

Keywords: Gill, Aeromonas hydrophila, Pangasius sutchi, Curcumin

Homeschooling in Lampung Province

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Abstract. The study aims to examine the effect of alternative education homeschooling towards students' learning achievement on math, English, science, and interest. The population of the research was 197 homeschooling students, sampling technique was taken randomly for 93 students. Dependent variable was learning achievement and independent variable was homeshooing learning. The data was analized by anova. The result of the research was shown that there was significant influence between homeschooling learning and academic achievement with a value of R Square of 0208, influence significant level of F count=23.903 with significance level/probability 0.000>0.05

Keywords: alternative education, homeschooling, learning achievement

Education as an Earthquake Disaster Alert Boost Safety Measures in Primary School Children in the Region Through Comic Urban Media Bandarlampung

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Abstract. In order to establish a culture of safety and endurance especially for the young generation , disaster risk reduction needs to be given to children from an early age . As many as 113 countries in the world has been put disaster alert education to primary schools. Among them is india, iran, turkey and bangladesh.Learned from the experience of the disasters that occurred in lampung province pedidikan about the need to be alert to earthquake disaster especially in the use of the media, with little comic the children loved in comics. The targets in may have had from the study is to increase knowledge , the ability and vigilance primary school student in urban areas bandarlampung for disasters gempabumi through the medium of comic . The purpose of this research is to find knowledge primary school student about education disaster alert before and after reading comic .Methods used in this research is descriptive method with the approach that is using survey questions structured given to primary school students aged 10-12 years .Sample technique wear random sampling where students who as sample are children of primary schools in the city of bandarlampung areas .

Keywords: education, mitigation, the geography teacher

Hipotetic Model of Continuous Professional Development of Vocational Lecturer in The Higher Vocational Education in Lampung

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Abstract. One key to the effectiveness and efficiency of higher vocational education lies in human resources namely lectures. Lectures are professional educators and scientist with main task of transforming, developing, and spreading the knowledge, technology, and art through education, research, service to the community. To do that, need development model of continuous professional competence which will affect the increase of 4 competence of lecturers, especially professional competence. The problem is the development of lecture professional competence in higher vocational education in Lampung has not optimally yet, and uncoordinated well, so that the level of professionalism of lecturers depend on himself. The objective of this research is to develop hypothetical model of continuous professional competence development of vocational lecturer in the higher vocational education in Lampung. The research begins with describing the condition of existing management professional competence of vocational lecturer, then do the theoretical studies and concludes with the development of hypothetical model.

Keywords: continuous professional development, higher vocational education, lecturer professionalism

Properties of the Probability-Weighted Moment Estimator for The Generalized Log-Logistic Distribution

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Abstract. Among the generalized distributions, the generalized log-logistic (GLL) has good potential for data modeling. The family of the GLL distribution includes several well-known distributions, such as log-logistic, lognormal, Weibull, khi-squared, and gamma distribution as limiting distributions or special cases. The GLL distribution might also be to the other well-known generalized distributions, such as generalized F (GF) and Beta (GB) distributions. Because of its features, its parameters need to be estimated and evaluated precisely and accurately. We propose to use the method of probability-weighted moments to derive estimators of the parameters of the GLL distribution. We investigate the properties of these estimators in small, moderate, and large samples large samples, via computer simulation.

Keywords: Generalized log-logistic distribution, Probability-weighted moment, Parameter estimator, Small and large samples, Simulation.

Limiting Behaviors of the Moment Generating Function of the Four-Parameter Generalized F Distribution

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Abstract. The main objective of this article is explicitely to derive the moment generating function of the four-parameter generalized F (G4F) distribution. Through parameterization of its moment generating function, we discuss its limiting behaviors in relation to those several well-known distributions. By utilizing MacLaurin series expansion and Stirling formula, one is shown that with parameterization of its moment generating function, the G4F distribution might have special relationship to several well-known generalized distributions, such as the three-parameter generalized F (G3F), generalized gamma (G3G), and gamma distributions.

Keywords: Moment generating function, Generalized four-parameter F distribution, Generalized three-parameter F distribution Generalized gamma, Gamma distribution, MacLaurin series, Stirling formula.

What Should We Trust from Inversion Model of Magnetotelluric Data?

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Abstract. Magnetotelluric (MT) is one of geophysical method and is widely used for geothermal exploration. This method (i.e. MT) is able to image the subsurface resistivity distribution; including electrically conductive zone due to clay mineral resulted from thermal alteration. Thus, 1D or 2D or 3D inversion model of MT data is usually used for guiding the exploration drilling. However, what kind of inversion model of MT data that we can trust is a common question. Low global misfit (i.e. the difference between measured data and model response) of the inversion model can be misleading. In this paper, we show some methods to check inversion model resulted from MT data. Plotting misfit of each site which is used for the inversion can give a better understanding from which site a conductive anomaly appears. Plotting apparent resistivity and phase of measured data and model responses of some sites is also a choice to know whether the conductive anomaly resulted from inversion can be trusted. The other method is doing and plotting the sensitivity test of the inversion model, so that we know how trustworthy the inversion model result of MT data.

Keywords: magnetotelluric, inversion model, misfit, model response, geothermal exploration

Performance Evaluation of Various Genetic Algorithm (GA) Approaches for Knapsack Problem

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Abstract. Knapsack Problem (KP) is known as one of optimization problems that have been used for many practical applications. It belongs to the class of NP-Hard problems. Several researchers reported heuristic methods for solving it. Those include Branch and Bound, Greedy Algorithm and Dynamic Programming. In this research, we focus on the performance evaluation of various Genetic Algorithm (GA) approaches to solve Knapsack Problem. We developed three different GA aprooaches with different statetgy. The first, random pinalti GA (rpGA) uses random strategty for generating chromosome and penalty strategy for infeasible chromosome. The second, directed pinalti GA (dpGA) uses directed strategy for generating chromosome and penalty for infeasible chromosome. The third, reparing strategi GA (rsGA) uses random strategy for generating chromosome and reparing strategy for infeasible chromosome. In order to see the performance of those algorithms, we have done numerical experiments by using several Benchmerk test problems given in literature. To see the effectiveness and the efficiency of the methods, we also vary crossover and mutation probalility. It is shown that rsGA could give better solution with reasonable computational time.

Keywords: Combinatorial Optimization, Genetic Algorithm, Knapsack Problem, Evaluation Strategy

Modification of Gambier Extracts as Green Inhibitor of Inorganic Material Scale Formation

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Abstract. The combination of Gambier extracts (Uncaria gambier Roxb leaves) with citric acid and benzoic acid in the ratio of 1:1:1 as green inhibitor of calcium carbonate scale formation has been performed. These experiments were carried out using the bottle-roller batch method at the temperature of 80 °C and at various concentration of a growth solution from 0.1 to 0.3 M. The data resulted shows that the combination of Gambier extracts, citric acid, and benzoic acid play a role as inhibitor to inhibit the formation of calcium carbonate scale at the various concentrations of the growth solution. The ability of combination of Gambier extracts, citric acid, and benzoic acid as green inhibitor of the formation of calcium carbonate scale is around 50–100% in inhibiting the formation of $CaCO_3$ scale. This ability is affected by the concentration of combination of Gambier extracts, citric acid, and benzoic acid added into the growth solution and the concentration of the growth solution as a growth media of calcium carbonate seed crystals.

Keywords: Scaling, green inhibitor, $CaCO_3$ crystals, Gambier extracts

Fish Condition Factor as Bioindicator of Water Quality on Mangrove Ecosystems at Labuhan Maringgai, Indonesia.

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Abstract. This paper discuss on the use of fish Condition Factor (CF) as a bioindicator of water quality level in mangrove ecosystems at Labuhan Maringgai, Indonesia. The results shows that fish CF, in the research site, are mostly higher than one. The following are the value for each fish species: Mystus nigriceps (1,23), Eleutheronema tetradactylus (0,93), Valamugil seheli (1,09), Mallotus villosus (1,61), Paraplagusia blochi (0,56), Lutjanus Griseus (2,22), Epinephelus fuscoguttatus (1,74), Lutjanus campechanus (1,74), Argyrops Bleekeri (3,07), Macrones microchus (1,19), Arius sagor (1,03), Lates calcarife (1,23), Plotusus canius (0,52). Regarding to the measured CF, it is known that the water quality at the concerned mangrove ecosystem is suitable for fish survival (fish CF > 1). Measured water quality at the concerned site was considered as mild to moderately polluted, proved by Pollution Index values of 1.84 to 8.34. Nitrate and turbidity, in particular, were failed to meet the water quality standard.

Keywords. Condition factor, Labuhan Maringgai, Mangrove ecosystems, Pollution index

Ammonium excretion, Indol Acetic Acid production, and phosphate solubilization of nitrogen-fixing bacteria isolated from crop rhizosfere

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Abstract. The aim of this research is to investigate the ability of nitrogen fixing bacteria isolates obtained from crop rhizosfere in the District of Maros, South Sulawesi province, Indonesia to excrete ammonium, to produce growth promoting substance called Indol Acetic Acid (IAA), and to solubilise phosphate. There were 43 previously isolated nitrogen fixing bacterial isolates inoculated in Burk's medium. Ammonium excreation was evaluated using Nessler reagent and spectrophotometer wavelength of 435 nm. The isolates with the ability to excrete high amount of ammonium were selected to IAA production and phosphate solubilisation analysis. IAA consentration was measured using salkwoski reagent in a spectrophotometry with wavelength of 535 nm. Phosphate solubilization assay was done by inoculating bacterial isolates on Pikovskaya medium. The ability to solubilise phosphate was marked by a clear zone around bacterial colonies. Among 43 nitrogn fixing bacterial isolates, 14 isolates could excrete ammonium in the consentration of 256,7 μM until 1027,77 μM. Those isolates also could produce IAA in the consentration between 7 ppm to 41,30 ppm. There were 7 isolates that could solubilize phopate with clear zone measure of 1,5 cm - 4,3 cm.

Keywords: Nitrogen fixing bacteria, ammonium excretion, IAA, phosphate solubilization.

POSTERS

Carbon Nanodots from Frying Oil as Catalyst for Photocatalytic Degradation of Methylene Blue Assisted Solar Light Irradiation

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Abstract. Carbon nanodots (C-Dots) of frying oil could be a photocatalyst for the degradation of methylene blue solution with assisted solar light irradiation. C-Dots of frying oil were resulted from the heating process at a temperature 300⬚C for 2 h. C-Dots of frying oil were used as a catalyst in methylene blue solution with variations the number of C-Dots and the time of solar light irradiation. The results of photocatalytic process showed that the methylene blue solution degraded concentration. It was observed from the color change of the solution and the absorbance intensity decreases with increasing time of photocatalytic process. FTIR spectra showed that the hydroxyl functional group -OH changes and more widened at wavenumber 3468 cm-1 because the result of photocatytic process of methylene blue solution is water (H_2O) and carbon dioxide (CO_2). Meanwhile, the intensity of the alkene functional group C= N at wavenumber 1650 cm-1 decreased during the photocatalytic process. These results indicate that C-Dots of frying oil have an excellent potential to be developed as a photocatalyst materials. Keywords— Carbon nanodots, photocatalyst, methylene blue..

Keywords : Carbon nanodots, photocatalyst, methylene blue.

Influences of Pore Forming Agent in Porous Composite from Waste Glass on Water Filter Performance

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Abstract. Porous composite from waste glass has been successfully fabricated by simple heating. In this study PEG mass fraction 3%-9% has been used as pore-forming agent in order to control pore properties of the composite. The composite was heated at 700°C along 2.5 hours. The result of porosity of the composite was 2.32-4.72% while permeability was $2.93\times10\text{-}15\text{-}2.45\times10\text{-}14$ m2.This study shown that porosity and permeability of the composite are increases as adjusting PEG fraction that influences water filter performance. Water filter performance of the composite tested to remove colloidal water river and methylene blue in the solution. It shown that the porous composited with 3% PEG has highest VIS-NIR transmission spectra that correspond as optimum composition of the composite as water filter.

Keywords : Pore forming agent, Porous composite, Waste glass, Water Filter.

Electrocardiogram Medical Recording Design using Microcontroller-based Fuzzy Clustering Means

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Abstract. An Early Cardiac Disease Detection System was developed to be one solution for facilitating detection of good human cardiac condition. The technique is using electrocardiogram (EKG) signal, but EKG system today have been not integrated into database on patient medical recording. Consequently, the data on cardiac patient medical recording are collected in manual manners for the sake of the next consultation, and if patient lose his or her medical recording the physician have not database for medical recording. In addition, the community, in general, is particularly lay on symptoms of cardiac disease, so a system is necessary to assist human to detect their cardiac condition before consultation to physician. To respond to the problems, a cardiac disease detection system completed with display and medical recording equipment is developed in this study. The equipment is portable intelligent device (Smartphone and PC desktop) to facilitate users in monitoring their cardiac conditions. Also, since there are some types (stadium) of cardiac disease, the Fuzzy Clustering Means was used in this study for accuracy of cardiac disease stadium diagnoses. The results are prototypes; that are, instruments with capabilities to display visualization of heartbeat, to classify cardiac disease and medical recording. To facilitate human to detect their cardiac conditions, the instruments were developed by integrating EKG into PC desktop and mobile PC (notebook and netbook) to monitor patient cardiac condition.

Keywords: Electrocardiogram,Fuzzy Clustering Means, Smartphone, PC desktop.

Simulation of Type PWR (Pressurised Water Reactor) Reactor Water Temperature using Optimal Discrete Control and D-Pole Assignment Method

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Abstract. In design of optimal control system,one of most important problems that designers dealing with is selection of Q and r weight matrix.That is how to select such the matrix so not only optimal qualification is fulfilled,but also qualification of dynamic characteristic which is consistent with specification. In solving the problem, K.Furuta and S.B.Kim from Tokyo Institute of Tecgnology,by 1987,have succeded to develop a method of selecting the weight matrix called as "D-Pole Assignment" method.It is in principle designed to put the poles of closed circle system into a circle-shaped zone with certain center and radius,which as then called as the "D-Zone". In order to facilitate the design process, "D-Pole Assignment" method was applied in this research for design of discrete optimal control at z-plane. This research also examines computation procedur of respond matrix to Riccati P.equation,F1 feedback vector,and Q weight matrix through the form of canonical fasevariable. Because the computation procedures of P,Q, and F1 by "D-Pole Assignment" will difficult to be done as a result of A and b matrix which are in common form.   Then the produced design procedure is applied into dynamic simulation of PLTN type PWR (Pressurised Water Reactor).The simulation performed to the control system of boiling water temperature within secondary circle of reactor,since the main effect of reactivity in reactor is caused by the temperature change.Furthermore simulation is conducted by means of investigating effect of citating period selecting on location of poles in the closed circle,and effect of change in "D-Zone" center on dynamic respond and the use control energy in closed circle system. Generally,from the simulation can be concluded that stability system became stronger when location of "D-Zone" center more and more close to unit circle center in z-plane.In order to include all poles the of the closed circle system into "D-Zone" then limits of center (α) and radius ($r2$) of the the "D-Zone" would be $0,025< \alpha < 0,40$ and $r2 = 0,40$ respectively.

Keywords : Feedback,Weight Matrix,PWR,Phase Variable,Riccati Equation.

A Game of Arranging Scrambled Letters into Meaningful Words for Young Children using FSA Method

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Abstract. The most gaming enthusiasts are children, because children have a natural tendency to play. Early Childhood Education (ECD) is an education for children before entering formal education. ECD according to the Republic of Indonesia Act No. 21/2003 on National Education System (NES) stated that early childhood development is an effort aimed at children aged 0-6 year old, which is accomplished through the provision of educational stimulation to assist their physical and psychological growth and development to prepare them entering the next educational level. A game-based learning method, i.e., a method of learning whilst playing, is applied in early childhood education. It is intended that the children are learning whilst having fun and playing. When learning doesn't exciting, it can be concluded that the learning process is boring and failed to make the children to have fun. Game-based learning helps children to exercising concentration. This study applies Finite State Automata (FSA) method to recognize letters a player selects according to vowel and consonant. The results were a game of recognizing A-Z letter, sorting scrambled letters and arranging scrambled letters into meaningful words. Implementation of the grouping meaningful words was still limited in the use of array data structure and, hence, game development will be required using meaningful word database.

Keywords: Game, Learning Method, Young Children, Array, FSA