Site Map

Archive | Feedback | Links | Contact Us |

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Home

Archive

Submit Paper

Author Guidelines

Editorial Board

Publication Fee

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Search

Google Custom Search

Home

Archive

Submit Paper

Author Guidelines

Editorial Board

Publication Fee

Title: GPS based vehicle tracking over GPRS for fleet management and passenger/ payload/vehicle security

Author (s):   Hartono Pranjoto, Lanny Agustine, Yosephat Suryo Susilo and Rofieko Tehuayo

Abstract: Global Positioning System (GPS) based vehicle tracking over General Packet Radio Service (GPRS) had been widely used in many places. This system was a combination of GPS in a vehicle to indicate its position on the geographic coordinate and a GPRS to send the data of position and other important data into a computer connected via the Internet. General Packet Radio Service (GPRS) is a data service part of a Global System for Mobile Communications GSM cellular phone with speed from 56 kilobit per second (kbps) up to 114 kbps. Coordinate data obtained from the GPS receiver onboard the vehicle was processed fully inside the receiver unit and the output of the unit was serial data communication using TTL logic level using NMEA-0183 protocol which was connected to the first serial port of a microcontroller. Before the coordinate system of the GPS passed to the GPRS unit, the microcontroller also checked the other conditions such as emergency button, power supply, internal battery and speed of vehicle. The unit had internal Lithium battery to self-sufficient its power consumption up to 10 hours. The battery could be recharged automatically from the vehicle battery with its own power management module. The lithium battery was important when the vehicle was stolen and the main battery was disconnected from the vehicle, the system could still track the vehicle. This unit was also equipped with vehicle security alert system in which when there were security breaches, the driver of the vehicle could push a hidden button and the operator would notice it almost immediately via the web page. The command for the GPRS modem and the GPS receiver modules were AT+ commands. The data received by the web server was then stored in a database on the server which contain the GPS coordinate and the time data was received. The sequence of coordinate and time were displayed on a web page in an overlay on Google Map which was freely available together with markers to indicate the location of the vehicle. The device with all the featured mentioned above has been built and shown to be working with all the conditioned mentioned above. The web page with different fleet management has been developed and shown to be working properly as indicated.

                                                                                                Full Text

Title: The prospect of shrimp shell waste as raw material in the gelatin production

Author (s):   Ong Lu Ki, Zakarias Danujatmiko, Aylianawati and Yohanes Sudaryanto

Abstract: Gelatin has been widely used in the food and pharmaceutical industries, e.g. as clarifier, thickener, emulsifier as well as foaming agent. Most commercial gelatins are produced from cow bone and skin as well as pig bone and skin. In the future this might become a serious problem because of the increasing demand of beef bone and skin for food as well as the "un-halal" aspect of "pig" gelatin. This condition reflects the need of study to produce gelatin from other sources such as shrimp shell waste. Shrimp shell consists of 25-40% protein, where the protein itself comprises of 60-75% collagen that can be converted to gelatin. Generally, gelatin is made through 3 steps, i.e. preparation of the raw material, demineralization and extraction. This research was aimed to study the effects of HCl solution concentration in the demineralization step, as well as the extraction temperature and extraction time to the yield of gelatin. Fourier Transform Infra Red (FTIR) was used to confirm the presence of gelatin in the final product. The results showed that the highest yield (32,1%) was produced using 9% HCl solution in the demineralization step, as well as the extraction temperature of 70°C and the extraction time of 3 hours in the extraction step. The characterization using FTIR shows that the gelatine produced from shrimp shell has the fungsional group of O-H (3600 cm^{-1}), C-H (2970 cm^{-1}), C=O (1690 cm^{-1}) and secondary N=H (1540 cm^{-1}) which are similar to the commercial gelatine made from cow skin. Various tests were also conducted, including moisture content (=14%), ash content (=10, 2%), protein content (=75, 8%), pH (=5), melting point (=32, 1°C), viscosity (=2, 8 cP) and Bloom gel strength (=76, 9 g). The results indicate the high quality of the produced gelatin, which is similar to commercial gelatin. Therefore, the use of shrimp shell waste as raw material in the gelatin production is quite potential.

                                                                                                Full Text

Title: Integration of virtual reality and web-based application in development of digital Songket museum

Author (s):   Bertalya, Prihandoko, Rakhma Oktavina and Vega Valentine

Abstract: This paper discusses about the further development of a digital museum of *songket* woven from Sumatra, which integrates the concept of web-based information technology with Virtual Reality. Development of this digital museum is following the spiral model of web-based software development stages consisting of formulation, planning, analysis, engineering, page generation and testing, and customer evaluation. Virtual Reality concept is used to present the digital museum to be natural.

                                                                                                Full Text

Title: Population metadata development to support data interoperability between government agencies in Indonesia

Author (s):   Lintang Yuniar Banowosari, I Wayan Simri Wicaksana, Lily Wulandari, Detty Purnamasari and Pancat Setyantana

Abstract: E-Government is currently being actively implemented in Indonesian government agencies; only the benefits of the service in the public community still had not been optimal. A country with a population of hundreds of millions of people, it requires metadata in the demographic data management. If the population/demographic metadata are not developed, then there are some problems that will be encountered. Suppose diversity in terms of databases, is a constraint when government agencies will perform the information exchange. The public sector has the characteristics of the various items of data and information that has diverse meaning or understanding, as in the fields of law, regulation, public services, administrative processes and various other documents. A basic problem of the huge data is to use a service in a cross-sector and regional data exchange within a country. One obstacle is the diversity of information systems, both in the use of hardware, operating systems, database up to information understanding. This article presents a solution to overcome one of diversity, i.e. the database diversity by building data interoperability between government agencies in Indonesia by developing population metadata. Population metadata was developed by looking at demographic data elements that already exist, and choosing important elements of the population data. The government agency that already has the data or database applications do not need to make changes, but only need to add a middleware to serve as a converter to take advantage of the population metadata mapping. Population metadata user is all government agencies, especially for public services and who need for the exchange of data related to population.

Full Text

Title: Rectangularity defect detection for ceramic tile using morphological techniques

Author (s):   Rosny Gonydjaja, Bertalya, and Tubagus Maulana Kusuma

Abstract: In ceramic tile factory, the production process has now performed automatically by industrial automation system, except the examination process for ceramic quality classification which is still conducted manually. Classification process is performed using the human visual assessment to find and to classify defect, where human judgment is dependent entirely on experience and knowledge. Therefore, this process requires an automatic mechanism which can provide an assessment of the ceramic quality accurately and consistently. This mechanism is based on a dimensional defect detection process, in particular rectangularity defect with shape feature extraction, using morphological techniques.

Full Text

Title: Probabilistic based economic feasibility assessment of seismic retrofit methods for structures

Author (s):   Mehdi Tonekaboni

Abstract: One of the main deficiencies of the current seismic rehabilitation codes is ignoring economic criteria in designing retrofit methods for structures. In this study, a novel probabilistic based procedure for the economic assessment of the different designed retrofit methods for a structure is proposed. In this procedure seismic hazard and fragility analysis, are applied in the Cost-Benefit Analysis (CBA) to compute the Economic Feasibility Index (EFI) of a retrofit method. This index is the ratio of the present value of the benefit from a seismic retrofit method to its cost. This benefit is computed by difference of the annualized loss expectancy of the structure before and after the retrofit. A retrofit method is economically feasible only if its EFI is greater than unity. The proposed index is used to economic assessment of the three retrofit methods, including, RC jacketing, steel jacketing and CFRP wrapping for a pre-code RC building located in Tehran. According to the obtained results in addition to the seismic performance of the retrofitted building and its cost of retrofit, site seismic hazard, Investment Return Period (IRP) and interest rate are also important parameters in economic feasibility assessment of a retrofit method. Increasing IRP will increase EFI but decrease the rate of its increase. Consequently, considering return periods more than 50 years has a negligible effect on increasing EFI. This Index is highly site dependent i.e., a retrofit method for a building may be economically beneficial but for a similar building, in another site become non-beneficial.

Full Text

Title: Realization and testing of lab-on-chip for human lung replication

Author (s):   Yudan Whulanza, Dwisetya Safirna Widyaratih, Jos Istiyanto and Gandjar Kiswanto

Abstract: This research realised 3D constructs so called lab-on-chip as pathways to study human cell under a controlled environment. The chip is a sandwich of two microchannels with microporous membrane in between to mimic human lung system. The challenge is the fabrication of each micro part and assembles them becoming a functional micro system. Firstly, the session was preceded by realization of 20mm x 0.5mm x 0.3mm (length x width x thickness) channels. Later on, porous membrane with size of 100µm x 100µm arranged as arrays were also realised using micro milling apparatus. Eventually, the system was tested by employing 300ml/h propanol and water in each channel. The diffusion of propanol into water channel was validated by gas chromatography (GC) apparatus to validate the functionality of the system.

Full Text

Title: A system dynamic model of train revitalization toward sustainable urban transportation system in Surabaya - Indonesia

Author (s):   Budisantoso Wirjodirdjo, Putri Amelia and Angga Akbar fanani

Abstract: Surabaya has the second largest population in Indonesia. The larger numbers of population will increase the population mobility. The high number of population mobility will raise many problems such as increase a traffic jam, oil and gas consumption, and air pollution in Surabaya. Train is one of the modes transportation which offers the solution in transportation problem in Surabaya. It provides the high capacity in the transportation which offers the cheap price in transportation. This research will study the revitalization planning of the train in Surabaya with using system dynamic approach. In addition, this system affords the complex system which related to economic, social, and environment aspect in order to create the sustainable transportation system. Also, the model will conduct 5 optional scenarios. The first scenario is increasing railway station in Surabaya. The second scenario is increasing parking lot capacity in railway station area. The third scenario is increasing the train lane. The fourth scenario is increasing the number of train's departure schedule. The fifth scenario is increasing the train series. Finally, the scenario which gives the significant effect to the environment and the social aspect is doing the increment of train's departure schedule.

Full Text

Title: Synthesis nickel hidroxide by electrolysis at high voltage

Author (s):   Yanatra Budipramana, Suprapto, Taslim Ersam and Fredy Kurniawan

Abstract: Nickel hydroxide nanoparticles have been synthesized electrochemically. The synthesis based on electrolysis system which bare nickels were used for both cathode and anode. The potential applied during electrolysis was from 10 - 55V. The variation of sodium citrate concentration, i.e. 0.1 M; 0.2M; 0.3 M; 0.4 M; 0.5M, was used to study optimal condition of nickel hydroxide nanoparticles formation. UV-Vis spectroscopy, X-ray Diffraction (XRD), Transmission Electron Microscopy (TEM) and Fourier Transform Infrared Spectrometer (FTIR) were used to characterize the microstructure and morphology of the products. Spherical nanoparticles were obtained by this method. The generated particles are nearly spherical with a mean size 60 nm depending on synthesis condition. A stable product with no agglomeration in the long term was obtained using conditon 0.3 M sodium citrate at 55 Volt for 30 minutes.

Full Text

Title: Simple delivery robot system based on line mapping method

Author (s):   Endrowednes Kuantama, Albert Brian Lewis Lukas and Pono Budi Mardjoko

Abstract: Simple delivery robot system was made to make daily activities easier because the robot can deliver things to another place as long as it is in the same floor and has line mapping. This research is different from previous line follower research; the robot used has a dimension of 40 cm (length) x 40 cm (wide) x 40 cm (height), it can be summoned from several rooms using RF remote and can be ordered to deliver things and send messages. The robot uses seven infrared sensors to trace the line which is within 1.5 cm from underneath its body. In this research, the robot can go to four designated rooms plus one base camp. The robot also has several features i.e.: alarm system which can indicate when the robot arrived at the destination, LCD and keyboard so the user can write message, obstacle sensor to avoid crash, and emergency system which will active when the robot stray out of the line. The emergency system activates video camera and alarm so the user can control the robot with remote control to position it back in the line map. All activities are controlled by microcontroller AT89C51. The focuses of this research are robot mapping system using line mapping, special remote system using radio frequency, message delivery system using LCD and emergency system using video camera and remote control. Maximum speed of the robot is 1.045 m/s, and it can accommodate maximum load of 3.5 kg.

Full Text

Title: Recognition of a scattering 3d object using axially distributed image sensing technique

Author (s):   Donghak Shin, Joon-Jae Lee and Byung-Gook Lee

Abstract: In this paper, we present a recognition method for a 3D object in scattering media by using the axially distributed sensing (ADS) method and nonlinear correlation operation. Since the scatter noise for a 3D object is recorded into the elemental images by ADS method, we apply a statistical image-processing algorithm to convert the scattering elemental images into the scatter-reduced ones. After obtaining the scatter-reduced elemental images, the 3D plane images are reconstructed using the computational reconstruction algorithm based on ray back-projection. The reconstructed plane images are used for 3D object recognition in the scatter medium. We perform the optical experiments and present the experimental results.

Full Text

Title: Predicting ozone concentrations levels using probability distributions

Author (s):   Ghazali N. A, Yahaya A. S., Nasir, M. Y and Mokhtar M. I. Z.

Abstract: Ozone (O_3) is one of the strongest atmospheric oxidants and is designated as a criteria pollutant in the atmospheric surface layer. Surface O_3 contributes to a number of environmental problem including adverse effects on health, vegetation and materials, as well as climate forcing. Thus it is necessary to gain a good understanding of the characteristics of O_3 pollution. In this research, four theoretical distributions namely Weibull, Beta, Lognormal and Inverse Gaussian distribution were used to find the best distribution that can fit the O_3 data at Cheras, Selangor. Statistical distribution models are based upon probability and capable of estimating the entire range of pollutant concentration. Probability density functions (pdf) and cumulative distribution functions (cdf) will be used to predict the time of the day with high ozone concentrations and hence can be used as a prediction tool. Parameter estimation for each type of distribution was estimated by using the method of maximum likelihood estimator (MLE). The best distribution was determined using the plots of cumulative distribution functions (cdf) and performance indicator including Root Mean Square Error (RMSE), Prediction Accuracy (PA) and Coefficient of Determination (R^2). The results revealed that the best distribution to represent O_3 concentration level in Cheras for 2010 is the Beta distribution. Based on the prediction using Beta distribution, it can be concluded that the O_3 concentration level in Cheras exceed the Malaysian Ambient Air Quality Guidelines of 0.01 parts per million (ppm).

Full Text

Title: Ultimate load of built-up cold formed steel column

Author (s):   Fadhluhartini Muftah, Mohd Syahrul Hisyam Mohd Sani, Shahrin Mohammad and Mahmood Md. Tahir

Abstract: Cold formed steel (CFS) has been used as the primary structure for flexural and compression member due to varieties of advantages such as high strength to weight ratio, high corrosion resistance, and ease of fabrication. The criteria need to be considered in improving the structural strength is the fabrication method. Fast and easy fabrication can produce an efficient structure. Built-up of normal CFS into new member with higher strength can be produced efficiently by attaching the normal steel using self-drilling screw. CFS channel with constant size has been used to produce built-up, back to back (BTB), and box-up (BU) with varieties of length. The constant spacing were used at 400 mm centre to centre along its length and supported by using an angle plate that screw through its web. 18 nos of columns were tested for compression until the column cannot resist any increment of load. The ultimate loads were compared to the predicted buckling load using EC3-1-3. The prediction of column capacity is based on flexural buckling and torsional buckling failure. BTB column results in higher load except for 2.5 m length, while the differences of experimental load are up to 24 % to the experimental. Meanwhile, BU results in higher load for all columns with differences up to 80 % compared to the code and the code is considered too conservative for this column type.

Full Text

Title:	Analysis of characteristics of coal-water slurries obtained by plasma and electric discharge methods
Author (s):	S. L. Buyantuev, A. B. Khmelev and A. S. Kondratenko

Abstract: The aim of the research is to obtain coal-water slurry, corresponding to modern requirements, with a minimum of energy. The paper presents the characteristics of coal-water slurries prepared by plasma and electric discharge methods. As a raw material used D-grade coal. By electron scanning microscopy was determined the chemical composition of suspensions and removed micrographs of the surface. Micrographs shower that the samples processed through both methods have pronounced dispersed structure, compared with the original. Elemental analysis showed a significant reduction in the oxides of sulfur and nitrogen. The results obtained make it possible to draw a conclusion about the availability of receiving coal-water slurries with new plasma and electric-discharge methods.

Full Text

Title:	An efficient water flow control approach for water heaters in direct load control
Author (s):	Alexander Belov, Nirvana Meratnia, Berend Jan van der Zwaag and Paul Havinga

Abstract: Tank water heaters (WHs) are present in a prevailing number of European households. Serving as energy buffers WHs have come under the spotlight of various direct load control (DLC) programs over the last few decades. Although DLC has proven to be an efficient measure towards daily peak demand shaving, the payback effect might lead to a new peak in the grid. This payback phenomenon takes place every time a group of WHs under DLC is permitted to catch up. If not handled properly. This paper presents a novel real-time water flow control approach for domestic water heating systems aiming at decreasing the payback effect of DLC actions. We identify possible control strategies based on an analysis of the water system's thermal dynamics. We formulate the problem of optimal water flow control in terms of minimum WH payback demand and maximum user comfort satisfaction. User comfort is formalized by an integral energy characteristic. Simulations show that water flow control can significantly mitigate the DLC payback effect by reaching the fair compromise between energy savings and discomfort of an end-user.

Full Text

Title:	Biofuel production from candlenut oil using catalytic cracking process with ZN/HZSM-5 catalyst
Author (s):	Agus Budianto, Danawati Hari Prajitno and Kusno Budhikarjono

Abstract: Biofuel is an alternative energy product that is environmentally friendly. Biofuel production is one of resolving the problems of energy shortage and global warming. This research aims to study the process of biofuel production from candlenut oil. The research was carried out by reacting the candlenut oil in a micro fixed bed reactor with diameter of 1 cm and length of 16.4 cm. Catalytic cracking method with Zn/HZSM-5 catalyst was used in this process. The effect of reactor temperature and nitrogen flow rate on the quality of biofuel was studied. Biofuel products were analyzed using Gas Chromatography. Biofuel composition is obtained by comparing the chromatogram of biofuels to the standart chromatogram. The result proves that biodiesel was the highest fraction of biofuels. The highest percentage of biodiesel was 80.75 % at a temperature of 325 °C and a nitrogen flow rate of 60 ml/min. Biofuel density was in the range of 0.81 to 0.84 g/ml. This biofuel had a cetane number of 74.8. Biofuel had octane number of 124.7, 114.7, and 119.7 using RON, MON, and AKI methods respectively. Biofuel had higher heating value of 19.269 btu/lb. Cetane number of biofuel was 46, 7% greater than that of fuel European Standard EN 590. This product can be recommended as a cetane improver.

Full Text

Title:	The role of cement dust in basalt-de-aluminated kaolin bricks
Author (s):	Hala Abu-El-Naga Hossein, Mona S. Mohammed and E A, EL-Alfi

Abstract: Effect of gradual substitution of altered basalt by a few percent of cement dust (0, 5, 10, and wt.15%) on the ceramic properties of basalt-de-aluminated kaolin fired up to 1100ºC was studied. The results show that the samples containing 5 and 10 wt% cement dust give the higher suitable ceramic properties than the other samples. As the cement dust contents increases in the sample the apparent porosity enhances and the bulk density decreases at all temperature. Also, The XRD results reveal that the peaks of plagioclase and pyroxene of the altered basalt completely disappears in the sample containing cement dust and the intensity peaks of diopside sharply increase with cement dust content and firing temperature.

Full Text

Title:	Spatial temperature pattern of a non-invasive 2.45 GHZ microwave hyperthermia device
Author (s):	Imam Santoso, Thomas Sri Widodo, Adhi Susanto and Maesadjie Tjokronagoro

Abstract: Hyperthermia is one method of tumor therapy, the goal of hyperthermia therapy is to generate enough heat ($41^{o}C$-$45^{o}C$) to kill the tumor cells without damaging the surrounding cells of healthy tissue. Maintain a stable temperature in the treatment is necessary, also knowing the area and the depth of penetrating by heat, especially when using microwave radiation hyperthermia type, purpose that the desired therapeutic effect can be restricted to certain area only (area contain tumor). In this research according to our developed microcontroller based 2.45 GHz microwave hyperthermia device, we investigate the temperature pattern during the exposure of microwave hyperthermia at ex vivo medium (agar phantom) based on some thermogram pictures acquired by using an infrared camera.

Full Text

Title:	Effective intrusion detection system for cloud architecture
Author (s):	P. Padmakumari, K. Surendra, M. Sowmya and M. Sravya

Abstract: Cloud computing enables the end users to easily access internet based applications and data storage services. With the increasing popularity of cloud, providing security to cloud environment has become an important issue. In order to provide security for a cloud environment we require more than the traditional security methods like firewalls, user authentication, access control and confidentiality in data transmission. Hence Intrusion Detection System (IDS) becomes a needful component in terms of cloud

security. Many methods are being utilized for the development of effective intrusion detection systems, but none of them is completely secure. In this process of betterment, here we present an intrusion detection system, by applying k-means clustering for anomaly detection and integrate it with a frequent attacks generation module using apriori algorithm to detect frequently occurring attacks in various network environments. To evaluate the performance, KDD 99 CUP dataset has been used in our system.

Full Text

Title: Role-based access rights model for cloud system

Author (s): P. Shanthi, Bhyravarapu Sri Lakshman, PadavalaPavan Kumar and Panga Siva Reddy

Abstract:
Due to the abstraction and resourcefulness of the Cloud environment, it is emerging to the fore as an answer to the traditional methods. The access rights are used to achieve secure means of data confidentiality and implementation of the business logic. Role based access rights (RBAR) provide a hierarchical model to read and write the data as per authorization and requirement of the implementation logic. The generic models have security drawbacks and are vulnerable to unethical exploits. The proposed model uses broadcast encryption technique and decrypts using respective key. This scheme guarantees, other users/roles are not affected when revoking a user, re-encryption is not needed after user revocation. In this RBAR, the security is improved by limiting the number of users per role, limiting the operations on timely basis and reliability is improved by storing the data for recovery.

Full Text

Title: WS component selection by improvised high hit ratio using simple jaccard cosine distances with modi's cost effectiveness

Author (s): K.R.Sekar, S. Devasena, K.S. Ravichandran and J. Sethuraman

Abstract:
Software component is an inevitable commodity in the field of web technology applications. Any business transaction in online has been taken care by the software component as the whole. Web service is a software component, which is all articulating highly in the market. Selection and prediction for such a type of component is a tough task for our application. Prism classifier is a statistical tool through which obtaining good classification and ontology for our semantics with number of attributes. Every web service component has its own significance and QOS. Prism classifier generates output considering only high values, resulting in the rules, which contains only the best component, skipping the next components in the priority queue. The drawback in classical prism classifier is rectified by considering the attributes of the component having tie between maximum values. The homogeneity levels amongst a class, variation between the training data sets are also analyzed. By, improving the prism classifier, the resulting rule contains the best of the best component suitable for the customer. The series of tests like Simple Matching co-efficient, Jaccard distances, cosine distance, T-test, ANOVA etc., together with modified Prism classifier is named as IH2RC [Improvised High Hit Ratio Classifier]. In this paper, IH2RC is applied on a training data set, which contains online translators with their related attributes. For cost effectiveness of the software component MODI'S method is employed in this scenario.

Full Text

Title: The thin layer drying characterstics of chilly leaf under open sun and in a solar dryer

Author (s): Subahana K. R, R. Natarajan, Abhishek Awasthi, Melvin Mathew and Muralidharan Nattamai Gangadharan

Abstract:
In bio-oil production by fast pyrolysis of agricultural residues, controlled drying of feedstock to appropriate moisture content is very important since higher moisture content in biomass generally causes operational problems of biomass combustors and higher CO emissions. Chilly plants form an abundant biomass after harvesting of fresh chillies. In this paper, experimental investigation of the thin-layer drying of chilly (*Capsicum annuum*) leaves was conducted under open sun and solar drying methods. Solar drying was realized through a solar air heater in a drying chamber. It was completed by both forced (collector with and without fins) and natural convection methods. The experiments were done to attain less than 10% residual moisture content. The experiments were done at an average ambient temperature of 37.74 °C and an average irradiance of 653.8 W/m^2. The calculated values were tailored to four different mathematical drying models available in literatures. The appraisal between models was done by the application of regression coefficients, Root mean square error and sum squared errors. The logarithmic model with the highest R^2 and lower SSE value best fits the open air drying (natural convection) and solar drying (forced convection) of chilly leaves best.

Full Text

Title: Numerical modelling in improving subsurface drainage system for salt concentration control

Author (s): Edward Ampofo A. and Trevor Tanton W.

Abstract:
The study demonstrates that three-dimensional variable-density groundwater flow models such as the SEAWAT model can be effectively used for design of subsurface drainage systems for controlling salt concentration in the root zone on salt affected irrigated land. The SEAWAT model was used to optimize subsurface drainage design to ensure that the salt concentration of the groundwater at the base of the root zone does not exceed pre determined levels instead of the conventional approach of maintaining the groundwater at a predetermined water Table level. The study was carried out on Mankessim Irrigation Project site in Ghana of initial shallow water Table depth of 0.5 m and salt concentration of 6800 mg/l with assumed impermeable layer at 10 m deep and impermeable field boundaries. The simulated mid-drain head matched well with the measured especially when calibrated and the longitudinal dispersivity lied between 10 and 50 % of the main cell length, the drain conductance was greater than 500 m^2/d and drain cell dimension was at least twice the diameter of the drain. Using the model, spacings were designed to be used as design criteria for subsurface drainage system to reduce the water Table depth from 0.5 m to 0.8 m from the soil surface and maintain concentrations of 6000; 5000; and 4000 mg/l at the base of the root zone. The results showed that over a wide range of irrigation water quality and aquifer hydraulic conductivity, the optimum drain spacing using SEAWAT model was wider by between 3 and 50 % and the amount of drain discharge reduced by 1 and 27 % than were calculated using conventional (Hooghoudt) design equations. It was concluded that Three-Dimensional Variable-Density Groundwater Flow models are better for designing effective drainage systems than conventional drain spacing design equations such as Hooghoudt.

Full Text

Title: Methodology for solving the divergence of fixed point method for the solution of a nonlinear equation

Author (s):   Myriam Rocío Pallares M. and Wilson Rodríguez C.

Abstract: When we need to determine the solution of a nonlinear equation, there are two options for doing: (a) "closed-methods" which use intervals that contain the root and during the iterative process reduce the size of "smart" way, and, (b) "open-methods" which represent an attractive option as they don't require an initial interval enclosure. In general, we know open-methods are more efficient computationally though don't always work suitably. In this paper we are presenting the study of a very particular divergence case when we use open-methods, in fact, we use the method of fixed point iteration to look for square roots. To solve this problem, we propose to apply some tricks (developed by authors) to modify the iteration function. We propose two alternatives doing additional formulations of the traditional method and its convergence theorem. Although the situation has been studied with other methods like Newton an interesting divergence situation is presented in the method of fixed point iteration which probably could be solved by using another method, however the goal here is to demonstrate that this situation can be solved and additionally is possible to get a convergence higher than quadratic convergence in the first iterations when we use the proposed alternatives.

Full Text

Title: Assessment of water resources under climate change: Damodar river basin, India

Author (s):   Mangolika Chatterjee, Debasri Roy, Subhasish Das and Asis Mazumdar

Abstract: This study evaluates the impact of climate change on water resources of the Damodar river basin in eastern India. Future climate scenario has been framed based on climate projections of regional climate model PRECIS (Providing Regional Climates for Impacts Studies) of the Hadley Centre for A1B scenario [Special Report on Emissions Scenarios (SRES) prepared under the Intergovernmental Panel on Climate Change coordination (IPCC)]. A continuous daily hydrologic model HEC-HMS (Hydrologic Engineering Centre-Hydrologic Modelling System) calibrated for the basin was used to simulate the daily hydrological condition for baseline period 1985-1990 and future period 2014-2025. The impact assessment has been carried out by comparing baseline and future precipitation, potential evapotranspiration (PET) and flow regimes and also performance of the Damodar Valley Corporation (DVC) system of reservoirs. Decrease of projected rainfall was noticed for months of July and August and increase of projected rainfall was observed for months of January and June for all sub-basins. The projected PET values for all sub-basins were found to be higher than corresponding baseline values during February to June and lower than corresponding baseline values for November to January. Increase of projected flow over the corresponding baseline flow was noted for months of January and June and decrease in projected flow was noted for the months of July and August for all sub-basins. Reliability of meeting municipal and industrial demands was found to be 100% during the months of June to December in projected years and in baseline years for all the reservoirs.

Full Text

Title: Turbocharging and turbocompounding optimization in automotive racing

Author (s):   Luca Piancastelli and Leonardo Frizziero

Abstract: Turbocharged spark ignition engine for automotive racing have a long and controversial history. From the times of high torque at all cost, to the actual F1 era of maximum efficiency. However turbocharging and turbocoumpounding basic concepts have not changed. It is surprising that, through the years, the same identical errors are repeated. Turbocharger (TC) unit design is an highly optimized task, that requires good concepts, good mathematical models, lots of experimental data and a very good optimization. Performances vary completely with design choices, with big differences between even close solutions. Present software for mathematical modeling of performances are far from accurate and should be corrected with experimental data to obtain effective results. Genetic Algorithms are to be used as optimization method to evaluate the best design solution. Even minor errors in design choices result in large penalties on performance.

Full Text

Title: Efficient driver design for amoled displays

Author (s):   CH. Ganesh and S. Satheesh Kumar

Abstract: The conventional A current feedback driver with double zeros compensation is proposed for medium to large AMOLED displays. The zeros for lead compensation are implemented with switched-capacitor circuits to reduce chip area. The selection rules for compensation Capacitors and zero capacitors are described to obtain wide bandwidth and high speed. The proposed driver has a settling time of 7us for the panel load of 10k/100pF. This work uses high gain and low gain differential amplifiers to provide constant current through pixel and also make sure that voltage induced in capacitor will keep transistor in saturation to make further operation in emission period. Capacitors used for this feedback loop will provide high speed and high bandwidth. Two phases of operation is done to make current through pixel is constant. The feedback system can be analyzed to check performance by parameters like gain margin and phase margin. This current feedback system gain margin and phase margin can be calculated by keeping Data current initially zero and testing output using test voltage. OTRA, high slew rate TRA are used to improve GM, PM with current feedback. In this paper all feedback techniques are compared by checking their performances based on gain margin and phase margin.

Full Text

Title: Variability of soil erodibility factor with some soil management practices in a semi-arid agroecological condition, Nigeria

Author (s):   Jibrin M. Dibal, Ali U. Bashir, B. G. Umara and Bakari Baraya

Abstract: An assessment of soil erosion and all factors tangential to it is essential in soil conservation and environmental management. Soil erodibility, or the K-factor, is crucial in predicting the effects of land use and management on soil loss and thus affects every land user. The K-factor is based on permeability class, soil structure, modified silt content, and organic matter percent. Various physical and biological measures are often employed to stabilize the soils against erosion. Information of the effectiveness of the common soil management in soil erosion control is scarce in Maiduguri and environs. The effects of the common soil management practices (bare soil, conservation tillage, mulching, and compaction) on soil erodibility were studied under a simulated rainfall. The universal soil loss equation (USLE) nomogram-based K- factors for each plot were also estimated. The Soil erodibility values varied from 0.014 in mulched soils to 0.022 measured for the bare soils. The erodibility values measured from bare soil were above the nomogram-based values. Mulching and compaction demonstrated high potentials of controlling soil erosion, but due soil densification, compaction resulted into largest runoff volume, and could effect crop growth by wearing away of nutrients. The

effectiveness of conservation tillage was found to rely on extent of ground cover. Mulching is thus the most recommended means of soil erosion control in the area.

Title: Design and utilization wastes in construction

Author (s):   Mir Heydar Hashemi, Nima Haj Mohammad Hassani Mamaghani and Mojtaba Daei

Abstract: Developing a database for the cases of waste can successfully result in the identification of the causes of waste, leading us to codify policies to prevent them. The results indicated that a considerable amount of the construction waste is due to poor design. The waste resulting from design and utilization does not stand among the priorities of waste management; consequently, architects do not invest enough considerations on waste in their designing. The inattention to the problem of waste in designing eventually results in the development of waste in both phases of implementation and utilization. In the present study, the development of waste has been categorized in three groups of 1. Waste due to designing, 2. Waste due to implementation, and 3. Waste due to utilization, from which the focus was on the waste due to designing and utilization. The objectives of the study are to provide a redefinition of construction waste due to design and utilization, and introduce the factors that can cause waste. Based on the findings, a checklist is presented in order to control and minimize the waste.

Title: Interpretation of pressure tests in horizontal wells in homogeneous and heterogeneous reservoirs with threshold pressure gradient

Author (s):   Freddy Humberto Escobar, Yu Long Zhao and Lie Hui Zhang

Abstract: A pressure gradient level that must be reached to enable the fluid to overcome the viscous forced is defined as the threshold pressure gradient, TPG. It has been observed that the TPG has effect on the pseudorradial (or late radial) flow regime of horizontal wells, but such earlier flow regimes as early radial, early linear and elliptical do not suffer the effect of the TPG. In this work, a methodology previously introduced in the literature for well test interpretation in horizontal wells drilled in both homogeneous and naturally fractured formations has been adapted by using some corrections factors. The re-formulated methodology was successfully tested on synthetic pressure tests.

Title: Secure storage and transmission of images based on a dual encryption scheme

Author (s):   Grasha Jacob and A. Murugan

Abstract: Today there is an urgent need to provide and protect the confidentiality of images when stored in a cloud or transmitted over public insecure channel.. Various encryption schemes have been developed to make information intelligible only to the intended user. This paper proposes a dual encryption scheme which is a combination of Key dependent S-Box and DNA sequence based encryption imparting double fold security for the storage and transmission of images.

Title: Effects of phenolic resin and fly ash on coefficient of friction of brake shoe composite

Author (s):   E. Surojo, Jamasri, V. Malau and M.N. Ilman

Abstract: The friction performance of brake shoe composite indicated by coefficient of friction is influenced by braking conditions including contact pressure, sliding speed or temperature. This behavior is influenced by composite formulation. In the present work, we focus to investigate effect of phenolic resin and fly ash with variation in braking condition on coefficient of friction. Particular attentions are paid to changes in coefficient of friction with respect to the variation of contact pressure, sliding speed and disc temperature. Friction wear test was performed using pin on disc machine. The results show that coefficient of friction decreases with increasing volume fraction of phenolic resin and increases as the amount of fly ash is increased. In addition, phenolic resin affects load and speed sensitivity of coefficient of friction. In contrast, fly ash does not affect load and speed sensitivity of coefficient of friction. The coefficient of friction increases as disc temperature is increased from 29 ^{o}C to 200 ^{o}C. Phenolic resin does not affect disc temperature sensitivity of coefficient of friction. Conversely, fly ash affects disc temperature sensitivity of coefficient of friction.

Title: Management of risk through seepage reduction for two earth dams in Kurdistan Region, Iraq

Author (s):   Sangar Hasan Abdulkareem, Thamer Mohamed Ahmed and Abdul halim Ghazali

Abstract: Risk management through seepage reduction for earth fill dams with evaluation of risk and reliability has been a major concern for the hydrosystem and geotechnical engineers. Several techniques have been established to measure risk and reliability of a system. One of the main approach of risk reduction for seepage at earthen dams is modeling technique. In case of existence of seepage problem through or underneath the earth dams, reliability of the analysis should be based on review of as-built drawing and construction/operation photography of the dam site in order to tackle the defects which cause the problem. This study aimed at managing the seepage risk reduction of two existing zoned earthen dams that newly constructed in Kurdistan Region, Iraq, namely Hamamuk dam and Bawashaswar dam. Both dams have been suffering from downstream flat slope seepage since initial filling. For this purpose, construction/operation photography were reviewed and SEEP/W models waspLied. Construction defects that caused seepage problems at both dams were detected based on the construction/operation photography. Also, the effects of these defects on seepage rate and seepage path were simulated using SEEP/W model. Appropriate solutions were proposed based on different guidelines and references.

Title: Cement-quartz electrically conductive composites based on graphite dispersions

Author (s):   Alexander Nikolaevich Lopanov, Evgenia Aleksandrovna Fanina and Oxana Nicolaevna Guzeeva

Abstract: Specific electric conductivity of composite materials based on graphite dispersions was studied. The aim of the work is to optimize electrical properties of composites. It was found that with increase of graphite mass fraction from 0.06 to 0.2 electrical conductivity of the system cement-quartz-graphite increases from 0.85 to 13.11 $ohm^{-1} \cdot cm^{-1}$. Temperature dependences of the model systems cement-graphite, quartz-graphite, cement-quartz-graphite on conductive phase mass fraction were analyzed. To obtain effective compositions with stable electrical characteristics threshold concentration of a conductive component for cement-quartz composites equal to 0.06 was determined; any excess of this value leads to a great increase in the electrical conductivity due to formation of continuous chain structures. Temperature dependence of an electric conductivity logarithm in the model system cement-quartz-graphite is described by rising curves. Activation energies of electrical conductivity in the model systems cement-graphite, quartz-graphite, cement-quartz-graphite were calculated at different mass fraction of graphite.

Full Text

Title: Creation of automated control system of environmental safety of an industrial complex

Author (s): Olga Alexandrovna Ivashchuk, Orest Dmitrievich Ivashchuk, Igor Sergeevich Konstantinov and Alexander Vasilievich Mamatov

Abstract: This article presents the methodological approaches to the creation of modern automated control systems of environmental safety of an industrial complex, endowed with the property of rapid response in real time on the dynamics of the current environmental situation. These systems solve the complex tasks: environmental monitoring, an adequate prediction of the development of ecological situation with the variation of external conditions; operational formation of alternative management scenarios, their objective evaluation with a selection of the most efficient (from an environmental and economic point of view).

Full Text

Title: Study of building an analytical solution of the axisymmetric problem of linear elasticity in stresses as exemplified by finding the stress-strainstate of an ellipsoid cocavityunder the inner pressure

Author (s): Natalya Alexandrovna Gasratova

Abstract: This article presents an approach to finding analytical solutions of the axisymmetric problem of linear elasticity, which is based on setting up the problem fully formulated in stresses. It closely studies the example of finding stress-strain state of an ellipsoid cocavity under the inner pressure.

Full Text

Title: Substantiation of physical and mathematical model and determination of accelerations under the action of the elastic mixer driving forces

Author (s): Maya Viktorovna Sukhanova

Abstract: This paper deals with the justification of physical and mathematical model of flexible mixer having enclosure as the working body in the form of a cylindrical container, made of an elastic material. It has been shown that the accelerations, arising from driving forces of the working bodies of the mixer and the elastic forces of the elastic material acting on the mixture, are the determining factor in the formation of multi-component granular mixtures. The presented physical-mathematical model of the elastic mixer allows determining the acceleration and, therefore, regulating and managing the process of mixing.

Full Text

Title: Technology of electrically conductive composites of alkaline earth metals carbonates and carbon dispersions

Author (s): Alexander Nikolaevich Lopanov, Igor Valentinovich Prushkovsky, Oxana Nicolaevna Guzeeva Kseniya Vladimirovna Tikhomirova

Abstract: Electrical conductivity of composite materials based on alkaline earth metal carbonates and carbon dispersions was studied, the possibility of regulation of the electro-physical properties, temperature coefficient of electrical resistance, electrical conductivity was shown. Samples of compositions of composites with different conductive phase content were obtained and studied. A model of an experimental installation of an instantaneous water heater with a heating element based on alkaline earth metal carbonates and carbon dispersions was developed and its main technical parameters were identified. In the instantaneous water heater water is heated when passing through the heater, and electric power is consumed only during the use of hot water. Heating temperature of water is 353 K and does not dependent on water flow rate in the range of 50 - 100 ml/min. The required voltage for water heating is 12 ... 40 V (this low voltage is safe and is a guarantee of reliable and long-term work).

Full Text

Title: A logistics pattern for fruit and vegetable transportation from island region: the case of Sicily

Author (s): Ferdinando Corriere, Dario Di Vincenzo and Rosario Corriere

Abstract: The globalization of markets regards many sectors in the E.U. and among them also the fruit and vegetable in the face of growing and increasingly intense competition exerted by the products of countries with emerging economies. But, at the same time, the globalization can also lead to the opening of new potential markets for the products, when and where the transport system, more than other things, appears to be efficient and effective and makes possible to reach the target markets in the shortest time possible and at the lowest possible cost. It is therefore very useful to create a model that takes into account the peculiarities of the different modes of transport between the different origins/destinations and that allows a comparison in real-time, in terms of cost and time (eventually by the use of different ICT systems of easy access) for the evaluation of different alternatives of travel. These technologies, also, allow promoting the *grouping* of goods to facilitate the formation of the load and, in the same way, of sorting the incoming as well as to make more efficient the total journey by helping to speed up the operations of embarking or of disembarking in the case of transportation combined "road-sea" type ro-ro. The proposed model, establishing an effective basis of information for trucks drivers, allows the development of alternative cheaper transports, before neglected because less rapid; as in the same time it may also allow to simulate the benefits of new actions on the supply of transport system (activation of new lines, reduction the time of boarding or ferrying, etc.).

Title: Improvement of laser to fiber coupling efficiency using microlens technique

Author (s):   Ali H. Al-Hamdani, Hayfa G. Rashid and Zainab Rashid Ghayib

Abstract: The efficiency of coupling between semiconductor laser LD and single-mode optical fiber SMF was increased by a microlens of an appropriate focal length placed between laser and fiber. ZEMAX software was used to optimize the design of an optical system. The employed coupling system composed LD of 1.55 μm wavelength, achromatic doublet microlens and single-mode fiber, thermalized over the temperature range (243-343K). Main source causing the coupling loss have studied, these are misalignment during adjusting and fixing the position of fiber referring to the axial misalignment, lateral misalignment, angular misalignment error (tilt) and lateral and angular misalignment to gather .Achromatic doublet microlens of different types of glass material were selected. Significant coupling efficiency (95.5%) has been obtained for N-BAK4, N-SF10 microlens of radius of curvature 7.00900, -6.67800 μm, respectively. The effect of varying the field of view angle over the range (0-9⁰) on the coupling efficiency was taken into account. Coma, astigmatism and spherical aberration were observed. Results shows that the misalignment error proves to be the predominant factor that affects the coupling scheme with precise adjusting accuracy relaxed misalignment tolerances should be employed in the coupling system.

Title: Numerical modeling of the impact problem using open source software

Author (s):   Myriam Rocío Pallares M. and Wilson Rodríguez C.

Abstract: Numerical modeling of impact problem using elastic and elastoplastic constitutive models and open source software is presented. The first case is an elastoplastic model for the analysis of a cylindrical aluminum element that impacts on a rigid surface; the second case, is an impact model of a body on the center of simply supported aluminum beam introducing elastic and elastoplastic constitutive models. This work is originated from the need to explore some possibilities of impact phenomenon modeling. The main contributions were: establish the importance of the constitutive models in modeling the impact phenomenon, accessing to explicit dynamic models of impact with Open Source Software like "Impact" Finite Element Program and explore possibilities of parallel computing and multi-platform as this software is developed in Java and offers possibilities for using several processors in parallel. Some results were compared with theoretical solutions. It´s noted that variation between the behavior of the elastic and elastoplastic material models in the instant of impact is significant as well as the advantage of using several processors in modeling the phenomenon due to small size of time steps that normally generate a high volume of iterations and a great computational cost of the models.

Title: Tensile strength of fly ash based geopolymer mortar

Author (s):   P.Yellaiah, Sanjay Kumar Sharma and T. D. Gunneswara Rao

Abstract: Geopolymer is a promising binding material produced from alkali activated alumino silicate material and emerging as an eco-friendly sustainable construction material as an alternative to Ordinary Portland Cement. Geopolymer technology contributes to the reduction of greenhouse gas emissions and also reduces disposal costs of industrial waste by recycling. In the present study, effect of basic parameters such as activator to fly ash ratio and curing temperature on tensile strength development of geo-polymer mortar using low calcium fly ash is investigated. Samples of Geopolymer mortar specimens are made for varied alkaline activator to fly ash ratio with constant proportion of fly ash to sand. Laboratory tests are conducted on Geopolymer mortar specimens for compressive strength, direct tensile strength and flexural strength. The results reveal that higher mechanical strength can be obtained at higher alkaline activator to fly ash ratio and at higher curing temperature.

Title: A three compartment mathematical model of liver

Author (s):   V.Anand and N.Ch. Pattabhi Ramacharyulu

Abstract: Mathematical modeling of pharmacokinetics is an important and growing field in drug development. Pharmacokinetics concerns with the distribution of drugs, chemicals or tracers by a fluid among the various compartment of human body. In this work we discuss the compartment mathematical model of liver function based on fundamental biological and pharmacological principles. Here we present behavior of thyroxin, iodine and bile over a period of time.

Title: Design, simulation and analysis of platinum micro heaters on AL2o3 substrate for sensor applications

Author (s):   Kathirvelan J and Vijayaraghavan R

Abstract: This paper presents the design, simulation and analysis of Platinum micro-heaters for sensor applications. Finite element method (FEM) analysis was used to investigate the thermal properties of individual electrically driven platinum micro-heaters. The uniform heat distribution and optimization of power consumption for the micro-heaters were performed by simulating on possible different patterns using COMSOL. Four different patterns of micro-heaters were used in simulation and they are (a) rectangular spiral, (b) diagonal slanting, (c) double spiral and (d) complementary double spiral type. These micro-heaters are designed to ensure minimum power consumption, low thermal mass and better temperature uniformity. The Simulated temperature profile shows that the temperature distribution is uniform over the sensing area. For all the four patterns the temperature profile and power consumption when operated over a supply voltage of 0.5 V to 4 V to obtain an operating temperature from 300 K to 1200 K is compared and presented.

Title: Lysozyme transmission through polymeric based ultrafiltration membrane: effect of ph and ionic strength

Author (s):   Sofiah Hamzah, Nora'aini Ali, Marinah Mohd Ariffin and Abdul Wahab Mohammad

Abstract: Fractionation and purification of complex protein mixture has becomes a great interest and has attracted a considerable amount of attention in recent years. This study aimed is to demonstrate the factors influencing the lysozyme separation through polyethersulfone ultrafiltration (UF) membrane. Asymmetric UF membrane with 15% polymer composition (UF15) was developed via phase inversion technique. Membrane was characterized in term of morphology, membrane surface charge and molecular weight cut-off to ensure its suitability for lysozyme separation. Effect of pH on the transmission of lysozyme through the UF15 membrane has been examined at different pH (5, 7, 9, 11 and 13) and ionic strength (0.1M, 0.2M and 0.3M). Results displayed that at optimum pressure 3 bars, permeation with pH 9 and 0.1M ionic strength of feed solution obtained the optimum flux and lysozyme transmission for about 36.6 x 10^{-5} m^3/m^2 and 92.9%, respectively. This study has proved that pH and ionic strength were found to be greatly affected the lysozyme transmission and promoted the lysozyme separation to a significant degree.

Full Text

Title: New deployable solar panel array for 1U nanosatellites

Author (s):   Mohammed Chessab Mahdi, Adnan Falh Hassan and Jaafer Sadiq Jaafer

Abstract: A new design for increased power extraction for NanoSatellites is proposed, which is used for KufaSat. This proposed design contains four expandable panels with additional sixteen solar cells, two solar cells on each side of panel. The proposed design with additional panels and how these additional panels are assembled to the body of KufaSat and how they are deployed after the launching are presented. Comparison between original design and proposed design in addition to discussion the increasing in power production and charge current are included.

Full Text

Title: Calculation of contact zone of grinding environment with partition in mills with cross-length movement of loading

Author (s):   Yuri Mikhailovich Fadin, Sergei Sergeyevich Latyshev, Andrei Vladimirovich Gavrilenko, Ksenia Gennadyevna Arkatova and Nikita Eduardovich Bogdanov

Abstract: In this paper there is a description of contact zones of grinding bodies with an inclined interchamber partition. Authors considered arrangement of zones in relation to an inclined partition and found out that these zones are various, and the contact in the first and second cameras of a pipe mill is carried during some time. Calculation of a contact one for loading level has been made. Analytical expression for calculation of loading bending around levels has been received. The combined method of calculation of a contour of active influence zone of grinding loading and contact zone of grinding loading with an inclined partition has been developed. Calculation of a contact zone for an angle natural slope has been carried out.

Full Text

Title: Constructive solution to eliminate air leaks and dust emission in the inlet and outlet of a kiln

Author (s):   Julia Anatolievna Bondarenko, Mikhail Alekseevich Fedorenko, Tamara Mikhailovna Canina, Nadezhda Savelievna Sevryugina, Olga Vasilievna Markova

Abstract: Design features of the lamella seal of cement kiln. Calculation of contact surface wear beads reduced by increasing the area of its contact with the kiln body, and applying a "light" alloy and compression force. Functional relationship between the parameter optimization and investigated factors. Dimensionless equation describing wear beads sealing device according to the major determinants of its design features and influencing its work in conditions of dry friction in the presence of a minor amount of solid lubricant. Determination of the load acting on the friction bead of the sealing device. Lubricant for friction surfaces. Justification of the choice of material friction surface (beads). Study the joint effect of insertion elements of wear on the friction surfaces. Analysis of the impact parameter optimization complexes. Ensuring uniform contact with the sidewall of the furnace sealing and prevent slipping, which will ensure minimum wear of rubbing surfaces and maximum seal life.

Full Text

Title: Distinctive features of the relations between grinding equipment and devices inside ball mill body

Author (s):   Vasiliy Stepanovitch Bogdanov, Sergey Ivanovitch Hanin, Denis Nikolaevitch Starchenko and Ildus Amirkhanovitch Sagitov

Abstract: The mathematical description of the parameters of spatial movement processes of the grinding bodies and their interaction with the inclined intermediate diaphragm in the rotating body of the ball mill is carried out to determine the influence of inside mill devices on the grinding load. It allows defining the kinematic and dynamic characteristics for each of the grinding bodies and their groups; the calculating method of the power consumed by their movement. An analytical expression is obtained to calculate the power consumed by the grinding media motion in the mill body with inclined intermediate diaphragm. The numerical computer and physical experiments with mill without inside mill devices are conducted to determine the power consumed by the grinding media motion. A quantitative estimation of the changes of kinematic parameters during the grinding media rotation, characterized by more intensive movement and changing their mode installation of the inclined intermediate diaphragm which contributes to the intensification of the process of grinding material is given.

Full Text

Title: Kinematics of the ball load in the tube ball mills with inclined interchamber partitions

Author (s):   Yuri Mikhailovich Fadin, Andrei Vladimirovich Gavrilenko, Ksenia Gennadyevna Arkatova, Jan Alexeevich Avdeev and Nikita Eduardovich Bogdanov

Abstract: In this paper we have studied features of kinematics of spherical loading in pipe spherical mills with inclined interchamber partitions. Calculation of a separation of a sphere from a drum of a mill and from an inclined partition has been made. Coordinates and sphere speed at the time of collision with a drum of a mill and an inclined partition have been calculated. Change of kinetic energy of a sphere in a mill with an inclined partition has been shown. Cross-length trajectories of movement of spheres depending

on their situation on a partition have been defined. Diverse nature of impact of spheres creates conditions of vibration impact on a crushed material. The scheme for definition of an active area of coverage of a partition has been submitted. The size and nature of kinetic energy allow to increase efficiency of process of crushing and to improve power of spherical mills. Schemes of movement of loading have been presented depending on an inclined angle of a partition and on rotation frequency.

[Full Text]

Title: Material composition and colloid-chemical properties of natural and modified montmorillonite clays

Author (s): Alexandr Ivanovich Vezentsev, Ekaterine Viktorovna Kormosh, Lidia Fedotovna Peristaya, Aleksey Vladimirovich Shamshurov and Roman Andreevich Cherkasov

Abstract: There is determined the dependence of colloid-chemical properties of the natural and modified montmorillonite clays from "Polyana" deposit in Shebekinsky district, Belgorod Region, Russian Federation, on their material composition, i.e. on their chemical, mineral and granulometric composition. It is shown that cation-substitution in the inter-pack positions of montmorillonite results in the increase of clay's sorption capacity and its natric form can be used for the efficient water purifying from iron ions (III). It has been observed the high adsorption rate of $Fe3+$ ions within the first five minutes of purifying water solutions, which is conditioned by increase of exchange cations content, increase of sorbent's specific surface and alteration of zeta-potential towards the negative range at beneficiation and modification. It has been detected that sorption of Fe^{3+} ions by natural and modified clays is determined by processes of ion exchange and are of chemosorption nature predominantly.

[Full Text]

Title: Performance review and principal directions for development of a grinding equipment in cement factory

Author (s): Alexey Alekseevich Romanovich

Abstract: The importance of energy-savings in grinding of materials in a cement factory using press-rolling crusher and grinding mill was considered. An analysis of the development of grinding equipment on the basis of grinding mill in the past half century has been presented. Comparative characteristics of existing grinding units are also presented. Established that the vast reserves of energy saving during grinding contain materials having anisotropic texture and is widely used in the manufacture of building materials, including cement, which have different ultimate resistance in directions perpendicular and parallel to the layering of the mineral. The recommended of development and retrofit of the grinding equipment to grind anisotropic materials, which include: to the uniform and ingress direction of mill feed across the width of the working surfaces of the rolls; force strength action in the direction of the strength of minimal pieces of anisotropic material; effective conditions deagglomeration and grinding mill the compacted pressure press-rolling crusher of materials; realization of effective constructively-technological solutions structural and technological solutions that enhance the wear resistance of working surfaces and other aggregates. Suggested areas of development and improvement of engineering and technology development grinding materials may be of interest to Russian and foreign organizations operating in the design and manufacture of the grinding equipment.

[Full Text]

Title: Specifying the parameters of flow aspiration in the tube mill

Author (s): Vasiliy Stepanovich Bogdanov, Olga Sergeevna Mordovskaya, Vitaliy Pavlovich Voronov, Dmitriy Sergeevich Khanin and Igor Viktorovich Kirilov

Abstract: The aspiration pipe of cement mills was previously viewed by the industrial enterprises of building materials primarily as a process of reducing the emission of dust from the loading space in the neck of the mill shop and reduce airborne dust in the grinding part. The works of different authors have shown that the efficient mode of aspiration intensifies the mill work and the right choice of aspiration, the de-dusting units reduces the return of the discharged dust. These studies have not been completed yet. In this paper we will consider the analytical form of the expressions determines the resultant velocity components and the aspiration flow in the first chamber of the tube mill rotated with the drum mill. It was established that the helical pitch of the aspiration flow in the chamber is inversely proportional to the volumetric flow rate of the air mass and directly proportional to the speed of the drum. The grinding bodies decrease the oscillation amplitude of masses aspiration by the increasing of the load factor of camera. The analytical dependences allow defining the rational modes of aspiration and required air flow.

[Full Text]

Title: Theory of vertical auger

Author (s): Aleksandra Vladimirovna Rud, Natalya Nikolayevna Evstratova, Vladimir Aleksandrovich Evstratov, Denis Vasilyevich Bogdanov, Svetlana Yurievna Lozovaya and Artem Sergeevich Lunev

Abstract: Vertical auger transportation of loose and pulverulent materials is an integral part of many technological processes in various industries and agriculture. The vertical screw conveyors are used in a wide range of various industries and along with such advantages as simple structure, continuity of transportation, integrity, the ability to transport dusty and pungent goods, have a significant drawback - material other than the translational motion in the direction of the axis of the pipeline performs rotational movement in the circumferential direction of the screw speed, which reduces productivity and increases the energy consumption of the conveyor. An adequate mathematical description of this process should allow designers to improve the efficiency of the vertical screw conveyors greatly by calculation and selection of the optimal values of the geometric, kinematic and dynamic parameters of working parts.

[Full Text]

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Title:	GPS based vehicle tracking over GPRS for fleet management and passenger/ payload/vehicle security
Author (s):	Hartono Pranjoto, Lanny Agustine, Yosephat Suryo Susilo and Rofieko Tehuayo

Abstract: Global Positioning System (GPS) based vehicle tracking over General Packet Radio Service (GPRS) had been widely used in many places. This system was a combination of GPS in a vehicle to indicate its position on the geographic coordinate and a GPRS to send the data of position and other important data into a computer connected via the Internet. General Packet Radio Service (GPRS) is a data service part of a Global System for Mobile Communications GSM cellular phone with speed from 56 kilobit per second (kbps) up to 114 kbps. Coordinate data obtained from the GPS receiver onboard the vehicle was processed fully inside the receiver unit and the output of the unit was serial data communication using TTL logic level using NMEA-0183 protocol which was connected to the first serial port of a microcontroller. Before the coordinate system of the GPS passed to the GPRS unit, the microcontroller also checked the other conditions such as emergency button, power supply, internal battery and speed of vehicle. The unit had internal Lithium battery to self-sufficient its power consumption up to 10 hours. The battery could be recharged automatically from the vehicle battery with its own power management module. The lithium battery was important when the vehicle was stolen and the main battery was disconnected from the vehicle, the system could still track the vehicle. This unit was also equipped with vehicle security alert system in which when there were security breaches, the driver of the vehicle could push a hidden button and the operator would notice it almost immediately via the web page. The command for the GPRS modem and the GPS receiver modules were AT+ commands. The data received by the web server was then stored in a database on the server which contain the GPS coordinate and the time data was received. The sequence of coordinate and time were displayed on a web page in an overlay on Google Map which was freely available together with markers to indicate the location of the vehicle. The device with all the featured mentioned above has been built and shown to be working with all the conditioned mentioned above. The web page with different fleet management has been developed and shown to be working properly as indicated.

Full Text

Title:	The prospect of shrimp shell waste as raw material in the gelatin production
Author (s):	Ong Lu Ki, Zakarias Danujatmiko, Aylianawati and Yohanes Sudaryanto

Abstract: Gelatin has been widely used in the food and pharmaceutical industries, e.g. as clarifier, thickener, emulsifier as well as foaming agent. Most commercial gelatins are produced from cow bone and skin as well as pig bone and skin. In the future this might become a serious problem because of the increasing demand of beef bone and skin for food as well as the "un-halal" aspect of "pig" gelatin. This condition reflects the need of study to produce gelatin from other sources such as shrimp shell waste. Shrimp shell consists of 25-40% protein, where the protein itself comprises of 60-75% collagen that can be converted to gelatin. Generally, gelatin is made through 3 steps, i.e. preparation of the raw material, demineralization and extraction. This research was aimed to study the effects of HCl solution concentration in the demineralization step, as well as the extraction temperature and extraction time to the yield of gelatin. Fourier Transform Infra Red (FTIR) was used to confirm the presence of gelatin in the final product. The results showed that the highest yield (32,1%) was produced using 9% HCl solution in the demineralization step, as well as the extraction temperature of 70°C and the extraction time of 3 hours in the extraction step. The characterization using FTIR shows that the gelatine produced from shrimp shell has the fungsional group of O-H (3600 cm^{-1}), C-H (2970 cm^{-1}), C=O (1690 cm^{-1}) and secondary N=H (1540 cm^{-1}) which are similar to the commercial gelatine made from cow skin. Various tests were also conducted, including moisture content (=14%), ash content (=10, 2%), protein content (=75, 8%), pH (=5), melting point (=32, 1°C), viscosity (=2, 8 cP) and Bloom gel strength (=76, 9 g). The results indicate the high quality of the produced gelatin, which is similar to commercial gelatin. Therefore, the use of shrimp shell waste as raw material in the gelatin production is quite potential.

Full Text

Title:	Integration of virtual reality and web-based application in development of digital Songket museum
Author (s):	Bertalya, Prihandoko, Rakhma Oktavina and Vega Valentine

Abstract: This paper discusses about the further development of a digital museum of *songket* woven from Sumatra, which integrates the concept of web-based information technology with Virtual Reality. Development of this digital museum is following the spiral model of web-based software development stages consisting of formulation, planning, analysis, engineering, page generation and testing, and customer evaluation. Virtual Reality concept is used to present the digital museum to be natural.

Full Text

Title:	Population metadata development to support data interoperability between government agencies in Indonesia

Author (s):   Lintang Yuniar Banowosari, I Wayan Simri Wicaksana, Lily Wulandari, Detty Purnamasari and Pancat Setyantana

Abstract: E-Government is currently being actively implemented in Indonesian government agencies; only the benefits of the service in the public community still had not been optimal. A country with a population of hundreds of millions of people, it requires metadata in the demographic data management. If the population/demographic metadata are not developed, then there are some problems that will be encountered. Suppose diversity in terms of databases, is a constraint when government agencies will perform the information exchange. The public sector has the characteristics of the various items of data and information that has diverse meaning or understanding, as in the fields of law, regulation, public services, administrative processes and various other documents. A basic problem of the huge data is to use a service in a cross-sector and regional data exchange within a country. One obstacle is the diversity of information systems, both in the use of hardware, operating systems, database up to information understanding. This article presents a solution to overcome one of diversity, i.e. the database diversity by building data interoperability between government agencies in Indonesia by developing population metadata. Population metadata was developed by looking at demographic data elements that already exist, and choosing important elements of the population data. The government agency that already has the data or database applications do not need to make changes, but only need to add a middleware to serve as a converter to take advantage of the population metadata mapping. Population metadata user is all government agencies, especially for public services and who need for the exchange of data related to population.

Title: Rectangularity defect detection for ceramic tile using morphological techniques

Author (s):   Rosny Gonydjaja, Bertalya, and Tubagus Maulana Kusuma

Abstract: In ceramic tile factory, the production process has now performed automatically by industrial automation system, except the examination process for ceramic quality classification which is still conducted manually. Classification process is performed using the human visual assessment to find and to classify defect, where human judgment is dependent entirely on experience and knowledge. Therefore, this process requires an automatic mechanism which can provide an assessment of the ceramic quality accurately and consistently. This mechanism is based on a dimensional defect detection process, in particular rectangularity defect with shape feature extraction, using morphological techniques.

Title: Probabilistic based economic feasibility assessment of seismic retrofit methods for structures

Author (s):   Mehdi Tonekaboni

Abstract: One of the main deficiencies of the current seismic rehabilitation codes is ignoring economic criteria in designing retrofit methods for structures. In this study, a novel probabilistic based procedure for the economic assessment of the different designed retrofit methods for a structure is proposed. In this procedure seismic hazard and fragility analysis, are applied in the Cost-Benefit Analysis (CBA) to compute the Economic Feasibility Index (EFI) of a retrofit method. This index is the ratio of the present value of the benefit from a seismic retrofit method to its cost. This benefit is computed by difference of the annualized loss expectancy of the structure before and after the retrofit. A retrofit method is economically feasible only if its EFI is greater than unity. The proposed index is used to economic assessment of the three retrofit methods, including, RC jacketing, steel jacketing and CFRP wrapping for a pre-code RC building located in Tehran. According to the obtained results in addition to the seismic performance of the retrofitted building and its cost of retrofit, site seismic hazard, Investment Return Period (IRP) and interest rate are also important parameters in economic feasibility assessment of a retrofit method. Increasing IRP will increase EFI but decrease the rate of its increase. Consequently, considering return periods more than 50 years has a negligible effect on increasing EFI. This Index is highly site dependent i.e., a retrofit method for a building may be economically beneficial but for a similar building, in another site become non-beneficial.

Title: Realization and testing of lab-on-chip for human lung replication

Author (s):   Yudan Whulanza, Dwisetya Safirna Widyaratih, Jos Istiyanto and Gandjar Kiswanto

Abstract: This research realised 3D constructs so called lab-on-chip as pathways to study human cell under a controlled environment. The chip is a sandwich of two microchannels with microporous membrane in between to mimic human lung system. The challenge is the fabrication of each micro part and assembles them becoming a functional micro system. Firstly, the session was preceded by realization of 20mm x 0.5mm x 0.3mm (length x width x thickness) channels. Later on, porous membrane with size of 100μm x 100μm arranged as arrays were also realised using micro milling apparatus. Eventually, the system was tested by employing 300ml/h propanol and water in each channel. The diffusion of propanol into water channel was validated by gas chromatography (GC) apparatus to validate the functionality of the system.

Title: A system dynamic model of train revitalization toward sustainable urban transportation system in Surabaya - Indonesia

Author (s):   Budisantoso Wirjodirdjo, Putri Amelia and Angga Akbar fanani

Abstract: Surabaya has the second largest population in Indonesia. The larger numbers of population will increase the population mobility. The high number of population mobility will raise many problems such as increase a traffic jam, oil and gas consumption, and air pollution in Surabaya. Train is one of the modes transportation which offers the solution in transportation problem in Surabaya. It provides the high capacity in the transportation which offers the cheap price in transportation. This research will study the revitalization planning of the train in Surabaya with using system dynamic approach. In addition, this system affords the complex system which related to economic, social, and environment aspect in order to create the sustainable transportation system. Also, the model will conduct 5 optional scenarios. The first scenario is increasing railway station in Surabaya. The second scenario is increasing parking lot capacity in railway station area. The third scenario is increasing the train lane. The fourth scenario is increasing the number of train's departure schedule. The fifth scenario is increasing the train series. Finally, the scenario which gives the significant effect to the environment and the social aspect is doing the increment of train's departure schedule.

Title:	Synthesis nickel hidroxide by electrolysis at high voltage
Author (s):	Yanatra Budipramana, Suprapto, Taslim Ersam and Fredy Kurniawan

Abstract: Nickel hydroxide nanoparticles have been synthesized electrochemically. The synthesis based on electrolysis system which bare nickels were used for both cathode and anode. The potential applied during electrolysis was from 10 - 55V. The variation of sodium citrate concentration, i.e. 0.1 M; 0.2M; 0.3 M; 0.4 M; 0.5M, was used to study optimal condition of nickel hydroxide nanoparticles formation. UV-Vis spectroscopy, X-ray Diffraction (XRD), Transmission Electron Microscopy (TEM) and Fourier Transform Infrared Spectrometer (FTIR) were used to characterize the microstructure and morphology of the products. Spherical nanoparticles were obtained by this method. The generated particles are nearly spherical with a mean size 60 nm depending on synthesis condition. A stable product with no agglomeration in the long term was obtained using conditon 0.3 M sodium citrate at 55 Volt for 30 minutes.

Full Text

Title:	Simple delivery robot system based on line mapping method
Author (s):	Endrowednes Kuantama, Albert Brian Lewis Lukas and Pono Budi Mardjoko

Abstract: Simple delivery robot system was made to make daily activities easier because the robot can deliver things to another place as long as it is in the same floor and has line mapping. This research is different from previous line follower research; the robot used has a dimension of 40 cm (length) x 40 cm (wide) x 40 cm (height), it can be summoned from several rooms using RF remote and can be ordered to deliver things and send messages. The robot uses seven infrared sensors to trace the line which is within 1.5 cm from underneath its body. In this research, the robot can go to four designated rooms plus one base camp. The robot also has several features i.e.: alarm system which can indicate when the robot arrived at the destination, LCD and keyboard so the user can write message, obstacle sensor to avoid crash, and emergency system which will active when the robot stray out of the line. The emergency system activates video camera and alarm so the user can control the robot with remote control to position it back in the line map. All activities are controlled by microcontroller AT89C51. The focuses of this research are robot mapping system using line mapping, special remote system using radio frequency, message delivery system using LCD and emergency system using video camera and remote control. Maximum speed of the robot is 1.045 m/s, and it can accommodate maximum load of 3.5 kg.

Full Text

Title:	Recognition of a scattering 3d object using axially distributed image sensing technique
Author (s):	Donghak Shin, Joon-Jae Lee and Byung-Gook Lee

Abstract: In this paper, we present a recognition method for a 3D object in scattering media by using the axially distributed sensing (ADS) method and nonlinear correlation operation. Since the scatter noise for a 3D object is recorded into the elemental images by ADS method, we apply a statistical image-processing algorithm to convert the scattering elemental images into the scatter-reduced ones. After obtaining the scatter-reduced elemental images, the 3D plane images are reconstructed using the computational reconstruction algorithm based on ray back-projection. The reconstructed plane images are used for 3D object recognition in the scatter medium. We perform the optical experiments and present the experimental results.

Full Text

Title:	Predicting ozone concentrations levels using probability distributions
Author (s):	Ghazali N. A, Yahaya A. S., Nasir, M. Y and Mokhtar M. I. Z.

Abstract: Ozone (O_3) is one of the strongest atmospheric oxidants and is designated as a criteria pollutant in the atmospheric surface layer. Surface O_3 contributes to a number of environmental problem including adverse effects on health, vegetation and materials, as well as climate forcing. Thus it is necessary to gain a good understanding of the characteristics of O_3 pollution. In this research, four theoretical distributions namely Weibull, Beta, Lognormal and Inverse Gaussian distribution were used to find the best distribution that can fit the O_3 data at Cheras, Selangor. Statistical distribution models are based upon probability and capable of estimating the entire range of pollutant concentration. Probability density functions (pdf) and cumulative distribution functions (cdf) will be used to predict the time of the day with high ozone concentrations and hence can be used as a prediction tool. Parameter estimation for each type of distribution was estimated by using the method of maximum likelihood estimator (MLE). The best distribution was determined using the plots of cumulative distribution functions (cdf) and performance indicator including Root Mean Square Error (RMSE), Prediction Accuracy (PA) and Coefficient of Determination (R^2). The results revealed that the best distribution to represent O_3 concentration level in Cheras for 2010 is the Beta distribution. Based on the prediction using Beta distribution, it can be concluded that the O_3 concentration level in Cheras exceed the Malaysian Ambient Air Quality Guidelines of 0.01 parts per million (ppm).

Full Text

Title:	Ultimate load of built-up cold formed steel column
Author (s):	Fadhluhartini Muftah, Mohd Syahrul Hisyam Mohd Sani, Shahrin Mohammad and Mahmood Md. Tahir

Abstract: Cold formed steel (CFS) has been used as the primary structure for flexural and compression member due to varieties of advantages such as high strength to weight ratio, high corrosion resistance, and ease of fabrication. The criteria need to be considered in improving the structural strength is the fabrication method. Fast and easy fabrication can produce an efficient structure. Built-up of normal CFS into new member with higher strength can be produced efficiently by attaching the normal steel using self-drilling screw. CFS channel with constant size has been used to produce built-up, back to back (BTB), and box-up (BU) with varieties of length. The constant spacing were used at 400 mm centre to centre along its length and supported by using an angle plate that screw through its web. 18 nos of columns were tested for compression until the column cannot resist any increment of load. The ultimate loads were compared to the predicted buckling load using EC3-1-3. The prediction of column capacity is based on flexural buckling and torsional buckling failure. BTB column results in higher load except for 2.5 m length, while the differences of experimental load are up to 24 % to the experimental. Meanwhile, BU results in higher load for all columns with differences up to 80 % compared to the code and the code is considered too conservative for this column type.

Full Text

Title:	Analysis of characteristics of coal-water slurries obtained by plasma and electric discharge methods
Author (s):	S. L. Buyantuev, A. B. Khmelev and A. S. Kondratenko
Abstract:	The aim of the research is to obtain coal-water slurry, corresponding to modern requirements, with a minimum of energy. The paper presents the characteristics of coal-water slurries prepared by plasma and electric discharge methods. As a raw material used D-grade coal. By electron scanning microscopy was determined the chemical composition of suspensions and removed micrographs of the surface. Micrographs showed that the samples processed through both methods have pronounced dispersed structure, compared with the original. Elemental analysis showed a significant reduction in the oxides of sulfur and nitrogen. The results obtained make it possible to draw a conclusion about the availability of receiving coal-water slurries with new plasma and electric-discharge methods.

Full Text

Title:	An efficient water flow control approach for water heaters in direct load control
Author (s):	Alexander Belov, Nirvana Meratnia, Berend Jan van der Zwaag and Paul Havinga
Abstract:	Tank water heaters (WHs) are present in a prevailing number of European households. Serving as energy buffers WHs have come under the spotlight of various direct load control (DLC) programs over the last few decades. Although DLC has proven to be an efficient measure towards daily peak demand shaving, the payback effect might lead to a new peak in the grid. This payback phenomenon takes place every time a group of WHs under DLC is permitted to catch up. If not handled properly. This paper presents a novel real-time water flow control approach for domestic water heating systems aiming at decreasing the payback effect of DLC actions. We identify possible control strategies based on an analysis of the water system's thermal dynamics. We formulate the problem of optimal water flow control in terms of minimum WH payback demand and maximum user comfort satisfaction. User comfort is formalized by an integral energy characteristic. Simulations show that water flow control can significantly mitigate the DLC payback effect by reaching the fair compromise between energy savings and discomfort of an end-user.

Full Text

Title:	Biofuel production from candlenut oil using catalytic cracking process with ZN/HZSM-5 catalyst
Author (s):	Agus Budianto, Danawati Hari Prajitno and Kusno Budhikarjono
Abstract:	Biofuel is an alternative energy product that is environmentally friendly. Biofuel production is one of resolving the problems of energy shortage and global warming. This research aims to study the process of biofuel production from candlenut oil. The research was carried out by reacting the candlenut oil in a micro fixed bed reactor with diameter of 1 cm and length of 16.4 cm. Catalytic cracking method with Zn/HZSM-5 catalyst was used in this process. The effect of reactor temperature and nitrogen flow rate on the quality of biofuel was studied. Biofuel products were analyzed using Gas Chromatography. Biofuel composition is obtained by comparing the chromatogram of biofuels to the standart chromatogram. The result proves that biodiesel was the highest fraction of biofuels. The highest percentage of biodiesel was 80.75 % at a temperature of 325 °C and a nitrogen flow rate of 60 ml/min. Biofuel density was in the range of 0.81 to 0.84 g/ml. This biofuel had a cetane number of 74.8. Biofuel had octane number of 124.7, 114.7, and 119.7 using RON, MON, and AKI methods respectively. Biofuel had higher heating value of 19.269 btu/lb. Cetane number of biofuel was 46, 7% greater than that of fuel European Standard EN 590. This product can be recommended as a cetane improver.

Full Text

Title:	The role of cement dust in basalt-de-aluminated kaolin bricks
Author (s):	Hala Abu-El-Naga Hossein, Mona S. Mohammed and E A, EL-Alfi
Abstract:	Effect of gradual substitution of altered basalt by a few percent of cement dust (0, 5, 10, and wt.15%) on the ceramic properties of basalt-de-aluminated kaolin fired up to 1100ºC was studied. The results show that the samples containing 5 and 10 wt% cement dust give the higher suitable ceramic properties than the other samples. As the cement dust contents increases in the sample the apparent porosity enhances and the bulk density decreases at all temperature. Also, The XRD results reveal that the peaks of plagioclase and pyroxene of the altered basalt completely disappears in the sample containing cement dust and the intensity peaks of diopside sharply increase with cement dust content and firing temperature.

Full Text

Title:	Spatial temperature pattern of a non-invasive 2.45 GHZ microwave hyperthermia device
Author (s):	Imam Santoso, Thomas Sri Widodo, Adhi Susanto and Maesadjie Tjokronagoro
Abstract:	Hyperthermia is one method of tumor therapy, the goal of hyperthermia therapy is to generate enough heat (41ºC-45ºC) to kill the tumor cells without damaging the surrounding cells of healthy tissue. Maintain a stable temperature in the treatment is necessary, also knowing the area and the depth of penetrating by heat, especially when using microwave radiation hyperthermia type, purpose that the desired therapeutic effect can be restricted to certain area only (area contain tumor). In this research according to our developed microcontroller based 2.45 GHz microwave hyperthermia device, we investigate the temperature pattern during the exposure of microwave hyperthermia at ex vivo medium (agar phantom) based on some thermogram pictures acquired by using an infrared camera.

Full Text

Title:	Effective intrusion detection system for cloud architecture
Author (s):	P. Padmakumari, K. Surendra, M. Sowmya and M. Sravya
Abstract:	Cloud computing enables the end users to easily access internet based applications and data storage services. With the increasing popularity of cloud, providing security to cloud environment has become an important issue. In order to provide security for a cloud environment we require more than the traditional security methods like firewalls, user authentication, access control and confidentiality in data transmission. Hence Intrusion Detection System (IDS) becomes a needful component in terms of cloud

security. Many methods are being utilized for the development of effective intrusion detection systems, but none of them is completely secure. In this process of betterment, here we present an intrusion detection system, by applying k-means clustering for anomaly detection and integrate it with a frequent attacks generation module using apriori algorithm to detect frequently occurring attacks in various network environments. To evaluate the performance, KDD 99 CUP dataset has been used in our system.

Full Text

Title: Role-based access rights model for cloud system

Author (s): P. Shanthi, Bhyravarapu Sri Lakshman, PadavalaPavan Kumar and Panga Siva Reddy

Abstract:
Due to the abstraction and resourcefulness of the Cloud environment, it is emerging to the fore as an answer to the traditional methods. The access rights are used to achieve secure means of data confidentiality and implementation of the business logic. Role based access rights (RBAR) provide a hierarchical model to read and write the data as per authorization and requirement of the implementation logic. The generic models have security drawbacks and are vulnerable to unethical exploits. The proposed model uses broadcast encryption technique and decrypts using respective key. This scheme guarantees, other users/roles are not affected when revoking a user, re-encryption is not needed after user revocation. In this RBAR, the security is improved by limiting the number of users per role, limiting the operations on timely basis and reliability is improved by storing the data for recovery.

Full Text

Title: WS component selection by improvised high hit ratio using simple jaccard cosine distances with modi's cost effectiveness

Author (s): K.R.Sekar, S. Devasena, K.S. Ravichandran and J. Sethuraman

Abstract:
Software component is an inevitable commodity in the field of web technology applications. Any business transaction in online has been taken care by the software component as the whole. Web service is a software component, which is all articulating highly in the market. Selection and prediction for such a type of component is a tough task for our application. Prism classifier is a statistical tool through which obtaining good classification and ontology for our semantics with number of attributes. Every web service component has its own significance and QOS. Prism classifier generates output considering only high values, resulting in the rules, which contains only the best component, skipping the next components in the priority queue. The drawback in classical prism classifier is rectified by considering the attributes of the component having tie between maximum values. The homogeneity levels amongst a class, variation between the training data sets are also analyzed. By, improving the prism classifier, the resulting rule contains the best of the best component suitable for the customer. The series of tests like Simple Matching co-efficient, Jaccard distances, cosine distance, T-test, ANOVA etc., together with modified Prism classifier is named as IH2RC [Improvised High Hit Ratio Classifier]. In this paper, IH2RC is applied on a training data set, which contains online translators with their related attributes. For cost effectiveness of the software component MODI'S method is employed in this scenario.

Full Text

Title: The thin layer drying characterstics of chilly leaf under open sun and in a solar dryer

Author (s): Subahana K. R, R. Natarajan, Abhishek Awasthi, Melvin Mathew and Muralidharan Nattamai Gangadharan

Abstract:
In bio-oil production by fast pyrolysis of agricultural residues, controlled drying of feedstock to appropriate moisture content is very important since higher moisture content in biomass generally causes operational problems of biomass combustors and higher CO emissions. Chilly plants form an abundant biomass after harvesting of fresh chillies. In this paper, experimental investigation of the thin-layer drying of chilly (*Capsicum annuum*) leaves was conducted under open sun and solar drying methods. Solar drying was realized through a solar air heater in a drying chamber. It was completed by both forced (collector with and without fins) and natural convection methods. The experiments were done to attain less than 10% residual moisture content. The experiments were done at an average ambient temperature of 37.74 °C and an average irradiance of 653.8 W/m^2. The calculated values were tailored to four different mathematical drying models available in literatures. The appraisal between models was done by the application of regression coefficients, Root mean square error and sum squared errors. The logarithmic model with the highest R^2 and lower SSE value best fits the open air drying (natural convection) and solar drying (forced convection) of chilly leaves best.

Full Text

Title: Numerical modelling in improving subsurface drainage system for salt concentration control

Author (s): Edward Ampofo A. and Trevor Tanton W.

Abstract:
The study demonstrates that three-dimensional variable-density groundwater flow models such as the SEAWAT model can be effectively used for design of subsurface drainage systems for controlling salt concentration in the root zone on salt affected irrigated land. The SEAWAT model was used to optimize subsurface drainage design to ensure that the salt concentration of the groundwater at the base of the root zone does not exceed pre determined levels instead of the conventional approach of maintaining the groundwater at a predetermined water Table level. The study was carried out on Mankessim Irrigation Project site in Ghana of initial shallow water Table depth of 0.5 m and salt concentration of 6800 mg/l with assumed impermeable layer at 10 m deep and impermeable field boundaries. The simulated mid-drain head matched well with the measured especially when calibrated and the longitudinal dispersivity lied between 10 and 50 % of the main cell length, the drain conductance was greater than 500 m^2/d and drain cell dimension was at least twice the diameter of the drain. Using the model, spacings were designed to be used as design criteria for subsurface drainage system to reduce the water Table depth from 0.5 m to 0.8 m from the soil surface and maintain concentrations of 6000; 5000; and 4000 mg/l at the base of the root zone. The results showed that over a wide range of irrigation water quality and aquifer hydraulic conductivity, the optimum drain spacing using SEAWAT model was wider by between 3 and 50 % and the amount of drain discharge reduced by 1 and 27 % than were calculated using conventional (Hooghoudt) design equations. It was concluded that Three-Dimensional Variable-Density Groundwater Flow models are better for designing effective drainage systems than conventional drain spacing design equations such as Hooghoudt.

Full Text

Title: Methodology for solving the divergence of fixed point method for the solution of a nonlinear equation

Author (s):   Myriam Rocío Pallares M. and Wilson Rodríguez C.

Abstract: When we need to determine the solution of a nonlinear equation, there are two options for doing: (a) "closed-methods" which use intervals that contain the root and during the iterative process reduce the size of "smart" way, and, (b) "open-methods" which represent an attractive option as they don't require an initial interval enclosure. In general, we know open-methods are more efficient computationally though don't always work suitably. In this paper we are presenting the study of a very particular divergence case when we use open-methods, in fact, we use the method of fixed point iteration to look for square roots. To solve this problem, we propose to apply some tricks (developed by authors) to modify the iteration function. We propose two alternatives doing additional formulations of the traditional method and its convergence theorem. Although the situation has been studied with other methods like Newton an interesting divergence situation is presented in the method of fixed point iteration which probably could be solved by using another method, however the goal here is to demonstrate that this situation can be solved and additionally is possible to get a convergence higher than quadratic convergence in the first iterations when we use the proposed alternatives.

Full Text

Title: Assessment of water resources under climate change: Damodar river basin, India

Author (s):   Mangolika Chatterjee, Debasri Roy, Subhasish Das and Asis Mazumdar

Abstract: This study evaluates the impact of climate change on water resources of the Damodar river basin in eastern India. Future climate scenario has been framed based on climate projections of regional climate model PRECIS (Providing Regional Climates for Impacts Studies) of the Hadley Centre for A1B scenario [Special Report on Emissions Scenarios (SRES) prepared under the Intergovernmental Panel on Climate Change coordination (IPCC)]. A continuous daily hydrologic model HEC-HMS (Hydrologic Engineering Centre-Hydrologic Modelling System) calibrated for the basin was used to simulate the daily hydrological condition for baseline period 1985-1990 and future period 2014-2025. The impact assessment has been carried out by comparing baseline and future precipitation, potential evapotranspiration (PET) and flow regimes and also performance of the Damodar Valley Corporation (DVC) system of reservoirs. Decrease of projected rainfall was noticed for months of July and August and increase of projected rainfall was observed for months of January and June for all sub-basins. The projected PET values for all sub-basins were found to be higher than corresponding baseline values during February to June and lower than corresponding baseline values for November to January. Increase of projected flow over the corresponding baseline flow was noted for months of January and June and decrease in projected flow was noted for the months of July and August for all sub-basins. Reliability of meeting municipal and industrial demands was found to be 100% during the months of June to December in projected years and in baseline years for all the reservoirs.

Full Text

Title: Turbocharging and turbocompounding optimization in automotive racing

Author (s):   Luca Piancastelli and Leonardo Frizziero

Abstract: Turbocharged spark ignition engine for automotive racing have a long and controversial history. From the times of high torque at all cost, to the actual F1 era of maximum efficiency. However turbocharging and turbocoumpounding basic concepts have not changed. It is surprising that, through the years, the same identical errors are repeated. Turbocharger (TC) unit design is an highly optimized task, that requires good concepts, good mathematical models, lots of experimental data and a very good optimization. Performances vary completely with design choices, with big differences between even close solutions. Present software for mathematical modeling of performances are far from accurate and should be corrected with experimental data to obtain effective results. Genetic Algorithms are to be used as optimization method to evaluate the best design solution. Even minor errors in design choices result in large penalties on performance.

Full Text

Title: Efficient driver design for amoled displays

Author (s):   CH. Ganesh and S. Satheesh Kumar

Abstract: The conventional A current feedback driver with double zeros compensation is proposed for medium to large AMOLED displays. The zeros for lead compensation are implemented with switched-capacitor circuits to reduce chip area. The selection rules for compensation Capacitors and zero capacitors are described to obtain wide bandwidth and high speed. The proposed driver has a settling time of 7us for the panel load of 10k/100pF. This work uses high gain and low gain differential amplifiers to provide constant current through pixel and also make sure that voltage induced in capacitor will keep transistor in saturation to make further operation in emission period. Capacitors used for this feedback loop will provide high speed and high bandwidth. Two phases of operation is done to make current through pixel is constant. The feedback system can be analyzed to check performance by parameters like gain margin and phase margin. This current feedback system gain margin and phase margin can be calculated by keeping Data current initially zero and testing output using test voltage. OTRA, high slew rate TRA are used to improve GM, PM with current feedback. In this paper all feedback techniques are compared by checking their performances based on gain margin and phase margin.

Full Text

Title: Variability of soil erodibility factor with some soil management practices in a semi-arid agroecological condition, Nigeria

Author (s):   Jibrin M. Dibal, Ali U. Bashir, B. G. Umara and Bakari Baraya

Abstract: An assessment of soil erosion and all factors tangential to it is essential in soil conservation and environmental management. Soil erodibility, or the K-factor, is crucial in predicting the effects of land use and management on soil loss and thus affects every land user. The K-factor is based on permeability class, soil structure, modified silt content, and organic matter percent. Various physical and biological measures are often employed to stabilize the soils against erosion. Information of the effectiveness of the common soil management in soil erosion control is scarce in Maiduguri and environs. The effects of the common soil management practices (bare soil, conservation tillage, mulching, and compaction) on soil erodibility were studied under a simulated rainfall. The universal soil loss equation (USLE) nomogram-based K- factors for each plot were also estimated. The Soil erodibility values varied from 0.014 in mulched soils to 0.022 measured for the bare soils. The erodibility values measured from bare soil were above the nomogram-based values. Mulching and compaction demonstrated high potentials of controlling soil erosion, but due soil densification, compaction resulted into largest runoff volume, and could effect crop growth by wearing away of nutrients. The

effectiveness of conservation tillage was found to rely on extent of ground cover. Mulching is thus the most recommended means of soil erosion control in the area.

Title: Design and utilization wastes in construction

Author (s):   Mir Heydar Hashemi, Nima Haj Mohammad Hassani Mamaghani and Mojtaba Daei

Abstract: Developing a database for the cases of waste can successfully result in the identification of the causes of waste, leading us to codify policies to prevent them. The results indicated that a considerable amount of the construction waste is due to poor design. The waste resulting from design and utilization does not stand among the priorities of waste management; consequently, architects do not invest enough considerations on waste in their designing. The inattention to the problem of waste in designing eventually results in the development of waste in both phases of implementation and utilization. In the present study, the development of waste has been categorized in three groups of 1. Waste due to designing, 2. Waste due to implementation, and 3. Waste due to utilization, from which the focus was on the waste due to designing and utilization. The objectives of the study are to provide a redefinition of construction waste due to design and utilization, and introduce the factors that can cause waste. Based on the findings, a checklist is presented in order to control and minimize the waste.

Title: Interpretation of pressure tests in horizontal wells in homogeneous and heterogeneous reservoirs with threshold pressure gradient

Author (s):   Freddy Humberto Escobar, Yu Long Zhao and Lie Hui Zhang

Abstract: A pressure gradient level that must be reached to enable the fluid to overcome the viscous forced is defined as the threshold pressure gradient, TPG. It has been observed that the TPG has effect on the pseudorradial (or late radial) flow regime of horizontal wells, but such earlier flow regimes as early radial, early linear and elliptical do not suffer the effect of the TPG. In this work, a methodology previously introduced in the literature for well test interpretation in horizontal wells drilled in both homogeneous and naturally fractured formations has been adapted by using some corrections factors. The re-formulated methodology was successfully tested on synthetic pressure tests.

Title: Secure storage and transmission of images based on a dual encryption scheme

Author (s):   Grasha Jacob and A. Murugan

Abstract: Today there is an urgent need to provide and protect the confidentiality of images when stored in a cloud or transmitted over public insecure channel.. Various encryption schemes have been developed to make information intelligible only to the intended user. This paper proposes a dual encryption scheme which is a combination of Key dependent S-Box and DNA sequence based encryption imparting double fold security for the storage and transmission of images.

Title: Effects of phenolic resin and fly ash on coefficient of friction of brake shoe composite

Author (s):   E. Surojo, Jamasri, V. Malau and M.N. Ilman

Abstract: The friction performance of brake shoe composite indicated by coefficient of friction is influenced by braking conditions including contact pressure, sliding speed or temperature. This behavior is influenced by composite formulation. In the present work, we focus to investigate effect of phenolic resin and fly ash with variation in braking condition on coefficient of friction. Particular attentions are paid to changes in coefficient of friction with respect to the variation of contact pressure, sliding speed and disc temperature. Friction wear test was performed using pin on disc machine. The results show that coefficient of friction decreases with increasing volume fraction of phenolic resin and increases as the amount of fly ash is increased. In addition, phenolic resin affects load and speed sensitivity of coefficient of friction. In contrast, fly ash does not affect load and speed sensitivity of coefficient of friction. The coefficient of friction increases as disc temperature is increased from 29 $^{\circ}$C to 200 $^{\circ}$C. Phenolic resin does not affect disc temperature sensitivity of coefficient of friction. Conversely, fly ash affects disc temperature sensitivity of coefficient of friction.

Title: Management of risk through seepage reduction for two earth dams in Kurdistan Region, Iraq

Author (s):   Sangar Hasan Abdulkareem, Thamer Mohamed Ahmed and Abdul halim Ghazali

Abstract: Risk management through seepage reduction for earth fill dams with evaluation of risk and reliability has been a major concern for the hydrosystem and geotechnical engineers. Several techniques have been established to measure risk and reliability of a system. One of the main approach of risk reduction for seepage at earthen dams is modeling technique. In case of existence of seepage problem through or underneath the earth dams, reliability of the analysis should be based on review of as-built drawing and construction/operation photography of the dam site in order to tackle the defects which cause the problem. This study aimed at managing the seepage risk reduction of two existing zoned earthen dams that newly constructed in Kurdistan Region, Iraq, namely Hamamuk dam and Bawashaswar dam. Both dams have been suffering from downstream flat slope seepage since initial filling. For this purpose, construction/operation photography were reviewed and SEEP/W models waspplied. Construction defects that caused seepage problems at both dams were detected based on the construction/operation photography. Also, the effects of these defects on seepage rate and seepage path were simulated using SEEP/W model. Appropriate solutions were proposed based on different guidelines and references.

Title: Cement-quartz electrically conductive composites based on graphite dispersions

Author (s):   Alexander Nikolaevich Lopanov, Evgenia Aleksandrovna Fanina and Oxana Nicolaevna Guzeeva

Abstract: Specific electric conductivity of composite materials based on graphite dispersions was studied. The aim of the work is to optimize electrical properties of composites. It was found that with increase of graphite mass fraction from 0.06 to 0.2 electrical conductivity of the system cement-quartz-graphite increases from 0.85 to 13.11 $ohm^{-1} \bullet cm^{-1}$. Temperature dependences of the model systems cement-graphite, quartz-graphite, cement-quartz-graphite on conductive phase mass fraction were analyzed. To obtain effective compositions with stable electrical characteristics threshold concentration of a conductive component for cement-quartz composites equal to 0.06 was determined; any excess of this value leads to a great increase in the electrical conductivity due to formation of continuous chain structures. Temperature dependence of an electric conductivity logarithm in the model system cement-quartz-graphite is described by rising curves. Activation energies of electrical conductivity in the model systems cement-graphite, quartz-graphite, cement-quartz-graphite were calculated at different mass fraction of graphite.

Full Text

Title: Creation of automated control system of environmental safety of an industrial complex

Author (s): Olga Alexandrovna Ivashchuk, Orest Dmitrievich Ivashchuk, Igor Sergeevich Konstantinov and Alexander Vasilievich Mamatov

Abstract: This article presents the methodological approaches to the creation of modern automated control systems of environmental safety of an industrial complex, endowed with the property of rapid response in real time on the dynamics of the current environmental situation. These systems solve the complex tasks: environmental monitoring, an adequate prediction of the development of ecological situation with the variation of external conditions; operational formation of alternative management scenarios, their objective evaluation with a selection of the most efficient (from an environmental and economic point of view).

Full Text

Title: Study of building an analytical solution of the axisymmetric problem of linear elasticity in stresses as exemplified by finding the stress-strainstate of an ellipsoid cocavityunder the inner pressure

Author (s): Natalya Alexandrovna Gasratova

Abstract: This article presents an approach to finding analytical solutions of the axisymmetric problem of linear elasticity, which is based on setting up the problem fully formulated in stresses. It closely studies the example of finding stress-strain state of an ellipsoid cocavity under the inner pressure.

Full Text

Title: Substantiation of physical and mathematical model and determination of accelerations under the action of the elastic mixer driving forces

Author (s): Maya Viktorovna Sukhanova

Abstract: This paper deals with the justification of physical and mathematical model of flexible mixer having enclosure as the working body in the form of a cylindrical container, made of an elastic material. It has been shown that the accelerations, arising from driving forces of the working bodies of the mixer and the elastic forces of the elastic material acting on the mixture, are the determining factor in the formation of multi-component granular mixtures. The presented physical-mathematical model of the elastic mixer allows determining the acceleration and, therefore, regulating and managing the process of mixing.

Full Text

Title: Technology of electrically conductive composites of alkaline earth metals carbonates and carbon dispersions

Author (s): Alexander Nikolaevich Lopanov, Igor Valentinovich Prushkovsky, Oxana Nicolaevna Guzeeva Kseniya Vladimirovna Tikhomirova

Abstract: Electrical conductivity of composite materials based on alkaline earth metal carbonates and carbon dispersions was studied, the possibility of regulation of the electro-physical properties, temperature coefficient of electrical resistance, electrical conductivity was shown. Samples of compositions of composites with different conductive phase content were obtained and studied. A model of an experimental installation of an instantaneous water heater with a heating element based on alkaline earth metal carbonates and carbon dispersions was developed and its main technical parameters were identified. In the instantaneous water heater water is heated when passing through the heater, and electric power is consumed only during the use of hot water. Heating temperature of water is 353 K and does not dependent on water flow rate in the range of 50 - 100 ml/min. The required voltage for water heating is 12 ... 40 V (this low voltage is safe and is a guarantee of reliable and long-term work).

Full Text

Title: A logistics pattern for fruit and vegetable transportation from island region: the case of Sicily

Author (s): Ferdinando Corriere, Dario Di Vincenzo and Rosario Corriere

Abstract: The globalization of markets regards many sectors in the E.U. and among them also the fruit and vegetable in the face of growing and increasingly intense competition exerted by the products of countries with emerging economies. But, at the same time, the globalization can also lead to the opening of new potential markets for the products, when and where the transport system, more than other things, appears to be efficient and effective and makes possible to reach the target markets in the shortest time possible and at the lowest possible cost. It is therefore very useful to create a model that takes into account the peculiarities of the different modes of transport between the different origins/destinations and that allows a comparison in real-time, in terms of cost and time (eventually by the use of different ICT systems of easy access) for the evaluation of different alternatives of travel. These technologies, also, allow promoting the *grouping* of goods to facilitate the formation of the load and, in the same way, of sorting the incoming as well as to make more efficient the total journey by helping to speed up the operations of embarking or of disembarking in the case of transportation combined "road-sea" type ro-ro. The proposed model, establishing an effective basis of information for trucks drivers, allows the development of alternative cheaper transports, before neglected because less rapid; as in the same time it may also allow to simulate the benefits of new actions on the supply of transport system (activation of new lines, reduction the time of boarding or ferrying, etc.).

Full Text

Title: Improvement of laser to fiber coupling efficiency using microlens technique

Author (s): Ali H. Al-Hamdani, Hayfa G. Rashid and Zainab Rashid Ghayib

Abstract: The efficiency of coupling between semiconductor laser LD and single-mode optical fiber SMF was increased by a microlens of an appropriate focal length placed between laser and fiber. ZEMAX software was used to optimize the design of an optical system. The employed coupling system composed LD of 1.55 μm wavelength, achromatic doublet microlens and single-mode fiber, thermalized over the temperature range (243-343K). Main source causing the coupling loss have studied, these are misalignment during adjusting and fixing the position of fiber referring to the axial misalignment, lateral misalignment, angular misalignment error (tilt) and lateral and angular misalignment to gather .Achromatic doublet microlens of different types of glass material were selected. Significant coupling efficiency (95.5%) has been obtained for N-BAK4, N-SF10 microlens of radius of curvature 7.00900, -6.67800 μm, respectively. The effect of varying the field of view angle over the range (0-9°) on the coupling efficiency was taken into account. Coma, astigmatism and spherical aberration were observed. Results shows that the misalignment error proves to be the predominant factor that affects the coupling scheme with precise adjusting accuracy relaxed misalignment tolerances should be employed in the coupling system.

Full Text

Title: Numerical modeling of the impact problem using open source software

Author (s): Myriam Rocío Pallares M. and Wilson Rodríguez C.

Abstract: Numerical modeling of impact problem using elastic and elastoplastic constitutive models and open source software is presented. The first case is an elastoplastic model for the analysis of a cylindrical aluminum element that impacts on a rigid surface; the second case, is an impact model of a body on the center of simply supported aluminum beam introducing elastic and elastoplastic constitutive models. This work is originated from the need to explore some possibilities of impact phenomenon modeling. The main contributions were: establish the importance of the constitutive models in modeling the impact phenomenon, accessing to explicit dynamic models of impact with Open Source Software like "Impact" Finite Element Program and explore possibilities of parallel computing and multi-platform as this software is developed in Java and offers possibilities for using several processors in parallel. Some results were compared with theoretical solutions. It´s noted that variation between the behavior of the elastic and elastoplastic material models in the instant of impact is significant as well as the advantage of using several processors in modeling the phenomenon due to small size of time steps that normally generate a high volume of iterations and a great computational cost of the models.

Full Text

Title: Tensile strength of fly ash based geopolymer mortar

Author (s): P.Yellaiah, Sanjay Kumar Sharma and T. D. Gunneswara Rao

Abstract: Geopolymer is a promising binding material produced from alkali activated alumino silicate material and emerging as an eco-friendly sustainable construction material as an alternative to Ordinary Portland Cement. Geopolymer technology contributes to the reduction of greenhouse gas emissions and also reduces disposal costs of industrial waste by recycling. In the present study, effect of basic parameters such as activator to fly ash ratio and curing temperature on tensile strength development of geo-polymer mortar using low calcium fly ash is investigated. Samples of Geopolymer mortar specimens are made for varied alkaline activator to fly ash ratio with constant proportion of fly ash to sand. Laboratory tests are conducted on Geopolymer mortar specimens for compressive strength, direct tensile strength and flexural strength. The results reveal that higher mechanical strength can be obtained at higher alkaline activator to fly ash ratio and at higher curing temperature.

Full Text

Title: A three compartment mathematical model of liver

Author (s): V.Anand and N.Ch. Pattabhi Ramacharyulu

Abstract: Mathematical modeling of pharmacokinetics is an important and growing field in drug development. Pharmacokinetics concerns with the distribution of drugs, chemicals or tracers by a fluid among the various compartment of human body. In this work we discuss the compartment mathematical model of liver function based on fundamental biological and pharmacological principles. Here we present behavior of thyroxin, iodine and bile over a period of time.

Full Text

Title: Design, simulation and analysis of platinum micro heaters on AL2o3 substrate for sensor applications

Author (s): Kathirvelan J and Vijayaraghavan R

Abstract: This paper presents the design, simulation and analysis of Platinum micro-heaters for sensor applications. Finite element method (FEM) analysis was used to investigate the thermal properties of individual electrically driven platinum micro-heaters. The uniform heat distribution and optimization of power consumption for the micro-heaters were performed by simulating on possible different patterns using COMSOL. Four different patterns of micro-heaters were used in simulation and they are (a) rectangular spiral, (b) diagonal slanting, (c) double spiral and (d) complementary double spiral type. These micro-heaters are designed to ensure minimum power consumption, low thermal mass and better temperature uniformity. The Simulated temperature profile shows that the temperature distribution is uniform over the sensing area. For all the four patterns the temperature profile and power consumption when operated over a supply voltage of 0.5 V to 4 V to obtain an operating temperature from 300 K to 1200 K is compared and presented.

Full Text

Title: Lysozyme transmission through polymeric based ultrafiltration membrane: effect of ph and ionic strength

Author (s):   Sofiah Hamzah, Nora'aini Ali, Marinah Mohd Ariffin and Abdul Wahab Mohammad

Abstract: Fractionation and purification of complex protein mixture has becomes a great interest and has attracted a considerable amount of attention in recent years. This study aimed is to demonstrate the factors influencing the lysozyme separation through polyethersulfone ultrafiltration (UF) membrane. Asymmetric UF membrane with 15% polymer composition (UF15) was developed via phase inversion technique. Membrane was characterized in term of morphology, membrane surface charge and molecular weight cut-off to ensure its suitability for lysozyme separation. Effect of pH on the transmission of lysozyme through the UF15 membrane has been examined at different pH (5, 7, 9, 11 and 13) and ionic strength (0.1M, 0.2M and 0.3M). Results displayed that at optimum pressure 3 bars, permeation with pH 9 and 0.1M ionic strength of feed solution obtained the optimum flux and lysozyme transmission for about 36.6×10^{-5} m^3/m^2 and 92.9%, respectively. This study has proved that pH and ionic strength were found to be greatly affected the lysozyme transmission and promoted the lysozyme separation to a significant degree.

Full Text

Title: New deployable solar panel array for 1U nanosatellites

Author (s):   Mohammed Chessab Mahdi, Adnan Falh Hassan and Jaafer Sadiq Jaafer

Abstract: A new design for increased power extraction for NanoSatellites is proposed, which is used for KufaSat. This proposed design contains four expandable panels with additional sixteen solar cells, two solar cells on each side of panel. The proposed design with additional panels and how these additional panels are assembled to the body of KufaSat and how they are deployed after the launching are presented. Comparison between original design and proposed design in addition to discussion the increasing in power production and charge current are included.

Full Text

Title: Calculation of contact zone of grinding environment with partition in mills with cross-length movement of loading

Author (s):   Yuri Mikhailovich Fadin, Sergei Sergeyevich Latyshev, Andrei Vladimirovich Gavrilenko, Ksenia Gennadyevna Arkatova and Nikita Eduardovich Bogdanov

Abstract: In this paper there is a description of contact zones of grinding bodies with an inclined interchamber partition. Authors considered arrangement of zones in relation to an inclined partition and found out that these zones are various, and the contact in the first and second cameras of a pipe mill is carried during some time. Calculation of a contact one for loading level has been made. Analytical expression for calculation of loading bending around levels has been received. The combined method of calculation of a contour of active influence zone of grinding loading and contact zone of grinding loading with an inclined partition has been developed. Calculation of a contact zone for an angle natural slope has been carried out.

Full Text

Title: Constructive solution to eliminate air leaks and dust emission in the inlet and outlet of a kiln

Author (s):   Julia Anatolievna Bondarenko, Mikhail Alekseevich Fedorenko, Tamara Mikhailovna Canina, Nadezhda Savelievna Sevryugina, Olga Vasilievna Markova

Abstract: Design features of the lamella seal of cement kiln. Calculation of contact surface wear beads reduced by increasing the area of its contact with the kiln body, and applying a "light" alloy and compression force. Functional relationship between the parameter optimization and investigated factors. Dimensionless equation describing wear beads sealing device according to the major determinants of its design features and influencing its work in conditions of dry friction in the presence of a minor amount of solid lubricant. Determination of the load acting on the friction bead of the sealing device. Lubricant for friction surfaces. Justification of the choice of material friction surface (beads). Study the joint effect of insertion elements of wear on the friction surfaces. Analysis of the impact parameter optimization complexes. Ensuring uniform contact with the sidewall of the furnace sealing and prevent slipping, which will ensure minimum wear of rubbing surfaces and maximum seal life.

Full Text

Title: Distinctive features of the relations between grinding equipment and devices inside ball mill body

Author (s):   Vasiliy Stepanovitch Bogdanov, Sergey Ivanovitch Hanin, Denis Nikolaevitch Starchenko and Ildus Amirkhanovitch Sagitov

Abstract: The mathematical description of the parameters of spatial movement processes of the grinding bodies and their interaction with the inclined intermediate diaphragm in the rotating body of the ball mill is carried out to determine the influence of inside mill devices on the grinding load. It allows defining the kinematic and dynamic characteristics for each of the grinding bodies and their groups; the calculating method of the power consumed by their movement. An analytical expression is obtained to calculate the power consumed by the grinding media motion in the mill body with inclined intermediate diaphragm. The numerical computer and physical experiments with mill without inside mill devices are conducted to determine the power consumed by the grinding media motion. A quantitative estimation of the changes of kinematic parameters during the grinding media rotation, characterized by more intensive movement and changing their mode installation of the inclined intermediate diaphragm which contributes to the intensification of the process of grinding material is given.

Full Text

Title: Kinematics of the ball load in the tube ball mills with inclined interchamber partitions

Author (s):   Yuri Mikhailovich Fadin, Andrei Vladimirovich Gavrilenko, Ksenia Gennadyevna Arkatova, Jan Alexeevich Avdeev and Nikita Eduardovich Bogdanov

Abstract: In this paper we have studied features of kinematics of spherical loading in pipe spherical mills with inclined interchamber partitions. Calculation of a separation of a sphere from a drum of a mill and from an inclined partition has been made. Coordinates and sphere speed at the time of collision with a drum of a mill and an inclined partition have been calculated. Change of kinetic energy of a sphere in a mill with an inclined partition has been shown. Cross-length trajectories of movement of spheres depending

on their situation on a partition have been defined. Diverse nature of impact of spheres creates conditions of vibration impact on a crushed material. The scheme for definition of an active area of coverage of a partition has been submitted. The size and nature of kinetic energy allow to increase efficiency of process of crushing and to improve power of spherical mills. Schemes of movement of loading have been presented depending on an inclined angle of a partition and on rotation frequency.

Full Text

Title: Material composition and colloid-chemical properties of natural and modified montmorillonite clays

Author (s): Alexandr Ivanovich Vezentsev, Ekaterine Viktorovna Kormosh, Lidia Fedotovna Peristaya, Aleksey Vladimirovich Shamshurov and Roman Andreevich Cherkasov

Abstract: There is determined the dependence of colloid-chemical properties of the natural and modified montmorillonite clays from "Polyana" deposit in Shebekinsky district, Belgorod Region, Russian Federation, on their material composition, i.e. on their chemical, mineral and granulometric composition. It is shown that cation-substitution in the inter-pack positions of montmorillonite results in the increase of clay's sorption capacity and its natric form can be used for the efficient water purifying from iron ions (III). It has been observed the high adsorption rate of Fe3+ ions within the first five minutes of purifying water solutions, which is conditioned by increase of exchange cations content, increase of sorbent's specific surface and alteration of zeta-potential towards the negative range at beneficiation and modification. It has been detected that sorption of Fe^{3+} ions by natural and modified clays is determined by processes of ion exchange and are of chemosorption nature predominantly.

Full Text

Title: Performance review and principal directions for development of a grinding equipment in cement factory

Author (s): Alexey Alekseevich Romanovich

Abstract: The importance of energy-savings in grinding of materials in a cement factory using press-rolling crusher and grinding mill was considered. An analysis of the development of grinding equipment on the basis of grinding mill in the past half century has been presented. Comparative characteristics of existing grinding units are also presented. Established that the vast reserves of energy saving during grinding contain materials having anisotropic texture and is widely used in the manufacture of building materials, including cement, which have different ultimate resistance in directions perpendicular and parallel to the layering of the mineral. The recommended of development and retrofit of the grinding equipment to grind anisotropic materials, which include: to the uniform and ingress direction of mill feed across the width of the working surfaces of the rolls; force strength action in the direction of the strength of minimal pieces of anisotropic material; effective conditions deagglomeration and grinding mill the compacted pressure press-rolling crusher of materials; realization of effective constructively-technological solutions structural and technological solutions that enhance the wear resistance of working surfaces and other aggregates. Suggested areas of development and improvement of engineering and technology development grinding materials may be of interest to Russian and foreign organizations operating in the design and manufacture of the grinding equipment.

Full Text

Title: Specifying the parameters of flow aspiration in the tube mill

Author (s): Vasiliy Stepanovich Bogdanov, Olga Sergeevna Mordovskaya, Vitaliy Pavlovich Voronov, Dmitriy Sergeevich Khanin and Igor Viktorovich Kirilov

Abstract: The aspiration pipe of cement mills was previously viewed by the industrial enterprises of building materials primarily as a process of reducing the emission of dust from the loading space in the neck of the mill shop and reduce airborne dust in the grinding part. The works of different authors have shown that the efficient mode of aspiration intensifies the mill work and the right choice of aspiration, the de-dusting units reduces the return of the discharged dust. These studies have not been completed yet. In this paper we will consider the analytical form of the expressions determines the resultant velocity components and the aspiration flow in the first chamber of the tube mill rotated with the drum mill. It was established that the helical pitch of the aspiration flow in the chamber is inversely proportional to the volumetric flow rate of the air mass and directly proportional to the speed of the drum. The grinding bodies decrease the oscillation amplitude of masses aspiration by the increasing of the load factor of camera. The analytical dependences allow defining the rational modes of aspiration and required air flow.

Full Text

Title: Theory of vertical auger

Author (s): Aleksandra Vladimirovna Rud, Natalya Nikolayevna Evstratova, Vladimir Aleksandrovich Evstratov, Denis Vasilyevich Bogdanov, Svetlana Yurievna Lozovaya and Artem Sergeevich Lunev

Abstract: Vertical auger transportation of loose and pulverulent materials is an integral part of many technological processes in various industries and agriculture. The vertical screw conveyors are used in a wide range of various industries and along with such advantages as simple structure, continuity of transportation, integrity, the ability to transport dusty and pungent goods, have a significant drawback - material other than the translational motion in the direction of the axis of the pipeline performs rotational movement in the circumferential direction of the screw speed, which reduces productivity and increases the energy consumption of the conveyor. An adequate mathematical description of this process should allow designers to improve the efficiency of the vertical screw conveyors greatly by calculation and selection of the optimal values of the geometric, kinematic and dynamic parameters of working parts.

Full Text

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BIOFUEL PRODUCTION FROM CANDLENUT OIL USING CATALYTIC CRACKING PROCESS WITH ZN/HZSM-5 CATALYST

Agus Budianto[1], Danawati Hari Prajitno[2] and Kusno Budhikarjono[2]

[1]Department of Chemical Engineering, Institute of Technology of Adhi Tama, Surabaya, Indonesia
[2]Department of Chemical Engineering, Sepuluh Nopember Institute of Technology, Surabaya, Indonesia
Chemical_budi@yahoo.co.id

ABSTRACT

Biofuel is an alternative energy product that is environmentally friendly. Biofuel production is one of resolving the problems of energy shortage and global warming. This research aims to study the process of biofuel production from candlenut oil. The research was carried out by reacting the candlenut oil in a micro fixed bed reactor with diameter of 1 cm and length of 16.4 cm. Catalytic cracking method with Zn/HZSM-5 catalyst was used in this process. The effect of reactor temperature and nitrogen flow rate on the quality of biofuel was studied. Biofuel products were analyzed using Gas Chromatography. Biofuel composition is obtained by comparing the chromatogram of biofuels to the standart chromatogram. The result proves that biodiesel was the highest fraction of biofuels. The highest percentage of biodiesel was 80.75 % at a temperature of 325 °C and a nitrogen flow rate of 60 ml/min. Biofuel density was in the range of 0.81 to 0.84 g/ml. This biofuel had a cetane number of 74.8. Biofuel had octane number of 124.7, 114.7, and 119.7 using RON, MON, and AKI methods respectively. Biofuel had higher heating value of 19.269 btu/lb. Cetane number of biofuel was 46, 7% greater than that of fuel European Standard EN 590. This product can be recommended as a cetane improver.

Keywords: biofuel, candlenut oil, cetane, improver, Zn/HZSM-5.

INTRODUCTION

Nowadays, the fossil energy resources become scarce, and they cannot be renewed. Moreover, the using of fossil energy resources is not environmentally friendly. This has triggered the awareness to find another sustainable energy resource [1]. Vegetable oils can be used in diesel engines after several chemical processes. Its viscosity and volatility can be reduced by trans-esterification process [2]. Later, biodiesel can be produced from this process in fatty acid methyl ester (FAME) form. Additionally, biofuel can be produced from vegetable oils by cracking process [3-9]. Biofuel has more advantages than that of FAME biodiesel. Biofuel is similar to conventional diesel oil chemical in its composition and it is liquid fuel [10]. Government of Indonesia through Presidential Decree No. 5 of 2006 has commanded the development of biofuel as a substituting energy resource. The use of biofuel is expected to be more than 5% in 2025. Vegetable oils that have been studied for biofuel production are palm oil, castor oil, candlenut oil, bintaro oil and nyamplung oil.

Candlenut is one resource of vegetable oil that has high oil content of 60-65%. Candlenut plants are very easy to grow and easy to maintain. Although the biofuel production process of candlenut oil has not been studied before, but it has been believed that the cracking process can provide better results than the esterification process. The achivment of the devolopment of zeolit catalys for palm oil cracking are not automatically used for other vegetble oils. For example ultrastable Y zeolite (USY) catalyst can be used for rubber seed oil cracking produced liquid fuel similar to those of gasoline-based fuels [3].

Composite catalyst from USY (SiO2/Al2O3 = 14), HY (5.5), Beta (37), ZSM-5 (90) and ZSM-5 (1770)) (25 wt %), commercial alumina (60 wt %) and alumina-sol

(15 wt% as Al2O3) with water if it is used for soybean oil, it will produce main fraction of biodiesel [4]. The study of plants, especially palm oil, cracking and the using of zeolites as catalyst have been carried out as a comparison [5]. Actually, the previous researchers have done the research with beeter result, but the catalyst has not been used for candlenut oil cracking yet.

Although the composition of candlenut oil is different from palm oil but they have some similar constituent of fatty acids. Therefore, the use of Zn/HZSM-5 in the catalytic cracking process of candlenut oil is very interesting to be developed. The purpose of this study was to determine the composition of the candlenut oil, to obtain the proper operating conditions to produce biofuel with the largest biodiesel fraction and to obtain the characteristics of the biofuel.

This research is useful to develop new energy from vegetable oil. The main point of this research is to produce special biofuel. The achievement of producing biofuel with cetane number higher than that of conventional fuel give real contribution in the development of new energy product. The use of candlenut oil is attracted because it is produced from a potential plant. The biofuel can be used directly or it is mixed by conventional fuel. The product with high cetane number can be developed as new cetane improver.

EXPERIMENTAL SET-UP

The study was initially started with catalyst preparation. The impregnation of Zn to HZSM-5 was done to obtain Zn/HZSM-5 catalyst. This catalyst was characterized using X-ray Fluorescence (XRF), X-Ray Diffraction (XRD) and Brunauer Emmett Teller (BET) methods. XRF method was used to determine the moles ratio of Si/Al and the Zn content. XRD method was used

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to prove the existence of HZSM-5 in catalyst. BET method was used to determine the specific surface area and the pore size of catalyst.

Another preparation is the extraction of candlenut oil. The extraction process was done by compression with pressure of 17.692 kg/m². The composition of candlenut oil was analyzed by Gas Chromatography-Mass Spectrometry (GC-MS).

Later, the cracking process was carried out in a micro fixed bed reactor. The cracking process equipment series consists of evaporator, reactor, condenser and nitrogen gas cylinder, as seen in Figure-1. The process was initiated by charging candlenut oil as a feed to be heated up to temperature of 250°C, while nitrogen was streamed to the reactor. Later, the cracking process was brought into each determined variable. The products out from the reactor were later analyzed by Gas Chromatography (GC) method.
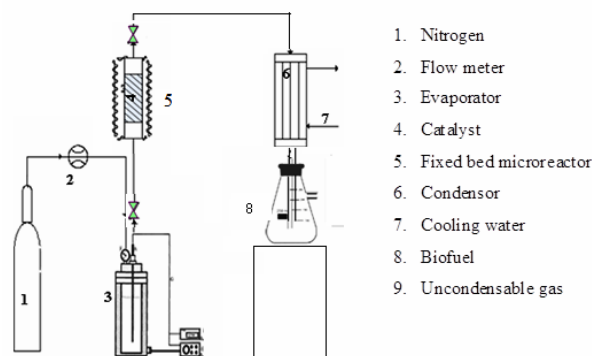

1. Nitrogen
2. Flow meter
3. Evaporator
4. Catalyst
5. Fixed bed microreactor
6. Condensor
7. Cooling water
8. Biofuel
9. Uncondensable gas

Figure-1. Equipment series of catalytic cracking.

RESULTS AND DISCUSSIONS

Determination of candlenut oil composition

The extraction of candlenut oil by compression produced 425 ml oil per kg of seed. Based on the GC-MS analysis result, candlenut oil contains oleic acid, 2-butyl-5-hexyloctahydro, palmitic acid and carbonic acid. The highest content was oleic acid of 69, 708%, as seen in Table-1.

Table-1. The composition of candlenut oil.

Name of fatty acid	Fatty acid (%)
Carbonic acid	3.685
Palmitic acid	8.357
Oleic acid	69.708
2-butyl-5-hexyloctahydro	18.251

Characterization of catalysts

The catalyst was proved as Zn/HZSM-5 with surface area of 109.345 m²/g, pore volume of 0.018 cm³/g, pore diameter of 37.235 Å, Zn content of 4.55% of mass and Si/Al mole ratio of 24.3.

Characteristics of Biofuels

Effect of reaction temperature on biodiesel selectivity

Temperature affected the selectivity of biofuel content, especially biodiesel in the product. Figure-2 shows that at nitrogen flow rate of 60 ml/min, the selectivity of biodiesel is in range of 76.77%-80.75%. The highest selectivity of biodiesel is reached at temperature of 325°C. Meanwhile, at nitrogen flow rate of 100 ml/min, the result shows that biodiesel selectivity increases from 40% to 70% from temperature of 300°C to 325°C, but later it decreases to 30% at 375°C. This is caused by the difference in the activation energy of each fraction in biofuels.

The selectivity of biodiesel from candlenut oil was 46.77% higher than that from palm oil with HZSM-5 catalyst. Moreover, the yield of biofuel from candlenut oil was 48.77% higher than that from palm oil with Zn/HZSM-5 catalyst.

Effect of reaction temperature on biokerosene selectivity

Biodiesel content is desired rather than biokerosene content in the product since biokerosene contains many impurities. The result shows that the lowest biokerosene selectivity is 15.17 % at temperature of 325°C and nitrogen flow rate of 60 ml/min, as shown in Figure-3. The selectivity of biokerosene from candlenut oil was 20% higher than that from palm oil cracking with Zn/HZSM-5 catalyst at temperature of 350°C.
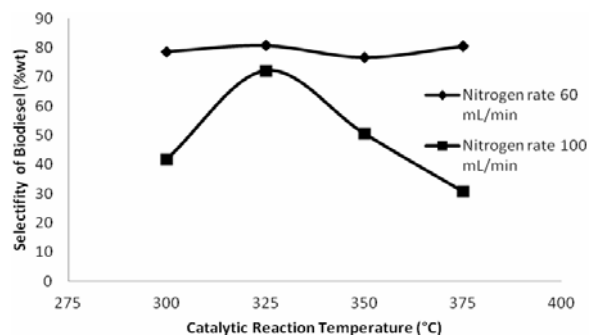

Figure-2. Effect of reaction temperature on the biodiesel selectivity for various nitrogen rates.
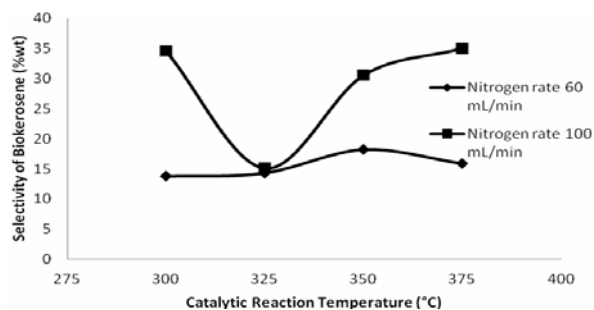
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Figure-3. Effect of reaction temperature on the
biokerosene selectivity for various nitrogen rates.

**Effect of reaction temperature on biogasoline
selectivity**

Since the desired product is biodiesel content,
therefore the lowest biogasoline content is expected.
Figure-4 shows that at nitrogen flow rate of 100 ml/min,
the lowest biogasoline selectivity of 12.62% is reached at
temperature of 325°C. Meanwhile at nitrogen flow rate of
60 ml/min, the lowest biogasoline selectivity of 3.51% is
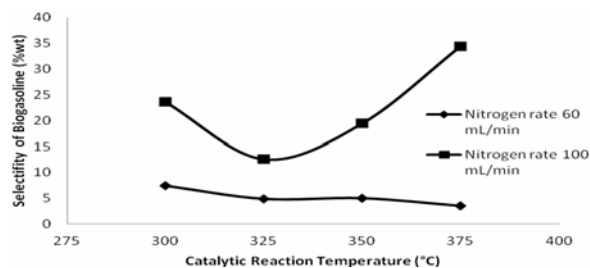reached at temperature of 375°C.

Figure-4. Effect of reaction temperature on the biogasoline
for various nitrogen rates octane number, Cetane Number
and Heating Value.

Biofuel consists of biodiesel, biokerosene and
biogasoline. The highest content was biodiesel with
percentage of 80.75%. The other contents were
biogasoline with percentage of 4.88% and remaining
biokerosene. The octane number of biofuels was analyzed
by RON, MON and AKI methods. The octane number was
124.7, 114.7, and 119.7 using RON, MON, and AKI
methods, respectively. The cetane number of biofuel was
74.8. This biofuel cetane number was 46.7 % greater than
that of the fuel European Standard EN 590. The higher
Heating Value (HV) of biofuel was 19, 269 btu/lb. Based
on these results, it is clear that biofuel can be
recommended to replace conventional biodiesel fuel since
it has high cetane number.

CONCLUSIONS

Candlenut oil has different composition to palm
oil. The composition of candlenut oil is oleid acid, 2-butyl-
5-hexyloctahydro, Palmitic acid dan Carbonic acid with
percenatge of 69,708%, 18.251, 8.357% dan 3.685%
respectively. The production of biofuel from candlenut oil

using catalytic cracking process with Zn/HZSM-5 catalyst
can be used as a substitute for fossil fuel energy sources.
Biofuel from candlenut oil has higher biodiesel selectivity
than that from palm oil. The biodiesel highest selectivity
was 80.75% at temperature of 325°C and nitrogen flow
rate of 60 ml/min. The cetane number of biofuel was 74.8,
which was high enough. Therefore, Zn/HZSM-5 is highly
reccomended for biofuel production from candlenut oil.

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