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Trends in Middleware Abstarction for Context Dissemination in Mobile Ad-Hoc Network

V. Hakami and M. Dehghan

Context dissemination completes the value chain of contextual information procurement and is identified as a precondition to actual context use by enlarging the visibility scope of context sources beyond the local acquisition or fusion entity and towards a network neighborhood. When leveraged for context-aware services in MANETs (Mobile Ad-hoc NETworks), an often-stated goal is to cater for personalized refinement and constant monitoring of a high volume of heterogeneous data with lower chance of longevity. Context-aware middleware abstractions pave the way by masking the physical distribution of data and by working out the appropriate logic for identifying the most relevant subset of context for use by an application component. This study compiles the state-of-the-art trends in programming abstractions built around the notion of context and present an exhaustives a detailed survey of their relevant middleware incarnations. Also, some key design considerations are identified for MANET-based context dissemination and the study investigates how these requirements have been approached from a variety of directions by the reviewed systems. *(Journal of Applied Sciences 9 (1): 1-14, 2009; **doi**: 10.3923/jas.2009.1.14)*

Moving Chain: A Surround-and-Push Method in Object Pushing Using Swarm of Robots

A. Khozaee and A. Ghaffari

In this research, a new approach to develop an object pushing system with a swarm of mobile robots is introduced. This is an attempt to design and develop a system for a swarm of robots and their behaviors to surround and push an object. The robot behaviors are devised in such a way that the robots would easily develop a swarm formation as an orbit around the object and push it toward the desired goal. Roughly speaking, a rotating orbit of robots around the object is developed first. The object is moved toward the goal as the orbit moves to the desired goal configuration. Based on this idea, using a simple decision making, each robot can easily determine its proper action to push the object while remaining in the robot formation. Fuzzy controllers are used to develop behaviors in each robot. Each robot makes decision and behaves individually without any direct communication with others. Based on this individually behavior the group cooperation will perform. The main characteristics of the developed system are

independency of the method to the object kinematics and its shape. Moreover, as a result of a swarm system, the method is not dependent on the number of robots in the system. Simulation results are given to support the proposed approach. *(Journal of Applied Sciences 9 (1): 15-26, 2009; **doi:** 10.3923/jas.2009.15.26)*

Supply Chains Based on Common Platforms: Analysis of Time Savings Gained by Commonality

M.A. Shafia, M.G. Ariyanezhad, M. Fathollah and F. Taham

Sharing common resources is amongst critical factors creating competitive advantages in business and manufacturing. In today's competitive and dynamic environment, application of the resource sharing approach has become the focal point of attention for business managers. By resource sharing and through common platform guidelines, the possibility of producing an extended variety of products using the least variable production elements is provided. Meanwhile, today's manufacturing industries are trying hard to plan and manage an effective foundation for creating a value stream from the point of supplying resources to the stage of delivering the final product to the customer. Standardizing and sharing product components and common platforms is of great assistance to this effort. This study presents a mathematical model to contribute to making the decision of choosing the best combination of common components and analyze the time effects of commonality approach and its possible consequential savings as one of the key performance indicators of a supply chain based on common platform. *(Journal of Applied Sciences 9 (1): 27-37, 2009; **doi:** 10.3923/jas.2009.27.37)*

Integrate Kano's Model and IPA to Improve Order-Winner Criteria: A Study of Computer Industry

Yu-Cheng Lee, Cheng-Chien Cheng and Tieh-Min Yen

The aim of study is to establish a new methodology of IPA to improve order-winner criteria and win orders. Importance-performance analysis (IPA) model has been widely used as the primary tool for market research and business improvement. However, traditional IPA model has important hidden assumption, that is performance and satisfaction have a linear relationship. Under these assumptions, if the quality characteristics cannot meet the above-mentioned assumption, the IPA model will not accurately analyze the importance and priority ranking for improvement, leading to wrongful decision making. This study puts forth a new decision making and analysis methodology that will, on one hand,

exploit the Kano's Model to establish nonlinear relationship between quality characteristics and customer satisfaction, when quality characteristics are functional and dysfunctional. On the other hand, the analysis will adjust the importance of quality characteristics according to the effect of quality characteristic improvement on customer satisfaction. The modified IPA model takes the nonlinear relationship between quality characteristics and customer satisfaction into consideration, not only boosting effectiveness of the IPA model, but also retaining the simple decision making pattern of traditional IPA models. Finally, the study takes a case of industrial computers in Taiwan to address the application and effect of IPA methodology modified by Kano's model. *(Journal of Applied Sciences 9 (1): 38-48, 2009;* ***doi:*** *10.3923/jas.2009.38.48)*

Automatic Adjustment of Television Sets Using an Uncalibrated Camera with a Novel Fuzzy Test Pattern and an Adaptive Alignment Algorithm

A. Peiravi and S. Toosizadeh

In this study we present the results of experimental research on an automatic adjustment system for television sets that relies on an inexpensive, uncalibrated camera to measure the geometric attributes of the TV screen and by using a closed-loop structure, sends adjustment signals which are generated by a computer to the television's internal EEPROM. Also several image processing tools have been utilized to measure the geometric parameters of the TV screen through the output images obtained by the camera. Control strategies are used to adjust and stabilize these parameters. We have already proposed and published a novel fuzzy test pattern and an adaptive alignment algorithm which are both used in the present research. This approach is implemented in real-time in a manufacturing house. *(Journal of Applied Sciences 9 (1): 49-58, 2009;* ***doi:*** *10.3923/jas.2009.49.58)*

Study on the Exigency Demands of Residential Buildings' Users

Răzvan Giuşcă, Raluca Giuşcă and V. Corobceanu

The aim of the study is to emphasize the actual demands of residential buildings' users and to explore new methods, yet less used, that could improve the buildings environmental comfort. The residential buildings, constructed by man in order to function as shelter where multiple processes of the social and material life takes place, are influenced by many factors that have to be taken under consideration

when projecting, constructing, using and post-using them. All aspects emphasized in this study should be first considered in the processes of their interaction and interdependency and then to be systemically approached and analyzed. During the second half of the twentieth century, the urban population knew an incredible growth. This growth led to an exponential increase of the energy consumption and a more than alarming exceeding of noxious gases in the air and wastage. There was a time when the energy consumption was considered an indication of the quality of life. Therefore, from the point of view of the energy consumption, many differences appeared between the developed countries and the developing ones. At the same time a person living in one of the developed countries has energy consumption twenty-five times greater than one living in a poor country. A popular idea was that we can fight poverty with increased energy consumption. However, the facts showed a disturbing reality energy wastage. *(Journal of Applied Sciences 9 (1): 59-68, 2009;* ***doi:*** *10.3923/jas.2009.59.68)*

Commonality and its Measurement in Manufacturing Resources Planning

M.A. Wazed, Shamsuddin Ahmed and Nukman Yusoff

The main objectives of this research are to study the commonality indices in manufacturing resource planning reported in literatures since 1980 and some useful insights including advantages and disadvantages of using commonality in manufacturing/production environment. It is observed that in designing a new family of products/processes or analyzing an existing family, commonality indices can often be used as a starting point. Systematic understanding and effective use of commonality and commonality indices can help managing inventory levels, uncertainties and cost dimensions. *(Journal of Applied Sciences 9 (1): 69-78, 2009;* ***doi:*** *10.3923/jas.2009.69.78)*

Hybrid Genetic Algorithm for Vehicle Routing and Scheduling Problem

K. Ghoseiri and S.F. Ghannadpour

This study aims to solve Vehicle Routing Problem with Time Windows (VRPTW), which has received considerable attention in recent years, using hybrid genetic algorithm. Vehicle Routing Problem with Time Windows is an extension of the well-known Vehicle Routing Problem (VRP) and involves a fleet of vehicles set-off from a depot to serve a number of customers at different geographic locations

with various demands within specific time windows before returning to the depot eventually. To solve this problem, this study suggests a hybrid genetic algorithm combined with Push Forward Insertion Heuristic (PFIH) to make an initial solution and λ-interchange mechanism to neighborhood search and improving method. The proposed genetic algorithm uses an integer representation in which a string of customer identifiers represents the sequence of deliveries covered by each of the vehicles. Part of initial population is initialized using Push Forward Insertion Heuristic (PFIH) and part is initialized randomly. A λ-interchange mechanism interchanges the customers between routes and generates neighborhood solution. At the end, in order to prove the validity of the suggested model, fourteen instances of Solomon's 56 benchmark problems-selected randomly- are solved and compared with the other meta-heuristic methods. The results indicate the good quality of the method. *(Journal of Applied Sciences 9 (1): 79-87, 2009;* ***doi:*** *10.3923/jas.2009.79.87)*

Obtaining and Characterization of the Polymer Concrete with Fly Ash

M. Harja, M. Bărbuţă and L. Rusu

The aim of this study is investigation of properties of polymer concrete with fly ash as filler for obtaining new composite building materials. Polymer concrete realized of epoxy resin, fly ash and crushed fine and coarse aggregates has been prepared for assessing the influence of fly ash and resin dosage over its properties. Density, microstructure, compressive strength, flexural strength and split tensile strength were studied for different combinations determined on the design of experiments concept. The experimental results confirm the possibility of using fly ash to produce polymer concrete at a potentially lower cost and without compromising its structural integrity. The use of fly ash as a filler in polymer concrete is very promising because it improves the physical properties of the material and particularly its compressive and flexural strength. *(Journal of Applied Sciences 9 (1): 88-96, 2009;* ***doi:*** *10.3923/jas.2009.88.96)*

A Genetic Algorithm for Scheduling Flexible Manufacturing Cells

M.T. Taghavifard, M. Heydar and S.S. Mousavi

In this study, scheduling of Flexible Manufacturing Cells (FMC) is taken into consideration. This type of production system combines the merit of job shop and

flow shop production systems. FMS Scheduling belongs to the class of problems that are known as NP-hard. This study presents a genetic algorithm-based technique to schedule machines and Automated Guided Vehicle (AGV), simultaneously. To generate schedules from a given chromosome, four Priority Dispatching Rules (PDR) are considered. Maximum completion time or makespan is defined as the objective function. The algorithm was coded and many randomly generated problems were solved. The obtained results were compared with optimum values obtained from the most comprehensive mathematical formulation in the literature. The experimental results show that the proposed method performs well in terms of efficiency and quality of solutions. For further study, the researchers will consider this problem in multi-objective environment. *(Journal of Applied Sciences 9 (1): 97-104, 2009; **doi:** 10.3923/jas.2009.97.104)*

An Investigation of Efficiency of Outlet Runoff Assessment Models: Navroud Watershed, Iran

H. Mojaddadi, M. Habibnejad, K. Solaimani, M.Z. Ahmadi and M.A. Hadian-Amri

This research has been carried out for investigation and comparison of the amount of precision and correctness of SCS unit hydrograph, GRAY, G.I.U.H and Gc.I.U.H models in determination of the shape and dimensions of outlet runoff hydrograph in Navroud watershed with 266 km^2 area, located in Giulan Province of Iran and use of these models for the similar watersheds and without any data. To investigate the amount of efficiency of above-mentioned methods, first 6 equivalent rainfall-runoff events were selected and for each, hydrograph of outlet runoff were calculated. Then the models were compared with together, for peak time, base time, peak flow and volume of outlet runoff and the most efficient model in estimation of hydrograph of outlet flow for similar regions was proposed. Comparison of calculated hydrographs obtained from models under research and observed hydrographs of selected events showed that SCS unit hydrograph method had the most direct agreement in three parameters of peak time, base time and volume of direct runoff. On the other hand, the geomorphoclimatic instantaneous unit hydrograph, with the highest mean relative error of 16%, had highest harmony in estimation of peak flow direct runoff. *(Journal of Applied Sciences 9 (1): 105-112, 2009; **doi:** 10.3923/jas.2009.105.112)*

A Non-Parametric Statistical Approach for Analyzing Risk Factor Data in Risk Management Process

S.M.H. Mojtahedi, S.M. Mousavi and A. Aminian

The aim of this study is to propose one practical approach to use non-parametric bootstrap technique in risk management processes especially for analyzing risk factor data, because of the fact that in most decision making cases data sizes and expert's comments are too small for analyzing risk factor data or often there are no parametric distributions on which significance can be estimated; therefore, standard statistical techniques do not always provide answers to complex risks questions. The non-parametric bootstrap is a powerful technique for assessing the accuracy of a parameter estimator in situations where conventional techniques are not valid and also non-parametric bootstrap technique is extremely valuable in situations where data sizes are too small. Bootstrap technique for decreasing the SD of risk factor data is described as well. Confidence intervals for risk factors are also obtained by means of bootstrap resampling technique. To make it more understandable, an application example is also provided. It can be concluded from the example that bootstrap will produce more accurate results in comparison with conventional techniques. *(Journal of Applied Sciences 9 (1): 113-120, 2009;* ***doi:*** *10.3923/jas.2009.113.120)*

The Effect of Dry Machining on Surface Integrity of Titanium Alloy Ti-6Al-4V ELI

G.A. Ibrahim, C.H. Che Haron and J.A. Ghani

In this study, surface integrity generated when machining Ti-6Al-4V-ELI alloy with coated cemented carbide tools under dry condition was investigated. The surface roughness values recorded when machining Ti-6Al-4V-ELI with coated carbide tools was lower at higher feed rate and generally, these curves consist of three stages. The machined surface generated consists of well-defined uniform feed marks running perpendicular to the tool feed direction. Surface damages on the machined surface generated observed after machining are deformation of feed marks and re-deposited workpiece material. The thin layer of disturbed or plastically deformed layer was formed immediately underneath the machined surface and it was found when cutting operation at cutting speed of 95, feed rate of 0.35 mm rev^{-1} and depth of cut of 0.10 mm and at the end of tool life. *(Journal of Applied Sciences 9 (1): 121-127, 2009;* ***doi:*** *10.3923/jas.2009.121.127)*

Appraisal of the Geostatistical Methods to Estimate Monthly and Annual Temperature

M.H. Mahdian, S. Rahimi Bandarabady, R. Sokouti and Y. Norouzi Banis

Three geostatistical methods were evaluated for estimation of monthly and annual temperature. These methods consist of Thin Plate Smoothing Splines (TPSS) with and without co variable, Weighted Moving Average (WMA) and Kriging (ordinary and cokriging). Moreover, the elevation was used as co variable. Cross Validation technique was used for comparison of the above-mentioned methods. Based on the results obtained in this study, regression coefficients between elevation and monthly or annual temperature was greater than 0.8. Variography analysis shows good spatial correlation for monthly and annual temperature in these regions. The TPSS method with power of 2 and with elevation as co variable was recognized as the most precise method in estimating monthly and annual temperature. Mean absolute error values for annual and monthly temperature was calculated 1.02 and 1.45°C, respectively). Also, the Cokriging method is ranked as the second method in estimating temperature with MAE = 1.5°C in this study. *(Journal of Applied Sciences 9 (1): 128-134, 2009; **doi:** 10.3923/jas.2009.128.134)*

Application of Analytical Hierarchy Process for the Evaluation of Climate Change Impact on Ecohydrology: The Case of Azraq Basin in Jordan

Yasin A. Al-Zu'bi

This study is related to ecohydrology which incorporates the use of ecosystem properties as a management tool in implementing a program of water resource management. The methodology adopted to assess the impact of climate change on ecohydrology in Azraq basin is based on water balance equation, US Soil Conservation Service Method (SCS), Penman-Monteith model, statistical correlation with meteorological data and Analytical Hierarchy Process (AHP). Scenarios are developed to reflect the extent of variations in both temperature and rainfall. Climate changes are addressed at three levels; local, national and regional. The study concluded that under the condition of increased temperatures and precipitation fluctuations, the overall mean annual recharge for the Azraq basin would decrease. Both results of AHP analysis and stochastic model indicated that the expected significant impact of climate change on ecohydrology will be at local level in the long term. *(Journal of Applied Sciences 9 (1): 135-141, 2009; **doi:** 10.3923/jas.2009.135.141)*

Effects of Intermediate Anchors on End Anchored Carbon Fibre Reinforced Polymer Laminate Flexurally Strengthened Reinforced Concrete Beams

M.Z. Jumaat and A. Alam

This research presents the results of an experimental study to look into the effects of intermediate anchors on end anchored CFRP laminate strengthened beams. Three beams of 125×250×2300 mm in dimensions were cast. Out of these, one beam was left un-strengthened and acts as the control beam and another two beams were strengthened with CFRP laminates. Both strengthened beams were end anchored to prevent premature end peeling. From the strengthened beams, one beam was intermediate anchored in the shear span to prevent premature shear failure. The anchorage lengths provided by the end and intermediate anchors were of 200 and 40 mm, respectively. The results showed that the intermediate anchors in shear span zone prevented premature shear failure. Result also showed that the strengthened beams with intermediate anchors had significant effects on failure loads, failure modes, strain characteristics, deflections and cracking patterns over the end anchored strengthened beam. *(Journal of Applied Sciences 9 (1): 142-148, 2009;* ***doi:*** *10.3923/jas.2009.142.148)*

Chemical Constituents of Oil-Cured Tropical Bamboo *Gigantochloa scortechinii*

R. Salim, R. Wahab, Z. Ashaari and H.W. Samsi

The chemical constituents of oil-cured 3 years-old tropical bamboo *Gigantochloa scortechinii* were investigated in this study. The bamboo splits were oil-cured using organic palm oil at temperature of 140, 180 and 220°C for duration of 30 and 60 min. The bamboo splits were then grinded into small particles and air-dried prior to the chemical analysis to obtain the compositions: holocellulose, hemicellulose, cellulose, lignin and starch. Untreated samples were used as control for comparison. The results obtained showed an overall reduction in the chemicals constituents after treatments compared to the control. Significant changes were however noted after the bamboo samples underwent treatment at temperature above 180°C. The holocellulose content decreased slightly from 81.4 to 79.7% for treatment conditions at 220°C for 30 min. On the other hand holocellulose content diminished significantly when the sample was treated at 180°C for 30 min and further treatment resulted in 72.7% holocellulose content at 220°C for 60 min

treatment. The hemicellulose content of bamboo ranged from 24.1 to 27.8% when treated at 140 and 220°C for 30 to 60 min, respectively. The cellulose content of heat-treated samples ranged 47.4 to 55.2%. Starch contents were largely reduced from 4.1 to 1.9% for control to oil-cured samples at 220°C for 60 min. *(Journal of Applied Sciences 9 (1): 149-154, 2009; **doi:** 10.3923/jas.2009.149.154)*

Multiple Regression Model for Compressive Strength Prediction of High Performance Concrete

M.F.M. Zain and S.M. Abd

A mathematical model for the prediction of compressive strength of high performance concrete was performed using statistical analysis for the concrete data obtained from experimental work done in this study. The multiple non-linear regression model yielded excellent correlation coefficient for the prediction of compressive strength at different ages (3, 7, 14, 28 and 91 days). The coefficient of correlation was 99.99% for each strength (at each age). Also, the model gives high correlation for strength prediction of concrete with different types of curing. *(Journal of Applied Sciences 9 (1): 155-160, 2009; **doi:** 10.3923/jas.2009.155.160)*

The Relationship Between Psychological Climate and Organizational Commitment

A.Z. Nammi and Maryam Zarra Nezhad

The aim of this study is to investigate the existence of relationships between components of psychological climate including autonomy, trust, pressure, cohesion, support, recognition, fairness and innovation and teachers, commitment to school, teaching occupation and work group. The study was conducted in one of the biggest cities (Ahvaz) in Iran, using a sample consisting of 170 teachers. Two methods were applied: Correlation analysis and multiple regression analysis. Support was found for the existence of statistically significant relationships between psychological climate and components of organizational commitment. The result of multiple regression analysis showed that trust, innovation support, fairness and recognition have significant effects on the explanation of variance of organization commitment. *(Journal of Applied Sciences 9 (1): 161-166, 2009; **doi:** 10.3923/jas.2009.161.166)*

Gender Differences in Creative Perceptions of Undergraduate Students

H. Naderi, R. Abdullah, H. Tengku Aizan, J. Sharir and V.K. Mallan

This study investigated the difference between gender-role identity and creativity of students at Malaysian Universities. The respondents were 153 undergraduate Iranian students (48 females, 105 males; aged 19 to 27 years) in Malaysia Universities. All students were given a Khatena-Torrance Creative Perception Inventory Test (KTCPI). The instrument comprised two subscales, namely, Something About Myself (SAM) and What Kind of Person Are You (WKOPAY)? Each subscale had fifty items. The results revealed no significant difference between female and male students' overall creative perception. Further examination revealed that male students score higher in the WKOPAY subscale ($t = 2.578$, $p = 0.011$), while females scored higher than males in the initiative factor ($t = 3.566$, $p = 0.000$) and males scored higher than females in the environmental sensitivity factor ($t = -2.216$, $p = 0.028$) in the SAM subscale. Further replications on similar samples are needed. *(Journal of Applied Sciences 9 (1): 167-172, 2009;* ***doi:*** *10.3923/jas.2009.167.172)*

Reliability Improvement of the Analog Computer of a Naval Navigation System by Derating and Accelerated Life Testing

Ali Peiravi

The reliability of the analog computer of the naval navigation system was improved by the application of derating and accelerated life testing. Spice circuit analysis and temperature profile analysis were performed based on which part derating scheme was developed. Afterwards a systematic approach for accelerated life testing was designed to discover the weaknesses of the system under test and the fixes to the system were performed to improve its reliability. Since many mechanisms of failure were present in the product being tested, the PMRL model was used for multiple failure modes in modeling the failure times obtained from accelerated life tests. A significant reduction in mean time to failure and improvement in reliability was achieved. The predictive calculations for the mean time to failures were carried out using MIL-HDBK-217F for the Naval Sheltered and the Naval Unsheltered working conditions per the real operating conditions of the system and were compared with the results obtained from our experimental and modeling work. *(Journal of Applied Sciences 9 (1): 173-177, 2009;* ***doi:*** *10.3923/jas.2009.173.177)*

Theoretical Study and Finite Element Simulation of Tearing in Hydroforming Process

S.A. Zahedi, A. Shamsi, A. Gorji, S.J. Hosseinipour and M. Bakhshi-Jouybari

An axisymmetric analysis was developed to investigate the tearing phenomenon in cylindrical Hydroforming Deep Drawing (HDD). By theoretical and finite element simulation methods, the critical fluid pressures which result rupture in the workpiece were studied. The results showed that the theoretical pressure path is an upper limit of the tearing path. The effects of anisotropy, drawing ratio, sheet thickness and strain hardening exponent on tearing diagram were also investigated. It is shown that die profile radius is effective on blank profile radius. *(Journal of Applied Sciences 9 (1): 178-182, 2009; **doi:** 10.3923/jas.2009.178.182)*

Factors Affecting the Success of Fisheries Co-Management as Perceived by Guilan's Fishermen

M.S. Allahyari

This study was intended to draw the factors affecting the success of fisheries co-management as perceived by Guilan's fishers, Iran. A sample of 136 fishers was selected through multistage cluster sampling technique. To identify the effective factors to success fisheries co-management, a self-designed questionnaire was developed to gather data. For determining the validity of questionnaire, the face and content validity was used. Reliability for the instrument was estimated at 0.77. According to factor analysis, the effective factors for the success of fisheries co-management process were categorized into nine groups that those factors explained 67% of the total variance of the research variables. The results also indicated that Common goal, Sustainable fishing and Lack of bureaucracy had the most effects on the success of fisheries co-management, respectively. *(Journal of Applied Sciences 9 (1): 183-187, 2009; **doi:** 10.3923/jas.2009.183.187)*

Self-Hypnosis in Attenuation of Asthma Symptoms Severity

M. Zobeiri, A. Moghimi, D. Attaran, M. Fathi and A.A. Ashari

According to probable effects of psychological stress on exacerbation of asthma symptoms, utilizing complementary therapies such as hypnosis may be an effective

treatment for reduction of asthma symptoms severity. Forty asthmatic patients were randomly allocated to self-hypnosis and control groups. Person's subjective perception of dyspnoea in both groups was assessed in 4 different stages via modified MRC scale (Modified Medical Research Council Dyspnoea Scale; range 0-4). Also, the Forced Vital Capacity (FVC) and Forced Expiratory Volume in one second (FEV_1) were measured through spirometry twice a time, once prior to and again at the end of this one month study period. Only 72.5% of the patients completed the trial. The median change in dyspnoea symptom scores was greater in self-hypnosis group than control group ($p = 0.004$). There was no significant difference in FVC, FEV_1 and FEV_1% within each group and between them. According to the results, self-hypnosis can improve symptomsbut does not seem to change lung function in asthmatic patients, at least in short periods of time. *(Journal of Applied Sciences 9 (1): 188-192, 2009;* ***doi:*** *10.3923/jas.2009.188.192)*

Relationship Between Maternal Distress with Fetus Growth Rate: Mediator Role of Heart Rate

M. Shafizadeh and M. Mehdizadeh

The aim of present investigation was to study the relationship between mothers' distress and fetal growth. In this correlational study, 110 pregnant women selected randomly and completed Depression Anxiety Stress Scale (DASS) before ultrasound measurement of fetus. The results of structural equation model have shown that the overall model has been accepted ($\chi^2 = 36.4$, $df = 24$, $p>0.05$). In fact, by increasing mothers' stress and anxiety, the fetus heart rate was increased and it decreased the height, weight, head circumference and width and femur length of fetus. Therefore, one of the environmental variables that have negative effect on the fetus growth is mother distress, because it can stimulate the fetal autonomic nervous system through the mediating of heart rate. *(Journal of Applied Sciences 9 (1): 193-196, 2009;* ***doi:*** *10.3923/jas.2009.193.196)*

Electrical Investigations of $YBa_2Cu_3O_{(7-x)}$ ($0 \le x \le 0.5$) Tunnel Junctions

B. Chouial and B. Hadjoudja

In this study, we investigate superconducting tunnelling junctions based on high T_c $YBa_2Cu_3O_{(7-x)}$ ($0 \le x \le 0.5$) superconductors. Prepared junctions were

characterised at different temperatures and several voltage ranges. It was found that the measured current-voltage as well as conductance characteristics exhibited good superconducting behaviour. Many properties such as the zero voltage anomaly and gap anisotropy were put into evidence. *(Journal of Applied Sciences 9 (1): 197-200, 2009; **doi:** 10.3923/jas.2009.197.200)*

Fast Adaptive Update Rate for Tracking a Manoeuvring Target with a Phased Array Radar, Using IMM and MRIMM Algorithms

H. Benoudnine, M. Keche, A. Ouamri and M.S. Woolfson

In this study, a new fast method for selecting the next update time in two maneuvering target tracking algorithms, namely the Interacting Multiple Models (IMM) algorithm and the Multi Rate Interacting Multiple Models (MRIMM), will be presented. Both IMM and MRIMM are used here to predict and estimate the target's possible states and to select the correct next update time. The idea is to assign to each model in the IMM and MRIMM algorithms an appropriate rate and to weight these rates by the models' probabilities to obtain the rate to use. The resulting algorithms are named, respectively, the Fast Adaptive IMM (FAIMM) algorithm and the Adaptive MRIMM (AMRIMM) algorithm. Using Monte Carlo simulations, the performances of these algorithms are compared to that of the Adaptive IMM algorithm that uses Van Keuk criterion to select the next update time and to that of the IMM algorithm and MRIMM that use a constant update time. *(Journal of Applied Sciences 9 (2): 201-213, 2009; **doi:** 10.3923/jas.2009.201.213)*

Analysis of Drivers for Development of Common Platform Throughout Supply Chain Management (Concepts, Drivers and Case Study in Auto Industry)

M.A. Shafia, M. Fathollah and H. Ghazanfari

In this research, we studied the causes and effects of the factors that determine the trend of employing Common Platforms (CP) in Supply Chain Management (SCM) of automotive industries. Moreover, we proposed a framework for analyzing Supply Chain Based on Common Platforms (SCBCP) in industries. The research methodology of this study is based on fact finding approach. Therefore, presenting the definitions and concepts of pertinent subjects, a conceptual model is developed for determining various aspects and finding facts regarding SCBCP in automotive

industry. Critical factors and important facts in SCBCP have been identified by developing and analyzing the conceptual model. In addition, a triple performance criterion for the evaluation of SCBCP is developed. This study is one of the first to present a framework for SCM based on CP. The main research questions behind this study concern the following three main aspects: understanding, describing and guiding how we can apply supply chain based on common platform in auto industry. *(Journal of Applied Sciences 9 (2): 214-225, 2009; **doi:** 10.3923/jas.2009.214.225)*

Petrochemistry of the Reduced, Ilmenite-Series Granitoid Intrusion Related to the Hired Gold-Tin Prospect (Basiran), Eastern Iran

M.H. Karimpour, C.R. Stern, A. Malekzadeh Shafaroudi, M.R. Hidarian and A. Mazaheri

Doing research, two suites of Oligocene-Miocene granitoids, one relatively oxidized (magnetite-series) and the other relatively reduced (ilmenite-series), were identified at Hired, Eastern Iran. Since Au-Sn mineralization is associated only with the relatively reduced ilmenite-series suite. It became interested to study the petrochemistry and petrophysics of these intrusive rocks. The magnetic susceptibility of the magnetite-series granitoids is greater than 300×10^{-5} SI. This suite includes meta-aluminous, medium-K to high-K series gabbros to diorites containing magnetite, hornblende and biotite. The magnetic susceptibility of the ilmenite-series granitoids are less than 60×10^{-5} SI. This suite includes meta-aluminous, high-K to shoshonitic diorites to granites, containing, biotite, muscovite and tourmaline. Both the ilmenite and magnetite series suites are strongly enriched in large ion lithophile elements (LILEs = K, Th, Rb, Ba) and depleted in high field strength elements (HFSE = Nb, Sr, Ti, Hf). Chondrite-normalized Rare Earth Element (REE) plots indicate strong enrichments of light relative to heavy REE, with $(La/Yb)_N$ between 7-24. Ilmenite suite granitoids have pronounced negative europium anomalies. Stockwork mineralization is found within and nearby the relatively reduced ilmenite-series granites. Based on their mineral assemblages (arsenopyrite, pyrrhotite, tourmaline, pyrite, gold and quartz), the ore-bearing fluids that generated these stockwork veins was also reduced. This and the spatial relationship of mineralization with the ilmenite suite granitoids, indicates that the ore fluids originated from reduced granitoid magmas. Hired Au-Sn deposit is a reduced-intrusion related gold system. *(Journal of Applied Sciences 9 (2): 226-236, 2009; **doi:** 10.3923/jas.2009.226.236)*

A Model for Stakeholder-Oriented Benchmarking Process

K. Mohajeri, M.D. Nayeri and M.M. Mashhadi

Despite the strategic orientation of most benchmarking processes in the past researches, this study provides a new approach to benchmarking in accordance with nowadays stakeholder-oriented business climate which stresses on performance improvements that benefit all stakeholder groups. So the purpose of this study is to propose a benchmarking process model addressing the key role of stakeholders in managing and measuring organization's performance. This model presents a stakeholder-oriented view to performance improvement through benchmarking tool using value based concepts. Based on reviewing the literature, an exploratory approach is used to design the process model of benchmarking and it is supported and tested through a case application in an Iranian business school. The presented model which includes 10 steps was successfully implemented in improving the value drivers of selected case. Hence it seems that the model can be of use to various industries and businesses to improve their value creation capabilities. On this basis, future researches should be focused on more case studies from various industries and businesses and more perfect realization of stakeholder orientation claims of suggested approach. *(Journal of Applied Sciences 9 (2): 237-247, 2009;* ***doi:*** *10.3923/jas.2009.237.247)*

Gaussian Radial Basis Adaptive Backstepping Control for a Class of Nonlinear Systems

F. Farivar, M. Aliyari Shoorehdeli, M.A. Nekoui and M. Teshnehlab

This study proposes a Gaussian Radial Basis Adaptive Backstepping Control (GRBABC) system for a class of n-order nonlinear systems. In the neural backstepping controller, a Gaussian radial basis function is utilized to on-line estimate of the system dynamic function. The adaptation laws of the control system are derived in the sense of Lyapunov function, thus the system can be guaranteed to be asymptotically stable. The proposed GRBABC is applied to two nonlinear chaotic systems which have the different order to illustrate its effectiveness. Simulation results verify that the proposed GRBABC can achieve favorable tracking performance by incorporating of $GRBF_{NN}$ identification, adaptive backstepping control techniques. *(Journal of Applied Sciences 9 (2): 248-257, 2009;* ***doi:*** *10.3923/jas.2009.248.257)*

The Investigation and Explanation of Local Model of Effective Internal Factors on Stock Price Index in Tehran Stock Exchange with Fuzzy Approach

Alireza Pakdin Amiri, Morteza Pakdin Amiri and Mojtaba Pakdin Amiri

The goal of this research was an investigation and explanation of local model of internal effective factors on stock price index in Tehran Stock Exchange (ISE) with fuzzy approach. Based on, it was reviewed literature of stock price index in special. The statistical population and sample were 500 and 150 elements, data collection instruments were documents, interviews and specially questionnaire with reliability of 0.85 as nonexprimental survey research, to explanation of local model with emphasize on fuzzy and using SPSS v.15 and FuzzyTech v.5.61 software. The results showed in the entire internal factors, managerial, marketing and structural variables have the most effect on stock price index. Finally, it is presented concluding, discussion, implications for managers and directions for further research. *(Journal of Applied Sciences 9 (2): 258-267, 2009; **doi:** 10.3923/jas.2009.258.267)*

Multi Criteria Decision Analysis and Geographic Information System Framework for Hazardous Waste Transport Sustainability

S. Monprapussorn, D. Thaitakoo, D.J. Watts and R. Banomyong

This study introduces a combination of Multi Criteria Decision Analysis (MCDA) and Geographic Information System (GIS) approaches to the hazardous waste transport problem. There are risks associated with a truck being involved in an accident during shipment of hazardous materials (HAZMAT) and/or hazardous wastes. The level of impact posed to surroundings depends on many factors such as population density, No. of sensitive locations, proximity to rescue units and security. It is essential that all of the related factors and criteria involved be considered prior to making decisions about route selection. Certain routing criteria and standards for HAZMAT transport have been developed in many developed countries such as the United States, Canada and European countries with the purpose of risk avoidance during shipment of these materials. However, a lack of a comprehensive framework for the selection of HAZMAT and/or hazardous waste routes that the transporter can use for aiding their decisions is a major concern in most developing countries. The purpose of this study is to develop a framework for making optimum hazardous waste transport routing choices by

incorporating multiple factors and sub-factors. Factors and sub-factors are divided into three main categories; economic, environmental and societal (exposure and emergency response) issues that are in line with the sustainability paradigm. The proposed framework can contribute to the thought processes of governmental policy-makers and carriers when they evaluate possible routes and are making their decision in order to minimize damage from transporting hazardous waste. *(Journal of Applied Sciences 9 (2): 268-277, 2009; **doi:** 10.3923/jas.2009.268.277)*

Tele-Visual Servoing of Robotic Mamipulators; Design, Implementation and Technical Issues

I. Hassanzadeh and H. Jabbari Asl

In this study, a new architecture for tele-visual servoing of a robotic manipulator is presented. An overview of methods employed for controlling robotic manipulators using a camera is illustrated. Image-based and position-based approaches are considered. Matlab®, Simulink® and xPC Target® toolbox are used to design a novel user-friendly toolkit called Tele-Visual Servoing Toolkit (TViST) for tele-visual servoing of robotic manipulators. TViST has hardware in the loop (HIL) property, i.e., simulation and implementation of the system are performed in the same environment. Stability analysis of visual servoing systems in presence of time delay is discussed by Lyapunov theorem. Furthermore, effects of robot dynamic on performance of the system are evaluated. In terms of low level control, proportional and H-infinity controllers are implemented as well. As a case study, a 5DOF Gryphon manipulator is considered. Simulations for various mentioned matters are done to validate the theoretical issues. Experimental results for the manipulator employing a virtual camera and a real camera are presented to illustrate and verified the practical performance. *(Journal of Applied Sciences 9 (2): 278-286, 2009; **doi:** 10.3923/jas.2009.278.286)*

Land Use Scenarios and Optimization in a Watershed

D. Nikkami, M. Shabani and H. Ahmadi

The main objective of this research is to study the optimized combination of land allocation to different land uses like rangeland, orchard, irrigated farming and dry farming for minimized soil erosion and maximized people's net income in Kharestan watershed located in the Northwest of Eghlid, Fars province, Iran. A multi-objective Linear Programming (LP) model was applied in three different land use

scenarios including existing land uses plus land management (Scenario 1), existing land uses with some degree of land management (Scenario 2), and proper land uses plus land management (Scenario 3). The amount of soil loss and net benefit in each land use were computed and used as inputs to formulate the objective functions and governing constraints in optimization problem. The problem was solved using the simplex method with the help of LINGO software package and the optimal solution was ultimately determined. The results showed that in the optimized condition, while rangelands experience no change, the area of orchards should be increased from 561 to 2115 ha (377%), irrigated farms should be reduced from 871 to 237 ha (73%) and dry farming lands should be decreased from 1050 to 129 ha (88%). Also, by existing land management, land use optimization decreases soil erosion by 3.7% and increases net income by 163%. In existing land use some land management implementation, decreases soil erosion by 37% and increases net income by 206%, while in proper land uses and management, soil erosion decreases by 53% and net income increases by 208%. Sensitivity analysis showed that the area of orchards and rangelands are the most sensitive parameters and their changes have the highest effect on the amount of net income and soil erosion. *(Journal of Applied Sciences 9 (2): 287-295, 2009; **doi:** 10.3923/jas.2009.287.295)*

Development of Heuristics for Multi-Product Multi-Level Capacitated Lotsizing Problem with Sequence-Dependent Setups

M. Mohammadi, S.M.T. Fatemi Ghomi, B. Karimi and S.A.Torabi

This study considers the problem of multi-product multi-level capacitated lotsizing and sequencing problem with sequence-dependent setups. A Mixed Integer Programming (MIP) formulation of the problem is proposed which is impractical to solve in reasonable computing time for non-small instances. Reducing the dimensionality of the problem and allowing to solve larger instances, a modified mathematical model is developed which ignores majority of combinations. The ability to quickly find integer-feasible solutions for non-small instances is another aspect of this paper. Hybrid methods that mixes rolling-horizon approach and heuristic are developed. Heuristic is used to determine binary variables of current period. To test the accuracy of hybrid methods, a procedure for obtaining a lower bound on the optimal solution is developed. The trade-offs between objective values and computing times are also provided. *(Journal of Applied Sciences 9 (2): 296-303, 2009; **doi:** 10.3923/jas.2009.296.303)*

Mobile Multimedia Control Model for Fire Disaster of City Building

X. Li, R. Salleh and O. Zakaria

In this study, we focus on combination of GIS and 5G wireless mobile multimedia networks to propose a real-time fire disaster processing model-Mobile Multimedia Control Model (MMCM) so that a quick response can be taken once fires over to reduce destroy, especially peoples life. In the end of the study, two models will be compared. *(Journal of Applied Sciences 9 (2): 304-311, 2009; **doi:** 10.3923/jas.2009.304.311)*

Comparison of Reconstructive Methods Using Different Filters to Study Cardiac Wall Motions in Gated Single Photon Emission Computerized Tomography

D. Shahbazi-Gahrouei, A. Arabpour, F. Rastgoo and N. Yaghoobi

The aim of study is to comparison of two reconstructive methods using different filters to study the five cardiac wall motions via Gated single photon emission computerized tomography imaging was done through Gated SPECT (with a two-day protocol) and quantitative coronary angiography (QCA) on 25 patients (16 males, 9 females, mean ages, 54.08 year). Angiography was performed on patients about 1 to 5 days before scanning. Regional wall motion was determined through two methods: using Gated SPECT, FBP and OSEM reconstructive methods and changes in frequency and spectrum slope in Metz, Butterworth and Ramp, it creates 42 sets. Motion disorders were classified in four groups. This data was compared and evaluated to data which was gained from QCA method in which motion disorders were classified in to four groups, too. The result reveals that in order to study function of each WM, the accurate and precise method is as follows ($r = 0.7$): For antero-basal wall OSEM reconstructive method with Ramp 2-8 filter and FBP reconstructive method with Metz 5-9 and Butterworth 0.35-9 filters is an accurate method. Applying OSEM with Ramp 4-8 filter and FBP with Metz 4.5-9 and Butterworth 0.35-9 filters for postero-basal wall is a suit method. OSEM with Ramp 2-8 filter and FBP with Metz 4-9 and Butterworth 0.30-9 filters for antero-lateral is a sufficient method. For apex wall, OSEM with Ramp 4-8 filter and FBP with Metz 4.5-9 and Butterworth 0.35-3 filters is a reliable method. Finally, applying OSEM with Ramp 2-8 filter and FBP with Metz 4.5-9 and Butterworth 0.35-9 filters for diaphragmatic wall is an accurate method. Electrocardiographic Gated single photon emission computed tomography

(EGS) supplies worthwhile functional data to cardiologists. Exercising two physical factors of reconstructive methods and filtration in Gated SPECT, significant information can be obtained about cardiac wall motions. It suggests using an appropriate reconstructive method and filtration for studying cardiac wall motions by non-invasive and economical Gated SPECT method supplies maximum results. *(Journal of Applied Sciences 9 (2): 312-319, 2009; **doi:** 10.3923/jas.2009.312.319)*

A New Genetic Algorithm Recommender System for Achieving Customer-Seller Win-Win Quiescent Point

A.A. Niknafs, A. Niknafs and M.E. Shiri

In this study, a new algorithm for considering the benefits of both customer and seller is proposed which is based on a win-win strategy in trade negotiations. This approach causes both sides to achieve a win-win quiescent point. In traditional commerce, this is done by negotiations between seller and customer. In this proposed method the preferences and needs of customer and seller are captured through the user interface. The algorithm compromises these two groups of factors and offers one or more recommendations that are satisfactory to both sides as much as possible. Although the system is designed based on the typical framework of collaborative filtering, yet it considers additional factor to item and customer that is the seller. The genetic algorithm is considered as a useful method for finding the best solutions for this problem. A simple example of e-negotiation between seller and customer is simulated and implemented using C No. and SQL server. The main application of the algorithm is in sophisticated ecommerce projects like tenders and contracts. The experiments results show the feasibility of the system and both customer and seller satisfaction. *(Journal of Applied Sciences 9 (2): 320-326, 2009; **doi:** 10.3923/jas.2009.320.326)*

Irreversibilities in Duct Geometries of Rhombic and Circular with Constant Wall Heat Flux and Laminar Flow

H. Taherian and H. Mirgolbabaei

In this study, a second law comparison of irreversibility is used to determine the optimum duct geometry which minimizes losses for a range of laminar flows with constant wall heat flux condition. Water as a working fluid is considered. The duct geometries used are rhombic with various angle of bevel and circular. Hydraulic diameters are used for the different geometries. The rhombic geometry with the

angle of 90°, when the frictional contributions of entropy generation become important is the best. Also power required to overcome fluid friction in the mentioned duct is smallest. *(Journal of Applied Sciences 9 (2): 327-333, 2009; **doi:** 10.3923/jas.2009.327.333)*

Wireless Spectrum Combination Protocol for 4G Networks

X. Li, R. Salleh and O. Zakaria

This research studies on multimedia applications which are now mainly achieved by wired and fixed internet users will also be widely achieved by mobile internet users in 4G networks as well. 3GPP2 has proposed a solution through integrating CDMA2000 network and WLAN network with fixed internet network for the issue. This kind of integration does not consider the wireless spectrum disparity and utilize them efficiently to get higher data rates for mobile internet users. In this study, we propose a new protocol to combine the two networks wireless spectrum. In the end, we simulate and quantitatively demonstrate the new protocol performance. *(Journal of Applied Sciences 9 (2): 334-340, 2009; **doi:** 10.3923/jas.2009.334.340)*

Study of the Effects of Natural Disasters on Gross Domestic Product in Iran

H. Sadeghi, S. Emamgholi Sefiddasht and M. Zarra Nezhad

The aim of this study is to investigate the effects of occurred natural disasters in Iran on Iran's Gross Domestic Product (GDP). An Auto Regressive Distributed Lags (ARDL) model has been applied during 1978-2004 in order to investigate the effects of disasters on Iran's GDP in short term and long term. The estimation results of the model suggested the existence of long-term equilibrium between non-oil GDP and explanatory variables. The findings of the research showed that both the short-term and long-term estimated models indicate the negative effects of these disasters on the Iranian economy, particularly on per capita investment and per capita GDP. Negative impact of natural disasters on per capita GDP was, in the first stage, due to the decline in physical capital. During the renovation period, the Iranian government allocated the budget to remedy the damages incurred to the infrastructures, residential and industrial units and product capacity in order to raise the per capita GDP. The results also showed the relatively slow speed of adjustment to the disequilibria, with only 17% of any deviation being corrected each year. *(Journal of Applied Sciences 9 (2): 341-347, 2009; **doi:** 10.3923/jas.2009.341.347)*

Salinity Causes Increase in Proline and Protein Contents and Peroxidase Activity in Wheat Cultivars

M. Goudarzi and H. Pakniyat

In a pot experiment, 15 cultivars of Iranian wheat (*Triticum aestivum* L.) were evaluated at glasshouse for proline and protein concentrations, peroxidase (POD) activity, SSI and STI in response to salinity (NaCl and Na_2SO_4 in 1:1 ratio). A Completely Randomized Design (CRD) with factorial treatments in three replications was used. Using three salt treatments: 1.26 (control), 6.8 and 13.8 dS m^{-1}. Salinity caused increase in proline and protein and POD activity in wheat genotypes in two salinity treatments. Kavir, Niknejad and Marvdasht showed high increase in some of studied traits compared with Ghods, Zarin and Cross Adl (sensitive cultivars). Based on studied traits other genotypes may be considered as semi-tolerant cultivars. Furthermore, tolerant cultivars showed higher STI and lower SSI compared with non-tolerant cultivars. Result showed that salinity tolerances are associated with higher accumulation of proline and protein concentration and higher POD activity in wheat. *(Journal of Applied Sciences 9 (2): 348-353, 2009; **doi:** 10.3923/jas.2009.348.353)*

Development of Mechanistic-Empirical Flexible Pavement Design in Iran

M. Ameri and A. Khavandi

Recent advances in flexible pavement design have prompted agencies to move toward the development and use of Mechanistic-Empirical (M-E) design procedures. Mechanistic-Empirical (M-E) design combine the elements of mechanical modeling and performance observation in determining the required pavement thickness for a set of design condition. In this study, a Mechanistic-Empirical (M-E) design procedures and algorithm based on KENLAYER software with regard to Iran climatic and traffic conditions is developed. This study also explores present relationships and diagrams based on effective variable on pavement design to facilitate design process. *(Journal of Applied Sciences 9 (2): 354-359, 2009; **doi:** 10.3923/jas.2009.354.359)*

The Psychometric Properties of Death Obsession Scale in Freshman Undergraduate Students

Gholamreza Rajabi

The validation, reliability and factor structure of the Death Obsession Scale (DOS) among freshman undergraduate students in Shahid Chamran University of Ahwaz

investigated in present study s included 200 freshman undergraduate students (140 males and 60 females) which were selected randomly. The DOS reliability by Cronbach's alpha statistics was 0.91 that indicate its high internal consistency. All items correlations with total score were significant, which supported its item and content validity. The DOS concurrent validity coefficient measured with Padua obsessive-compulsion inventory and was been significant (r = 0.43) also, DOS construct validity was determined via principal component analysis (Promax Rotation) that resulted in two-factors solutions (death rumination and dominance and death idea worry), that account for 53% of the variance and confirmatory factor analysis confirmed two-factor model. There is a significant gender difference in student sample too. Finally, the results confirmed DOS reliability and validity as a useful tool for both of research and clinical goals among normal and abnormal population. *(Journal of Applied Sciences 9 (2): 360-365, 2009;* ***doi:*** *10.3923/jas.2009.360.365)*

Influence of Alkaline and Enzymatic Treatments on the Properties of Doum Palm Fibres and Composite

F. Zbidi, S. Sghaier, M.B. Nejma and M. Zidi

In the presents study, an analysis of the influence of alkaline treatment for different concentrations as well as that of the enzymatic treatment on the morphology and on the mechanical properties of the leafstalk doum palm fibres is detailed to improve the hydrophobicity, the compatibility fibre/matrix and the composite mechanical resistance. The fibre surface topography has been characterized by SEM. And the obtained images show that the alkaline treatment gives porous fibres and the biological treatment gives smooth surfaces. The results confirm that both treatments eliminate the fibre residual impurities and influence their properties. A tensile test series were carried out to study the effect of the treatments on the mechanical features of the leafstalk doum palm fibres. The chemical treatment for a concentration of 1.5 N has improved considerably the mechanical properties. The composites used were made of doum palm fibres as reinforcement for epoxy resins. The composite mechanical properties have been studied from flexural tests. This study presents the results of an experimental investigation in order to select the best mechanical characteristics of epoxy resin/doum palm fibres. *(Journal of Applied Sciences 9 (2): 366-371, 2009;* ***doi:*** *10.3923/jas.2009.366.371)*

A Feasibility Study of Micor-Hydroelectric Power Generation at Sapchari Waterfall, Khagrachari, Bangladesh

M.A. Wazed and Shamsuddin Ahmed

The main objective of this research is to study the Sapchari waterfall in the Khagrachari district of Bangladesh as an initiative for harnessing power from micro-hydro. It is found that with the head and flow rate available encircling the year, Sapchari waterfall should be sustainable for micro hydro power plant. The effect on the ecosystem of the area is very less, the ecotourism will increases hopefully and both the way of living and the living standard of this vicinity will be ameliorated after such installation. *(Journal of Applied Sciences 9 (2): 372-376, 2009; **doi:** 10.3923/jas.2009.372.376)*

Investigation of Tribological Properties of Brake Pads by Using Rice Straw and Rice Husk Dust

Ibrahim Mutlu

In the present study, investigation of new materials to replace the asbestos has started to be considered. Brake pads used in automotive industry contain materials composed of more than ten different ingredients. In this study, the use of Rice Straw Dust (RSD) and Rice Husk Dust (RHD) has been investigated for assessing the tribological properties of brake pads. RSD and RHD both have silica in them which gives the pad materials a ceramic like behavior. To obtain RSD and RHD, rice straw and rice husk were grained after they have been dried. Different amounts of RSD and RHD were included in the brake pad mix along with the other regular ingredients. These newly formulated brake pads have been tested under Friction Assessment and Screening Test (FAST). Friction coefficient, wear rate and Scanning Electron Microscope (SEM) for friction surfaces were examined to assess the performance of these samples. *(Journal of Applied Sciences 9 (2): 377-381, 2009; **doi:** 10.3923/jas.2009.377.381)*

Investigation of Using Cedar Pine Cone Dust and Boric Acid in Brake Pads

I. Mutlu

In this study, the use of cedar (cidrus) pine cone (CPC) dust along with boric acid (BA) has been investigated for assessing the effect on friction coefficient. CPC has

resin in it. BA is a boron production which is widely used in boron glass production and in ceramic industry for increasing the heat resistant and forming abrasion resistant. Newly formulated brake lining material with five different ingredients has been tested under Friction Assessment and Screening Test (FAST). Friction coefficient, wear rate and scanning electron microscope (SEM) for friction surfaces were examined to assess the performance of these samples. *(Journal of Applied Sciences 9 (2): 382-386, 2009; **doi:** 10.3923/jas.2009.382.386)*

Macroeconomic Policies and the Best Environmental-Oriented Policy in Agricultural Sector of Iran (Case of Soil Erosion)

S. Hosseini, M. Ghorbani, M. Torshizi and N. Zargham

This study investigated how the appropriate environmental policy may change during a long-term macroeconomic planning and under different policy weights. For this purpose, a simple general equilibrium model has been established. Results showed that choosing the appropriate policy is depend on preferences of government; so that when weight of environmental factors in policy making is less than 40% (weight of economic factors is more than 60%), lowland food production subsidies policy is preferable policy and when weight of environmental factors is more than 40%, upland food production tax policy is appropriate policy. Base on results of this study, as the weight of environmental and economic factors changed in this study, one can think about changing the weight of any of economic factors. For example, if PPI doesn't have any importance in policy making, it can be eliminated and if government wants to give more attention to consumer prices than producer prices, policy maker can set the weight of CPI more than that of PPI in ranking. *(Journal of Applied Sciences 9 (2): 387-391, 2009; **doi:** 10.3923/jas.2009.387.391)*

Leakage Tolerant, Noise Immune Domino Logic for Circuit Design in the Ultra Deep Submicron CMOS Technology for High Fan-in Gates

A. Peiravi, F. Moradi and Dag T. Wisland

In this study, the results of research carried out in order to develop and present a new logic for the design and development of leakage-tolerant and noise immune circuits in the ultra deep submicron CMOS technology are presented. We present

novel domino logic to overcome the increasing static power consumption due to leakage power and to improve noise-immunity for high fan-in gates and compare it with standard domino logic. A noise metric and ISO-delay conditions are used to compare present proposed logic with conventional domino logic for various high fan-in OR gates. The results show remarkable improvement in noise immunity while drastically reducing power consumption. *(Journal of Applied Sciences 9 (2): 392-396, 2009; **doi:** 10.3923/jas.2009.392.396)*

Quicksort Algorithms: Application of Fixed Point Theorem in Probabilistic Quasi-Metric Spaces at Domain of Words

S. Shakeri, M. Jalili, R. Saadati, S.M. Vaezpour and Lj. Ciric

This research applied on a probabilistic quasi-metric version of a fixed point theorem to obtain the existence of solution for a recurrence equation associated to the analysis of Quicksort algorithms. Actually, we will establish ther results in the more general framework of probabilistic quasi-metric spaces because, in this context, the measurement of the distance from a word x to another word y, automatically indicates if x is a prefix of y or not, while the Baire metric does not provide this information. Finally, will be applied our methods to prove the existence (and uniqueness) of solution for some recurrence equations associated to the asymptotic complexity analysis of Quicksort algorithms and Divide and Conquer algorithms, respectively. *(Journal of Applied Sciences 9 (2): 397-400, 2009; **doi:** 10.3923/jas.2009.397.400)*

Materialized View Selection in Data Warehousing: A Survey

C.A. Dhote and M.S. Ali

This study presents the critical survey of the methodologies to select materialized view in more efficient way. In this study, we are summarizing all these methodologies with critical analysis. Advanced solutions are particularly focusing the evolutionary optimization methods. We have analyzed and compartmentalized the available literature on the basis of relevant evaluation parameters. Important books, Ph.D thesis, links, etc. are also given in study. To work out this study we have gone through more than fifty research papers. This study may be helpful to the researchers, who are working in the domain of the Data Warehouse focusing on the materialized view selection. *(Journal of Applied Sciences 9 (3): 401-414, 2009; **doi:** 10.3923/jas.2009.401.414)*

Kernel Density Analysis of Maritime Fishing Traffic and Incidents in Canadian Atlantic Waters

J. Shahrabi and R. Pelot

In this study, fishing vessel activities and incidents that occurred within Canadian Atlantic Waters are mapped and examined using Kernel density technique that is used as the advance hot spot technique. This technique precisely identifies location, spatial extent and intensity of incidents hot spots. Recent studies have shown that geospatial information is of fundamental importance to maritime risk analysis providing efficient risk management and geo-information systems represent a powerful new technology that can address many information needs of risk managers and decision makers working with geographically referenced data. This study used the increased capabilities offered by Geomatics techniques and geographic information system to identify hazardous locations for maritime traffic in Canadian Atlantic waters. This research uses spatial analysis to examine risks associated with maritime commercial fishing vessels activities and incidents. The objective of this study is to investigate incident hot spots and ultimately to identify hazardous regions by using a density-based hot spot identification technique. This study examines activities and incidents associated with fishing vessel traffic in the waters of the four Canadian Coast Guard (CCG) SAR statistical areas in the Atlantic region including Cape Breton, Bay of Fundy, SouthWestern Shore and Eastern Shore. In this study the statistical advantage of Kernel density technique was shown. Since the Kernel density method generalizes incidents for the entire study area it also gives a better indication regarding hot spot areas. As a result the value of density estimates at any specific location is developed. The results of this study can help the Coast Guard to deploy resources in order to maximize response capability specifically in these hazardous locations. These methods are also appropriate for finding local concentrations of fishing incidents and the probability of fishing incidents relative to fishing activity. *(Journal of Applied Sciences 9 (3): 415-426, 2009; **doi:** 10.3923/jas.2009.415.426)*

Using Concept Maps as a Method of Assessment in Work-Energy Subject

D. Erduran-Avci, P. Unlu and R. Yagbasan

The purpose of this study is to analyze the concepts of work-energy subject in 7th grade science course and the relations among them. Concept maps were used as a method of assessment and relationships between concepts of work-energy

topic were examined using this way. The research was performed by contribution of 50 students within a period of 7 weeks. Each student formed his/her concept map related to the topic. These maps were assessed according to Novak's score system. The assessment was made with two raters and g coefficient was found as 0.97. Additionally work-energy achievement test was applied at the end of this process. Results obtained from the concept maps and the results of the test were compared. As a result, the correlation between the two assessment methods was computed as 0.416. The relationships between the concepts were examined deeply. Serious defects were determined in the linking words in the concept maps of the students. *(Journal of Applied Sciences 9 (3): 427-437, 2009; **doi:** 10.3923/jas.2009.427.437)*

Experimental Study of Crack Growth Behavior and Fatigue Life of Spot Weld Tensile-Shear Specimens

M. Shariati and M.J. Maghrebi

In this study, the experimental behaviors of the fatigue crack growth are studied and the fatigue lives of tensile-shear (TS) specimens are determined. To achieve this, many TS specimens are prepared by the welding mild steel sheets of 1 and 1.5 mm thickness and then tested under constant amplitude loading using a servo-hydraulic fatigue testing machine (INSTRON 8802). The fatigue crack growth and the crack length are measured simultaneously by an optical microscope with 100X magnification. The experimental results indicate that the fatigue life of specimens decreases with any increase in load level. Also the crack initiation and propagation firstly occurs in plate with less thickness. According to the experimental observations when a high level loading is applied to the spot weld joints, the nugget suddenly pull-out and cannot withstand the fatigue loading. *(Journal of Applied Sciences 9 (3): 438-448, 2009; **doi:** 10.3923/jas.2009.438.448)*

A Two-Layer Channel-Aware Scheduling Algorithm for IEEE 802.16 Broadband Wireless Access Systems

R. Ghazizadeh, P. Fan and Y. Pan

In this study, a two-layer channel-aware scheduling algorithm, named Adaptive Credit-Based Fair Queuing (ACFQ) Based on Credit-Based Fair Queuing (CBFQ) is introduced. The proposed algorithm adapts the error-free CBFQ with

the multi-rate nonideal environment considering the Adaptive Modulation and Coding (AMC) at the radio link layer and provides packet-level Quality of Service (QoS) over the wireless fading channel. It is shown that the introduced AMC architecture and compensation model in two-layer scheduling provide fair sharing while ensuring high bandwidth efficiency. Furthermore, the proposed scheduler exhibits very low complexity, thus suitable for practical implementation. *(Journal of Applied Sciences 9 (3): 449-458, 2009;* ***doi:*** *10.3923/jas.2009.449.458)*

Classification and Diagnostic Prediction of Cancers Using Gene Microarray Data Analysis

Alireza Osareh and Bita Shadgar

In this study, we aim to develop an automated system for robust and reliable cancer diagnoses based on gene microarray data. Amongst various utilized statistical classifiers, support vector machines outperform other popular classifiers, such as K nearest neighbours, naive Bayes, neural networks and decision tree, often to a remarkable degree. We choose a set of 9 publicly available benchmark microarray datasets that encompass both binary and multi-class cancer problems. Results of comparative studies are provided, demonstrating that effective feature selection is essential to the development of classifiers intended for use in gene-based cancer classification. In particular, amongst various systematic experiments carried out, best classification model is achieved using a subset of features chosen via information gain feature ranking for support vector machine classifier. *(Journal of Applied Sciences 9 (3): 459-468, 2009;* ***doi:*** *10.3923/jas.2009.459.468)*

Measuring Customer Satisfaction Using a Fuzzy Inference System

A.Y. Darestani and A.E. Jahromi

This study presents a new method called FCSMM (Fuzzy Customer Satisfaction Measurement Method) for measuring individual customer satisfaction using a fuzzy inference system. The main advantage of this method is its simplification in evaluation of Customer Satisfaction Index (CSI) based on simple linguistic statements collected from experienced people. In contrast with assumptions used

in other methods such as linear regression principles and predefined criteria weights, the aforementioned statements form the FCSMM computational structure. Since the drivers of satisfaction and dissatisfaction and performance indexes can be simultaneously applied, concurrent direct and indirect customer satisfaction measurement is provided by the model. A set of average indexes is proposed for calculation of total CSI and average satisfaction index for each driver. Other analytical tools are applied to analyze results of this method. An example is provided in this study to demonstrate the implementation process of FCSMM. *(Journal of Applied Sciences 9 (3): 469-478, 2009; **doi:** 10.3923/jas.2009.469.478)*

Presentation of Giresun City Traffic Noise Pollution Map Via Geographical Information System

E. Kalipci and Ş. Dursun

Noise, which is a factor of sound pollution, is investigated in this study because it has negative effects on the people health. It is easily possible to plan the cities according to the necessity of the future, to investigate the sources of the noise, to determine the noise areas and to learn what precautions should be taken by means of the noise pollution maps. In this study done for this reason; the noise maps in Giresun city centre during mornings, afternoons and evenings are prepared by combining the measured noise values with the coordinates that are determined by Geographical Information System (GIS) receivers on the measurement points on Netcad 4.0 computer programme. Thanks to the noise pollution maps prepared, it is evidently carried out that the noise pollution level on the coastal motorway regarded as an international road is highly over the value which is declared in the instructions and it is almost at a level that threatens people' health. Reducing on the noise pollution level is remarkably seen because of decreasing of both the residential areas and commercial shops, getting away from the coastal line as going away from the city centre to the southern part of the city. Increasing on the noise pollution level is unfortunately observed in the regions since there are plenty of commercial shops, a lot of vehicles and people activities. Determining the present noise pollution situation in Giresun, the precautions to reduce the noise pollution are already found out. Putting in use of these determined precautions immediately will be extremely beneficial for keeping people's health living in Giresun city centre by reducing the noise pollution level. *(Journal of Applied Sciences 9 (3): 479-487, 2009; **doi:** 10.3923/jas.2009.479.487)*

Design and Implementation of a Novel High Performance Content Processor for Storage Disks Using an Exact String Matching Architecture

A. Peiravi and M.J. Rahimzadeh

In this study, a high performance content processor for storage disks is proposed which could be easily installed in any host as an interface between the hard disk and the system bus. Moreover, a novel and powerful exact string matching architecture is presented using which we can search for several thousand strings at high rates. The average database size and associated software support systems are growing at rates that are greater than the increase in general purpose processor performance. Also, at the physical level there is a remarkable growth in disk storage performance. However, with the ever-increasing amounts of information available, the ability to accurately and quickly search and retrieve desired information has become a critical issue. We have implemented the proposed architecture on a Xilinx XC4VFX100 Field Programmable Gate Array (FPGA) and shown that the system can search for over sixteen-thousand 32 byte strings with a speed near the maximum stated in ATA-7 standard. Present design implementation has a much better performance as measured in Throughput/(LogicCells/Char) when compared with the best existing designs.
(Journal of Applied Sciences 9 (3): 488-496, 2009; ***doi:*** *10.3923/jas.2009.488.496)*

A Dynamic Ex ante Input Demand Model with Application to Western Canadian Agriculture

G. Chabokrow, R. Gray and M. Ghorbani

This research tries to study a dynamic Ex ante input demand model with application to western Canadian agriculture. The dynamic Ex ante input demand model combines the cost of capital adjustment and Ex ante output choice to create a dynamic model that is theoretically and empirically appealing. The four input empirical model provided a tractable means of estimating a dynamic Ex ante input demand system combined with an Ex ante supply function. The application to Western Canadian agriculture resulted in model that was dynamically stable and consistent with profit maximization. The results show that agricultural capital (machinery and buildings) is a quasi-fixed input, with significant adjustment costs and a slow rate of adjustment. Technological change and machinery investment are energy and material-using for western Canadian

agriculture. There is some indication that agricultural wealth lowers the discount rate within the sector has a positive effect on capital investment. *(Journal of Applied Sciences 9 (3): 497-504, 2009; **doi:** 10.3923/jas.2009.497.504)*

The Visualization of Three Dimensional Brain Tumors' Growth on Distributed Parallel Computer Systems

Norma Alias, Mohd Ikhwan Safa bin Masseri, Md. Rajibul Islam and Siti Nurhidayah Khalid

The main aim of this study is to visualize the brain tumors' growth in three-dimensional and implement the algorithm on distributed parallel computer systems. The Partial Differential Equations (PDE) to solve the mathematical problem will be discussed in this study. The growth of the brain tumor through angiogenic process is described as parabolic model in partial differential equations. The discretization of the three-dimensional parabolic equations for the brain tumor's growth mathematical model using a numerical finite-difference method will be implemented from the earlier study of two dimensional model and thus a parallelization of algorithm simulation to computational resources based on high-performance computing systems will be used to generate the growth of the brain tumor in three dimensional. The study also includes an observation of the behaviour of the cells graphically and Parallel Virtual Machine (PVM) is used to communicate the platforms involved in the computational clusters. A comparison of sequential and parallel algorithm will be discussed and this study will address the major issues of the parallel computers performance in terms of efficiency, effectiveness, speedup and temporality. *(Journal of Applied Sciences 9 (3): 505-512, 2009; **doi:** 10.3923/jas.2009.505.512)*

A New Approach for Modeling Spatio-Temporal Events in an Earthquake Rescue Scenario

A.R. Vafaeinezhad, A.A. Alesheikh, A.A. Roshannejad and R. Shad

This study explores the advantages of modeling spatio-temporal events in an earthquake scenario. For this purpose, the theory of Time Geography is assessed and extended such that rescue team can act more efficiently. Heuristic programming in an activity based manner is exercised to manage team activities in space and time. Rescue team is forced to perform several tasks in an earthquake event; this study focuses on modelling the activities of life-detecting, collapse-lifting and injured-transporting. In order to assess the model, a case study was simulated

through normal and suggested methods. The comparisons between them have done through three different scenarios; fixed numbers of members, fixed number of members with 5 h work limitation and finally variable number of members with no time constraint. The statistical analysis on the results show an average of 27.22% improvement in groups' activities. This model can be implemented on Spatio-Temporal Geospatial Information System (GIS) and other researchers can develop it to manage the entire rescue team activities. *(Journal of Applied Sciences 9 (3): 513-520, 2009;* ***doi:*** *10.3923/jas.2009.513.520)*

Supply Chain Demand Forecasting; A Comparison of Machine Learning Techniques and Traditional Methods

J. Shahrabi, S.S. Mousavi and M. Heydar

In this study, supply chain demand is forecasted with different methods and their results are compared. In this research traditional time series forecasting methods including moving average, exponential smoothing, exponential smoothing with trend at the first stage and finally two machine learning techniques including Artificial Neural Networks (ANNs) and Support Vector Machines (SVMs), are used to forecast the long-term demand of supply chain. By using the data set of the component supplier of the biggest Iranian's car company this research is then implemented. The comparison reveals that the results producing by machine learning techniques are more accurate and much closer to the actual data in contrast with traditional forecasting methods. *(Journal of Applied Sciences 9 (3): 521-527, 2009;* ***doi:*** *10.3923/jas.2009.521.527)*

Development and Test of Fixed Average K-means Base Decision Trees Grouping Method by Improving Decision Tree Clustering Method

Jai-Houng Leu, Chih-Yao Lo and Chi-Hau Liu

New analytical methods and tools which were called FAKDT (Fixed Average K-means base Decision Trees) on human performance have been developed and they make us look at the Enterprise in different aspects in this study. Decision Tree Clustering Method is one of the data mining methods that have been applied widely in different fields to analyze a large amount of data in recent years. Generally speaking, in the human resource incubation of an enterprise, if employees of high learning potential, high stability and high emotional quotient are selected, the return of investment in human resources will be more apparent. If employees of the above mentioned traits can be well utilized and incubated, the

industry competitiveness of the enterprise will be enhanced effectively. From the personality specialty point of view, its function is to predict the efficiency of the personal achievement in correlation to his some implying personality specialties (blood group, constellation, etc.). The main purpose of this research is to get the useful information and important message about human performance from their historical records with this method. The Decision Tree Clustering Method data mining skills were improved and applied to get the critical factors that affect the human traits for its feasibility in this study. *(Journal of Applied Sciences 9 (3): 528-534, 2009;* ***doi:*** *10.3923/jas.2009.528.534)*

Development and Validation of Mathematics Courseware Usefulness Evaluation Instrument for Teachers

N. Sahari, A.A. Abdul Ghani, H. Selamat and A.S. Md. Yunus

The primary purpose of this study was to develop an instrument for evaluating the usefulness of mathematics courseware and to provide psychometric evidence of validity and reliability. Throughout four phases of this study, 696 participants were involved and six types of MCs were used. Each participant was required to evaluate the courseware heuristically and complete the Mathematics Courseware Usefulness Evaluation Instrument (MCUE). Based on the theoretical perspective, a hypothesized model with three factors which were usability, functionality and efficiency, five sub-factors and seven criteria were proposed. This study presents some empirical evidence of whether the evaluation model and its underlying metrics are reliable and valid for determining the usefulness of Mathematics Courseware. A pool of evaluation metrics were collected based on the MC preliminary evaluation survey, related articles on MC reviews and based on several existing evaluation instruments. Through several experiments, we validate an eight-dimension usefulness attribute involving Ease of use, Attractiveness, User control, Concept presentation, reinforcement, assessment, accuracy and learning support material and 56 metrics. *(Journal of Applied Sciences 9 (3): 535-541, 2009;* ***doi:*** *10.3923/jas.2009.535.541)*

Laboratory Scale Effect of Aquifer Thickness on Dispersivity of Porous Media

H. Moazed, E. Maroufpour, H.A. Kashkouli and J.M.V. Samani

In the present study, the dependence of dispersivity on the thickness of aquifer has been investigated. The physical model used in the study consisted of a rectangular Plexiglas tank with inner dimensions of 720 mm length, 100 mm width

and 1200 mm height. Sodium chloride with an electrical conductivity (EC) of 14 dS m^{-1} was selected as conservative contaminant. Porous media used in the experiments consisted of homogeneous coarse and medium sand particles. The experiments were performed in two different stages. In the first stage, 10 experiments in the aquifer with coarse sand particles and eight experiments in the aquifer with medium sand particles with constant thickness of 100 mm and flow velocities ranging from 4.5×10^{-5} to 11.25×10^{-5} m sec^{-1} were performed. In the second stage, experiments with thicknesses of 200-1000 and 100 mm layer distance were performed. The flow velocity in the second stage was maintained at 9.0×10^{-5} m sec^{-1} for each simulated aquifer, based on the previous studies. Results of the study indicated that: (1) the dispersivity values obtained for coarse and medium sand particles with 100 mm thickness were in the range of 0.25-0.65 and 0.11-0.33 cm, respectively and the mean values of dispersivity for both aquifers were in the range of 0.01 to 1.0 cm which are in agreement with the findings of other researchers, (2) the dispersivity values obtained for aquifers with coarse and medium sand particles and thicknesses of 200-1000 mm were in the range of 0.31-0.63 and 0.14-0.46 cm, respectively, which are in agreement with the findings of others as well, (3) the dispersivity of sandy porous media is independent of particle size and (4) in homogeneous sandy aquifers with coarse and medium particle size, the dispersivity is independent of aquifer thickness. *(Journal of Applied Sciences 9 (3): 542-548, 2009;* ***doi:*** *10.3923/jas.2009.542.548)*

Psychological Disorders of Elderly Home Residents

A. Etemadi and K. Ahmadi

This study aims at knowing old age problems especially for those living at elderly homes and extending counseling services to the vast and new field of geriatrics in Iran. In this study 120 old people who lived at governmental and private elderly homes in Tehran, Iran were randomly enrolled and studied using SCL90 and Beck Depression Inventory. The results showed that signs of depression and somatization disorders were the most common ones among the elderly in elderly homes. In all studied clinical scales, the rate of psychological symptoms was more among women than men. The most important worries of the elderly were economic status, social relations, dissatisfaction with old age, lack of favorite activities and their family members' treatment. Since living at an elderly home means staying away from family support and that it is considered reproachable, attending to psychological and emotional needs of the elderly home residents is essential. *(Journal of Applied Sciences 9 (3): 549-554, 2009;* ***doi:*** *10.3923/jas.2009.549.554)*

Identification of Ionic Conductances in a Reentry Model of Ventricular Myocardium Cells

Z.S. Dastgheib, A. Azemi, M. Khademi, M. Shajiee, M. Arvaneh, H. Gholizadeh and V.R. Sabzevari

In this study, a new method will be introduced to find ionic conductance parameters of ventricular cell channels that are part of a reentry loop. These parameters play a significant role in generation and dispersion of a normal action potential and hence ECG signal and formation of a reentry. The dangerous phenomenon reentry, occur when an electrical impulse travels in a circle within the heart, rather than moving outward and then stopping. Depending on the timing, this can produce a sustained abnormal rhythm, a self-limiting burst of supraventricular tachycardia, or a dangerous ventricular tachycardia. Here, a detailed Luo-Rudy model has been used for modeling ventricular myocardium cells and construction of a one-dimensional ring for reentry simulations. The proposed method is based on using Genetic Algorithms to identify the unknown parameters. The advantage of the proposed method over Least Squares parameter estimation approach is provided. *(Journal of Applied Sciences 9 (3): 555-560, 2009;* ***doi:*** *10.3923/jas.2009.555.560)*

A New Algorithm for Optimum Design of Mechanical Draft Wet Cooling Towers

A. Ataei, M.H. Panjeshahi and M. Gharaie

The present study describes the designing of a thermally and economically optimum mechanical draft counter-flow wet cooling tower. The design model allows the use of a variety of packing materials in the cooling tower toward optimizing heat transfer. The design model incorporated the cooling tower factors to achieve the optimum design. The main factors included: the diameter of the water droplets, the liquid to gas mass ratio, the height of rain zone, packing zone and spray zone, the air and water velocity inside the tower and the frontal area. Once the optimum packing type is chosen, a compact cooling tower with low fan power consumption is modelled within the known design variables. The optimization model is validated against a sample problem. The suggested design algorithms of cooling tower are computed using Visual Studio.Net 2003 (C++). *(Journal of Applied Sciences 9 (3): 561-566, 2009;* ***doi:*** *10.3923/jas.2009.561.566)*

Extension Methods and Organizational Characteristics for Supporting Sustainable Water Resource Management in Agriculture of Iran

A.R. Ommani, M. Chizari, C. Salmanzadeh and J.F. Hossaini

The primary purpose of this research was to identify extension methods and organizational characteristics for supporting Sustainable Water Resource Management (SWRM) in agriculture of Iran. The total population of agricultural extension experts (N = 110) of Agricultural-Jihad Organization of Khuzestan Province of Iran considered as population of study. A mailed questionnaire was used to collect the data. The response rate of questionnaire was 78% (N = 86). Appropriate descriptive statistics such as mean scores, standard deviations and correlation coefficient were used. The findings show that extension experts had positive perceptions about SWRM in agriculture. Extension experts believed that among extension methods, on-farm education, problem solving methods and workshop had very high importance for supporting SWRM in agriculture. Also, ranking based on the perceptions of extension experts indicated that the three most important organizational characteristics of extension system for supporting SWRM in agriculture were: considering local groups, participatory management and considering job qualification. It is concluded that appropriate extension methods and organizational characteristics for supporting SWRM needs to be accurately implemented for the extension system development. *(Journal of Applied Sciences 9 (3): 567-572, 2009;* ***doi:*** *10.3923/jas.2009.567.572)*

An Introduction of a New Spark Advanced Control Algorithm Using Boost Simulation and Cylinder Pressure

Z. Oveisi, S.S. Mohtasebi, V. Esfehanian and A. Keyhani

Generally in this study, a closed-loop control algorithm is used to present suitable ignition timing at different engine operating conditions and neural network is used for estimating the peak pressure position of cylinder with only five points entries of cylinder pressure curve and then the optimum ignition timing of engine is obtained. After that, engine model in Boost software environment is used and peak pressure position of cylinder is obtained in optimum ignition timing and different speeds and loads of engine and is used for training neural network and so average value of that position is considered as the target value of controller. With comparison of several neural networks with different neuron numbers in hidden

layer, optimum neural network model with structure 5-5-1 and 99.89% simulation accuracy is obtained. Net entries are five points of cylinder pressure curve and the number of hidden layer neurons is five. Also, a neuron in the output layer is used to find the peak pressure position of the cylinder. Since the control method is based on the cylinder pressure, all the equations related to the engine in this field were studied and a program for getting cylinder pressure based on crankshaft angle is written in Matlab engineering software environment. Finally, all of algorithm steps and written equations in Matlab were solved and results in engine speed of 2000 rpm with wide open throttle showed that the control algorithm can suitably keep the peak pressure position of the cylinder constant in 15.89° after top dead center while target value of the controller was 16°. Thus, the ignition timing is very close to MBT value which is equal to the peak pressure position of 16°. *(Journal of Applied Sciences 9 (3): 573-577, 2009;* ***doi:*** *10.3923/jas.2009.573.577)*

An Entity-Relationship Model for Forest Management Unit Case Study: Kheiroud Forest

S.Z. Goushegir and J. Feghhi

The principle objective of this research was to design conceptual data model for Hyrcanian forest. The data model is based on E-R diagram as useful tool for designing the data used in data model. As a result a forest conceptual data model describes system elements and their relationships in Hyrcanian forest unit. It can be used as a primary core of a more comprehensive forest information system. Finally, this study indicates the advantages of designing conceptual data model for Hyrcanian forest management. *(Journal of Applied Sciences 9 (3): 578-582, 2009;* ***doi:*** *10.3923/jas.2009.578.582)*

Modeling of Optical Properties of Normal and Tumor Tissue Using Reflectance Spectra for Appropriate Dosimetry in Photodynamic Therapy

N. Naghavi and M.H. Miran Baygi

The evolution of photodynamic therapy (PDT) to a fully developed treatment modality requires the development of appropriate dosimetry to ensure proper quality control during treatments. The parameters measured for PDT quality control are drug accumulation and penetration depth. In this study, a model has

been developed based on reflectance spectroscopy to help understanding light propagation from light delivery system to tissue and vice versa. This model can be used to determine the depth of tissue necrosis during PDT and to evaluate and improve the dosimetry. *(Journal of Applied Sciences 9 (3): 583-587, 2009; **doi:** 10.3923/jas.2009.583.587)*

Comparative Efficacy of Some Geostatistical Methods for the Estimation of Spatial Variability of Topsoil Salinity

R. Sokouti and M.H. Mahdian

The present research was conducted to analyze spatial changes in soil salinity distribution as an aspect of soil degradation and to compare the efficacy of different Geostatistical methods in its estimation and the preparation of maps of the spatial distribution of soil salinity. To estimate soil salinity of non-sampled areas, the methods of Kriging, Co-Kriging and Weighted Moving Average were applied in Geographical Information System (GIS) medium. To evaluate the efficacy of the methods, the cross-evaluation approach with two statistical parameters of mean bias error and mean absolute error was taken in practice. Results indicated the high precise of Kriging method with regression coefficient of 0.98 for the estimation of salinity rates in the areas, for where no data were available before. Estimation error for this method was 1.31 and biass was -0.34 dS m^{-1} which indicates high accuracy of Kriging method to estimate topsoil salinity and its precise. *(Journal of Applied Sciences 9 (3): 588-592, 2009; **doi:** 10.3923/jas.2009.588.592)*

Ingot Fabrication of Base Material for Solar Cell $CuInSe_2$

A.H. Soepardjo

Research on base material fabrication for solar cell was done using the vertical Bridgman furnace method and the final products are ingots of $CuInSe_2$. The ingots were then characterized by using optical and electrical characterization methods. Optical characterization includes measuring with X-ray Diffraction (XRD) to determine the parameter value of lattice crystal and using Energy Dispersive Spectroscopy (EDS) to determine the material composition. Extension coefficient, dielectric constant and refraction index were also measured by using elipsometer. Electric characterization was used to classify the type of the material using galvanometer. *(Journal of Applied Sciences 9 (3): 593-596, 2009; **doi:** 10.3923/jas.2009.593.596)*

Evaporation Losses from Sprinkler Irrigation Systems under Various Operating Conditions

A. Bavi, H.A. Kashkuli, S. Boroomand, A. Naseri and M. Albaji

The sustainability of irrigated agriculture depends upon consistently achieving high irrigation application efficiency. In semi-arid areas, the portion of water that might be lost due to wind and evaporation would be significant. Thus a proper understanding of factors affecting spray losses (Ls) in sprinkler irrigation is important for developing water conservation strategies. The objectives of this study include: characterize Ls under different weather conditions and operating pressures for semi-portable hand move sprinkler system in western south of Iran (Khuzestan Province); propose adequate predictive equations by using multiple regression and Suggest several recommendations for helping about design and management for sprinkler irrigation system in semi-arid areas. The results showed that wind velocity and vapor pressure deficit were the most significant factors affecting the evaporation losses. Exponential relationships between the evaporation losses and both wind velocity and vapor pressure deficit have been found. For the operating pressures used in this study the least effect on evaporation was found. Combined losses from a sprinkler system for a given set of operation conditions have been estimated by using the results obtained from the experiments. Combined losses ranged from 4.4 to 8.9% of the applied water. *(Journal of Applied Sciences 9 (3): 597-600, 2009;* ***doi:*** *10.3923/jas.2009.597.600)*

Advances in Modeling and Simulation of Biomass Pyrolysis

N. Prakash and T. Karunanithi

The various aspects of modeling and simulation work carried out so far in biomass pyrolysis since 1946 have been extensively reviewed in the present study. Biomass pyrolysis, one of the few non conventional energy routes, is highly promising and capable of handling the current energy crisis successfully for the present and in the near future. Pyrolysis as a stand alone or as the core of biomass gasification process is complex in nature, the understanding and knowledge of this multifaceted phenomenon can heavily influence the efficiency and effectiveness of the whole gasification process. Even though, the modeling of biomass pyrolysis process was initiated during 1940's gradual changes, improvements and alternates have been carried out throughout these years. All these years, various modeling approaches were adopted, different kinetic schemes were proposed, diverse numerical schemes were followed and range of parameters were implemented, all these have

developed a baffling picture over the subject. The complexity of the process, as such the large number of components involved in the intermediates and end products; the dependency of the process over numerous parameters namely the temperature, space and time dependent physical, thermodynamic and transport properties, the particle shape, size, shrinkage factors and moisture content all these justify even today the necessity and requirement of research for further improvement and enrichment in the modeling and simulation fronts of this process. This study sums up the work carried out in literature on modeling and simulation of wood pyrolysis and suggests new research directions and approaches necessarily to be made up in future. *(Asian Journal of Scientific Research 2 (1): 1-27, 2009; **doi:** 10.3923/ajsr.2009.1-27)*

A Protection Scheme for Three-Phase Induction Motor from Incipient Faults Using Embedded Controller

M. Sudha and P. Anbalagan

This study presents a protection scheme for three-phase induction motor from incipient faults using embedded microcontroller. The induction motor experiences several types of electrical faults like over/under voltage, over load, phase reversing, unbalanced voltage, single phasing and earth fault. Due to these electrical faults, the windings of the motor get over heated which lead to insulation failure and thus reduce the life time of the motor. To analyze the behavior of induction motor during electrical faults, the induction motor is modeled using arbitrary reference frame theory in MATLAB/Simulink environment; the faults are created and the variation of the induction motor parameters under faulty conditions are observed. Based on the analysis, embedded controller is developed to protect the motor from incipient faults. *(Asian Journal of Scientific Research 2 (1): 28-50, 2009; **doi:** 10.3923/ajsr.2009.28.50)*

Estrogen Receptor-α Gene, Codon 594 (G3242A) Polymorphism Among Iranian Women with Breast Cancer: A Case Control Study

Sakineh Abbasi, Patimah Ismail, Fauziah Othman, Rozita Rosli and Cyrus Azimi

A case-control study was conducted to establish a database of ESR1 polymorphisms in Iranian population in order to compare Western and Iranian (Middle East) distributions and to evaluate ESR1 polymorphism as an indicator of clinical outcome. The *ESR1* gene was scanned in Iranian patients newly

diagnosed invasive breast tumors, (150 patients) and in healthy individuals (147 healthy control individuals). PCR single-strand conformation polymorphism technology and direct sequencing was performed. The silent single nucleotide polymorphism (SNPs) was found, as reported previously in other studies, but at significantly different frequencies. The frequency of genotype 01 in codon 594 (ACG→ACA), (G3242A), exon 8 was significantly higher in breast cancer patients (48.0%) than in control individuals (1.4%; p = 0.001). The allele 1 in codon 594 was significantly more common in breast cancer patients with age at menarche </=12 (40.8%) than in those which their menstruation began at older than 12 years old (23.9%; p = 0.002). The allele 1 in codon 594 exhibited, the greater the frequency, the lesser the likelihood of LN metastasis. Present results demonstrated that this particular SNP marker may increase accuracy in predicting LN. Therefore, this SNP marker further increased predictive accuracy in Iranian population. These data suggest that ESR1 polymorphisms are correlated with various aspects of breast cancer in Iranian *ESR1* genotype, as determined during pre-surgical evaluation, might represent a surrogate marker to increase predicting breast cancer in Iranian population. *(Asian Journal of Scientific Research 2 (1): 51-60, 2009;* ***doi:*** *10.3923/ajsr.2009.51.60)*

Comparison of Bone Mineral Density in Isfahani Women with other Populations: The Impact on Diagnosis of Using Different Normal Ranges

M.R. Salamat, M.B. Tavakoli, M. Salehi, E. Pishva, A.H. Salari and F. Tabesh

Bone Mineral Density (BMD) of 359 healthy Isfahani women aged 23-60 years were compared with the Caucasian's, Tehranis and some Arab women. BMD was determined using dual energy X-ray absorptiometry (DXA) at the lumbar spine and proximal femur. Age related changes in BMD were similar to those described in Lebanese and Saudis for the femur, Lebanese having the lowest femur BMD. However, the age related values for the spine were similar for all populations, having the lowest BMD values for the Isfahani women. The problem of using manufacture provided reference data was investigated. In fact using the manufacture provided reference data for the femoral neck diagnosed only 14.9% of the postmenopausal women as normal due to improper use of T-score, while using the Isfahan normative data 41.9% of the postmenopausal women were diagnosed as normal. The normative peak BMD values acquired for Iranian women in Isfahan and Tehran were different, in particular for the spine. The normative BMD values in Isfahan were only acquired for the young women. Therefore, for the management of patients, determining the secondary causes of

osteoporosis (Z-scores<-2) it is highly recommended to establish the normal range for the entire age range of 20-80 years normal women and make further investigations to find the reason(s) for the discrepancies in the normal BMD ranges of women in Iran. *(Asian Journal of Scientific Research 2 (1): 61-67, 2009; **doi:** 10.3923/ajsr.2009.61.67)*

Estimation of Global Solar Radiation in Rwanda Using Empirical Models

B. Safari and J. Gasore

Understanding solar radiation data is essential for modeling solar energy systems. The purpose of the present study was to estimate global solar radiation on horizontal surface using sunshine-based models. Angström-type polynomials of first and second order have been developed from long term records of monthly mean daily sunshine hour values and measured daily global solar radiation on horizontal surface at Kigali, Rwanda. Coefficients of those polynomials were derived using least square regression analysis. These coefficients were then used for the estimation of solar radiation in other places of Rwanda where measures of solar radiation do not exist but sunshine records are available. *(Asian Journal of Scientific Research 2 (2): 68-75, 2009; **doi:** 10.3923/ajsr.2009.68.75)*

The Study of Properties of WC-Based and W-Based Composites Fabricated by Infiltration with Liquid Cu-Mn Binder

M. Tata, D. Miroud, S. Lebaili and T. Cutard

This study refers to the characterization of alloys WC-W-Ni, obtained from a process of sintering, by using fine powders infiltrated by an alloy Cu-Mn binder. This process is used to produce a carbide cemented high-speed cutting tools and drilling tools because of their high hardness, refractoriness and wear resistance. The study required, the determination of the sintering conditions of the infiltration. The operation of infiltration consists of heating the binder until the melting point 950°C to let it infiltrate by gravity, the mixture of metal powders respectively, W, WC, W+Ni, WC+Ni and WC+W, thus allowing the powder grains to drown in the binder while being densified during cooling. The characterization of powders is used to determine theirs physical properties, chemical composition, powder classes and specific surface. The present study investigates the possibilities of Cu-Mn alloys used as binder alloys in infiltration of WC-based and W-based powders. After infiltration, a microstructural and mechanical characterization of the

sintered samples and infiltrant were conducted in order to include/understand the phenomena implied during the densification and infiltration. *(Asian Journal of Scientific Research 2 (2): 76-86, 2009;* ***doi:*** *10.3923/ajsr.2009.76.86)*

Methoxy Poly Ethylene Glycol-*b*-poly (D, L-lactide-*co*-glycolide) Films as Drug Delivery Systems for Ibuprofen

Y. Baimark and T. Phromsopha

Methoxy poly (ethylene glycol)-*b*-poly (D,L-lactide-*co*-glycolide) diblock copolymers (MPEG-*b*-PDLLG) films containing a poorly water-soluble drug were prepared by evaporation method of MPEG-*b*-PDLLG and drug solution in dichloromethane. Ibuprofen was used as a poorly water-insoluble model drug. Influences of MPEG block length and DLL/G ratio on drug-loaded film character and drug release behavior were investigated. Inhibition of entrapped ibuprofen crystallization in the MPEG-*b*-PDLLG films was observed from thermal analysis. The drug release rates increased as the MPEG block length increased. Incorporation of G units in the PDLL block also induced the faster drug release rate. The drug had released from the films through diffusion mechanism. *(Asian Journal of Scientific Research 2 (2): 87-95, 2009;* ***doi:*** *10.3923/ajsr.2009.87.95)*

Adsorptive Removal of Arsenite as (III) and Arsenate as (V) Heavy Metals from Waste Water using *Nigella sativa* L.

S.M. El-Said, M.B.S. Alamri, Ali-Bin Saleh El-Barak and O. Alsogair

This study was focused on *Nigella sativa* Linn. as an alternative absorbent in order to remove As (III) and arsenate As (V) from synthetic waste water. As such, *Nigella sativa* L. was collected from Burydah A-Qassim. Batch experiments were conducted to determine the adsorptive efficiency of *Nigella sativa* L. to remove As (III) and arsenate As (V) from waste water. The preliminary experiments were revealed that alkaline solutions (pH>9) without *Nigella sativa* L. caused homogeneous oxidation of As (III) to As (V) so the adsorption process was investigated at pH range 2-8. The batch experiments were revealed that adsorption of As ion on *Nigella sativa* L. was maximal at low pH (at a 3.0) value. The adsorption studies revealed that the ongoing adsorption validates Langmuir adsorption isotherms at temperatures 25, 35 and 45°C. The adsorption isotherm data was also employed to calculate the thermodynamic parameter of Gibb's free energy which gives a negative value for the adsorption

of As ion on *Nigella sativa* L. The negative values of free energy indicate the feasibility and spontaneous nature of the adsorption process. From these results, it can be concluded that the *Nigella sativa* L. could be a good adsorbent for the removal of cationic metals coming from waste water. *(Asian Journal of Scientific Research 2 (2): 96-104, 2009; **doi:** 10.3923/ajsr.2009.96.104)*

Scalp Nerve Block in Children Undergoing a Supratentorial Craniotomy; A Randomized Controlled Study

Manal el Gohary, M. Gamil, K. Girgis and Sherry Nabil

The aim of this randomized double blinded controlled study was to evaluate the effect of SNB during craniotomies for supratentorial tumors in pediatric patients, with respect to intra- and postoperative hemodynamics, intraoperative anesthetic and analgesic consumption and postoperative analgesic requirements. Thirty children, aged 6 to 12 years, scheduled for elective craniotomies for supratentorial tumors were randomly assigned to one of two groups: control group (n = 15) and Scalp Nerve Block (SNB) group (n = 15). After a standardized induction and 5 min prior to head pinning, a SNB was performed. In the control group the block was performed with normal saline, while in the SNB group the block was performed with bupivacaine 0.25%. Intraoperative Mean Arterial blood Pressure (MAP) and Heart Rate (HR) were recorded before induction (baseline), 5 min after induction, at head pinning and at skin incision, together with sevoflurane and fentanyl consumption. Postoperative MAP and HR were measured and recorded. Postoperative pain assessment was done using Visual Analogue Scale (VAS) score. Rescue analgesia (IV paracetamol, 15 mg kg^{-1}) was given for a VAS>3. Time to first rescue analgesic, number of patients who required analgesia as well as number of paracetamol doses in the first 24 h postoperative were recorded. The SNB group showed more stable intraoperative and postoperative hemodynamics and a significant reduction in the total intraoperative fentanyl dose required. VAS scores were significantly lower in the SNB group compared to the control group till 12 h postoperative. Significantly fewer patients in the SNB group required rescue analgesic in the first 24 h postoperative (8 vs. 15, $p<0.05$). Time to first rescue analgesic was significantly longer in the SNB group compared to the control group (6.6±1.9 h vs. 1.7±0.8 h, $p<0.05$). Number of paracetamol doses required in the first 24 h postoperative was significantly higher in the control group compared to the SNB group. We conclude that SNB using bupivacaine 0.25% results in decreased intraoperative analgesic requirements and more stable intra- and postoperative hemodynamics. It also reduces postoperative pain leading to decreased postoperative analgesic consumption. *(Asian Journal of Scientific Research 2 (2): 105-112, 2009; **doi:** 10.3923/ajsr.2009.105.112)*

Blood Chemistry Changes as an Evidence of the Toxic Effects of Anionic Surfactant Sodium Dodecyl Sulfate

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The objective of the present study was to investigate the toxic, damaging and irritative effects of repeated exposure to Sodium Dodecyl Sulfate (SDS) on rabbit skin. The animals were exposed to 5% solution of SDS for 8 weeks through skin brushing. All exposed rabbits manifested dermatitis and they were dull, depressed, emaciated and their body weight was decreased. Blood chemical parameters including alkaline phosphatase (ALP), alanine transaminase (ALT), aspartate transaminase (AST), gama-glutamyl transferase (GGT), amylase, cholesterol, high density lipoproteins (HDLPs); triglycerides (TGs), creatinine, urea, glucose and potassium (K^+) were estimated after 8 weeks of SDS exposure. All blood parameters except ALP and creatinine were significantly increased or decreased as compared to that of the controls. It is concluded that topical application of SDS is capable of damaging the skin with all signs of dermatitis. Further, SDS is capable of being adsorbed and penetrates through the skin barrier and thus reaches the internal organs such as liver to provoke systemic damages. The estimated blood parameters can potentially serve as biomarkers for assessing SDS toxicity. However, further studies are warranted to confirm this hypothesis. *(Asian Journal of Scientific Research 2 (2): 113-118, 2009; **doi:** 10.3923/ajsr.2009.113.118)*

Synthesizing the 2004 Mw 6.2 Kojour Earthquake Using Empirical Green's Function

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The main objective of this study is to simulate the acceleration time histories of May 28, 2004 Kojour earthquake (M_w 6.2) happened at Northern part of Iran. The uncertainties inherently exist in the seismological parameters are reduced to find the suitable parameters for synthesizing process. The hypocenter location, focal mechanism and the causative fault dimensions are some of the parameters, studied in this article. The Empirical Green's Function method approach along with a genetic algorithm technique is used to optimize the differences between synthesized ground motions and observed data and consequently to extract the aforementioned seismological source parameters. The proposed technique is utilized by comparing the elastic response spectra corresponding to the synthesized three components of the main event at Poul station and those of the recorded data. Thereafter, to find out the accuracy of the method, using the estimated source parameters from the approach, the Empirical

Green's Function method is utilized to generate the three components of strong motion recorded at another station, Noshahr. Proper match of the synthesized and observed data confirms the suitability of selected model parameters and the efficiency of the method for synthesizing ground motions. Also, the three components of acceleration time histories of the mainshock were predicted at another station, Baladeh, at which the main event was not recorded during the earthquake. The proposed approach can be used to find the acceleration response spectra and also time histories that are compatible with those response spectra for studying structural behavior during happened earthquakes in the regions with lack of recorded time histories. *(Asian Journal of Scientific Research 2 (3): 119-134, 2009; **doi:** 10.3923/ajsr.2009.119.134)*

Application of DDQ and p-Chloranilic Acid for the Spectrophotometric Estimation of Milrinone in Pharmaceutical Formulations

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Two simple, rapid and sensitive spectrophotometric methods have been proposed for the determination of milrinone in pharmaceutical formulations. The first method is based on the charge transfer complexation reaction of milrinone with 2, 3-Dichloro-5, 6-Dicyanobenzoquinone, DDQ while the second method is based on charge transfer reaction of milrinone with p-Chloranilic Acid (pCA). Under the optimized experimental conditions Beer's law is obeyed in the concentration range of 2-40 μg mL^{-1} for method A and 5-100, 2-40 μg mL^{-1} for method B. The recovery ranged from 100.06 -100.11 for method A and from 99.34 -99.97 for method B. The coefficient of correlation was found to be 0.9998 for A and 0.9999 for B and the detection limit for method A and method B was found to be 0.765 and 3.35, respectively. Both the methods have been applied to determination of milrinone in the pharmaceutical formulation. Results of the analysis are validated statistically. *(Asian Journal of Scientific Research 2 (3): 135-145, 2009; **doi:** 10.3923/ajsr.2009.135.145)*

Protein Extraction and Preparation of Protein Hydrolysates from Rice with Low Phenylalanine Content

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Aiming the introduction of rice in the phenylketonurics diet, the protein extraction and phenylalanine (Phe) removal processes were studied. For protein extraction,

an enzymatic method was used and for Phe removal, a papain and an Activated Carbon (AC) were used. The influence of protein:AC ratio, type and way of using AC was tested. The efficiency of Phe removal was evaluated by second derivative spectrophotometry. The results showed that the condition which gave the highest protein extraction yield (63.4%) was that using a sample concentration of 1:10 (w/v) at a temperature of 50°C, as well as an enzyme:substrate ratio of 10:100 at a reaction time of 5 h. Activated carbon was efficient for removing Phe, leading to values above 70% for most of the samples and the best result (94.1% of Phe removal) was found for a protein:AC ratio of 1:88, using simultaneously three types of AC (20×50, 12×25, 6×12 mesh), which led to a final Phe content of 82.5 mg kg^{-1} of hydrolysate. *(Asian Journal of Scientific Research 2 (3): 146-154, 2009; **doi:** 10.3923/ajsr.2009.146.154)*

Comparison of NmF2 Variability at Ibadan, Singapore and Slough during Different Epochs of Solar Cycle

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NmF2 variability, VR, at Ibadan (7.4°N, 3.9°E, 6°S dip) is investigated for diurnal and seasonal changes during low, moderate and high solar activity. It is also compared with those of Singapore (1.3°N, 103.8°E, 17.6°S dip) and Slough (51.5°N, 359.4°E, 66.5°S dip). NmF2 absolute VR (and not only relative VR) is greater during the night and slightly greater around noon than during other daytime hours. While, daytime NmF2 shows no seasonal variation, night time NmF2 is greater during the equinoxes at low and moderate solar activity and during the equinox and June solstice at high solar activity. Daytime VR found not to show latitudinal difference during moderate solar activity is observed to increase with latitude during high solar activity. Nighttime VR is found to decrease with latitude during high solar activity. While, NmF2 VR at Ibadan and Singapore are found to decrease alternately with sunspot number, R, that of Slough is observed to increase with R during about the first half of the day and to decrease with R during the other part. *(Asian Journal of Scientific Research 2 (3): 155-160, 2009; **doi:** 10.3923/ajsr.2009.155.160)*

Anatomical Structures and Fiber Morphology of New Kenaf Varieties

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Kenaf plant is claimed as one of the fast-growing herbaceous plants with the high potential as a fiber material or lignocellulosic material. Nine kenaf varieties i.e., Q-

Ping, KK60, V12, V19, V36, V132 and NS V133 and TK were introduced recently by Taman Pertanian Universiti, Universiti Putra Malaysia as one of the potential plant to replace tobacco plantation. Since, these nine kenaf varieties are new to Malaysia, therefore, there is a need to study their anatomical structures and fiber morphology as well as microscopic appearances to understand their different and similarity. Cell morphology and anatomical appearances were observed and evaluated under the image analysis system (Leitz DMRB). From the results, V19 and V12 had the wider ray among the nine varieties, whereas other varieties in their microscopic appearance were almost similar to those observed in many diffuse-porous hardwoods. The longest fiber length was observed in variety TK (2.96 mm) followed by V36. Q-ping showed the widest fiber diameter and lumen diameter amongst the nine varieties, with value of 28.64 μm in bast fiber and 28.06 μm in core diameter. However, Q-ping had the thinnest core cell wall with the thickness of 3.34 μm. In term of fiber length, all the kenaf varieties bast fiber has longer fiber than core fiber. The kenaf core of nine varieties has wider fiber diameter and fiber lumen diameter than the bast fiber. Conclusively, although kenaf exhibit similarity in some fiber morphology and anatomical structures, however, there still some distinction that can be used to differentiate these kenaf variety. *(Asian Journal of Scientific Research 2 (3): 161-166, 2009;* ***doi:*** *10.3923/ajsr.2009.161.166)*

Collagenase and Sodium Iodoacetate-Induced Experimental Osteoarthritis Model in Sprague Dawley Rats

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The objective of this study was to apply and compare two different experimental osteoarthritis (OA) methods in the rat, namely: Collagenase induced OA (CO) and Monosodium iodoacetate induced OA (MIA) models. The assessment of OA development and progression were performed through three different periods (2, 4 and 6 weeks). Intra-articular injection of either 4 mg joint^{-1} CO type II or 3 mg joint^{-1} MIA, were administered to the adult male Sprague Dawley rats, into their right knee joints. Evaluation of OA changes in the knees was achieved with both histopathology score system and radiography approach. Gross results revealed earliest changes such as swelling and redness of the right knee joints of all rats injected with either CO or MIA. Joint dissection revealed distinct thickening of the joint capsule in MIA-injected rats than in CO group. Present finding revealed early development of radiographical as well as histopathological changes in MIA injected group. However, both OA injected groups resulted in a chronic joint degeneration, measured by cellular changes, matrix degradation, subchondral

changes and marginal osteophyte formation. Present findings showed significantly higher histopathological score in MIA injected group than those of CO in each of the three selected periods for OA induction. In conclusion, present results demonstrated that MIA can induce OA changes in a shorter period of time than CO in the Sprague Dawley rat. Radiography approach could be a useful tool to evaluate osteoarthritic changes in the knee joints. *(Asian Journal of Scientific Research 2 (4): 167-179, 2009; **doi:** 10.3923/ajsr.2009.167.179)*

Anti-Diabetic Activity of Aqueous Extract of *Monascus purpureus* Fermented Rice in High Cholesterol Diet Fed-Streptozotocin-Induced Diabetic Rats

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The present study was designed to investigate the hypoglycemic and hypolipidemic activity of aqueous extract of *Monascus* fermented Indian variety rice in high cholesterol fed-streptozotocin-induced diabetic rats. Wister rats were fed with high cholesterol diet for 2 weeks prior to intra-peritoneal injection with streptozotocin (50 mg kg^{-1}). The Indian variety rice IR-532-E-576 was fermented with *Monascus purpureus* for 10 days and sterilized. Aqueous extract of the fermented rice at two dose levels showed a significant decrease in fasting blood glucose level. The total cholesterol and triglycerides were also significantly reduced where as the HDL cholesterol levels were significantly increased, which confirmed the potent anti-diabetic property of the *Monascus purpureus* fermented rice in diabetic rats, which may be due to presence of statins. *(Asian Journal of Scientific Research 2 (4): 180-189, 2009; **doi:** 10.3923/ajsr.2009.180.189)*

Investigation on the Effect of Different Disintegrants on the Orodispersible Tablets of Rabeprazole

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In the present study, an attempt was made to formulate orodispersible tablets of rabeprazole. Tablets were prepared by direct compression method using diluent and various disintegrants. Tablets were also prepared using treated agar (TAG) powder as one of the disintegrant. A total number of ten formulations were prepared and evaluated. Along with physicochemical parameters, the tablets were also evaluated for special parameters like wetting time, *in vitro* dispersion time, *in vitro* disintegration and *in vitro* drug release. The results of wetting time,

in vitro dispersion time and *in vitro* disintegration signify that as the concentration of disintegrant increases the time required for disintegration decreases. A better disintegration was observed in formulation OT1, OT2, OT5 and OT6 containing crospovidone and croscarmellose sodium. The correlation and slope values obtained after performing *in vitro* release studies indicated that all the ten formulations followed first order release rate kinetics. *(Asian Journal of Scientific Research 2 (4): 190-197, 2009;* ***doi:*** *10.3923/ajsr.2009.190.197)*