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Mineralogical and Geochemical Characteristics of Clay Deposits from South Abarkouh District of Clay Deposit (Central Iran) and Their Applications

A.S. Mahjoor, M. Karimi and A. Rastegarlari

Clay-rich sediments from South Abarkouh district of clay deposit (SADC) in central Iran were analyzed for mineralogical and chemical composition, including the Rare earth element contents. Fifteen clay deposits have been located in Lower Permian (Artinskian) sediments of the area. The sediments are dominated by kaolinite, illite and quartz and minor phases include chlorite, albite, goethite, paragonite, natroalonite and gypsum. Whole rock chemistry shows that sediment samples rich in SiO_2 and Al have low Fe, Sc and Cr contents. The high Chemical Index of Alteration (CIA) values, high Chemical Index of Weathering (CIW) values, high ratio of TiO_2/Zr and low contents of the alkali and alkali earth elements of the clay-rich sediments suggest a relatively more intense weathering source area. Barium, Rb, Ca and Mg were probably flushed out by water during sedimentation. The chondrite-normalized Rare earth element patterns of the clay-rich sediments show LREE enrichments and a negative Eu anomaly. The high chondrite normalized La/Yb ratios and Gd/Yb ratios lower than 1.3, indicate that the sediments are enriched in LREEs. The mineralogical composition, REE contents, main elements discrimination diagram and elemental ratios in these sediments such as TiO_2/Al_2O_3 suggest a provenance mainly felsic rocks, with only minor contributions from basic sources. The basic sediments were most likely derived from Granitic-Riolitic rocks. The most significant geochemical finding is that despite intense weathering, which has affected most elements, the REE, Th and Sc remain immobile. The chemistry and the mineralogy of the studied samples, compared to other commercial clays, shows that they need some treatment to render them suitable for ceramics production. *(Journal of Applied Sciences 9 (4): 601-614, 2009;* ***doi:*** *10.3923/jas.2009.601.614)*

A Two-Dimensional Thermomechanical Analysis of Burn-Through at In-Service Welding of Pressurized Canals

Farid Vakili-Tahami and Hamed Masumi-Asl

In this study a numerical model has been developed to predict the onset of the failure of a rectangular canal-wall during an in-service welding process. In-service welding is one of the many applications of welding methods which has a wide use in petrochemical and gas industries. The safety of the in-service welding is a major

concern and the investigation of the Burn-Through and Hot-Cracking risks is becoming an important issue. In this research a Finite Element based numerical method has been used to model the in-service welding of an AISI 304 stainless steel plate on a rectangular canal-wall. A coupled 2D thermo-elasto-plastic FE model has been developed in which the temperature dependency of the physical properties of the material has been taken into account. Also, the effect of different factors such as: pressure of the fluid passing through the canal, different types of supports and geometry of the weld beads to reduce the risk of the burn-through have been studied. In addition, temperature-time diagrams have been produced which can be used to study the possibility of hot-cracking. The results show that the burn-through occurs under the welding pool and it is more likely to happen in the first welding-pass. These results show that the thermal condition of the fluid passing the canal, the external loadings such as internal pressure and supports have significant effect on the thermal stresses which may cause burn through. *(Journal of Applied Sciences 9 (4): 615-626, 2009;* ***doi:*** *10.3923/jas.2009.615.626)*

Constraint Joint-Replenishment Inventory Control Problem with Fuzzy Rough Demand

A.A. Taleizadeh, S. Nikpour and M. Zarei

An Uncertain Economic Order Quantity (UEOQ) model with payment in advance is developed to purchase high-price raw materials. A joint policy of replenishments and pre-payments is employed to supply the materials. The rate of demand is considered fuzzy rough variables, lead time is taken to be constant and it is assumed that shortage does not occur in the cycles. The cycle is divided into three parts; the first part is the time between the earlier replenishment-time to the next order-time (t_0), the second part is the period between t_0 to a payment-time (t_{lc}) and the third part is the period between t_{lc} to the next replenishment-time. At the start of the second part (t_0), α% of the purchasing cost is paid. The (1-α)% remaining purchasing cost is paid at the start of the third part (t_{lc}). The cost of the model is purchasing under incremental discount, clearance cost, fixed-order cost, transportation cost, holding and capital cost. Holding cost is for on-hand inventory and capital cost is for the capital that is paid for the next order. The constraints of the problem are space, budget and the number of orders per year. Also lead-time is considered less than a cycle time. We show that the model of this problem is a fuzzy rough mixed integer-nonlinear-programming type and in order to solve it, hybrid method of particle Swarm Optimization and fuzzy rough simulation is used. At the end, a numerical example is given to demonstrate the applicability

of the proposed methodology in real world inventory control problems. *(Journal of Applied Sciences 9 (4): 627-638, 2009; **doi:** 10.3923/jas.2009.627.638)*

Hybrid Control of Flexible Manipulator

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

This study describes hybrid control methods to control a flexible manipulator with payload. The dynamic equation of the system has been derived by Lagrange's method. The designed controllers consist of two parts, classical controllers, PID and Linear Quadratic Regulation (LQR) and hybrid controllers, Fuzzy Neural Network (FNN) controller with Feedback Error Learning (FEL) and Sliding mode control using Gaussian Radial Basis Function Neural Network (RBFNN). The fuzzy neural network and radial b asis function neural network are trained during control process and they are not necessarily trained off-line. *(Journal of Applied Sciences 9 (4): 639-650, 2009; **doi:** 10.3923/jas.2009.639.650)*

Transform Domain Based Multi-Channel Noise Cancellation Based on Adaptive Decorrelation and Least Mean Mixed-Norm Algorithm

M. Geravanchizadeh and T.Y. Rezaii

In this study, a transform domain based adaptive noise cancellation algorithm is proposed to enhance noise carrying speech signals. The algorithm deals with situations where the microphones should locate in close proximity, as they cancel out the crosstalk effects. In other words, the source of the noise signal is not available separately and is independent of the desired speech signal. This is the case in mobile phones and hands-free systems, where the smallness of the dimension of the applied speech enhancement system is desirable. In the proposed algorithm the Discrete Sine Transform (DST) is used as self orthogonalizing transform to address the eigen-spread problem of adaptive filter, whereas Least Mean Mixed-Norm (LMMN) adaptation algorithm and Symmetric Adaptive Decorrelation (SAD) structure are applied to improve the convergence rate of the adaptive filter and make a considerable improvement in the performance of the noise cancellation procedure. Also, the Voice Activity Detection (VAD) is used to reduce the computational costs and decrease the execution time. However in this study, there was an utmost attempt to consider all of the practical problems, while the minimum simplifying assumptions are made. The simulation results

have proven the robustness of this algorithm compared with commonly used algorithms, in the sense of SNR and MSE improvement and speech intelligibility. *(Journal of Applied Sciences 9 (4): 651-661, 2009;* ***doi:*** *10.3923/jas.2009.651.661)*

A Simulated Annealing Algorithm for Flexible Job-Shop Scheduling Problem

M. Yazdani, M. Gholami, M. Zandieh and M. Mousakhani

This study addresses the flexible job-shop scheduling problem to minimize makespan. In fact, the FJSP mainly presents two difficulties. The first one is to assign each operation to a machine out of a set of capable machines and the second one is to sequence the assigned operations on all machines. Hence, to solve this NP-hard problem, a simulated annealing algorithm is proposed. The meta-heuristic algorithm explores the solution space using a stochastic local search while trying to avoid local optima through accepting probabilistic moves to the worse solutions. The neighborhood search structures of assignment and sequencing are used for generating neighboring solutions to search the solution space. To evaluate the performance of the algorithm, twenty benchmark problems adopted from the literature are used. Consequently, the computational results validate the quality of present approach. *(Journal of Applied Sciences 9 (4): 662-670, 2009;* ***doi:*** *10.3923/jas.2009.662.670)*

Dynamic Analysis of Esfahan Metro Tunnels

A. Bagherzadeh and B. Ferdowsi

This study discusses the modeling of Esfahan metro tunnels subjected to earthquake and interaction of tunnels. In critical structures like subway tunnels, performing a time history dynamic analysis is the only acceptable method for determining the seismic-induced forces. For sites with no recorded earthquake ground motion, artificially generated accelerograms to represent the real earthquake records has been suggested by many experts. This study addressed the modeling of metro tunnels subjected to earthquake with finite difference numerical model. FDM model is developed to estimate the long-term support system. The numerical results of obtained in this research were compared with the analytical solutions. The analytical procedure in this study is limited in scope; it appears to be useful for a preliminary design of tunnel linings to estimate the seismic effect. *(Journal of Applied Sciences 9 (4): 671-679, 2009;* ***doi:*** *10.3923/jas.2009.671.679)*

Combined Operation of Unified Power Quality Conditioner and Photovoltaic Array

M. Hosseinpour, Y. Mohamadrezapour and S. Torabzade

In this study, the design of combined operation of UPQC and PV array is proposed. The proposed system is composed of series and shunt inverters, PV array connected to DC link by boost converter which is able to compensate the voltage sag and swell and voltage interruption, harmonics and reactive power in both islanding and interconnected modes. The proposed system is able to inject the active power to grid in addition to its ability in improvement of power quality in point of common coupling. Also, it can provide a part of sensitive load power during voltage interruption. The results of simulation in MATLAB/SIMULINK software show that the mentioned system operates correctly. *(Journal of Applied Sciences 9 (4): 680-688, 2009; **doi:** 10.3923/jas.2009.680.688)*

Java Versus .NET: A Comparative Analysis of Performance, Size and Complexity of Credit Card Authorization Systems

S. Hafizah Ab. Hamid, M. Hairul N. Md. Nasir and H. Hassan

This study presents a comparative analysis of the performance, size and complexity in both the Java and .NET platforms. Two identical prototypes of a credit card authorization engine were developed using the JAVA and .NET programming languages in order to measure and compare the performance of the authorization process as well as to measure and compare the size and development complexity of these two programming languages. The architecture of the singleton design pattern of a credit card authorization system using a multi-threading technique presented in this study supports the dynamic tuning of the size of the thread pool at runtime. It can be observed that the performance of the authentication engine in the .NET platform is slightly better than in the Java platform. Lines of Code (LOC) have been chosen as a metric to measure the size of the multi-threaded credit card authorization system whereby the total length of the multi-threaded credit card authorization system using a thread pool in .NET is 5048, while in Java it is 5199. The Cyclomatic Complexity number for the multi-threaded credit card authorization systems indicates that the .NET version is slightly less complicated than the Java version. *(Journal of Applied Sciences 9 (4): 689-697, 2009; **doi:** 10.3923/jas.2009.689.697)*

The Role of Depth of Vocabulary Knowledge in Reading Comprehension in EFL Contexts

S. Kaivanpanah and H. Zandi

The present study attempts to shed light on the role of depth of vocabulary knowledge in reading comprehension and its relationship with grammatical knowledge. To this end, a pre-1995 TOEFL and a measure of depth of vocabulary knowledge was administered to 57 EFL learners (17 male and 40 female). The analysis of the results showed that (a) language proficiency influences performance on depth of vocabulary knowledge tests (b) although depth of vocabulary knowledge is significantly related to reading, grammatical knowledge explains the greatest amount of variance in tests takers' performance on reading comprehension tests and (c) knowledge of collocation is related to grammatical knowledge. Having presented the findings in detail, the present study advises language teachers to increase the grammatical knowledge of language learners through diverse means such as focus on form and explicit grammar instruction. *(Journal of Applied Sciences 9 (4): 698-706, 2009;* ***doi:*** *10.3923/jas.2009.698.706)*

Dynamic Total Cost of Ownership Optimization for IPTV Service Deployment

Pejman Goudarzi

The Total Cost of Ownership (TCO) for developing communication services comprises from two parts; CAPital EXpenditure (CAPEX) and OPerational EXpenditure (OPEX). These two types of costs are interrelated and affect any service provider's deployment strategy. In many traditional methods, selection of critical elements of a new service is performed in a heuristic manner aimed at reducing only the OPEX part of the TCO which is not necessarily optimal. In the current study, a mathematical modeling approach is developed for describing the cost of each Internet Protocol Tele Vision (IPTV) component. Then, based on the proposed models, the TCO optimization problem of the IPTV service is formulated as a nonlinear programming one. The solution of the proposed optimization problem can track the dynamic changes of the TCO and lead to a time-varying optimal solution. Numerical results associated with the developed method are presented. *(Journal of Applied Sciences 9 (4): 707-715, 2009;* ***doi:*** *10.3923/jas.2009.707.715)*

Web Information Extraction for Question and Answering System about Prices of Chinese Agricultural Products

Wen-Sheng Wang, Li Liu, Qing-Tian Zeng, Xiao-Rong Yang and Neng-Fu Xie

This study presents an approach to Web information extraction for the question and answering system about prices of Chinese agricultural products. This approach first uses the training corpus to product keyword dictionary and then matches the sample pages to find key information path to format automatic information extraction. The advantage of this approach is effectively to avoid the nonstandard Hyper Text Marked Language (HTML) pages and to obtain high extraction accuracy in specific domain. *(Journal of Applied Sciences 9 (4): 716-723, 2009; **doi:** 10.3923/jas.2009.716.723)*

Evaluation of Performance of Plastic Concrete Cutoff Wall in Karkheh Dam Using 3-D Seepage Analysis and Actual Measurement

M.S. Pakbaz, A. Dardaei and J. Salahshoor

In this study, first the integrity of the plastic concrete cutoff wall in Karkheh dam is sought by reviewing constructional controls and observations. Then, the performance of the wall before the extension is modeled using SEEP 3-D computer code and calibrated using actual seepage measurements. The future performance of the wall when reservoir reaches its maximum level is also predicted. At last the effect of extension of the wall on the seepage using 3-D model is presented. According to the results of this study the integrity of the wall itself is warranted. The considerable seepage observed after impoundment was mainly due to partially penetrated cutoff wall in the left and right abutments. Three dimensional prediction of seepage after construction of a completely penetrated wall in the left and right abutment and impervious blankets indicates decrease in seepage by 20-60% in right and left abutment, respectively. *(Journal of Applied Sciences 9 (4): 724-730, 2009; **doi:** 10.3923/jas.2009.724.730)*

A New Accident Investigation Approach Based on Data Mining Techniques

Sh. Parhizi, J. Shahrabi and M. Pariazar

In this study some data mining techniques for accident investigation and risk analysis is proposed. Function of most of accident investigation and risk analysis

methodologies have been based on establishment of different scenarios of accident occurrence and simulation of accidents situation and so far no fundamental action for the analysis of remained data from accident has taken place. This study with the approach of data analysis and using different techniques of data mining can eliminate deficiencies of other techniques therewith covers theirs advantages. In this study factor analysis utilized to identify effective factors on occurrence of accidents. Cluster analysis utilized to classify accidents. A case study in a petrochemical company has been done in order to execute and investigate proposed methodology. The results show four different factors effecting on accident's occurrence and ten different clusters of accidents recognized. Also association rules exposed to discover all patterns and rules that cause occurrence of accidents. *(Journal of Applied Sciences 9 (4): 731-737, 2009; **doi:** 10.3923/jas.2009.731.737)*

Physical Design of Source Couple Logic Pulse Generator Circuit for Ultra Wideband Applications

M. Azaga and M. Othman

A proposed design of Ultra Wideband (UWB) pulse generator circuit is presented. The design is based on Source Couple Logic (SCL) for its low power and high immune to noise so it can be used in mixed signal ICs environment. The pulse is digitally generated by using SCL inverters and NAND gates; the output of clock pulse input is dual pulse signals opposite to each other. The design is simulated and result of the circuit is dual pulses with width of sub-nanosecond. The results gotten have satisfied the design idea as desired. Post simulation has been carried out by using HSPICE, the layout is done using Cadence Virtuoso and verification is done by Mentor Graphic Interactive tool. All simulations are based on MIMOS 0.35 μm process PDK. *(Journal of Applied Sciences 9 (4): 738-744, 2009; **doi:** 10.3923/jas.2009.738.744)*

The Survey of Plant Species Diversity and Richness Between Ecological Species Groups (Zagros Ecosystem, Ilam)

M. Heydari and Ali Mahdavi

The aim of this study was to investigate the biodiversity and richness of vegetation between ecological species group. In this research, vegetation (tree, shrub, bush and herbaceous species), Persian Oak (*Quercus brantii*) natural regeneration, some physical and chemical properties of soil and physiographic factors were

taken in 50 sample plots. The plots area was 20×20 m. The sample plots were located using transect's method. The coverage percent of trees and shrubs in each plot were measured regarding to large and small canopy diameter. For herbaceous layer, Withaker, hasted plot sampling was used and 64 m^2 were defined as minimal area. Overall, 4 trees, 3 shrubs, 1 bush and 78 herbaceous species, which belong to 73 genera and 32 families, were recognized. Multivariate analysis methods were used to classify and determine the relationship between species composition and environmental factors and also to recognize ecological species group. The results indicated that five ecological species groups were recognized in the study area and the parameters such as: elevation, organic matter, N, P, K, bulk density, SP, pH, clay and C/N were important factors. The results indicated that biodiversity and richness were maximum in the third group. This site was more humid than the others and organic materials such as, N, P and K are higher than the other sites. In the fifth group that bulk density was high and organic matters were low and its soil was compacted, biodiversity and richness were lower than the other groups. *(Journal of Applied Sciences 9 (4): 745-751, 2009;* ***doi:*** *10.3923/jas.2009.745.751)*

Monitoring Temperature Variation of Reactance Capacitance of Water Using a Cylindrical Cell Probe

G. Behzadi and H. Golnabi

In this study by using a capacitive cell probe the temperature variation of the electrical properties of the water liquids is investigated. Variation of the reactance capacitance parameter of liquids with temperature in the range of 17-60°C is measured for the plain water and water mixtures. The temperature variations of the capacitance for the cool distilled and tap water samples are studied for the range of 17-29°C obtained. Present results indicate an averaged variation of 4.69 μF/°C for the distilled water and 3.24 μF/°C for tap water in warm up process to a near room temperature. The cooling behaviors for the warm mineral, tap and salt water liquids are also investigated in this study. Average variations of 0.54 μF/°C for the mineral water, 0.76 μF/°C for the tap water and 1.44 μF/°C for the dilute salt water are obtained for the high temperature range. In comparing the results for different liquids, dilute salt water shows a factor of 2.6 increase in measured capacitance in comparison with the mineral water when temperature drops from 60.0 to 35.0°C. Hence the reported cell probe provides a relatively accurate method to determine the temperature dependence of reactive capacitance for the pure liquids and also liquids with a trace impurity. *(Journal of Applied Sciences 9 (4): 752-758, 2009;* ***doi:*** *10.3923/jas.2009.752.758)*

Combining Several PBS-LMS Filters as a General Form of Convex Combination of Two Filters

A. Fathiyan and M. Eshghi

Combination approaches can improve the performance of adaptive filters. Recently a convex combination of adaptive filters was proposed to improve the performance of LMS algorithm. Our proposal in this study is to use the PBS-LMS algorithm instead of LMS algorithm in the structure of convex combination. Our simulations showed that this structure not only has the optimality of first one, but also, it has the features of PBS-LMS algorithm such as regularity. By using PBS-LMS algorithm in this structure we saved in total number of samples needed by filter to converge about 22.2%, for example the fast filter converged to the steady state in 352 samples, the slow one in 397 samples and the overall filter in 309 samples. Also, this scheme was generalized, combining multiple PBS-LMS filters with different adaptation step sizes. *(Journal of Applied Sciences 9 (4): 759-764, 2009; **doi:** 10.3923/jas.2009.759.764)*

A New Two Phase Bidirectional Hybrid Switched Reluctance Motor/Field-Assisted Generator

E. Afjei, A. Seyadatan and H. Torkaman

The switched reluctance motor is a simple and robust machine, which has found application over a wide power and speed ranges in different shapes and geometries. This study introduces a new two phase hybrid configuration for a switched reluctance motor/field assisted generator. The proposed novel motor/generator consists of two magnetically independent stator and rotor sets (layers), where each stator set includes four salient poles with windings wrapped around them, while the rotor comprises of two salient poles. There is a stationary reel, which has the field coils wrapped around it and is placed between the two-stator sets. The two sets are connected independently in the motor mode of operation. In this connection the poles in each layer can have both North and South Pole configurations. In the generator mode, the stator poles in one set can have either north or south pole configuration and the stator poles in the other set (layer) have the opposite pole arrangement. In this format, the developed magnetic field from the stator poles goes to the rotor poles after that to the rotor shaft and then completes its path via the motor/generator housing. To evaluate the motor performance, two types of analysis, namely, the numerical technique and the experimental study have been utilized. In the numerical analysis, the finite element

analysis is employed, where as in the experimental study, a proto-type motor has been built and tested. *(Journal of Applied Sciences 9 (4): 765-770, 2009; **doi**: 10.3923/jas.2009.765.770)*

Evaluation of Dough Sensory Properties Impacted by Yeasts Isolated from Cassava

B. Boboye and I. Dayo-Owoyemi

This study is focused on isolating and identifying yeasts found in cassava as well as assessing the dough fermenting abilities of the isolates in term of leavening. A total of seven yeasts were isolated from the liquor of a four days fermented cassava. These are *Geotrichum lactis*, *Saccharomyces ellipsoideus*, *Candida tropicalis*, *C. robusta*, *C. intermidia*, *Debaryomyces hansenii* and *Zygosaccharomyces bailii*. They were used to ferment wheat flour doughs in order to test the fermentative ability of the isolates. The fermented doughs were baked and organoleptic analysis was carried out using some physical parameters namely: leavening, texture, aroma, taste and appearance. The analysis showed that *Saccharomyces ellipsoideus*, *Geotrichum lactis* and *Candida robusta* were best in leavening the flour doughs. Each of these isolates scored between 55 and 60% in all the attributes tested. In the sensory attributes applied, statistical analysis using ANOVA ($p<0.05$) and Duncan Multiple Range Test showed that about 71 and 80% of the tested isolates compared favourably with the commercial baker's yeasts STK Royal and Saf-instant used. *(Journal of Applied Sciences 9 (4): 771-776, 2009; **doi**: 10.3923/jas.2009.771.776)*

Maximum Power Control of Variable Speed Wind Turbine Connected to Permanent Magnet Synchronous Generator Using Chopper Equipped with Superconductive Inductor

M.B. Bana Sharifian, Y. Mohamadrezapour, M. Hosseinpour and S. Torabzade

In this study, maximum power control of wind turbine and induction generator connected with two back to back voltage source converters to grid are studied. Machine currents are controlled by indirect vector control method. In this method, generator side converter controls the maximum excitation (air gap flux) by machine's d-axis current and controls generator torque by machine's q-axis current. Induction generator speed is controlled by Tip Speed Ratio (TSR) upon the wind speed variations in order to generate the maximum output power. Grid

side converter regulates the DC link voltage and injective active power by d-axis current and regulates the injective reactive power by q-axis current using simple control method P-Q. Simulation results show that the proposed method operates correctly. *(Journal of Applied Sciences 9 (4): 777-782, 2009;* ***doi:*** *10.3923/jas.2009.777.782)*

Study of $Bi_{1.65-x}Pb_{0.35}Sb_xSr_2Ca_2Cu_3O_y$ Superconductor

S.E.M. Ghahfarokhi, M.Z. Shoushtari and M. Farbod

In this study, the effect of annealing time and Sb doping on Bi-based superconductor properties have been investigated. Partial substitution of Sb for Bi in the $Bi_{1.65-x}Pb_{0.35}Sb_xSr_2Ca_2Cu_3O_y$ (BPSSCCO) superconductor has been found to increase the volume fraction of Bi (2223) phase. The BPSSCCO superconductor is made by solid state reaction method, using Bi_2O_3, PbO, CuO, $CaCO_3$, $SrCO_3$ and Sb_2O_3 powders as starting material. This study, reports $Bi_{1.65-x}Pb_{0.35}Sb_xSr_2Ca_2Cu_3O_y$ compound properties with x = 0.0, 0.03, 0.05 and 0.07 as variable. For that the effect of annealing time and amount of Sb doping on BPSSCCO microstructure, critical temperature and critical current density have been investigated. The structural analysis was carried out using XRD, SEM and EDX instruments. Both the critical temperature (T_c) and critical current density (J_c) were measured at 77 K. The critical current density was performed via V-J measurement in liquid nitrogen. The X-ray diffraction patterns show that low amount of Sb beside long annealing time enhance the fraction of Bi (2223) phase as well the critical current density. In order to study the effect of Sb on resistivity at room temperature, the V-I curves in the samples were measured. The resistivity of Sb doped samples at room temperature increases directly with increases of Sb. On the contrary, it is decreases by annealing time increase. *(Journal of Applied Sciences 9 (4): 783-788, 2009;* ***doi:*** *10.3923/jas.2009.783.788)*

A New Approach to Find the Optimal Solution for Base Stock Policies

N. Yazdan Shenas, A. Eshraghniaye Jahromi and M. Modarres

In this study, the cost function of the defined system is derived first. Then, we prove this function is convex in the system's base stock level. Finally, based on the convexity of the cost function, the optimal solution for the base stock model is determined. For demonstrating the applicability of the proposed method, we

resort to solving an example. *(Journal of Applied Sciences 9 (4): 789-793, 2009; **doi:** 10.3923/jas.2009.789.793)*

Knowledge Acquisition from Textual Documents for the Construction of Medicinal Herbs Domain Ontology

I. Zaharudin, S.A. Noah and M.M. Noor

In this study a semi automatic acquisition of domain relevant terms from digital documents in e-newspaper related to Malaysian medicinal herbs is presented. This study proposes (1) TFIDF-based term classification method for acquiring single word terms, (2) recognition of multi-word using TerMine software to acquire multiword terms and (3) Hearst's methodology of acquiring semantic relationships of hyponym. The results show the benefits of using these methods in selecting relevant terms from domain specific corpus. From this study it is believed that the combination of these three methods might be helpful to select relevant terms as well as minimize the effort to discard irrelevant terms manually from wide collection of terms from the corpus. *(Journal of Applied Sciences 9 (4): 794-798, 2009; **doi:** 10.3923/jas.2009.794.798)*

Variational Iteration Method for Solving Integral Equations

S. Shakeri, R. Saadati, S.M. Vaezpour and J. Vahidi

In this study, several integral equations are solved by He's variational iteration method. The method can solve various different non-linear equations as Volterra integral equations of the second kind, Ferdholm integral equations and mixed integral equations. Comparison with exact solution shows that the method is very effective and convenient for solving integral equations. *(Journal of Applied Sciences 9 (4): 799-800, 2009; **doi:** 10.3923/jas.2009.799.800)*

Age Structure, Growth, Mortality and Yield-Per-Recruit of Sergestid Shrimp, *Acetes indicus* (Decapoda: Sergestidae) From the Coastal Waters of Malacca, Peninsular Malaysia

S.M.N. Amin, A. Arshad, J.S. Bujang and S.S. Siraj

Age structure, growth, mortality and yield-per-recruit of *Acetes indicus* were examined in the coastal waters of Malacca, Peninsular Malaysia between February 2005 and January 2006. Monthly length frequency data were analyzed using

FiSAT software for estimating population parameters, including asymptotic length (L_∞), growth co-efficient (K) and exploitation rate (E) to assess the status of the stock. The L_∞ and K for males were estimated at 29.40 mm and 1.70 $year^{-1}$ and for the females that were 42 mm and 1.20 $years^{-1}$, respectively. The growth performance index (φ') was calculated as 3.16 and 3.33 for males and females. The growth pattern of males and females showed positive allometric nature of growth ($b>3$, $p<0.05$). The maximum life span (t_{max}) of males and females was 1.76 and 2.50 years, respectively. Total mortality (Z) by length converted catch curve was estimated at 4.15 $year^{-1}$ for males and 3.50 $year^{-1}$ for females. The rate of natural mortality (M) for males and females was calculated as 2.65 and 1.91 $year^{-1}$ and the fishing mortality (F) was 1.50 and 1.59 $year^{-1}$ for males and females, respectively. The recruitment pattern of *A. indicus* was continuous throughout the year with two major peaks. The exploitation rate (E) of males was 0.36 and that of females was 0.45. The maximum allowable limit of exploitation (E_{max}) of males and females was 0.71 and 0.57 for the highest yield. The exploitation rates were less than the predicted E_{max} values of males and females. Thus, the stock of *A. indicus* was found to be under exploited in the investigated area. *(Journal of Applied Sciences 9 (5): 801-814, 2009;* ***doi:*** *10.3923/jas.2009.801.814)*

Advanced Spaceborne Thermal Emission and Reflection Radiometer Mineral Mapping to Discriminate High Sulfidation, Reduced Intrusion Related and Iron Oxide Gold Deposits, Eastern Iran

M.H. Karimpour and C.R. Stern

Thirty scenes of Aster data from eastern Iran were processed using the Multispectral supervised classification method for identifying hydrothermal alteration zones related to possible mineral deposits. Several areas having great potential for mineral exploration were identified. ASTER mineral mapping from three known types of gold mineralization in eastern Iran were compared. Chah Shaljami, a high sulfidation Au (lithocap of porphyry Cu) prospect, shows alunite, silica, jarosite, dickite, montmorillonite and gypsum. Alteration is intense and covers an area of 3×4 km^2. Aeromagnetic data show low magnetism within the area of alteration, indicating that magnetite was destroyed during alteration. Qaleh Zari is a specularite-rich Iron oxide Cu-Au deposit (IOCG). ASTER mineral mapping shows only epidote and chlorite. Alteration is narrow and is linear. Aeromagnetic data show high magnetism in most of the area, therefore alteration did not destroy the primary magnetite. Hired is a reduced-intrusion-related Au

prospecting area. ASTER mineral mapping shows tourmaline, chlorite, silica and minor sericite. Alteration is local and is not as extensive as at Chah Shaljami. Aeromagnetic data show a very broad area of low magnetism that is associated with reduced ilmenite series intrusive rock. *(Journal of Applied Sciences 9 (5): 815-828, 2009; **doi:** 10.3923/jas.2009.815.828)*

Hydrothermal Alteration Mapping in SW Birjand, Iran, Using the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Image Processing

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

Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) image processing have been used for mapping hydrothermal alteration in Eastern Iran. Eastern Iran has a great potential for the discovery of different types of mineralization. This technique works very well in eastern Iran due to low precipitation causing very minor soil development and the small amount vegetation and therefore good rock exposure. ASTER images processing can identify areas with hydrothermal alteration for further exploration. Application of ASTER false color composite images, color composite ratio images, principal component analysis and Spectral Angle Mapper (SAM) techniques detected five altered areas in the district of SW Birjand, Eastern Iran. Spectral Angle Mapper (SAM) classification proved to be the best method for mineral mapping. This technique shows very good results for identification of different type of alteration with distinct mineral assemblages. The SAM method has also detected argillic and alunitization zones in areas that had not been clearly recognized by earlier techniques. *(Journal of Applied Sciences 9 (5): 829-842, 2009; **doi:** 10.3923/jas.2009.829.842)*

Petrography and Mineral Chemistry of the Boroujerd Pluton (Sanandaj-Sirjan Zone, Western Iran)

A. Ahmadi Khalaji, Z. Tahmasbi and R. Zarei Sahamieh

The Boroujerd pluton is chiefly constituted of quartz-diorite, granodiorite and monzogranite. The mineral chemistry and microprobe analysis of mineral assemblages in these rocks indicate that the magma in this area has a metaluminous to slightly peraluminous composition, related to calc-alkaline, arc-type magmas and displays features typical of I-type granitoids. Also, the average pressure and temperature is estimated at 1.093±0.6 k bars and 785±40 in quartz-diorites,

respectively. All analyzed samples have log FO_2-14.1 which show this magma crystallized in high oxygen fugacity. Also, the occurrence of magnesio-hornblende and Fe^{2+}biotite in Boroujerd rocks suggest relatively oxidized magma. *(Journal of Applied Sciences 9 (5): 843-853, 2009;* ***doi:*** *10.3923/jas.2009.843.853)*

Distributed Data Clustering Using Expectation Maximization Algorithm

B. Safarinejadian, M.B. Menhaj and M. Karrari

In this study, a distributed expectation maximization (DEM) algorithm is first introduced in a general form for estimating parameters of a finite mixture of components. This algorithm is used for density estimation and clustering of the data distributed over the nodes of a network. Then, a distributed incremental EM algorithm (DIEM) with a higher convergence rate is proposed. After a full derivation of distributed EM algorithms, convergence of both DEM and DIEM algorithms is studied based on the negative free energy concept. It is shown that these algorithms increase the negative free energy incrementally at each node until reaching the convergence. Finally, the proposed algorithms are applied to cluster analysis of gene-expression data. Simulation results approve that DIEM remarkably outperforms DEM. *(Journal of Applied Sciences 9 (5): 854-864, 2009;* ***doi:*** *10.3923/jas.2009.854.864)*

Science Students' Misconceptions of the Water Cycle According to their Drawings

Osman Cardak

This study conducted by based on student drawings and interviews was held with the aim of determining misconceptions of science students receiving education in universities about the water cycle. There are a number of techniques to indicate misconceptions of students. Open ended questions, two-stage diagnosis tests, concept maps, word association and interviews are some of these techniques. In addition, science educators have started to use drawings methods in order to ensure students to understand science and to obtain knowledge about their misconceptions recently. As a result of analysis of drawings and interviews, it was seen that more than half of students has comprehensive or partially conceptual knowledge, but approximately one fourth of students has misconceptions about this subject. In addition, it was determined that students

have misconceptions like water cycle is only evaporation of water from the earth to the atmosphere and its return to the earth from the atmosphere by condensing. *(Journal of Applied Sciences 9 (5): 865-873, 2009; **doi:** 10.3923/jas.2009.865.873)*

Thermobarometry of the Astaneh Pluton and its Related Subvolcanic Rocks (Sanandaj-Sirjan Zone, Western Iran)

Z. Tahmasbi, M. Khalili and A. Ahmadi-Khalaji

The Astaneh area belongs to the Sanandaj-Sirjan Zone (SSZ) in Western Iran. The igneous rocks in this area consist of tonalite, granodiorite, monzogranite and subvolcanic rocks (rhyodacites). The mineral chemistry and microprobe analysis of mineral assemblages in these rocks indicate that the magma in this area has a metaluminous to slightly peraluminous composition, related to calc-alkaline, arc-type magmas and displays features typical of I-type granitoids. Also, the average of minimum pressure is estimated at 1.37 kbars in tonalites whereas the maximum pressure is 6.58 kbars in pargasite in dacitic enclaves. The maximum temperature is 767°C in pargasitic amphibole crystallized in dacitic enclave whereas the minimum temperature is 650°C in tonalite. All analyzed samples have log fO_2 in the range between -13 (in dacitic enclave) to -18.3 (in tonalite) and -15 (in tonalitic enclave), respectively, which show this magma crystallized in high fO_2. The presence of phenocrysts of plagioclase (An = 80-90) together with plagioclase (An = 35-40), pargasitic amphibole in dacitic enclave and oscillatory zoned plagioclase in rhyodacites might be accounted for by a magma mixing model in the subvolcanics of Astaneh. *(Journal of Applied Sciences 9 (5): 874-882, 2009; **doi:** 10.3923/jas.2009.874.882)*

Monte-Carlo Modeling of Some Niger Delta Slope Events

M.I. Oladapo, J.S. Ojo, M.O. Olorunfemi and B.A. Adetola

Monte-Carlo modeling has been utilized in this study to simulate seismic P-wave events on four horizons (AA, BB, CC and DD) in a Niger Delta Slope environment with the aim of generating AVO attributes. Monte-Carlo modeling undertaken on a well log from the Gulf of Mexico served as a generic model and control. Trends analysis regressions generated in the environment served as input for the models while default parameter in SAVIOR (fluid method) was used for establishing reservoir fluid properties. Fourier velocity served as velocity function. The results of the modeling are presented as AVO crossplots for brine sand

(background), residual hydrocarbon and commercial hydrocarbon. For each event, offset-dependent synthetic seismograms are also generated using Zoeppritz equations. The AA horizon is typified by incoherent orientations of AVO crossplots. The horizon is thus presumed unconsolidated. The synthetic seismogram generated shows no perceptible amplitude variation with offset on all the models. AVO crossplot of the encountered BB horizon show that most of the commercial hydrocarbon plots and some of the residual hydrocarbon plots fall on quadrant III (bright spot quadrant). Synthetic seismic generated for BB horizon exhibits positive AVO response (soft kick) on the commercial hydrocarbon model. A similar but marginal response was obtained on brine saturated BB model. Brine saturated model of the AVO crossplot for CC horizon model plotted mostly on hard sand quadrant. Conversely, presumed commercial hydrocarbon saturated CC is split between the hard sand and soft sand quadrants with low background normal values. The DD horizon is similar to the deep model of the Gulf of Mexico and hence exhibits similar crossplot. Curiously, high background normal (Bn) characterized residual hydrocarbon models while unconsolidated gas sand horizons exhibit anomalous characteristics. The AVO crossplot obtained from the Monte-Carlo model could be a robust tool for mapping reservoirs within the Niger Delta Slope. *(Journal of Applied Sciences 9 (5): 883-891, 2009;* ***doi:*** *10.3923/jas.2009.883.891)*

A Decentralized Stable Fuzzy Adaptive Controller for Large Scale Nonlinear Systems

R. Ghasemi, M.B. Menhaj and A. Afshar

A new method to design a decentralized Fuzzy Adaptive Controller (FAC) for a class of large scale nonaffine nonlinear systems is proposed in this study. It is assumed that functions of the subsystems and their interactions are unknown. To design controller, the lyapunov function is proposed for the system and then unknown parameters of controller and system are derived based on the stability theory. The robustness against uncertainty and external disturbance, the boundedness of the estimation errors, the convergence of the output error to zero and the lyapunov stability of the closed loop system are guaranteed. To use the knowledge of the experts in FAC is another advantage of controller. Robust adaptive control has been used to avoid chattering in adaptation laws. An illustrative example is given to show the promising performance of the proposed method. *(Journal of Applied Sciences 9 (5): 892-900, 2009;* ***doi:*** *10.3923/jas.2009.892.900)*

Effect of Treated Domestic Wastewater on Physical and Chemical Characteristics of Soils

Ahmed A. Al-Othman

The study was carried out to determine the effect of treated domestic wastewater (TDW) on physical, chemical and microbial properties of three soils. There was no significant change in the sand, silt and clay fractions after 458 days of TDW irrigation. The parameters included soil pH, which remained within moderately alkaline region after 458 days of TDW irrigation. The SAR of A and B soils changed from 3.27-2.95 and 3.67-2.15, respectively after 200 days of irrigation. But, the decrease in SAR was less in the same soil when irrigated with TDW continuously for 458 days compared to 200 days due to salt leaching to lower soil depths. The concentration of cations (Na^+, K^+, Ca^{2+}, Mg^{2+}) showed significant ($p<0.001$, $p<0.032$) increase after 200 days followed by a significant ($p<0.001$, $p<0.008$) decrease after 458 days of TDW irrigation. The concentrations of Na^+ in A and B soils decreased with the soil depth except soil C which showed the highest concentration of K as 13.9 meq L^{-1} than the control sample as 3.2 meq L^{-1} after 200 days of irrigation and at 150 cm soil depth. The K^+ concentration increased from 0.2 to 0.5 meq L^{-1} and 0.2-0.8 meq L^{-1} in A and B soils, respectively. However, at 458 days of irrigation, the K^+ concentration dropped below, 0.2 meq L^{-1} in both samples. The electrical conductivity (EC), sodium absorption ratios (SAR), cations (Na+, K^+, Ca^{2+}, Mg^{2+}) and anions (CO_3^{2-}, HCO_3^-, Cl^-, SO_4^{2-}) showed similar patterns. But the values of these cations/anions increased after 200 days of irrigation which again dropped below the initial values of soils. The average number of bacteria in soil A, B and C after 200 days and 458 days of TDW irrigation were 99 and 393 cells, 149 and 333 cells and 56 and 559 cells, respectively. In addition to the above, the microbial analysis indicated that *E. coli* was absent in all the soils irrigated with TDW. The research findings suggest that although the TDW irrigation did not mainly affect the physical and chemical properties of soil under investigation, but is likely to contaminate the groundwater on long term basis in Riyadh region. *(Journal of Applied Sciences 9 (5): 901-908, 2009;* ***doi:*** *10.3923/jas.2009.901.908)*

The Performance of Laterally Loaded Single Pile Embedded in Cohesionless Soil with Different Water Level Elevation

M.R. Taha, Jasim M. Abbas, Qassun S. Mohammed Shafiqu and Zamri H. Chik

A three-dimensional finite element simulation is presented in this study to investigate the lateral pile response for single vertical pile embedded in

cohesionless soil. Four water table cases we simulated, i.e., dry soil condition, water table in the base and middle of the pile length and fully saturated soil. Linear elastic model of pile is used for modeling the pile material while Mohr-Coulomb model is used to simulate the surrounding soil. The pile-soil interaction are composed of 16-node interface elements. It was found that the water table elevation influence on the behavior of laterally loaded pile. As expected the case of dry soil condition gives more resistance than other three soil cases. *(Journal of Applied Sciences 9 (5): 909-916, 2009;* ***doi:*** *10.3923/jas.2009.909.916)*

A New Method for Estimating Project Weight Values

F. Zorriassatine and M. Bagherpour

In this study, an AHP-based method integrated with fuzzy logic is deployed to estimate Project Weight Values (PWVs). Two criteria, namely man-hour and work preference, are used as input in the model to estimate their related weights. Man-hour and work preference are assumed to be deterministic and fuzzy respectively. The fuzzy nature allows deployment of linguistic variables during PWV estimation. The study uses a numerical example for demonstrating the application of the proposed approach. If desired, the model discussed here can be further extended to capture other aspects of interest in the estimation of PWV such as: the required time, budget, etc. A reliable perspective for actual progress of a project is thus provided. It is shown that the proposed approach can be applied to other aspects of a project such as project close up and capital budgeting applications. The approach proposed by this study can be used as an initial step in order to implement an earned value management system. *(Journal of Applied Sciences 9 (5): 917-923, 2009;* ***doi:*** *10.3923/jas.2009.917.923)*

Improved Joint Probabilistic Data Association Filter for Multi-Target Tracking in Wireless Sensor Networks

T. Yousefi Rezaii and M.A. Tinati

In this study the Regularized and simplified Monte Carlo-Joint Probabilistic Data Association Filter (RMC-JPDAF) is proposed and applied to the classical problem of multiple target tracking in a cluttered area. To encounter with the data

association problem that arises due to unlabeled measurements in the presence of clutter, we have used the Joint Probabilistic Data Association Filter (JPDAF). The Monte Carlo methods are used in order to the fact that they have the ability to estimate any general state-space model with nonlinear and non-Gaussian functions for target dynamics and measurements likelihood. The Conventional implementation of Monte Carlo-JPDAF (MC-JPDAF) uses the resampling stage in order to reduce the variance of samples (called degeneracy problem); however this procedure itself causes another problem called sample impoverishment phenomenon, which is unavoidable and the tracking performance will decrease. So, we propose to use the regularized resampling stage instead, to counteract this shortcoming. Finally, the target dynamics model is used as the proposal distribution in MC-JPDAF, in order to decrease the computational cost while the performance of the tracking system is nearly maintained. The simulation results of the proposed system are presented and compared with those of the standard Monte Carlo implementation of FPDAF and the performance improvement of the proposed algorithm is proven. *(Journal of Applied Sciences 9 (5): 924-930, 2009;* ***doi:*** *10.3923/jas.2009.924.930)*

Immunity Level of Personal Computers to Voltage Sags in the 240 V/50 Hz Distribution Systems

Hussain Shareef, Azah Mohamed and Nazri Marzuki

This study focuses on investigating the vulnerability of personal computers (PCs) to voltage sags in the context of local power distribution system in Malaysia. Based on recent testing standards and utilizing a modern industrial power corrupter, extensive tests are conducted for a wide range of PCs. For predefined malfunction criteria, such as monitor image distortion and reboot/restart condition, sag depth and duration are varied to construct individual voltage immunity curves. To obtain a quick overview about voltage sensitivity of PCs and to compare with the standard ITIC and SEMI F47 design goals, a generic voltage tolerance curve is then developed. The experiment results show that the PCs used in the local system have relatively high tolerance level to voltage sags when compared to the design goals of ITIC and SEMI F47 standards. Furthermore, the developed voltage tolerance curve may be helpful to mitigate sensitivity of personal computers to voltage sags in the local environment. *(Journal of Applied Sciences 9 (5): 931-937, 2009;* ***doi:*** *10.3923/jas.2009.931.937)*

Comparative Evaluation of Physicochemical Properties of Corn Flours Through Different Water Qualities and Irrigation Methods

M.J. Amiri, A. Ebrahimizadeh, S. Amiri, M. Radi and M. Niakousari

In this study, the effects of different irrigation methods (furrow, surface drip and subsurface drip) and water qualities (municipal treated effluent and fresh water) with irrigation scheduling based on soil moisture and root depth monitoring were evaluated on the composition and physicochemical quality of the corn flour. A split plot experiment with three main treatments (irrigation methods) and two sub-main treatments (irrigation water qualities) with four replications were designed and executed in Marvdasht sewage station. The magnitude and extent of the factorial influence were measured/conducted using the effects on Water Absorption Capacity (WAC), Swelling Index (SI), solubility (TSS) and Gelatinization Temperature (GT). Based on the results, the corns, irrigated by furrow irrigation method showed higher protein and oil contents than those irrigated by other methods. In each irrigation method, the samples irrigated with effluent, had higher protein content than those irrigated with fresh water. However, the protein content of the grains probably improved with increasing the volume of irrigation water in furrow methods than the other irrigation methods. The sub-surface drip using wastewater can be a good choice from the point view of agriculture (due to its higher water saving and greater yield) and also food industry (because of the high starch content, solubility and swelling index and the least gelatinization point of the corn flours). *(Journal of Applied Sciences 9 (5): 938-943, 2009; **doi:** 10.3923/jas.2009.938.943)*

Basic Laws of Thermodynamics and the Influence of Vitalistic Conception on Learning of the High School Students About Matter Cycle and Energy Flow

Fulya Öztaş

This study analyzes whether the basic laws of thermodynamics or vitalistic conception is effective in explanation of the matter cycle and energy flow in an ecological system by the high school students. The findings of the study suggest that although the students know the physical and chemical laws about matter cycle and energy flow as well as the second law of thermodynamics on theoretical basis, they are faced with some difficulties arising from the vitalistic conception in applying to the biological facts. *(Journal of Applied Sciences 9 (5): 944-949, 2009; **doi:** 10.3923/jas.2009.944.949)*

Increment Characteristics for Man-Made Stand of Norway Spruce (*Picea abies* L. Karst) in North of Iran

A. Fallah, H. Jalilvand, M.R. Pormajidian, S. Mohammadpoor Pashakolaei and Y. Kooch

In this study, the afforestation stands of 18.1 ha with planting interval 2×2 m of *Picea abies*, at the age of 44 years old was investigated to compute increment and wood production in Kelardasht plantation (North of Iran). This stand was inventoried using region map and 70×70 m inventory grid. The samples were taken by randomized-systematic method. Increment statistical factors in 32 sample plots with 500 m^2 area were measured. Inside each plot, Diameter at Breast Height (DBH) of whole trees and height of four witness trees (two thickness trees inside the plot and two nearest trees to center of plot) were measured. Results of this research showed that survival percentage of *Picea abies* at the age of 44 years old was 39.3% in Kelardasht region. Also, the average of stand diameter, height, basal area, volume, annual volume increment and form factor were 16.86 cm, 18.20 m, 23.59 m^2 ha^{-1}, 193.73 m^3 ha^{-1}, 4.4 m^3/ha/year and 0.46, respectively. Considering obtaining results and comparing them with its main habitat, the stand increment amount and statistical parameters are low. *(Journal of Applied Sciences 9 (5): 950-955, 2009;* ***doi:*** *10.3923/jas.2009.950.955)*

Effect of Impregnation with Timbercare Aqua on the Properties of Some Woods

Abdullah Togay

The aim of this study was to investigate the effect of impregnation with timbercare aqua on the Modulus of Elasticity (MOE) in bending of some woods. According to Duncan test results, for non-impregnated woods MOE were found the highest in Oriental beech (12,490 N mm^{-2}), the lowest in Oriental spruce (8,165 N mm^{-2}). For impregnated woods, Modulus of Elasticity (MOE) were found the highest in Oriental beech once impregnated (14,360 N mm^{-2}) and the lowest in Scotch Pine thrice impregnated (7,246 N mm^{-2}). The results show that except for oak samples, one times impregnation with timbercare aqua due to the increasing MOE and impregnation with timbercare aqua can be useful for the wood material subject to bending stress, which needs high elasticity. *(Journal of Applied Sciences 9 (5): 956-961, 2009;* ***doi:*** *10.3923/jas.2009.956.961)*

Numerical Analysis of Bio-Heat Transfer in a Spherical Tissue

Po-Jen Cheng and Kuo-Chi Liu

This study uses the Pennes bioheat equation in spherical co-ordinates to describe the heat transport occurring in biological tissues during magnetic tumor hyperthermia. A hybrid numerical scheme based on the Laplace transform, change of variables and the modified discretization technique in conjunction with the hyperbolic shape functions is proposed for solving the present problem. The effects of blood perfusion, metabolism and the difference of thermophysical properties between the diseased and health tissues are explored. The accuracy of the numerical results is evidenced by comparing with the results in the literature. The metabolic heat generation rate and the blood perfusion rate practically affect the temperature rise behavior *in vivo* during hyperthermia treatment. *(Journal of Applied Sciences 9 (5): 962-967, 2009;* ***doi:*** *10.3923/jas.2009.962.967)*

The Effect of Gender and Grade Level Differences on Achievement Goal Orientations of Iranian Undergraduate Students

M. Fouladchang, R. Marzooghi and B. Shemshiri

The purpose of this study was to investigate the effect of gender and grade level differences on goal orientations of undergraduate students in an Iranian university. The sample consisted of 302 Iranian students at Shiraz University (64% were females; Mean age = 20.78 years, SD = 1.58), selected by random cluster sampling. They completed achievement goal questionnaire. Results showed the effect of gender and grade level differences on undergraduates' goal orientations. The results gave support to the some western findings that males have a greater performance-approach goal orientation than females. Also, last graders reported higher scores on mastery goal orientation than first graders. There was no significant interaction effect of gender and grade level. *(Journal of Applied Sciences 9 (5): 968-972, 2009;* ***doi:*** *10.3923/jas.2009.968.972)*

Application of High Performance Liquid Chromatography to the Analysis of Pesticide Residues in Eggplants

S. Islam, M.S. Hossain, N. Nahar, M. Mosihuzzaman and M.I.R. Mamun

A reverse phase high performance liquid chromatographic method with an acetonitrile-water mobile phase gradient and UV/Visible detection is described for

the determination of three pesticides, frequently used in agriculture, in eggplant samples. The samples were sprayed with three pesticides namely, Diazinon, Malathion, Sumithion at three different doses and were harvested at two different Pre-Harvest Interval (PHI) of days 1 and 5 after the application of the pesticides. Sample preparation involved extraction with ethyl acetate and clean up was accomplished by solid-phase extraction using florisil columns. Calibration curves that were constructed for the analytes with matrix matching followed linear relationships with good correlation coefficients (R^2>0.990). The average recoveries of the pesticides which were sensitive to matrix effects ranged from 88-120%. Detection limit of less than 0.02 mg kg^{-1} showed that the method developed can be used to determine the pesticide residues in concentrations lower than the maximum residue limits. In the analysis of residues, samples treated with Diazinon at all doses, residual amounts above Maximum Residue Limit (MRL) (0.02 mg kg^{-1}) were found. Malathion and Sumithion were found above MRL (0.5 mg kg^{-1}) value in only one sample for each pesticide. *(Journal of Applied Sciences 9 (5): 973-977, 2009;* ***doi:*** *10.3923/jas.2009.973.977)*

Dissolution of *Philosamia ricini* Silk Film: Properties and Functions in Different Solutions

Y. Srisuwan and P. Srihanam

In this study, dissolution of Eri (*Philosamia ricini*) cocoons in different solutions was investigated and compared with Nang-Lai variety (*Bombyx mori*) cocoons. The Lithium Bromide (LiBr), calcium nitrate ($Ca(NO_3)_2$), Zinc chloride ($ZnCl_2$), Lithium thiocyanate ($LiSCN{\cdot}xH_2O$), 85% phosphate and mixture (calcium chloride ($CaCl_2$)/Ethanol/H_2O; 1:2:8) solution systems were used. Efficiency of the dissolving solution was examined by measuring the percentage of dissolved silk. It was found that the Nang-Lai silk was completely dissolved in all solutions, whereas, Eri silk was slightly dissolved, except for 85% phosphate solution. The Fourier transform infrared spectroscopy (FTIR) spectra of the Eri silk film composed of β-sheet form than Nang Lai silk film. With thermogravimetric analysis, the Eri silk film showed two stages of thermal decompositions while the Nang-Lai silk was a single stage. In conclusion, thermal stability of the Eri silk was higher than the Nang-Lai silk. *(Journal of Applied Sciences 9 (5): 978-982, 2009;* ***doi:*** *10.3923/jas.2009.978.982)*

The Ant-Bee Routing Algorithm: A New Agent Based Nature-Inspired Routing Algorithm

Sh. Rahmatizadeh, H. Shah-Hosseini and H. Torkaman

In this study, a new agent-based routing algorithm that are based on both ant and bee colony optimization algorithms is proposed and named as the Ant-Bee Routing (ABR) algorithm. In the proposed algorithm, the initial AntNet Routing (ANR) algorithm is modified where some intelligent features of bees are included to enhance the performance of the ANR algorithm. Experiments with the ABR algorithm are implemented using the OMNET++ software platform by means of NTTNET network topology. Results showed that the performance of ABR algorithm is much better than the ANR algorithm with reduction in packets delay. The ABR is also suitable in dynamic environments. *(Journal of Applied Sciences 9 (5): 983-987, 2009; **doi:** 10.3923/jas.2009.983.987)*

T-Test for Visualizing Frequently Used Arabic Words

R.J.R. Yusof, R. Zainuddin, M.S. Baba and Z.M. Yusoff

The aim of visualizing the frequently used words is to solve the problem of reading comprehension. This is referring to the case of the non-Arabic speakers of the Muslim community, reading or reciting extensively an Arabic document (the Quran) without comprehension. This study outline an experiment testing whether there is any significant difference on the level of comprehension when images are used as part of the reading material of the Arabic text. It was found that using text only translation, resulted in no significant difference of the level of comprehension and the expected values. However, there is significant difference on the level of comprehension between Arabic text translation of the frequently used words and the text image of the frequently used word. *(Journal of Applied Sciences 9 (5): 988-992, 2009; **doi:** 10.3923/jas.2009.988.992)*

Data-Oriented Model of Sine Based on Chebyshev Zeroes

A. Habibizad Navin, S.H. Es-hagi, M.N. Fesharaki, M. Mirnia and M. Teshnelab

This study presents a new method based on data-oriented theory for sine modeling. This model of sine made by an array of data based on Chebyshev zeroes. To compute sine by this model less mathematical operations are needed comparing to common methods. Hardware and software implementation of this

model provides faster module. *(Journal of Applied Sciences 9 (5): 993-996, 2009; **doi:** 10.3923/jas.2009.993.996)*

Investigation of Sampling Method Application with Fixed Plot in Sampling of Coppice Forests (Case Study: Oak Coppice Forests in Central Zagros)

H. Naghavi, A. Fallah, H. Jalilvand, J. Soosani and Y. Kooch

The aim of this research was investigation of sampling method application with fixed plot in sampling of Zagros coppice forests (West of Iran). Zagros forests confronted with much damage before. These damages had due to destroying areas of forests and retrogradation formed in the other areas. Structure of these forests changed because of last years damages and coppice forests were formed, finally. Collection of appropriate qualitative and quantitative information is necessary for principle management and programming. An inventory network with 200×400 m dimension designed in study area for this research. Then, numbers of 40 witness plots with 1 ha area were produced. Samplings were performed by circle form sample plots with 10 ARE area (1 ARE = 100 m^2 area) and square form sample plots with 15, 20, 30, 40 and 50 ARE areas within mentioned 1 ha plots. The obtained results of sampling different methods for estimation number of group coppice per hectare and crown covering were compared with results of witness plots. Analysis of Variance (ANOVA), compare means test (LSD) at $p<0.05$ and percent of standard error (E %) were used for comparison of the means. Results of this research showed that number per hectare parameter of 20 ARE plots had significant differences with results of witness plots. The other plots had no significant differences viewpoint number per hectare parameter. The minimum and maximum of E% were observed in circle form sample plots with 10 ARE (E% = 10.82%) and 50 ARE (E% = 8.12%) areas, respectively for number per hectare parameter. *(Journal of Applied Sciences 9 (5): 997-1000, 2009; **doi:** 10.3923/jas.2009.997.1000)*

Application of Artificial Neural Networks for Airline Number of Passenger Estimation in Time Series State

M. Zandieh, A. Azadeh, B. Hadadi and M. Saberi

This study presents an integrated Artificial Neural Networks (ANN) to estimate and predict airline number of passenger in Iran. All type of ANN-Multi Layer Perceptron (MLP) is examined to this estimation. The ANN models are

implemented on MATLAB software. Auto-Correlation Function (ACF) is utilized to define input variables. Finally, the best type of ANN-MLP is determined with Data Envelopment Analysis (DEA). Kruskal-Wallis test is used for asses the impact of raw data, preprocessed data and post process method on ANN performance. Monthly airline number of passenger of Iran airline from 1993 to 2005 is considered as the case of this study. *(Journal of Applied Sciences 9 (6): 1001-1013, 2009; **doi:** 10.3923/jas.2009.1001.1013)*

Feature Ranking by Weighting and ISE Criterion of Nonparametric Density Estimation

Xiaoming Wang and Shitong Wang

This study deals with how to efficiently rank features of datasets. As we may know well, reducing the dimensionality of datasets (i.e., feature reduction) is an important step in pattern recognition tasks and exploratory data analysis. Quite often, feature ranking is required before completing feature reduction. In this study, a novel classifier-free feature ranking approach based on the combination of both weighting features and ISE (Integrated Squared Error) criterion is proposed. ISE is measured in terms of the modified non-parametric Parzen window density estimator in this study. The advantage of the proposed approach is that it allows us to make an efficient and effective non-parametric implementation and requires no prior assumption. The experimental results demonstrate that the proposed approach here is very promising. *(Journal of Applied Sciences 9 (6): 1014-1024, 2009; **doi:** 10.3923/jas.2009.1014.1024)*

An Elliptic Curve-Based Signcryption Scheme with Forward Secrecy

Mohsen Toorani and Ali Asghar Beheshti Shirazi

An elliptic curve-based signcryption scheme is introduced in this paper that effectively combines the functionalities of digital signature and encryption and decreases the computational costs and communication overheads in comparison with the traditional signature-then-encryption schemes. It simultaneously provides the attributes of message confidentiality, authentication, integrity, unforgeability, non-repudiation, public verifiability and forward secrecy of message confidentiality. Since it is based on elliptic curves and can use any fast and secure symmetric algorithm for encrypting messages, it has great advantages to be used for security establishment in store-and-forward applications and when dealing with

resource-constrained devices. *(Journal of Applied Sciences 9 (6): 1025-1035, 2009; **doi:** 10.3923/jas.2009.1025.1035)*

Numerical Analysis of Interaction Between Earth and Large Foundations Regarding Size Effect

J. Khazaie and S.A. Amirshahkarami

In this study, change in behaviors occurring beneath and around the foundation which caused by changes in foundation dimensions is studied numerically, by taking into account the interaction between earth and foundation. To do so, two dimensional and constant computational models with constant domain under uniform distributed load for both large and small foundation have been analyzed using ANSYS software, version 8.1. The results of this analysis clearly show that the earth beneath and around small foundations is shearing and general failure mechanism, which is the same as the predicted behavior and accepted failure mechanism most researchers believe in. But, based on the results obtained from this research, the earth located in the central areas as well as the earth under the large foundations is mainly bearing compressive and comprehensive stresses having hardening. Consequently, their endurance is gradually increasing. Hence, the stress concentrations as well as the deformations are directed toward this region. In case loading is constant, the regions outside the foundation and beneath (the sides) bear unloading (localization). While footing dimensions increase, rigid wedge angle will be increased up to 90°. Thus, the failure mechanism in large foundations is local and forming a resistant. Such resistance creates bearing column beneath the foundation and punching effect which happens between the earths under the vicinity of the foundation is clearly seen. Namely, if soil behavior and properties change, the foundation geometry will change as well. So, with regard to geometry increase and with the change in the behaviors of the earth material, the stiffness matrix changes which is in the form of coupled. *(Journal of Applied Sciences 9 (6): 1036-1045, 2009; **doi:** 10.3923/jas.2009.1036.1045)*

Components Interaction Markup Language for Mediator Connector

H. Sanatnama, A.A.A. Ghani, R. Atan and M.H. Selamat

The concern of interaction or collaboration between components can be found when evolution of software engineering came a long way from machine-level language to procedural programming and then to object-oriented programming

and now to component-based software development. An interaction is a set of activities that happens for a specific use case in a system, based on the ability of components (requires and provides services) to send messages to each other. This study introduces Component Interaction Markup Language (CIML) as an improvement of the attachment uses by mediator connector we proposed in earlier study. CIML aims to make the attachment well-formed as a generic framework for component composition based on interactions between components. CIML supports component composition based on interactions between components and has language constructs for description of component instantiations, component initializations and component interactions. *(Journal of Applied Sciences 9 (6): 1046-1055, 2009; **doi:** 10.3923/jas.2009.1046.1055)*

Seismic Interpretation of Growth Fault and Salt Diapirism in Qianjiang Sag, Jianghan Basin, Southeastern China

Aida Bensekhria, Fei Qi, Wanzhong Shi and Yeping Zhan

Qianjiang depression is one of the most faulted lacustrine depressions in Southeastern China. This study considered the main faulting influencing the different sedimentary rocks, the causes of this faulting and the relationship of faulting to salt diapirism. To satisfy research needs, 3D seismic data have been used, where four seismic section profiles were chosen. Northeastward salt domes aligning along the depression center showed evidence of active diapirism and a normal growth fault has been continually active at least since the middle Eocene. This steep fault extended deeply to a strong reflection event that may represent the base of the salt layer. It can be inferred that faulting is caused by basinward flow of salt from the deep part of the depression into domes, there by creating a great difference in hydrostatic pressure between the upthrown (uplifted area) and the downthrown (depression area) sides of the fault and, by removing support for the over lying block of sedimentary rocks. *(Journal of Applied Sciences 9 (6): 1056-1064, 2009; **doi:** 10.3923/jas.2009.1056.1064)*

A Nonlinear Dynamic Based Redundancy Index For Reinforced Concrete Frames

A.A. Fallah, A.S. Moghadam and A. Massumi

In almost all codes of practice for seismic resistant design of buildings, a behavior factor is used to reduce design base shear. The behavior factor is affected by

several parameters such as ductility, overstrength and redundancy reduction factors. There are two common approaches to assess the effects of redundancy on the strength of a structural system, which are as follows: static pushover analysis and incremental dynamic analysis. The two indices: redundancy strength coefficient and redundancy variation coefficient have been introduced to measure these effects. Simplified methods are developed and presented to calculate these parameters. In this study, the redundancy strength and the redundancy variation parameters are evaluated for the reinforced concrete plane frames with different number of stories, bays and ductility capacities. The investigations indicate that these two parameters are mainly the results of redundancy reduction factors. *(Journal of Applied Sciences 9 (6): 1065-1073, 2009; **doi:** 10.3923/jas.2009.1065.1073)*

A Methodology for Analyzing the Transient Availability and Survivability of a System with Every Combination of Components by Using Fault Tree

Maghsoud Amiri, Farhad Ghassemi-Tari, Mohsen Rahimi Mazrae Shahi, Jamshid Salehi Sadaghiani and Ali Mahtasshami

The main purpose of this study is to offer a new method for transient analysis of availability and survivability of a system with the identical components and one repairman and with every combination of components either standard system for example series systems, parallel systems, stand-by systems and K out of N systems or complex system. This method is a technique for fault tree evaluation too. The considered system is supposed to consist of n components and there are some composition of them that systems the failure occurs when one of its composition occur. Some concepts such as fault tree, Markov models, Eigen vectors and Eigen values are employed for analyzing the transient availability and survivability of the system. By reason of using fault tree analysis, the new method is useful for large systems where high reliability is required and where the design is to incorporated many layers of protection such as in nuclear reactor systems. The method is implemented through an algorithm which is tested in MATLAB programming environment. The new method enjoys a stronger mathematical foundation and more flexibility for analyzing the transient availability and survivability of the system. *(Journal of Applied Sciences 9 (6): 1074-1081, 2009; **doi:** 10.3923/jas.2009.1074.1081)*

Performance of Asymmetric Multistory Shear Buildings with Different Strength Distributions

A. Aziminejad and A.S. Moghadam

The experience from the performance of buildings during past earthquakes has shown that asymmetric buildings often sustain more extensive damages as compared to the symmetric buildings. Performance of an asymmetric building can be quantified by responses such as rotation of the floor, the maximum drift of flexible and stiff edges of the building or the ductility demand of the elements on those edges. In this study, the nonlinear dynamic behaviour of a set of five-story asymmetric buildings with different strength distribution is studied to investigate the effect of different strength distribution strategies. To show different responses such as drift, ductility and plastic hinge rotation of the models, fragility curves are used. The results show that among torsionally rigid models studied here, models with a smaller strength eccentricity perform better. However, in general, the optimum strength eccentricity is shown to be a function of the selected damage index. For example, if damage index is represented by the inter-story drift ratio, the appropriate strength distribution is the configuration with a small strength eccentricity. On the other hand, if damage function is represented by ductility demand of the elements, the appropriate strength distribution is the one with strength center between the centers of mass and rigidity. By identifying the more exact configurations of centers of mass and rigidity, they can be utilized as a proper way for reduction of adverse torsional effects in design or rehabilitation of asymmetric buildings. These configurations can also be used as a new reference point for identifying acceptable limits of eccentricity. *(Journal of Applied Sciences 9 (6): 1082-1089, 2009;* ***doi:*** *10.3923/jas.2009.1082.1089)*

Strategic Thinking or Thinking of a Strategist?

S. Iranzadeh, H. Emari and H. Bevrani

The purpose of this study is to design an applied framework for strategic thinking which can be applied in all managerial levels and all types of organizational environments. No especial applied frame has been presented for this thinking. This study presents a theoretical framework for the thinking type of a manager by making a historical research and studying the scientific documents about the thinking of a strategist. In the new theoretical framework, we have tried suggest the best type of thinking for a strategist after analyzing the environment of his decisions. So, in this framework, the traditional viewpoint about strategic thinking,

which considered it as a special type of right-brain thinking against other types of right-brain thinking and suggested it to a strategist, is put aside and it is suggested that the strategist should use a suitable type of thinking under different conditions. *(Journal of Applied Sciences 9 (6): 1090-1097, 2009;* ***doi:*** *10.3923/jas.2009.1090.1097)*

Seasonal Rainfall Forecasting Using Artificial Neural Network

G.A. Fallah-Ghalhary, M. Mousavi-Baygi and M. Habibi-Nokhandan

The rainfall of Khorasan Province, the Northeastern part of Iran, was evaluated from Dec. to May that is included 80% total of annual rainfall in the area under study using artificial neural network. The data of 37 rainfall stations were selected and analyzed over a period of 33 years (1970-2002). The Digital Elevation Model (DEM) was then used to calculate the average rainfall in the area of interest. The relation between variation of synoptic patterns including Sea Surface Temperature (SST), Sea Level Pressure (SLP), the difference of sea level pressure, the difference between sea surface temperature and 1000 hPa surface level, relative humidity at 300 hPa level, geopotential height at 500 hPa level and air temperature at 850 hPa level with mean rainfall of the region were considered. Then the artificial neural network model was trained for 1970-2002 period and rainfall for period of 1993-2002 was predicted. The results showed that artificial neural network method was very successful in predicting rainfall and in more than 70% of years could predict rainfall within acceptable precision. The root mean square error of the model was found to be 41 mm which is considered negligible at yearly level and it is expected that by increasing the number of years of statistical data the precision of the model would increase. *(Journal of Applied Sciences 9 (6): 1098-1105, 2009;* ***doi:*** *10.3923/jas.2009.1098.1105)*

Eliminating Premature End Peeling of Flexurally Strengthened Reinforced Concrete Beams

M.A. Alam and M.Z. Jumaat

This study presents the results of an experimental study investigating the effect of U-shaped end anchors on flexurally strengthened reinforced concrete beams for the prevention of premature end peeling. A simple design guideline for the anchorage length of end anchor is proposed. A total of five beams, each 2300 mm long, 125 mm wide and 250 mm deep with a tension steel reinforcement ratio of 0.73%, was cast and tested. One beam was left un-strengthened and used as a control, two beams were strengthened with steel plates and the remaining two

beams were strengthened with Carbon Fibre Reinforced Polymer (CFRP) laminates. One each of the steel plate and CFRP laminate strengthened beams were further strengthened with mild steel U-shape end-anchors at both ends of the beams. The beams were then tested under two-point loading. The experimental results revealed that the U-shaped end anchors of designed anchorage length eliminated premature end peeling and it had significant effects on the failure mode, ultimate load, deflections and strain characteristics of the strengthened beams. It is seen from the results that the end-anchored strengthened beams showed higher ultimate load and more ductile behaviour compared to the un-anchored strengthened beams. *(Journal of Applied Sciences 9 (6): 1106-1113, 2009;* ***doi:*** *10.3923/jas.2009.1106.1113)*

Designing an Adaptive Fault Tolerance Structure in Distributed Real Time Systems

N. Mosharraf and M.R. Khayyambashi

In this study, the Fault Tolerance CORBA (FT-CORBA) structure as a structure used for supporting fault tolerance programs as well as relative important parameters including replication style and number of replica which play further role in improved performance and making it adaptive to real time distributed system have been reviewed. Studying these specifications have been made a structure adaptive to real time systems with higher performance than FT-CORBA structure and finally the implementing of the said structure and determination of the number of replica and the objects replication style as well as the significance of related parameters have been investigated. *(Journal of Applied Sciences 9 (6): 1114-1120, 2009;* ***doi:*** *10.3923/jas.2009.1114.1120)*

Metals Distribution in Topsoils Around Industrial Town of Ahwaz II, Ahwaz, Iran

M.Sh. Fazeli, M.H. Moosavi, M. Pournia and Z. Jassemi Zergani

The objective of this investigation was to assess the extent and severity of heavy metals pollution and conduct to identify the source (lithogenic and anthropogenic) within the topsoil of the vicinity of the industrial town of Ahwaz II in Khuzestan Province. Twenty soil samples were collected from topsoils around the industrial town at the depth of 0-10 cm and they were digested with aqua regia for heavy metal (Cu, Zn, Cr and Ni) analysis, using Atomic Absorption Spectrophotometer. Sample collection, preparation and analysis (Bulk chemical analysis and chemical partitioning studies) were conducted by using EPA standard method. The

abundance of measured heavy metals in the soils was decreased as: Ni>Zn>Cr>Cu. In most cases the concentration of heavy metals in the soils was lower than the tolerable level for multifunctional land use. Results of the chemical partitioning analysis stated that the percentage of the lithogenic source of heavy metals in the topsoil samples are almost double of that are shown for anthropogenic source at the surrounding area of the industrial town of Ahwaz II. *(Journal of Applied Sciences 9 (6): 1121-1127, 2009;* ***doi:*** *10.3923/jas.2009.1121.1127)*

Effects of Air-Fuel Ratio and Engine Speed on Performance of Hydrogen Fueled Port Injection Engine

M.M. Rahman, Mohammed K. Mohammed and Rosli A. Bakar

This study was investigated the effect of air-fuel ratio (AFR) and engine speed on performance of the single cylinder hydrogen fueled port injection engine. GT-Power was utilized to develop the computational model for port injection engine. One dimensional gas dynamics model was represented the flow and heat transfer in the components of the engine. Throughout the study, air-fuel ratio was varied from stoichiometric mixture to lean. The engine speeds were varied from 2500 to 4500 rpm. The results show that the air-fuel ratio and engine speed were greatly influence on the performance of hydrogen fueled engine especially Brake Mean Effective Pressure (BMEP), thermal efficiency and brake specific fuel consumption (BSFC). It was shown that decreases of the BMEP and brake thermal efficiency with increases of the engine speed and air-fuel ratio while the increases of the BSFC with increases of the speed and air-fuel ratio. The cylinder temperature increases with increases of engine speed however temperature decreases with increases of air-fuel ratio. The volumetric efficiency increases with increases of engine speed and equivalent ratio. The volumetric efficiency of the hydrogen engines with port injection is serious problem and reduces the overall performance of the engine. This emphasized the ability of retrofitting the traditional engines with hydrogen fuel with minor modifications. *(Journal of Applied Sciences 9 (6): 1128-1134, 2009;* ***doi:*** *10.3923/jas.2009.1128.1134)*

A Novel Design of Ternary Galois Field Based on Carbon Nano Tube FETs

S. Abdollahvand, E. Shahamatnia, P. Keshavarzian and K. Navi

In this study, a novel design of ternary multiplier and adder based on carbon nanotube field effect transistors is proposed to implement Galois field. Ternary logic is implemented utilizing the dependency of threshold voltage to diameter of

carbon nanotube. Regarding the importance of multiplier and adder circuits in computer systems, the design of these circuits by field effect transistors with carbon nanotube channel will pave the way for production of more complex circuits and achieving computer systems in nano scales. The number of transistors and resistors in the proposed design is reduced compared to the design which uses multiple-valued logic basic operators. *(Journal of Applied Sciences 9 (6): 1135-1140, 2009; **doi:** 10.3923/jas.2009.1135.1140)*

Regional Analysis of Low Flow in Karkheh and Karoon Watersheds

H. Zarrin, F. Sharifi, M. Vafakhah and M.H. Mahdian

In this research, to evaluating of low flow from data of 28 hygrometry stations of Karkheh and Karoon basin, were analyzed and then flow duration curve was drew and discharge of parameters includes $Q_{75\%}$, $Q_{90\%}$, $Q_{92\%}$, $Q_{95\%}$ and $Q_{99\%}$ were calculated. Toward nomination of effective factors on low flow 21 parameters was detected such as physiographic, hydro climatic and geomorphologic, with geographic information system. With principal components analysis method we chose components which has less correlation. This component in regard of their importance include: weighted average slop of catchment, area, average elevation of catchment, compactness coefficient and slop of main channel which illustrate 80.5% of variation of data. In continue regional analysis with multivariate regression to establish relations between low flow and catchment's characteristics. Finally regard to comparing and assessment the accuracy of estimating methods, we used 9 control stations data and then we compared the amount of discharge of low flow-on the base of-achieved models with the amounts of control stations and finally the results shown that obtained models in this area were significant (at 99% level). *(Journal of Applied Sciences 9 (6): 1141-1146, 2009; **doi:** 10.3923/jas.2009.1141.1146)*

Morphology and Thermal Stability of Chitosan and Methoxy Poly (ethylene glycol)-*b*-Poly (ϵ-caprolactone)/Poly(D, L-lactide) Nanocomposite Films

Supawut Khamhan and Yodthong Baimark

The objective of this study was to prepare biodegradable chitosan nanocomposite films contained dispersed nanoparticles of methoxy poly(ethylene glycol)-*b*-poly(ϵ-caprolactone) (MPEG-*b*-PCL) or methoxy poly(ethylene glycol)-*b*-poly(D,L-lactide) (MPEG-*b*-PDLL) diblock copolymers by solvent evaporation of nanoparticle suspension-chitosan solution. The nanoparticles were firstly

produced in the chitosan solution by modified-spontaneous emulsification solvent diffusion method without any surfactants before film casting. The dispersed nanoparticles with approximately 100 and 300 nm in sizes for MPEG-*b*-PDLL and MPEG-*b*-PCL, respectively can be observed throughout the chitosan film matrices. Nanoparticle morphology was spherical shapes with smooth surfaces. The nanoparticles of MPEG-*b*-PDLL were smaller than the MPEG-*b*-PCL. The possible interactions between the chitosan film matrices and the nanoparticles were evaluated by thermogravimetry. Thermal stability of the chitosan film matrices were enhanced by nanoparticle incorporating. The chitosan/MPEG-*b*-PCL nanocomposite films had lower film transparency and moisture uptakes than the chitosan/MPEG-*b*-PDLL nanocomposite films. The both film transparency and moisture uptakes decreased as the diblock copolymer ratio increased. *(Journal of Applied Sciences 9 (6): 1147-1152, 2009;* ***doi:*** *10.3923/jas.2009.1147.1152)*

Prediction of Vertical Peak Ground Acceleration and Vertical Acceleration Response Spectra from Shallow Crustal Earthquakes

H. Aghabarati and M. Tehranizadeh

In this study, empirical ground-motion models for the vertical component from shallow crustal earthquakes are derived using worldwide strong ground-motions. Models are applicable to moderate and large magnitudes, distances 0-100 km and spectral periods of 0-10 sec. These attenuation relationships are presented for vertical peak ground acceleration and vertical acceleration response spectra in active tectonics regions. The effects of magnitude, distance, local average shear wave velocity, mechanism and nonlinear site response are included in these equations. The hanging wall effect is included with an improved model that varies smoothly as a function of the source properties and the site location. The standard deviation is magnitude dependent with smaller magnitudes leading to larger standard deviations. *(Journal of Applied Sciences 9 (6): 1153-1158, 2009;* ***doi:*** *10.3923/jas.2009.1153.1158)*

A Novel Constellation with Different Noises in Discrete Multitone System

S.G. Maghrebi, M. Lotfizad and M. Ghanbari

In this study, a new constellation, the Non-Rectangular Quadrature Amplitude Modulation (NQAM) instead of Quadrature Amplitude Modulation (QAM) in the Discrete Multi-Tone (DMT) system is presented that has better performances.

These constellations, with the same average power, have been applied to six standard channels (CSA No. 1 through CSA No. 6). The AWGN and burst noise are applied to these channels separately. Based on the simulation results, the NQAM constellation has a better performance, in terms of the Bit Error Rate (BER), with respect to the conventional QAM constellation, especially for high SNRs, without any increase in the computational complexity. *(Journal of Applied Sciences 9 (6): 1159-1164, 2009; **doi:** 10.3923/jas.2009.1159.1164)*

Normalizing the Bender Visual-Motor Gestalt Test Among 6-10 Year-Old Children

Gholamreza Rajabi

This research is aimed at normalizing the visual-motor Bender Gestalt Test among 1014 students (693 boys and 321 girls) that focused on Koppit'z system for administration and scoring. Findings indicated a test-retest reliability coefficient (after 4 weeks) of 0.81 ($p \leq 0.001$). There was a significant negative correlation between BGT scores, Good enough-Harris Drawing Test ($r = -0.36$; $N = 80$) and Colored Progressive Matrices Children Test ($r = -0.41$; $N = 117$). However, gender-related differences were found to be significant ($p \leq 0.0001$); and males attained higher error mean scores than their female counterparts. Also, age-related differences were significant that is older children attained lower error mean scores than younger children (8 and 7 year-old age-groups children). The results showed perceptual performance improvement with students' increasing age, especially for 9 and 10 years-old ones, which is consistent with Koppit'z maturational hypothesis. *(Journal of Applied Sciences 9 (6): 1165-1169, 2009; **doi:** 10.3923/jas.2009.1165.1169)*

Simulation of Soil Wetting Pattern Under Point Source Trickle Irrigation

G. Ainechee, S. Boroomand-Nasab and M. Behzad

Information on moisture distribution patterns under point source trickle emitters is a pre-requisite for the design and operation of trickle irrigation systems. This will ensure precise placement of water and fertilizer in the active root zone. The distribution pattern is influenced by the soil properties and the behavior of applied water. In this study, water movement in three soil types from a surface point source was investigated. Experimentation included determination of maximum depths and widths of wetted zone after one hour time interval of water application.

The surface wetted radius increased with an increase in application rate. A good relationship was found between the surface wetted radius and the volume of water applied. This suggested that for a certain volume of water applied, a corresponding wetted surface radius can be predicted. The numerical values of wetted surface radius for each flow rate group were compared with those predicted by the suggested equations. Predictability of model was estimated as 96.8 and 95.3%, respectively, for prediction of wetted width and depth. The results showed good agreement for all application rates. *(Journal of Applied Sciences 9 (6): 1170-1174, 2009; **doi:** 10.3923/jas.2009.1170.1174)*

Application Pesaran and Shin Method for Estimating Irans' Import Demand Function

M. Ghorbani and M. Motallebi

In this study, import demand function of Iran has been analyzed with Pesaran and Shin method for 1960-2005. The results showed import demand is elastic related to increasing in gross domestic income. Thus, increasing in economic growth and national income increase balance of trade deficit and government could decrease balance of trade deficit with economic growth, simultaneously, so that imposes suitable fiscal polices like reducing in expenditure. Import growth because of increasing in gross domestic income showed Iran is going to open economy but it wouldn't be cause of decreasing in production and competition power of domestic firms and producers. *(Journal of Applied Sciences 9 (6): 1175-1179, 2009; **doi:** 10.3923/jas.2009.1175.1179)*

Modelling and Simulation Single Layer Anti-Reflective Coating of ZnO and ZnS for Silicon Solar Cells Using Silvaco Software

H. Abdullah, A. Lennie and I. Ahmad

In this study, simulated single layer Anti-Reflective Coating (ARC) on silicon solar cell that based on the refractive index limit of silicon dioxide (SiO_2), zinc oxide (ZnO) and zinc sulphide (ZnS) are presented. Two simulations of ZnO and ZnS coating were simulated to compare with SiO_2 ARC on silicon solar cell surface. These simulations carried out with variable coating thickness that is 50, 60, 70 and 80 nm by using ATLAS simulator. From the simulation obtained, it was found that the value of V_{oc} and J_{sc} are 397.69 mV and 15.646 mA cm^{-2}, respectively, from silicon solar cell with 0.05 μm SiO_2 coating. For the Fill Factor (FF) and power conversion efficiency (η) of this solar cell is 0.758 and 4.72% were computed. As

for the ARC simulation, the spectral response of ZnO and ZnS coating was increased around 600 and 700 nm, respectively, which are capable of reducing the refractivity over a wide range of wavelengths compared to SiO_2 increased around 400 nm wavelength. This can be concluded that when the refractive index value is high, the available photocurrent also can be high in wide range wavelength and more reducing the refractivity. In ARC analysis, the ZnS coating could perform more efficiency on wide range of wavelength compared to SiO_2 and ZnO ARC. *(Journal of Applied Sciences 9 (6): 1180-1184, 2009;* ***doi:*** *10.3923/jas.2009.1180.1184)*

Competitive Analysis of Two Special Bahncard Replacement Problem

Lili Ding, Xinmin Liu and Wanglin Kang

This study provides a new competitive analysis framework for the Bahncard problem through introducing the two-stage discount rate and the risk management. For the online decision-makers, who have not any information about future demand, a new online algorithm is present to help them choose an optimal replacement strategy. Furthermore, when the online decision-makers are willing to increase their risk for some reward, an optimal online risk algorithm is developed, which help them manage risk based on their risk tolerance and forecast. *(Journal of Applied Sciences 9 (6): 1185-1189, 2009;* ***doi:*** *10.3923/jas.2009.1185.1189)*

Assessment of Heavy Metal Pollution in Tilehbon River Sediments, Iran

M. Goorzadi, Gh. Vahabzadeh, M.R. Ghanbarpour and A.R. Karbassi

In this study, four sediment samples on Tilehbon River were chemically analyzed in order to determine the concentration, origin and pollution intensity of heavy metals (Pb, Cr, Mn, N, Cd, Cu, Zn and Fe). The concentration of these elements was determined by using inductively coupled plasma atomic emission spectrometry (ICP-AES). Then a cluster analysis has conducted using MVSP 3.1 software. The obtained results showed that the concentration of heavy elements are transitive as compared with the average concentration of these elements in ground surface and global sediments and they controlled by geological units. Lime units play the most important role to control the concentration of elements. Based on Muller geochemical index, the sediments in Tilehbon River are not polluted.

*(Journal of Applied Sciences 9 (6): 1190-1193, 2009; **doi:** 10.3923/jas.2009.1190.1193)*

Using the Complete Squares Method to Analysis the Global Optimal Policy for Vendor-Buyer Integrated Inventory System Within Just in Time Environment

Fang-Kuo Wang and Kun-Shan Wu

The present study was carried out to investigate Yang's model by using an algebraic method (neither applying the first-order nor the second-order differentiations) to determine the optimal replenishment policy. The number of delivery and the integrated total cost is immediately provided by the proposed algebraic derivation as well. As a result, students who are unfamiliar with calculus may be able to understand the solution procedure with ease. *(Journal of Applied Sciences 9 (6): 1194-1197, 2009; **doi:** 10.3923/jas.2009.1194.1197)*

Improvement of Oral Lichenoid Lesions Following Amalgam Filling Removal

M. Sahebjamee, A. Mansourian, H. Kermanshah, F. Hoseinkhezri, J.M. Beitollahi and F.M. Heravi

The main aim of this study was to determine the effect of amalgam fillings removal on lichenoid reactions remission in Iranian patients. In a randomized before after clinical trial study, nineteen cases with clinical diagnosis of lichenoid reactions and amalgam fillings at the same side were selected. The amalgam fillings, which were next to the lesions, were replaced by composite and the possible improvement of these lesions was evaluated 3 months later. Amalgam fillings were replaced in 19 patients. 3 (16%) revealed complete remission, 8 (42%) showed partial improvement and 8 (42%) showed no improvement. In general, the results of this study showed that replacing amalgam fillings with composite can be used as an effective way for managing oral lichenoid reactions. *(Journal of Applied Sciences 9 (6): 1198-1200, 2009; **doi:** 10.3923/jas.2009.1198.1200)*