



**International Publications Awards
Cairo University**



Faculty of Engineering



International Publications Awards
Cairo University



Name : Prof. Abdel Kareem Hassan



Dep. : Engineering Mathematics and Physics

Title : Non-derivative design centering algorithm using trust region optimization and variance reduction

A. S. O. HASSAN, H. L. ABDEL-MALEK and A. A. RABIE

Journal : Engineering Optimization 38 37-51 (2006)

ISSN : 0305-215X

Impact Factor : 0.52

Abstract :

Fluctuations in manufactured integrated circuit parameters may dramatically reduce the parametric yield. Yield maximization can be formulated as an unconstrained optimization problem in nominal parameter values, which is known as design centering. The high expense of yield evaluations, the absence of any gradient information, and the presence of some numerical noise obstruct the use of the traditional derivative-based optimization methods. In this article, a novel design centering algorithm is presented, which consists of a non-derivative unconstrained optimizer coupled with a variance reduction estimator. The used optimizer combines a trust region mechanism with quadratic interpolation and provides efficient use of yield evaluations. The stratified sampling technique is used to develop a lower variance yield estimator that reduces the number of circuit simulations required to reach a desired accuracy level. Numerical and practical circuit examples are used to demonstrate the efficiency of the proposed algorithm with respect to other methods in the same field.

Key Words :

Design centering; Trust region; Quadratic interpolation; Variance reduction



International Publications Awards
Cairo University



Name : Prof . Adel Shaltout



Dep. : Electric Power and Machines

Title : Cost-Effective Control Scheme for Reduction of Torsional Torque Oscillations in Starting Large Induction Motors

N. Abdel Rahim and A. Shaltout

Journal : Electric Power Components 1163-1176 (2006)

ISSN : 1532-5008

Impact Factor : 0.12

Abstract :

This paper presents a variable frequency drive using a slip-frequency control scheme for starting and operating large induction motors. The proposed control scheme regulates the slip frequency and sets a predetermined maximum value on the motor line current. Thus, it alleviates the problem of the high starting current of the motor, and suppresses the shaft torque oscillations, preventing them from reaching hazardous levels. In addition to its simplicity and hence cost-effectiveness, the proposed scheme is shown to be capable of reducing the motor line current by approximately 78% when compared to the direct on-line start of the large motor.

Key Words :

Large Induction Motors; Motor drive; Slip frequency control; Constant V/F control scheme.



International Publications Awards
Cairo University



Name : Prof . Ahmed Mahmoud Soliman



Dep. : Electronics and Communication Engineering

Title : A Modified CMOS Realization of The Operational Transresistance Amplifier (OTRA)

Hassan Mostafa, Ahmed M. Soliman

Journal : Frequenz 60 70-76 (2006)

ISSN : 0016-1136

Impact Factor : 0.121

Abstract :

A modified CMOS realization of the operational transresistance amplifier (OTRA) is presented. A fair comparison with Salama and Soliman OTRA [1] shows that the modified OTRA provides better performance in all parameters. The OTRA is suitable for analog VLSI applications since it does not suffer from constant gain bandwidth product. Hence, it can exhibit wide bandwidth at high gain values. Moreover, an OTRA based variable gain amplifier (VGA) is introduced. A detailed analysis taking the effect of the finite transresistance gain in consideration is provided.

Key Words :

CMOS operational transresistance amplifier, analog VLSI applications, variable gain amplifier, wireless communications,



International Publications Awards
Cairo University



Name : Prof . Ahmed Mahmoud Soliman



Dep. : Electronics and Communication Engineering

Title : New op-Amp- RC to Gm- Ctransformation Method

Rania F. Ahmed , Inas A. Awad and Ahmed M. Soliman

Journal : Analog Integrated Circuits and Signal Processing 49 79-86
(2006)

ISSN : 0925-1030

Impact Factor : 0.28

Abstract :

A new transformation method is proposed and used to transform op-amp-RC circuits to Gm - C ones with only grounded capacitors. The proposed method enables the generation of high-performance Gm -C filters that benefit from the advantages of good and well-known op-amp-RC structures and at the same time feature electronic tunability, high frequency capability and monolithic integration ability. An attractive feature of the proposed method is that it results in Gm -C structures with only grounded capacitors in spite of the presence of floating capacitors in the original op-amp-RC circuits.

Key Words :

Gm -C filters; Transformation method; Generation of Gm -C circuits.



**International Publications Awards
Cairo University**



Name : Prof . Ahmed Mahmoud Soliman



Dep. : Electronics and Communication Engineering

Title : Novel Accurate Wideband CMOS Current Conveyor

Hassan M. Hassan and Ahmed M. Soliman

Journal : Frequenz 60 233-235 (2006)

ISSN : 0016-1136

Impact Factor : 0.121

Abstract :

Novel CMOS Class-A positive type second generation current conveyor (CCII) suitable for high frequency applications is proposed. It provides accurate voltage and current tracking as well as low input impedance.

Key Words :

wideband, CMOS current conveyor, analog circuits



International Publications Awards
Cairo University



Name : Prof . El Sayed Tag Eldin

Dep. : Electric Power and Machines



Title : Fault Location Scheme for Combined Overhead Line with Underground Power Cable

El Sayed Tag Eldin , Mohamed Mamdouh Abd ElAziz , Doaa khalil Ibrahim and Mahmoud Gilany

Journal : Electric Power Systems Research 76 928-935 (2006)

ISSN : 0378-7796

Impact Factor : 0.33

Abstract :

This paper presents a fault location scheme for transmission systems consisting of an overhead line combined with an underground power cable. The algorithm requires phasor measurements data from one end of the transmission line and the synchronized measurements at the most far end of the power cable. Fault location is derived using distributed line model, modal transformation theory and Discrete Fourier Transform. The technique can be used on-line or off-line using the data stored in the digital fault recording apparatuses. The proposed scheme has the ability to locate the fault whether it is in the overhead line or in the underground power cable. In addition to, the proposed scheme gives an accurate estimation of the fault resistance at fault location. Extensive simulation studies carried out using MATLAB show that the proposed scheme provides a high accuracy in fault location under various fault conditions.

Key Words :

Fault location; Modal transformation; Phasor extraction; Combined overhead lines; Power cables.



International Publications Awards
Cairo University



Name : Prof . El Sayed Tag Eldin

Dep. : Electric Power and Machines



Title : A Phasor-Based Double Ended Fault Location Scheme for Aged Power Cables

Mohamed Mamdouh Abd Elaziz, El Sayed Tag Eldin, Doaa Khalil Ibrahim and Mahmoud Gilany

Journal : Electric Power Components and Systems 34 417-432 (2005)

ISSN : 1532-5008

Impact Factor : 0.12

Abstract :

This paper presents a fault location scheme for aged power cables using phasor measurements from both ends of the cable line. The proposed fault location scheme is derived using two-terminal measurements incorporated with a distributed line model, modal transformation theory, and discrete Fourier transforms. The proposed scheme can solve the problem of cable changing parameters, especially the change of the relative permittivity and thus for the operating positive, negative, and zero sequence capacitance changes. Extensive simulation studies are carried out using the alternative transients program ATP/EMTP. The simulation studies show that the proposed scheme provides a high accuracy in fault location calculations under various system and fault conditions. The results show that the proposed method responds very well, being insensitive to fault type, fault distance, fault resistance, and fault inception angle. The proposed scheme solves the problem of aged cables with change of electric parameters. In addition, it gives an accurate estimation of the fault resistance in all fault types.

Key Words :

Aged cabl; Distributed line model; Fault location; Modal transformation; Phasor extraction; And power cable lines protection.



International Publications Awards
Cairo University



Name : Prof. Emad Al-Hussaini

Dep. : Electronics and Communication Engineering



Title : A Generalized Blind Adaptive Multi-User Detection Algorithm for Multipath Rayleigh Fading Channel Employed in a MIMO System

Yasmine A. Fahmy, Hebat-Allah M. Mourad, and Emad K. Al-Hussaini

Journal : Communications and Networks 290-296 (2006)

ISSN : 1229-2370

Impact Factor : 0.457

Abstract :

In this paper, a generalized blind adaptive algorithm is introduced for multi-user detection of Direct Sequence Code Division Multiple Access (DS-CDMA) wireless communication systems. The main property of the proposed algorithm is its ability to resolve the multipath fading channel resulting in Inter Symbol Interference (ISI) as well as Multiple Access Interference (MAI). Other remarkable properties are its low complexity and mitigation to the near-far problem as well as its insensitivity to asynchronous transmission. The proposed system is based on the minimization of the output energy and convergence to the Minimum Mean Square Error (MMSE) detector. It is blind in the sense that it needs no knowledge of the other users' signatures, only the intended user signature and timing are required. Furthermore, the convergence of the Minimum Output Energy (MOE) detector to the MMSE detector is analytically proven in case of M-ary PSK. Depicted results show that the performance of the generalized system dominates those previously considered. Further improvements are obtained when Multiple Input Multiple Output (MIMO) technique is employed

Key Words :

Multi-user detection, Multipath Rayleigh fading channel, Blind adaptive techniques, MIMO.



International Publications Awards
Cairo University



Name : Prof. Emad Al-Hussaini

Dep. : Electronics and Communication Engineering



Title : Three proposed mobile radio multirate CDMA systems through multipath Rayleigh fading channel

Emad K. Al-Hussaini, Hebat-Allah M. Mourad and Ahmed S. Harmal

Journal : Frequenz 126-129 (2006)

ISSN : 0016-1136

Impact Factor : 0.127

Abstract :

The main properties of the precombining blind adaptive multiuser detector (PBA-MUD), which is composed of a rake and a minimum output energy receiver (MOE), are low complexity, multiple-access interference mitigation and remarkable near-far resistance in time-varying multipath fading channels scenarios. In this paper the PBA-MUD is applied to a multirate with variable spreading length, CDMA mobile system. Furthermore, a second multirate system is also suggested, using a prerake at the transmitter. This simplifies the receiver while maintaining a good performance. A channel coding is employed for both systems giving an appreciable improvement. Finally, a diversity technique is applied to the first proposed system resulting in an appreciable improvement. The performance measure is the average bit error rate versus the SNR per bit in a single cell environment.

Key Words :

Multirate, CDMA, blind adaptive multiuser detection, multipath Rayleigh fading channels, coding, diversity



International Publications Awards
Cairo University



Name : Prof. Emad Al-Hussaini

Dep. : Electronics and Communication Engineering



Title : Multi-User MIMO Mobile CDMA Uplink System
Employing Turbo Coding and Joint Detection Through a
Multipath Rayleigh Fading Channel

Yasmine A. Fahmy, Hebat-Allah M. Mourad and Emad K. Al-Hussaini

Journal : Wireless Personal Communications 325-342 (2006)

ISSN : 0929-6212

Impact Factor : 0.31

Abstract :

. In this paper, a generalized multiple-input multiple-output (MIMO) antenna system that can be fitted to the uplink of a wireless communication system is considered for the general case of multi-user. At the transmitter, the information bits are Turbo coded, then interleaved and passed through a serial-to-parallel converter. The channel is assumed bad urban suffering from multipath Rayleigh fading resulting in inter-symbol and multiple access interferences (ISI and MAI). At the front-end of the receiver, a number of receiving antennas are used followed by a joint multi-user estimator based on the Minimum Mean Square Error Block Linear Equalizer (MMSE-BLE). Computer simulations demonstrate a significant performance improvement in both single user and multi-user cases.

Key Words :

MIMO systems, Turbo coding, CDMA, Joint multi-user detection, Multipath Rayleigh fading channel, Least mean square error equalizers.



International Publications Awards
Cairo University



Name : Prof . Essam El-Deen Khaleel



Dep. : Mechanical Engineering

Title : Preserving the Tombs of the Pharaohs

Essam E Khalil, PhD (London), Member Ashrae

Journal : Ashrae 48 34-38 (2006)

ISSN : 0001-2491

Impact Factor : 0.18

Abstract :

Visitor traffic in the pharaohs' tombs within the Valley of the Kings in Luxor, Egypt, is contributing to the deterioration of the tombs' interior wall paintings. Contributing factors include excessive humidity, high temperature, lighting effects, pests, shock and vibration, and pollution.¹ To preserve the tombs and contents, as well as provide for visitor comfort, a proper ventilation system is needed to control indoor climate conditions.



International Publications Awards
Cairo University



Name : Prof . Essam Hashish



Dep. : Electronics and Communication Engineering

Title : Localized pulses exhibiting a missilelike slow decay

Amr M. Shaarawi , Maha A. Maged , Ioannis M. Besieris and Essam Hashish

Journal : Optical Society of America 23 2039-2052 (2006)

ISSN : 1084-7529

Impact Factor : 1.76

Abstract :

We investigate the quasi-missile behavior of known localized wave solutions, such as the modified power spectrum and splash pulses. We demonstrate that source-free localized waves can exhibit slow decay rates analogous to Wu's missile solutions, which are characterized by an amplitude decay rate slower than $1/R$ over an unlimited range. When excited from a finite aperture, the missilelike decay is not exhibited by all localized waves showing such behavior in the source-free situation. On the other hand, localized wave missiles generated from a finite aperture have peaks that exhibit quasi-missile decay. In an extended intermediate range between the near- and the far-field regions, these pulses decay at a rate slower than $1/R$ before switching to the usual $1/R$ decay.



International Publications Awards
Cairo University



Name : Prof . Hany Lamey Abdel-Malek



Dep. : Engineering Mathematics and Physics

Title : The Ellipsoidal Technique for Design Centering of
Microwave Circuits Exploiting Space Mapping
Interpolating Surrogates

Hany L. Abdel-Malek, Abdel-karim S. O. Hassan, Ezzeldin A. Soliman,
and Sameh A. Dakroury

Journal : IEEE Transactions on Microwave Theory and Techniques
54 3731-3738 (2006)

ISSN : 0018-9480

Impact Factor : 2.28

Abstract :

A new technique for design centering of microwave circuits is introduced. This technique exploits the space-map-ping interpolating surrogate (SMIS) with a modified ellipsoidal technique. The design centering solution for microwave circuits is obtained with a small number of fine model evaluations and, hence, the number of electromagnetic simulations is greatly reduced. Practical and demonstrative examples are included to show the efficiency of the new technique.

Key Words :

Computer-aided design (CAD) algorithms; design centering; ellipsoidal technique; microwave circuits; space map-ping (SM)



International Publications Awards
Cairo University



Name : Prof . Khaled Abdel-Fattah Ahmed



Dep. : Mining, Petroleum and Metallurgical

Title : Study Compares PVT Calculation Methods for Nonblack Oil Fluids

K.A. El-Fattah, Ahmed H. El-Banbi and M. H. Sayyoubh

Journal : OIL & GAS JOURNAL 35-39 (2006)

ISSN : 0030-1388

Impact Factor : 0.07

Abstract :

A comparison of different methods for generating pressure-volume- temperature (PVT) properties of volatile oil and gas-condensate reservoir fluids determined that PVT properties generated with the Whitson and Torp method agree the best with full equation-of-state (EOS) compositional simulation. Besides the comparison with the EOS compositional simulation, the study also compared the initial-oil-in-place (IOIP) calculations with the generalized material-balance equation. The study included a wide range of fluid characteristics from nine reservoir fluid systems: six gas condensate, two volatile oil, and one wet gas.



International Publications Awards
Cairo University



Name : Prof . Khaled Mohamed El Sayed

Dep. : Electronics and Communication Engineering



Title : Channel-Aware Earliest Deadline Due Fair Scheduling for
Wireless Multimedia Networks

Khaled M.F. Elsayed and Ahmed K.F. Khattab

Journal : WIRELESS PERSONAL COMMUNICATIONS 38
233-252 (2006)

ISSN : 0929-6212

Impact Factor : 0.31

Abstract :

Providing delay guarantees to time-sensitive traffic in wireless multimedia networks is a challenging issue. This is due to the time-varying link capacities and the variety of real-time applications expected to be handled by such networks. We propose and evaluate the performance of a channel-aware scheduling discipline and a set of policies that are capable of providing such delay guarantees in TDM-based wireless networks. First, we introduce the Channel-Dependent Earliest-Due-Date (CD-EDD) discipline. In this discipline, the expiration time of the head of line packets of users' queues is taken into consideration in conjunction with the current channel states of users in the scheduling decision. This scheme attempts to guarantee the targeted delay bounds in addition to exploiting multiuser diversity to make best utilization of the variable capacity of the channel. We also propose the violation-fair policy that can be integrated with the CD-EDD discipline and two other well-known scheduling disciplines [1, 2]. In this policy, we attempt to ensure that the number of packets dropped due to deadline violation is fairly distributed among the users. The proposed schemes can provide statistical guarantees on delays, achieve high throughput, and exhibit good fairness performance with respect to throughput and deadline violations. We provide extensive simulation results to study the performance the proposed schemes and compare them with two of the best known scheduling disciplines [1, 2] in the literature.

Key Words :

Fairness; Multiuser diversity; Qos provisioning; Scheduling; Wireless networks.

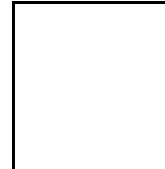


International Publications Awards
Cairo University



Name : Prof . Mahmoud Abu El Ela

Dep. : Mining, Petroleum and Metallurgical



Title : New Method Improves Back-Allocation for Gas,
Condensate at Processing Plants

Mahmoud Abu El Ela, Ismaiel Mahgoub, Mostafa Nabawi and Mohamed Abdel Azim

Journal : Oil & Gas Journal 48-52 (2006)

ISSN : 0030-1388

Impact Factor : 0.07

Abstract :

The main objective of this study is to develop a methodology for the back allocation of natural gas and condensate at natural gas processing facilities. This methodology based on energy and weight balance equations using the compositions of the gas and condensate of the inlet and outlet streams. The applicability of this work is confirmed by actual case study in Khalda Petroleum Company (an international joint venture company in Egypt). The new allocation system has been proved to be a reliable and comprehensive solution to meet the requirements of Khalda back allocation process. The system provides capabilities to compute production on points where accurate measurements are not physically possible or economically practicable. Such study is an original contribution to the knowledge of back allocation methods.

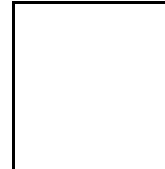


International Publications Awards
Cairo University



Name : Prof . Mahmoud Abu El Ela

Dep. : Mining, Petroleum and Metallurgical



Title : Egyptian Gas Plant Employs Absorbents for Hg Removal

Mahmoud Abu El Ela , Ismaiel Mahgoub, Mostafa Nabawi and Mohamed Abdel Azim

Journal : Oil & Gas 52-58 (2006)

ISSN : 0030-1388

Impact Factor : 0.07

Abstract :

Khalda Petroleum Company (an international joint venture company in Egypt) has recently found Mercury as a naturally occurring component of geological derived hydrocarbons in the Western Egyptian desert. Since then, Khalda Petroleum Company has concentrated on measuring and removing of the mercury from its produced gas. A mercury removal unit was installed at Salam gas processing plant. The mercury contents of the gas at the inlet and outlet of Salam mercury removal unit have been continuously monitored. This paper covers the process design, the field analysis procedures, and the performance of the Salam mercury removal unit. Such study is an original contribution to the knowledge of mercury problems in the gas industry and the technologies used for mercury removal.

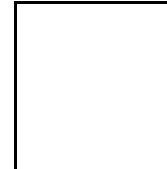


International Publications Awards
Cairo University



Name : Prof . Mahmoud Abu El Ela

Dep. : Mining, Petroleum and Metallurgical



Title : Integrated Approach Recommends Redevelopment Plan

Mahmoud Abu El Ela

Journal : Oil & Gas 55-60 (2006)

ISSN : 0030-1388

Impact Factor : 0.07

Abstract :

Oil production in Egypt is based on the development of mature fields with highly complex geological and reservoir characteristics; therefore, a great amount of creativity is required to operate these oil fields. This paper presents an integrated approach for development a mature field. The main elements of this approach are (1) collection, evaluation, and analysis of the reservoir data, (2) reserve estimation and determination of the amount and location of the remaining oil, and (3) integrating of the reservoir data and selection of a proper technique to improve the recovery factor such as application of a secondary/tertiary recovery methods, or drilling of new wells...etc. This approach addresses a general framework of optimizing the data analysis process. The applicability of this work is confirmed by actual field case study (Shukheir Bay Field) in Offshore Shukheir Oil Company (an international joint venture company in Egypt). Such study is an original contribution to the knowledge of mature field development aspects, which proved effective in clarifying the overall view of the reservoir performance in view of facilitating decision making for developmental plans.



International Publications Awards
Cairo University



Name : Prof . Mohamed El-Gamal



Dep. : Engineering Mathematics and Physics

Title : Optimization and Characterization of Electromagnetically Coupled Patch Antennas Using RBF Neural Networks

M. D. A. Mohamed, E. A. Soliman , and M. A. El-Gamal

Journal : Electromagn. Waves and Appl 20(8) 1101-1114 (2006)

ISSN : 0920-5071

Impact Factor : 0.28

Abstract :

A new neural network model is presented in this paper. It utilizes radial basis functions neural network. The model solves the problem of the electromagnetically coupled microstrip patch antennas. At a specific resonance frequency, the proposed model predicts the optimum geometrical dimensions of both the patch and feeding microstrip line. Moreover, it provides the important characteristics of the optimum design. These characteristics include the impedance bandwidth, gain, and radiation efficiency. The proposed neural network model is very accurate and extremely faster than the classical approach.



International Publications Awards
Cairo University



Name : Prof . Mohamed Nasr Allam



Dep. : Irrigation and Hydraulics

Title : Rainfall Runoff Modeling Using Artificial Neural Networks
Technique; Case Study: The Blue Nile Catchment

Mamdouh A . Antar, Ibrahim Ellassiouti and Mohamed N. Allam

Journal : Hydrological Processes 20 1201-1216 (2006)

ISSN : 0885-6087

Impact Factor : 1.330

Abstract :

This paper presents a rainfall-runoff model for the Blue Nile catchment, based on the Artificial Neural Network (ANN). The best geometry of the ANN rainfall-runoff model in terms of number of hidden layers and nodes are identified through a sensitivity analysis. The Blue Nile (BN) catchment (about 300,000 km²) in the Nile Basin is selected here as a case study. The catchment is classified into seven subcatchments, and the mean areal precipitation over those subcatchments is computed as a main input to the ANN model. The available daily data (1992 – 1999) is divided into two sets for model calibration (1992 – 1996) and for validation (1997 – 1999). The results of ANN model are compared with one of physical distributed rainfall-runoff models that apply hydraulic and hydrologic fundamental equations in a grid base. The results over the case study area and the comparative analysis with the physically based distributed model show that, ANN technique has a great potential in adequately simulating the rainfall-runoff process. Because of the too short available record used in the calibration of the ANN model, the ANN model is biased compared to the distributed model, especially in high flows.

Key Words :

Rainfall – Runoff – Neural Networks – Distributed Model



International Publications Awards
Cairo University



Name : Prof . Nabil Mahmoud Abdel-Moniem



Dep. : Chemical Engineering

Title : Thermodynamic modeling for the removal of Cs⁺, Sr²⁺, Ca²⁺ and Mg²⁺ ions from aqueous waste solutions using zeolite A

K. M. Abd El-Rahman , A. M. El-Kamash , M. R. El-Sourougy and N. M. Abdel-Moniem

Journal : Radioanalytical and Nuclear Chemistry, 268 221–230 (2006)

ISSN : 0236-5731

Impact Factor : 0.46

Abstract :

The batch removal of Cs⁺, Sr²⁺, Ca²⁺ and Mg²⁺ ions from aqueous solutions using synthetic zeolite A was investigated. The influence of the initial ion concentration, pH and temperature was studied. The obtained isotherm data have been correlated with Langumir, Freundlich, and Dubinin-Radushkevich (D-R) isotherm models. The effect of the temperature on the equilibrium distribution values has been utilized to evaluate the standard thermodynamic parameters such as free energy (DG), enthalpy (DH) and entropy (DS). Based on the D-R isotherm expression, the maximum ion-exchange capacity and the mean free energy of each studied ion has been determined. The selectivity sequence, deduced from the equilibrium isotherm data is: Sr²⁺>Ca²⁺>Mg²⁺>Cs⁺>Na⁺.



International Publications Awards
Cairo University



Name : Prof . Nabila Philip Attaallah Seif



Dep. : Engineering Mathematics and Physics

Title : Hermite-Gaussian-Like Eigenvectors of the Discrete Fourier Transform Matrix Based on the Direct Utilization of the Orthogonal Projection Matrices on its Eigenspaces

Magdy Tawfik Hanna , Nabila Philip Attalla Seif and Waleed Abd El Maguid Ahmed

Journal : IEEE Transactions on Signal Processing 54 2815-2819 (2006)

ISSN : 1053-587X

Impact Factor : 1.82

Abstract :

A new version is proposed for the Gram-Schmidt algorithm, the orthogonal procrustes algorithm and the sequential orthogonal procrustes algorithm for generating Hermite-Gaussian-like orthonormal eigenvectors for the discrete Fourier transform matrix F . This version is based on the direct utilization of the orthogonal projection matrices on the eigenspaces of matrix F rather than the singular value decomposition of those matrices for the purpose of generating initial orthonormal eigenvectors. The proposed version of the algorithms has the merit of achieving a significant reduction in the computation time.

Key Words :

Discrete fractional Fourier transform; Hermite-Gaussian-like orthonormal Eigenvectors; orthogonal procrustes algorithm; sequential orthogonal procrustes algorithm; Gram-Schmidt algorithm; projection matrices.



International Publications Awards
Cairo University



Name : Dr . Noha Mohamed Salem

Dep. : Engineering Mathematics and Physics



Title : Phase Transitions of Carbon Tetra-Fluoride Using Raman Spectroscopy and Molecular Dynamics Simulations

S. M. El-Sheikh , K. Barakat , N. M. Salem and L. Ulivi

Journal : High Pressure Research 1-4 (2006)

ISSN : 0895-7959

Impact Factor : 0.55

Abstract :

The pressure-dependent phase transitions of carbon tetra-fluoride are studied both experimentally and theoretically. We report the results of Raman spectroscopy measurements at pressures up to 6 GPa and at room temperature. On the other hand, molecular dynamics simulations on small clusters (108 and 256) were conducted using the Lennard-Jones interaction between the atoms within the framework of the isothermal–isobaric ensemble. Our theoretical predictions agree to a great extent with our and other experimental findings for most of the transitions.

Key Words :

Raman spectroscopy; Phase transitions; Molecular dynamics simulations.



International Publications Awards
Cairo University



Name : Dr . Noha Mohamed Salem

Dep. : Engineering Mathematics and Physics



Title : Phase transitions of methane using molecular dynamics simulations

S. M. El-Sheikh , K. Barakat and N. M. Salem

Journal : Chemical Physics 124516-0-124517.9 (2006)

ISSN : 0021-9606

Impact Factor : 3.14

Abstract :

Using a short ranged Lennard-Jones interaction and a long ranged electrostatic potential, CH₄ under high pressure was modeled. Molecular dynamics simulations on small clusters of 108 and 256 molecules were used to explore the phase diagram. Regarding phase transitions at different temperatures, our numerical findings are consistent with experimental results to a great degree. In addition, the hysteresis effect is displayed in our results.



International Publications Awards
Cairo University



Name : Prof . Reem Sayed Ettouney



Dep. : Chemical Engineering

Title : Implosion of a large crystallizer vessel

R. S. Ettouney

Journal : Process Safety and Environmental Protection 84(b1) 21-26
(2006)

ISSN : 0957-5820

Impact Factor : 0.50

Abstract :

The collapse of the body of a large crystallizer vessel while it was being drained is reported. A simple model is developed to investigate the liquid level and gas space pressure dynamics for various degrees of obstruction of the vent valve. The causes of failure of the venting system are identified. An analysis of possible damage to interconnected components is presented and alternative system modifications suitable for avoidance of similar such accidents are discussed.

Key Words :

implosion; collapse; vessel draining; venting dynamics.



International Publications Awards
Cairo University



Name : Prof . Reem Sayed Ettouney



Dep. : Chemical Engineering

Title : Double decomposition process analysis

R. S. Ettouney

Journal : Chemical Engineering and Processing 45 198-203 (2005)

ISSN : 0255-2701

Impact Factor : 1.16

Abstract :

An analysis of a process for recovery of both products of a double decomposition reaction through two consecutive evapocrystallization-washing steps is conducted on the basis of a simple expression for the heterogeneous equilibrium between the precipitated solids and liquor ions' concentrations. The expression is based on lumping the system's non-idealities in terms of an interaction parameter. The developed model is applied to synthesis of the process for the production of K₂SO₄ and NH₄Cl by double decomposition. The presented results illustrate the trends among the various critical internal design variables and their sensitivity to the interaction parameter. This enables an optimum trade off between the operating conditions subject to verification through a limited set of pilot tests.

Key Words :

Double decomposition; Potassium sulphate; Ammonium chloride; Metathetical salts



International Publications Awards
Cairo University



Name : Prof . Saeed Rezk Grace

Dep. : Engineering Mathematics and Physics



Title : Oscillation criteria for first- order forced nonlinear
difference equations

Ravi P. Agarwal, Said R. Grace, and Tim Smith

Journal : Mathematical and Computer Modelling 44 163-187 (2006)

ISSN : 0895-7177

Impact Factor : 0.42

Abstract :

Some new criteria for the oscillation of first-order forced nonlinear difference equations of the form $\Delta x(n) + q_1(n)x_{\mu}(n+1) = q_2(n)x_{\lambda}(n+1) + e(n)$, where λ, μ are the ratios of positive odd integers $0 < \mu < 1$ and $\lambda > 1$, are established. Copyright © 2006 Ravi P. Agarwal et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.



International Publications Awards
Cairo University



Name : Prof . Saeed Rezk Grace



Dep. : Engineering Mathematics and Physics

Title : The Oscillatory Behavior of Second Order Nonlinear
Functional Differential Equations

E.M.E. Zayed

Journal : Arabian Journal for Science and Engineering 31 23-30
(2006)

ISSN : 1319-8025

Impact Factor : 0.15

Abstract :

The main objective of this paper is to study the oscillatory behavior of the solutions of the following non linear functional differential equations

$(a(t) - (x(t)) x'(t))' + p(t) x'(t) + q(t) f(x(g(t))) = 0$. The function f is not required to be monotonic .

AMS Subject Classification: 34K10, 34K15, 34K25, 34K99

Key Words :

Oscillatory and nonoscillatory solutions; Comparison; Nonlinear functional differential equations.



International Publications Awards
Cairo University



Name : Dr . Sayed Kaseb



Dep. : Mechanical Engineering

Title : Sunlit fraction of vertical slant windowpanes

S. Kaseb and M.F. El-Refaie

Journal : Building and Environment 41 1251-1261 (2006)

ISSN : 0360-1323

Impact Factor : 0.68

Abstract :

When evaluating the instantaneous rate of solar heat gain through a window, it is essential to know the shaded area, if any, of the glazing. This is a typical standard drill, which is frequently carried out for conventional windows, which have the glass panes parallel to the building exterior wall. Sometimes, and for architectural or other reasons, the glass may be fixed in a vertical but horizontally rotated position; i.e. non-parallel to the wall. This may help to rationalize the energy requirements for air conditioning. The objective of this paper is to establish a systematic method to calculate the sunlit, and hence the shaded, fraction of slant-glass area. The presented analysis takes into account all of the numerous variables involved in the problem; namely, location, date, time of the day, wall orientation, rotation of glass relative to the wall, and geometrical characteristics of the window. The calculation procedure is casted in a general computer program which can be readily and unlimitedly used for any set of conditions. Some sample results are presented.

Key Words :

Windows; Solar heat gain; Shading; Sunlit fraction



International Publications Awards
Cairo University



Name : Prof . Yasser Mostafa Kadah



Dep. : Biomedical Engineering and Systems

Title : **Deconvolution-Interpolation Gridding (DING): Accurate Reconstruction for Arbitrary k-Space Trajectories**

Refaat E. Gabr , Pelin Aksit , Paul A. Bottomley , Abou-Bakr M. Youssef and Yasser M. Kadah

Journal : **Magnetic Resonance in Medicine 56 1182-1191 (2006)**

ISSN : 0740-3194

Impact Factor : 3.51

Abstract :

A simple iterative algorithm, termed deconvolution-interpolation gridding (DING), is presented to address the problem of reconstructing images from arbitrarily-sampled k-space. The new algorithm solves a sparse system of linear equations that is equivalent to a deconvolution of the k-space with a small window. The deconvolution operation results in increased reconstruction accuracy without grid subsampling, at some cost to computational load. By avoiding grid oversampling, the new solution saves memory, which is critical for 3D trajectories. The DING algorithm does not require the calculation of a sampling density compensation function, which is often problematic. DING's sparse linear system is inverted efficiently using the conjugate gradient (CG) method. The reconstruction of the gridding system matrix is simple and fast, and no regularization is needed. This feature renders DING suitable for situations where the k-space trajectory is changed often or is not known a priori, such as when patient motion occurs during the scan. DING was compared with conventional gridding and an iterative reconstruction method in computer simulations and in vivo spiral MRI experiments. The results demonstrate a stable performance and reduced root mean square (RMS) error for DING in different k-space trajectories.

Key Words :

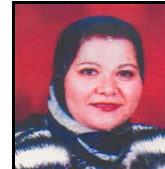
gridding; nonuniform sampling; density compensation function; deconvolution-interpolation; arbitrary trajectories



International Publications Awards
Cairo University



Name : Prof . Nesreen. Ezz El Deen



Dep. : Parasitology

Title : An investigational approach to an outbreak of
Ichthyophthirius in two ornamental fish species

E.E. Elsayed , N. Ezz El Dien and M.A.Mahmoud

Journal : Bulletin Of The European Association Of Fish Pathologists
26(5) 211-216 (2006)

ISSN : 0108-0288

Impact Factor : 0.72

Abstract :

Ichthyophthiriasis (white spot) is one of the economically important diseases affecting almost all freshwater fish and causing outbreaks associated with devastating losses. An outbreak of white spot occurred in an aquaria holding Siamese shark (*Pangasius sutchi*) and goldfish (*Crassius auratus*). Initial observation of the outbreak showed that only *P. sutchi* was affected with typical white spot associated with mortalities. However, *C. auratus*, a known susceptible species for Ich, in the same aquarium showed only mild erythema that disappeared during the course of infection with no mortalities. An experimental infection with *Ichthyophthirius multifiliis* was induced in *P. sutchi* and cohabitation was performed with the infected fish and naïve *P. sutchi* and *C. auratus* to investigate the variation between the two species. *Pangasius sutchi* showed typical clinical signs with mortalities while cohabitant *C. auratus* showed only mild erythema without mortalities. Histopathological examination was performed to evaluate the infection variation. The study provides clinical evidence of the potential presence of more than one strain of *I. multifiliis* of different species specificity.

Key Words :

Ichthyophthirius multifiliis; *Pangasius sutchi*; *Carassius auratus*; infection; protozoa; ciliates



International Publications Awards
Cairo University



Name : Prof . Yehia Badr

Dep. : Laser Sciences and Interactions



Title : On 308 nm photofragmentation of the silver nanoparticles

Y. Badr , M.G. Abd El Wahed and M.A. Mahmoud

Journal : Applied Surface Science 253 2502-2507 (2006)

ISSN : 0169-4332

Impact Factor : 1.26

Abstract :

Silver nanoparticles (Ag NPs) were prepared by different chemical methods possessing different sizes 32, 82, and 205 nm. The influence the size of Ag NPs was demonstrated by the absorption and fluorescence spectra, the maximum absorption of Ag NPs increases as the particle size increases. When Ag NPs irradiated with 308 nm excimer laser; the maximum absorption and the full width at half maximum decreased as the number of pulses increased up to 100,000 pulse; due to the size reduction. The fluorescence spectra of Ag NPs and irradiated Ag NPs with 308 nm excimer laser were recorded after excitation at 441.5 nm He–Cd laser, showing a red shift increasing as the particle size is increased.

Key Words :

Photodegradation; Laser fluorescence; Silver nanoparticles



International Publications Awards
Cairo University



Name : Prof . Ahmed Mahmoud Gad



Dep. : Statistics

Title : Analysis of Longitudinal Data with Intermittent Missing Values Using the Stochastic EM Algorithm1

Ahmed M. Gad and Abeer S. Ahmed

Journal : Computational Statistics & Data Analysis 50 2702-2714 (2006)

ISSN : 0167-9473

Impact Factor : --

Abstract :

Longitudinal data are not uncommon in many disciplines where repeated measurements on a response variable are collected for all subjects. Some intended measurements may not be available for some subjects resulting in a missing data pattern. Dropout pattern occurs when some subjects leave the study prematurely. The missing data pattern is defined as intermittent if a missing value followed by an observed value. When the probability of missingness depends on the missing value, and may be on the observed values, the missing data mechanism is termed as nonrandom. Ignoring the missing values in this case leads to biased inferences. The stochastic EM (SEM) algorithm is proposed and developed to find parameters estimates in the presence of intermittent missing values. Also, in this setting, the Monte Carlo method is developed to find the standard errors of parameters estimates. Finally, the proposed techniques are applied to a real data from the International Breast Cancer Study Group.

Key Words :

Repeated measures; Nonrandom intermittent missing; The stochastic EM algorithm; Standard errors; Quality of life; Breast cancer.



International Publications Awards
Cairo University



Name : Prof . Hisham Mohamed Abdel Salam



Dep. : Decision Support System

Title : A Simulation-Based Optimization Framework for Product Development Cycle Time Reduction

Hisham M. E. Abdelsalam and Han P. Bao

Journal : IEEE Transactions on Engineering Management 53 (2006)

ISSN : 0018-9391

Impact Factor : 0.864

Abstract :

By the mid-1990s, the importance of early introduction of new products to both market share and profitability became fully understood. Thus, reducing product time-to-market became an essential requirement for continuous competition. Since product development projects (PDPs) are based on information content and their accompanying information-dominated methods, an efficient methodology for reducing PDP time initially requires developing an understanding of the information flow among different project processes. One tool that helps achieving this understanding is the design structure matrix (DSM). Because much of the time involved in a complex PDP is attributable to its expensive iterative nature, resequencing project activities for efficient execution become the next requirement. This paper presents a simulation-based optimization framework that determines the optimal sequence of activities execution within a PDP that minimizes project total iterative time given stochastic activity durations. A mathematical model representing the problem is built as an MS Excel module and Visual Basic for Applications (VBA) is used to interface this module with a metaheuristic optimization algorithm called Simulated Annealing and commercial risk analysis software “Crystal Ball” to solve the model.

Key Words :

Terms—Manufacturing, Monte Carlo simulation, optimization, project management, sequencing.



International Publications Awards
Cairo University



Name : Dr . Mahmoud Ebeid



Dep. : Egyptian Archaeology

Title : Demotic Inscriptions from the Galleries of Tuna El- Gebel
(I)

Mahmoud Ebeid

Journal : Résumés en français et en anglais 57-75 (2006)

ISSN : --

Impact Factor : --

Abstract :

In the course of the cleaning and excavations processes which were carried out by the archaeological mission of Munich University in the subterranean galleries of Tuna el Gebel (Ibiotapheion) since 1979 to 1988, and by the joint archaeological mission of Cairo and Munich Universities from 1989 until now - in order to complete, record and re-estimate the previous excavations in the galleries which have been already carried out by S. GABRA in the name of Cairo University (1931-1952) and others (), as well as making excavations in new spots - a lot of demotic inscriptions were found. The most interesting inscriptions were written on the exterior of the coffins of the sacred animals, made of limestone, wood, or pottery (). They were brought from places all over Egypt to be buried in the subterranean galleries of Tuna el Gebel (resting place of the Ibis, the Baboon, the Falcon and the gods who rest with them) (). A selected group from these demotic inscriptions is the subject of this article.

Key Words :

Tuna el Gebel; Ibis necropolis; Ptolematic Period; Demotic inscriptions; Sacred animals; Animal sarcophagus; onomastics.