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SECOND INTERNATIONAL CONFERENCE FOR APPLIED AND PURE MATHEMATICS

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ABSTRACTS

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ABSTRACTS

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Numerical Reconstruction of Time-Dependent Thermal Conductivity for Heat Equation from Non-Local Overdetermination Conditions

Mohammed Sabah Hussein

University of Baghdad, College of Science, Department of Mathematics, Baghdad, Iraq
mmmsh@scbaghdad.edu.iq

Abstract: Recovery of time-dependent thermal conductivity has been numerically investigated. The problem of identification in one-dimensional heat equation from Cauchy boundary data and mass/energy specification has been considered. The inverse problem recasted as a nonlinear optimization problem. The regularized least-squares functional is minimised through *lsqnonlin* routine from MATLAB to retrieve the unknown coefficient. We investigate the stability and accuracy for numerical solution for two examples with various noise level and regularization parameter.

Keywords: Inverse problem; Finite difference method; nonlinear optimization, heat equation, regularization, coefficient identification problem.

Coefficient Bounds for P-Valent Functions Associated with Quasi-Subordination

Abdul Rahman S. Juma[1] and Mohammed H. Saloomi[2]

[1]Department of Mathematics, University of Anbar, Ramadi, Iraq.
dr_juma@hotmail.com

[2]Department of Mathematics, University of Karbala, Karbala, Iraq.
mohammed_h1963@yahoo.com

Abstract: We define some new subclasses of holomorphic and p-valent functions which are based on the quasi-subordination. The initial coefficients and Fekete-Szego bounds are computed in this paper. Many of new and known consequences are shown to follow as special cases of our results.

Keywords: Fekete-Szego bound, p-valent function, subordination, quasi- subordination.

Global Stability of Cholera Epidemic with General Recovery Rate Involving External Source of Disease

Ahmed Ali Mohsen[1] and Xueyong Zhou[2]

[1]Ministry of Education, 1st Rusafa, Baghdad-Iraq.
aamuhseen@gmail.com

[2]College of Mathematics and Information Science, Xinyang Normal University, Xinyang 464000, Henan, P.R. China.
xueyongzhou@126.com

Abstract: In this article a mathematical model that describes the spread of infectious disease in a population is proposed and studied. This model describes the spread of cholera disease with external source of disease and nonlinear recovery function h(I), The local and global stability of the model is studied. Our results suggest that the basic reproduction number itself is not enough to describe whether cholera will prevail or not. Finally, the global dynamics of this model is studied numerically.

Keyword: Cholera disease, global stability, external source, recovery function.

Changes of Tadpole Domination Number upon Changing of Graphs

M.Al-Harere[1] and P.A. Khuda Bakhash[2]

[1]Department of Applied Sciences, University of Technology, Baghdad, Iraq
100035@uotechnology.edu.iq

[2]Department of Applied Sciences, University of Technology, Baghdad, Iraq
pkh885826@gmail.com

***Abstract*:** In this paper, the effect of tadpole domination change of the graph is examined in the network, by deleting a vertex from a graph, where this vertex may represent the network (representing the graph) error or the possibility of dispensing it to reduce costs. Based on that, change tadpole domination number is examined. The increase, decrease, and non-increase or non-decrease in domination number is also determined in a case of deletion, so some basic cases for this domination change have been proved.

***Keywords*:** dominating set, tadpole graph, tadpole domination number.

Evolution of Wear Articular Cartilage of Synovial Human Hip Joint Using Non-Newtonian Elastic Model

Enas Yahya Abdullah

University of Kufa / College Of Education **/** Department Of mathematical
inasy.abdullah@uokufa.edu.iq

*Abstract***:** This paper study relationship between wear and elastic deformation in layers of articular cartilage and determine parameters effective on elastic deformation in normal and disease of synovial hip joint, relationship elastic deformation with squeeze film characteristic under condition lubrication was discussion with using non-Newtonian mathematical model .The results was obtained, the impact elastic deformation effects on the performance of synovial human hip joint is medical and dynamics apparent and not negligible. Compared with wear of articular cartilage (Osteoarthritic).elastic effects provide enhancement in the load carrying capacity and friction force

*Keywords***:** synovial fluid, elastic deformation, eccentricity ratio.

On Estimation of P(Y<X) Based on Lomax Distribution

Abbas Najim Salman[1] and Alaa M. Hamad[2]

[1]Department of Mathematics, Ibn-Al-Haitham College of Education, University of Baghdad
abbasnajim66@yahoo.com

[2]Department of Mathematics, Ibn-Al-Haitham College of Education, University of Baghdad
alaa_073@yahoo.com

Abstract: The present paper concerns with the problem of estimating the reliability system in the stress – strength model under the consideration non identical and independent of stress and strength and follows Lomax Distribution. Various shrinkage estimation methods were employed in this context depend on Maximum likelihood, Moment Method and shrinkage weight factors based on Monte Carlo Simulation. Comparisons among the suggested estimation methods have been made using the mean absolute percentage error criteria depend on MATLAB program.

Keywords: Lomax Distribution, Stress – Strength Reliability, Maximum Likelihood, Moment Method, Shrinkage Method, mean absolute percentage error.

On μ*-Extending Modules

Enas Mustafa Kamil[1] and Wasan Khalid [2]

[1]University of Baghdad
mustafaenas@gmail.com

[2]University of Baghdad
wasankhalid65@gmail.com

Abstract: Let R be an associative ring with identity and let M be a left R- module. As a generalization of essential submodules Zhou defined an $ℱ$- essential submodules provided it has a nonzero intersection with any nonzero submodule in $ℱ$ where $ℱ$ is a collection of R- modules such that if $M \in ℱ$, then $M' \in ℱ$ for any module M' isomorphic to M. In this article we study μ*- essential submodules as a dual of μ-small submodules provided it has a nonzero intersection with any nonzero singular submodule of M. Also we define and investigate μ*-extending modules with some examples and basic properties.

Keywords. μ*-essential, μ*-closed submodules, μ*-extending modules.

Blow-Up Set and Upper Rate Estimate for Reaction-Diffusion Parabolic Equation

Maan A. Rasheed

Department of Mathematics, College of Basic Education,
Mustansiriyah University, Baghdad-Iraq
maan.rasheed.edbs@uomustansiriyah.edu.iq

*Abstract***:** This paper is concerned with the blow-up properties of a reaction-diffusion equation with homogenous Dirichlet boundary conditions, defined on a ball in R^n. We show that the blow-up in this problem can occur in finite time at only a single point. Moreover, the upper blow-up rate estimate for this problem is derived.

*Keywords***:** Blow-up solution; Blow-up set; Blow-up rate estimate; Semilinear Heat equation.

The Solutions Growth of 2nd Order Des Where the Coefficients Are Meromorphic Belong to Edrei-Fuchs Class

Eman A. Hussein[1] and Ayad W. Ali[2]

[1]The University of Mustansiriyah/College of Sciences/Department of Mathematics
dr_emansultan@yahoo.com

[2]The University of Mustansiriyah/College of Sciences/Department of Mathematics
ayoodalkhalidy@yahoo.com

Abstract: In this paper, we shall consider the second order linear complex differential equations with meromorphic coefficients. One of the coefficients belongs to Edrei-Fuchs class and the other one satisfy some conditions under which any nontrivial solution of mentioned equation is of infinite order.

Keywords: Edrei-Fuchs class, deficient value, meromorphic function, order, lower order.

Copulas in Classical Probability Sense

Ahmed AL-Adilee[1] and Zainalabideen Abdual Samad[2]

[1]University of Kufa, Faculty of Education, Dept. of Math.
ahmeda.aladilee@uokufa.edu.iq

[2]University of Kufa, Faculty of Education, Dept.of C.S.
zainalabideena.alsaraf@uokufa.edu.iq

Abstract: Basically, the construction of copulas is depending on the joint distribution function and its corresponding marginal distribution functions. According to that fact, it has been proposed a corresponding approach to the classical approach of copulas so that we could build copulas through classical probability formulas. It has been presented copulas in an equivalent probability space formulas to the classical formulas. Also, it has been shown multivariate forms of copulas in that sense. Mainly, it has been proposed probability of events as elements of copulas instead of elements of copula that belong to the interval [0,1] because it is known that each probability of an event is also belong to [0,1]. Also, it has been shown some probabilistic constructions within independent and its related formulas. Moreover, it has been turned to an extension of multivariate constructions and show its properties. Eventually, there are several different examples that have been demonstrated upon the modified definitions.

The Combined Effectiveness of Magnetic Force and Heat\Mass Transfer on Peristaltic Transportation "Hyperbolic Tangent" Nanofluid in a Slopping Non-Regular Non-Symmetric Channel

Tamara Sh. Ahmed

University of Baghdad, Collage of Education for Pure Science Ibn al Haitham, Mathematics Department
tamaraalshareef@yahoo.com

Abstract: in the present article, we present the peristaltic motion of "Hyperbolic Tangent nanofluid" by a porous area in a two dimensional non-regular a symmetric channel with an inclination under the impact of inclination angle under the impact of inclined magnetic force, the convection conditions of "heat and mass transfer " will be showed. The matter of the paper will be further simplified with the assumptions of long wave length and less "Reynolds number ".we are solved the coupled non-linear equations by using technical analysis of "Regular perturbation method "of series solutions. We are worked out the basic equations of continuity, motion, temperature, and volume fraction particles for the recently fluid. The impact of incoming parameters on the inflow features have been studied and painted.

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$\mathcal{M}$-Projectively Nearly Co-Symplectic Manifold

Nawaf J. Mohammed[1] and Habeeb M. Abood[2]

University of Basrah, Department of Mathematics
nawafjaber80@yahoo.com

University of Basrah - Department of Mathematics
iraqsafwan2006@gmail.com

Abstract: The present article focuses on the geometrical properties of $\mathcal{M}$-projective tensor of nearly co-symplectic manifold ($\mathcal{NC}$-manifold). In particular, we have demonstrated the vanishing of the aforementioned tensor. These properties facilitated us to determine the condition under which the $\mathcal{NC}$-manifold is an Einstein space. Further, it has established the condition for the projective and $\mathcal{M}$-projective tensors to be linearly dependent.

Keywords: Nearly co-symplectic manifold; $\mathcal{M}$-projective tensor; Einstein space.

Suction / Injection Effects on Unsteady Chemically Radiating Magneto-Hydrodynamics Oscillatory Flow in a Vertical Channel

Joseph Kpop Moses

Department of Mathematical Sciences, Kaduna State University, Kaduna, Nigeria.
kpop.moses@kasu.edu.ng

Abstract: Suction/injection effects on unsteady chemically radiating magneto-hydrodynamics oscillatory flow in a vertical channel have been investigated. The flow is laminar and incompressible. The temperatures prescribed at the channel walls are non – uniform. A uniform magnetic field is applied transverse to the channel. Non – dimensional parameters are used to non – dimensionalized the governing equations to dimensionless form. Closed form solution method is used to solve the dimensionless equations that govern the flow and the solutions for velocity, temperature and concentration distribution are obtained. The influence of flow parameters as they affect the velocity profile, temperature distribution, species concentration, skin friction, Nusselt number and Sherwood number are analysed and shown graphically in detail using MATLAB. Out of many results, it is concluded that the suction/injection parameter accelerates the velocity and elevates the temperature distribution and species concentration.

On Geometry of Conformally Co-Symplectic Manifold

Farah H. Al-Hussaini[1], Aligadzhi R. Rustanov[2], and Habeeb M. Abood[3]

[1]University of Basrah, Department of Mathematics, Basrah, Iraq.
farahalhussaini14@yahoo.com

[2]National Research Moscow State University of Civil Engineering, Institute of Fundamental Education, Department of Applied Mathematics, Moscow, Russia.
aligadzhi@yandex.ru

[3]University of Basrah, Department of Mathematics, Basrah, Iraq.
iraqsafwan2006@gmail.com

Abstract. In this article, we introduced the concept of holomorphic sectional conharmonic tensor of a normal local conformally almost co-symplectic manifold ($\mathcal{NLCACS}$-manifold). In particular, we established some of its properties and analytical expressions. Consequently, analytical conditions for the $\mathcal{NLCACS}$-manifold to be a kind of point wise constancy conharmoniclly holomorphic sectional are obtained.

Using Travelling Salesman Principle to Evaluate the Minimum Total Cost of the Iraqi Cities

Sajad Majeed Jassim[1] and Faez Hassan Ali[2]

[1]Department of Mathematics, College of Science, Al-Mustansiryah University, Baghdad, Iraq.
sajadm49@gmail.com

[2]Department of Mathematics, College of Science, Al-Mustansiryah University, Baghdad, Iraq.
faezhassan@uomustansiriyah.edu.iq

Abstract: In this paper we exploit the Travelling Salesman Problem to evaluate the minimum total cost (distance or time) for Iraqi cities. So two main methods are investigated to solve this problem; these methods are; Dynamic Programming (DP) and Branch and Bound Technique (BABT). For the BABT, more than one lower and upper bounds are be derived to gain the best one. The results of BABT are completely identical to DP, with less time for number of cities (n), $5 \leq n \leq 25$. These results proof the efficiency of BABT compared with some good heuristic methods. We are suggesting some additional techniques to improve the computation time of BABT for $n \leq 80$.

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Some Results on Wiener Indices for a Connected Graph G

Ahmed M. Ali

Mosul University, College of Computer Sciences and
Mathematics
ahmedumcscm@gmail.com

Abstract: For a connected graph G, Wiener, hyper-Wiener and partial-Wiener indices are single number and defined by

$$W(G) = \sum_{\{u,v\} \subseteq V(G)} d(u,v \mid G) \quad HW(G) = \frac{1}{2} \sum_{\{u,v\} \subseteq V(G)} [d^2(u,v \mid G) + d(u,v \mid G)]$$

and

$$W_i(G) = \sum_{\substack{\{u,v\} \subseteq V(G) \\ d(u,v \mid G) \geq i}} d(u,v \mid G)$$

, $1 \leq i \leq \delta$; respectively, where $d(u,v \mid G)$ is the distance between u and v, $V(G)$ is the vertex set of G and δ is the diameter of G.

In this paper, we find a relationship between the some Wiener indices such as Wiener index, hyper-Wiener index and partial Wiener index of a connected graph G, also some examples are given.

Keywords: Wiener index, hyper-Wiener index, partial Wiener index.

An ADMM for ARMA-State Space Model Estimation via Convex Optimization Using a Nuclear Norm Penalization Approach

Basad Al-Sarray[1] and Stéphane Chrétien[2]

[1]University of Baghdad, College of Science, Computer Science, Jadirya, 10071, Baghdad, Iraq
basad.a.alsarray@gmail.com

[2]National Physical Laboratory, Teddington, Hampton road, TW11 0LW, UK
stephane.chretien@npl.co.uk

*Abstract***:** Estimation of State-Space models together with joint model selection is a difficult computational problem. Recent developments in convex penalization to least squares estimation problems provide an elegant solution to this problem that needs efficient optimization to be put to work in potentially large scale settings. In this paper, we study an Alternating Method of Multipliers for a penalized Subspace-type approach to State Space estimation with a nuclear norm penalty. Our model takes into account possible missing data. More-over, we show how creating artificial missing data at random provides a simple approach to hyper-parameter selection. Numerical experiments are proposed to illustrate the performance of our method.

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Some New Types of Perfect Mappings

G. S. Ashaea[1] and Y. Y. Yousif[2]

[1]Department of Mathematics, College of Education for Pure Sciences (Ibn -Al-Haitham), University of Baghdad.
ghidaasadoon@gmail.com

[2]Department of Mathematics, College of Education for Pure Sciences (Ibn -Al-Haitham), University of Baghdad.
yoyayousif@yahoo.com

Abstract: In this work, we introduce a new kind of perfect mappings, namely j-perfect mappings and j-ω-perfect mappings. Furthermore we devoted to study the relationship between j-perfect mappings and j-ω-perfect mappings. Finally, certain theorems and characterization concerning these concepts are studied; $j = \theta$, δ, α, pre, b, β.

Behavior of Visible Submodules in the Class of Multiplication Modules

Buthyna Najad Shihab[1] and Mahmood S. Fiadh[2]

[1]Dept. of Mathematics / college of Education for pure science Ibn-ALHaitham / University of Baghdad / Baghdad / Iraq.
Dr.buthyna@yahoo.com

[2]Dep. of computer / college of Education / Al – Iraqia University/ Baghdad / Iraq.
Salim_fa@yahoo.com

Abstract: In this study, we suppose that T is a commutative ring with identity and X is a unitary module on T. A proper submodule W of a module X over a ring T is called visible if for every nonzero ideal I of T, implies $W = IW$ where this concept is up (to our knowledge). Here the behavior of the above concept has been studied within the class of multiplication modules. Some of the distinctive results has been submitted also,the trace of visible submodule has been presented where it was symbolized by $Tr(W)$. Two important descriptions for the trace of visible submodule of multiplication module have been given, also we have demonstrated when the visible submodule of multiplication are torsionless, add to that many properties of $Tr(W)$ have been reviewed.

Keywords: Visible submodule, divisible module, multiplication module, cancellation module, torsionless module, flat module.

Strong and Weak Forms of μ-Kc-Spaces

Nadia A. Nadhim[1], Haider J. Ali[2], and Rasha N. Majeed[3]

[1]Department of Mathematics, Faculty of Education for pure sciences, University of AL-Anbar, AL-Anbar, Iraq.
mad772918@gmail.com

[2]Department of Mathematics, College of Science, University of AL-Mustansiriyah, Baghdad, Iraq.
haiderali89@yahoo.com

[3]Department of Mathematics, Faculty of Education for pure sciences Abn AL-Haitham, University of Baghdad, Baghdad, Iraq.
rashanm6@gmail.com

Abstract: In this paper, we provided some types of μ-Kc-spaces namely, μ-$K(\alpha c)$- (resp. μ-$\alpha K(\alpha c)$-, μ-$\alpha(Kc)$- and μ-$\theta(Kc)$-) spaces for minimal structure spaces denoted by (m-spaces). Some properties and examples are given. The relationships between our some types of μ-Kc-spaces are investigated. Finally, new types of open(resp. closed) functions on m-spaces are introduced and studied some of their properties.

On Subclass of Multivalent Harmonic Functions Involving Multiplier Transformation

Rafid Habib Buti[1] and Kassim A. Jassim[2]

[1]Department of Mathematics and Computer Applications, College of Sciences, University of Al-Muthanna
Rafidhbuti@yahoo.com

[2]Department of Mathematics, College of Sciences, University of Baghdad
Kasimmathphd@gmail.com

Abstract: In this paper, we studied a subclass of multivalent (j-valent) harmonic functions defined by differential operator associated with multiplier transformation, we obtain a coefficients bounds, distortion bounds and extreme points.

Keywords: Multivalent functions, harmonic function, differential operator, multiplier transformation.

On Weaker Forms of Walc-Spaces

Reyadh Delfi Ali

Department of Mathematics, College of Education for Pure
Sciences Kerbala University,
reyadhdelphi@gmail.com

Abstract: The purpose of this paper, we present a new definition
of four weaker forms of WALC-space (AL_s-spaces s=1,2,3,4) and
Study and find their relationships with some other classes of
topological spaces as well as among themselves.

Keywords: LC-space, ALC-space, WALC-space, Lindelöf, almost
Lindelöf, locally Lindelöf spaces.

On T-Extending Modules

Bahar H. Al-Bahrani[1] and Entisar A. Al-Dhahari[2]

[1]University of Baghdad, College of Science
albahranibahar@yahoo.com

[2]University of Baghdad, College of Science
eahmed.math@gmail.com

Abstract: In this paper we introduce the concepts of the T-direct sum and T-extending modules and we give some basic properties of these types of modules. Also we define the relations αT and βT on the set of submodules containing T of a module M and we give some basic properties.

Radiation and Mass Transfer Effects on MHD Oscillatory Flow for Jeffery Fluid with Variable Viscosity through Porous Channel in the Presence of Chemical Reaction

Dheia Gaze Salih Al-Khafajy

Department of Mathematics, College of Computer Science and Information Technology, University of Al-Qadisiyah, Diwaniyah-Iraq
dr.dheia.g.salih@gmail.com, dheia.salih@qu.edu.iq

Abstract: The present paper deals with a radiation and mass transfer effects on MHD oscillatory flow for Jeffery fluid with variable viscosity through porous channel in the presence of chemical reaction. The fluid viscosity is assumed to vary as an exponential function of temperature. The perturbation technique series use to solve the momentum equation. The effects of thermal conductivity, Grashof number, Darcy number, Hartmann number, radiation parameter, Schmidth number and chemical reaction parameters on velocity, temperature and concentration has been discussed for variations in the governing parameters.

Keywords: Jeffrey fluid, MHD, Oscillatory flow, Porous medium, Thermal radiation.

Modelling and Simulation of Airflow in an Inclined Bifurcated Trachea

Esam A. Alnussairy[1], Ahmed Bakheet [2] , Norzieha Mustapha [3] and Norsarahaida Amin[4]

[1]Department of Mathematics, College of Computer Science and Mathematics, Wasit University, Iraq.
eahmed@uowasit.edu.iq
[2]Department of Mathematics, College of Science, Al-Mustansiriyah University, Baghdad, Iraq.
[3]Computer Science and Mathematics, Universiti Teknologi MARA UiTM Kelantan,18500, Machang, Kelantan, Malaysia
[4]Department of Mathematical Sciences, Faculty of Science, University Technology Malaysia.

Abstract: The effect of horizontal sleeping position on the health of some patients with breathing problems still needs to be clarified. A new update mathematical model for simulating the unsteady airflow inside a bifurcated trachea for various Reynolds numbers and inclination angles is determined. The governing unsteady equations of motion, consisting of two-dimensional Navier-Stokes equations, nonlinear and non-homogenous are derived and numerically solved using the finite difference Marker and Cell (MAC) method. A numerical code based on Matlab platform is developed to calculate specifically, in addition to other flow characteristics, the pressure distribution and the streamlines which are missing in most previous works in this area. The results for axial velocities at a horizontal situation show good agreement with both numerical and other experimental findings. New results show that an increase in the inclination angle diminishes the pressure drop inside the main and a bifurcated trachea, Sleeping in a horizontal position leads to a negative effect for many patients. Consequently, the bed should be positioned at the angle between 30° and 45°. The excellent features of these results suggest that the proposed model-based procedure may contribute towards the development of more accurate and effective inclined bed therapy (IBT).

Keywords: Numerical simulation; bifurcated trachea; pressure correction; Inclined Bed Therapy (IBT).

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Oscillation Criteria for Solutions of Neutral Differential Equations of Impulses Effect with Positive and Negative Coefficients

Hussain Ali Mohamad[1] and Aqeel Falih Jaddoa[2]

[1]University of Baghdad, College of Science for Women, Department of Mathematics.
hussainam_math@csw.uobaghdad.edu.iq

[2]University of Baghdad, College of Education for Pure Science Ibn Al-Haitham, Department of Mathematics
akeelfalih@gmail.com

Abstract: In this paper, some sufficient and necessary conditions are obtained to ensure the oscillatory of all solutions of the first order impulsive neutral differential equations. Also, we improve and generalize some results in the references. New lemmas are established to demonstrate the oscillation property. Special impulsive rules match with neutral differential equation are defined. Some examples are given to illustrate the obtained results.

Bifurcation in Discrete Prey-Predator Model

Sadiq Al-Nassir[1] and Alaa Hussein Lafta[2]

[1]Department of Mathematics, College of Science, University of Baghdad, Baghdad, Iraq.
Sadiq20202000@yahoo.com

[2]Department of Mathematics, College of Science, University of Baghdad, Baghdad, Iraq.
alaahlafta@gmail.com

Abstract: The dynamics of discrete-time prey-predator model are studied and investigated. The model has four fixed points. The origin fixed point is always exists while the others are exist under some conditions. The conditions that required achieving local stability of all fixed points are also set. The results indicate that the model has a flib bifurcation which found by varying the prey intrinsic growth parameter via pray and predator populations, respectively. Finally, numerical simulations not only illustrate our results, but also exhibit the complex dynamic behavior and chaotic.

Keywords: Discrete model, bifurcation theory, Competition.

Inclined Magnetic Field of Porosity Non-Uniform Channel on Peristaltic Flow with Couple Stress and Application in Medical Treatment (Knee Arthritis)

Liqaa Zeki Hummady[1] and Mohammed G. S. AL-Safi[2]

[1]University of Baghdad. Department of Mathematic, Baghdad, Iraq.
Liqqaz.hammady@scbaghdad.edu.iq

[2]Department of Accounting- Al-Esraa University College, Baghdad, Iraq,
mohammed.ghazi@esraa.edu.iq

***Abstract*:** The present study deals with influence of an inclined magnetic field (IMF) of non –uniform horizontal asymmetric channel (NU) through the porous medium (PM) and couple stress (CS) effect on the fluid. The impacts traces velocity on the channel walls (CWs) have been taken in to consideration and the impacts of small volume of non-linear of the study has been investigated through Manu plating long wave length (LWL) and the low degree of Reynolds number (LRN) approximations. Axial velocity (AV) is subjected to the mathematical expression for, stream function (SF), pressure gradient (PG), pressure rise per wave length has been extracted through analytical application. As for the dominance physical parameters which are involved in the current model the results are submitted in the form of graph. This problem has been applied in the field of medical treatment of knee arthritis.

***Keywords*:** Magnetic Field, couple stress fluid, peristaltic flow, Non-uniform channel, porous medium.

Development of GIS Model Builder for Estimation of Actual Evapotranspiration Based on Surface Energy Balance Algorithm for Land

Hussein Sabah Jaber

Department of Surveying Engineering, University of Baghdad, Aljadriyah, Baghdad, Iraq

husseinsabah00@gmail.com

Abstract: Estimation associated with the actual evapotranspiration by utilizing the traditional methods represented by the field measurements is very difficult, therefore this research aims to use Surface Energy Balance Algorithm for Land (SEBAL) algorithm as modern method in GIS for determination of actual evapotranspiration from satellite images. Landsat remote sensing data together with climate data were used to calculate the actual evapotranspiration parameters by using SEBAL model during the 2014 in Iraq. A tool box for this model has been developed in Geographic Information System (GIS) by using model builder and python scripting to ease the calculations for the users, save the efforts and reduce the cost and the time. After pre-processing for these data in Arc GIS software 10.3, the results of all parameters values of SEBAL have been determined to calculate of actual evapotranspiration for the study area and represented as digital maps. Production evapotranspiration maps using GIS may be provided policy makers with accurate data regarding irrigation management. SEBAL is suitable for applying over plain surfaces and the selected of study area in this research was flat terrain, hence SEBAL should be chosen to provide a great estimation regarding actual evapotranspiration. This paper illustrated the capability of SEBAL model with regard to evapotranspiration estimation utilizing meteorological data and remote sensing techniques. However, other researchers further investigated this model under different environments and climate conditions**.**

Keywords: SEBAL, Actual evapotranspiration, GIS, Python scripting.

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Study of a Predator-Prey Model with Modified Ratio-Dependent and Sokol-Howell Functional Response

Safaa Jawad Ali

Technical Instructor Preparing Institute, Middle Technical University, Baghdad, Iraq.
safa_ali1962@yahoo.com

Abstract: In this paper a predator-prey food chain model with modified ratio-dependent and Sokol-Howell functional response is proposed and discussed. The model is observed to be dissipative. The stability of the equilibrium points of the three species system is analyzed. The flow of the model is explored theoretically with two functional responses and numerically with three ones.

Keywords: Sokol-Howell, modified ratio-dependent, stability analysis, functional response.

Semi-T-Abso Fuzzy Submodules and Semi-T-Abso Fuzzy Modules

Hatam y. Khalaf[1] and wafaa h. Hanoon[2]

[1]Department of Mathematics, College of Education for Pure
Science (Ibn-Alhythaim), University of Baghdad, Iraq.
dr.hatamyahya@yahoo.com

[2]Dept. of Computer Science, College of Education for Girls,
University of Kufa, Iraq.
wafaah.hannon@uokufa.edu.iq

Abstract: Let $\acute{M}$ be a unitary R-module and R be a commutative ring with identity and let X be a fuzzy module of an R-module $\acute{M}$. Our aim in this paper to study the concepts semi T-ABSO fuzzy submodules and semi T-ABSO fuzzy modulesas generalizations of T-ABSO fuzzy submodules and T-ABSO fuzzy modules. Many new basic properties, characterizations and relationships between semi T-ABSO fuzzy submodules(modules) and other concepts are given.

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Numerical Solution for Classical Optimal Control Problem Governing By Hyperbolic Partial Differential Equation via Galerkin Finite Element with Gradient and Frank Wolfe Methods

Eman H. Al-Rawdanee and Jamil A. Ali Al-Hawasy

Mustansiriyah University, College of Science, Department of Mathematics
jhawassy17@uomustanriyah.edu.iq

***Abstract*:** This paper deals with the study of the discrete classical optimal control problem (DCOCP) for systems of linear hyperbolic partial differential equations (LHPDEs) with initial (ICs) and boundary (BC) conditions. At first the existence theorem of a unique discrete solution for the discrete state equation when the discrete control is fixed is proved using the Galerkin finite element method (GFEM) in space variable and the implicit finite difference scheme (IFDS) in time variable, which they will be denote by (GFEIM). Second, the existence theorem of a discrete classical optimal control (piecewise constants (PCs)) is stated and proved. The necessary condition for the optimality of the DCOCP problem is proved. Finally an algorithm is given and a computer program is coded to find the numerical solution of the DCOCP problem, the discrete state and discrete adjoint are found using the GFEIM, while the Gradient method (GM) with Armijo step search (GARM) and the Frank Wolfe method (FWM) with Armijo step search (FWARM) are used to obtain the discrete classical optimal control, some illustrative examples are given to show the efficiency of these methods.

Keywords: Numerical classical optimal control, hyperbolic boundary value problem, finite element method, Gradient method, Frank Wolfe method.

Develop AES Algorithm Based on Fuzzy Set Theory

Ali H. kashmar[1], Ammar I. Shihab[2], and Zaineb L. Abood[3]

[1]University of Baghdad, College of Science, Baghdad, Iraq
Kashmar992000@yahoo.dk
[2]University of Baghdad, College of Science, Baghdad, Iraq
ammarste@gmail.com
[3]University of Baghdad, College of Science, Baghdad, Iraq
zaineblatef@yahoo.com

Abstract: Advance Encryption Standard AES cryptosystem is one of well-known block cipher that widely used to encrypt the sensitive data. However, attackers have pointed some drawbacks in the design of block ciphers, such as: (a) all block ciphers apply a same key for the encipherment of multiple blocks; (b) if adversary can discover the key for one block, he can immediately break the other blocks. Many security attacks have been applied on AES cipher including linear, differential, distinguishing, correlation and statistical attacks. The main objectives of this paper are; to develop a strong and high performance AES algorithm with the utilization of fuzzy function, to suggest three encryption approaches mixing AES with fuzzy function, and to analyze the security and evaluate the efficiency of developed algorithms. The result detects that the ciphertext acquired is the similar as the plaintext and fuzzy set theory was suitable for apply as round function in the design of other block ciphers. Moreover, the security properties, demonstrated that our designs were highly secure and robust against possible cryptographic attacks. Finally, the statistical test for randomness and comparison of the proposed ciphers with identical ciphers revealed that the proposed algorithms were efficient, and faster than the conventional block ciphers.

Keywords: Cryptography, AES, Fuzzy set theory, Security attacks, Statistical tests.

H-Essential Submodules and Homessential Modules

Muna Abbas Ahmed[1] and Tamadher Arif Ibrahiem[2]

[1]University of Baghdad, College of science for women,
Department of Mathematics
munaaa_math@csw.uobaghdad.edu.iq

[2]University of Baghdad, College of science for women,
Department of Mathematics
tamadheraref@yahoo.com

Abstract: The main goal of this paper is to introduce and study new concepts, the first named H-essential submodules, and we use it to construct the second concept which we call homessential modules. Several fundamental properties of the two concepts are investigated, and other characterizations are given. Moreover, many relationships of homessential modules with other related concepts are studied such as quasi-Dedekind, uniform, prime and extending modules.

Keywords: Essential submodules; H-essential submodules; Homessential modules.

The Unique Maximal J-Regular Submodule

Rafid M. AL – Shaibani[1] and Nuhad S. AL-Mothafar[2]

[1]Department of Mathematic, College of Science, University of Baghdad, Iraq
rafidmath22880@gmail.com

[2]Department of Mathematic, College of Science, University of Baghdad, Iraq
Nuhad_Math@yahoo.com

Abstract: An R-module A is said to be J-regular module if, for each $a \in J(A)$, $r \in R$, there exist $t \in R$ such that $r\,a = r\,t\,r\,a$. We proved that each unitary R-module A contains a unique maximal J-regular submodule, which we denoted by M (A). Furthermore, the radical properties of A have investigated. We proved that if A is an R-module and N is a submodule of A, then $J(N) \cap M(A) \subseteq M(N)$. Moreover, if A is "projective," then $M(A) = M(R) \cdot J(A)$ and $M(A) \cap J(R).J(A) = (0)$.

Key Words: pure submodules, J-pure submodules, regular modules, J-regular modules.

Certain Types of Topological Vector Spaces

Jalal Hatem Hussein Bayati

Department of Mathematics, College of Science for Woman,
University of Baghdad,
jalalintuch@yahoo.com

Abstract: In this study, the concepts of gsp-topological vector space, δ-topological vector space and δ-homogeneous space was introduced and studied, and some properties of them are given.

*Keywords***:** topological vector space, gsp-closed set, gsp-continuous mapping.

Convergence of SchröDinger Operator with Electromagnetic Potential

Hadeel Ali Hassen[1] and Yahea Hashem Saleem[2]

[1]University of Basrah College of education for pure science.
hadeelali2007@yahoo.com

[2]University of Basrah College of education for pure science.
yahea_h@mail.ru

***Abstract*:** We consider the Schrödinger operator with electromagnetic potentials
$H = \sum_{j=1}^{n} \frac{1}{2} \left(i\partial_j + b_j(x) \right)^2 + V(x)$ in $L^2(R^n)$ where $b_j(x), j = 1, 2, \dots n$ and $V(x)$ are real-valued functions on $R^n, V \in L^1_{loc}(R^n), b \in C^2(R^n), \ \partial_j = \frac{\partial}{\partial x_j}$, and $i = \sqrt{-1}$. We investigate the convergence of the function $\Psi(t, x)$ in $L^2(R^n)$ which is defined by
$\Psi(t, x) = \int d\mu_x^t(\omega)$
$\{\exp[-i \int_0^t b(\omega(s)) \, d\omega - \frac{1}{2} i \int_0^t \operatorname{div} b(\omega(s)) \, ds - \int_0^t V(\omega(s)) \, ds]\} \varphi(\omega(t))$ …(1)
,and we research its analytic in the space $L^2(R^n)$

***Keywords*:** Schrödinger operator, electric potential, magnetic potential, Feynman-Kac- Itô formula.

On Essential (T-Small) Submodules

Firas sh. Fandi[1] and Sahira M. Yaseen[2]

[1]Mathematics Department College Education for Pure Science, University of Anbar, Iraq.
Frisshker1978@gmail.com

[2] Mathematics Department College of Science University of Baghdad, Iraq.
Sahira.mahmood@gmail.com

Abstract: Let M be an R-module and T be a submodule of M. A submodule K of M is called ET-small submodule of M(denoted by $K \ll_{ET} M$), if for any essential submodule X of M such that $T \subseteq K+X$ implies that $T \subseteq X$. We study this mentioned definition and we give many properties related with this type of submodules.

Keywords:T-small submodule, T-maximal submodule, T- Radical submodule, ET-small submodule, ET-maximal submodule, ET-Radical submodule.

E^h-b-Preinvex Functions and Local E^h-b-Preinvex Programmings

Ammar Abdulkadhim Enad[1]   and Saba Naser Majeed[2,*]

[1]Department of Mathematics, College of Education for Pure Science (Ibn-Haitham), University of Baghdad, Baghdad, Iraq
ammaralkaaby33@gmail.com

[2]Department of Mathematics, College of Education for Pure Science (Ibn-Haitham), University of Baghdad, Baghdad, Iraq
saba.n.m@ihcoedu.uobaghdad.edu.iq

Abstract: In this paper, the classes of B-preinvex and E-B-preinvex functions are extended to the classes of b^h-preinvex and E^h-b-preinvex functions, respectively. In this extension the effect of the functions $h: [0,1] \to \mathbb{R}$ and $b: \mathbb{R}^n \times \mathbb{R}^n \times [0,1] \to \mathbb{R}^+$ are taken into consideration. Some basic properties for the new functions are discussed and some optimality properties for local E^h-b-preinvex nonlinear optimization problems involving E^h-b-preinvex functions are established. The new results can be considered as an extension to several results that are introduced in the literature.

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Existence of Relatively Bounded Solutions of First Order Nonlinear Neutral Differential Equations

Hussain Ali Mohamad[1] and Bashar Ahmad Jawad Sharba[2]

[1]University of Baghdad, College of Science for Women, Department of Mathematics
hussainam_math@csw.uobaghdad.edu.iq

[2]University of Kufa, Faculty of Computer Science and Mathematics, Department of Mathematics
bashara.hamod@uokufa.edu.iq

Abstract: In this paper some sufficient conditions are obtained to insure the existence of positive solutions which is relatively bounded from one side.Weused the Krasnoselskii's fixed point theorem and Lebesgue's Dominated Convergence theoremto obtain new sufficient conditions for the existence of a Nonoscillatoryrelatively boundedsolutions. Example included to illustrate the main results.

Property (ao) and Tensor Product

Zaman Adel Rashid[1] and Buthainah A. A. Ahmed[2]

[1]Department of Mathematics, College of Science, University of Baghdad, Iraq
zamnhamza11@gmail.com

[2]Department of Mathematics, College of Science, University of Baghdad, Iraq
buthainah41@gmail.com

Abstract: Let $\mathcal{S}_1 \in BL(X_1)$ and $\mathcal{S}_2 \in BL(X_2)$ are a continuous linear operators and both have property (ao) then their tensor product has property (ao) if and only if the upper Weyl spectrum identity $\sigma_{\mathcal{SF}_+^-}(\mathcal{S}_1 \otimes \mathcal{S}_2) = \sigma_{\mathcal{SF}_+^-}(\mathcal{S}_1)\sigma(\mathcal{S}_2) \bigcup \sigma_{\mathcal{SF}_+^-}(\mathcal{S}_2)\sigma(\mathcal{S}_1)$ holds true. Perturbations by quasi-nilpotent operators are considered.

The Number of Spinal-Convex Polyominoes

Eman F. Mohomme[1] and Mustafa Ab Sabri[2]

[1]Al Mustansiriyah university, college of basic education.
emanfatel@uomustansiriyah.edu.iq

[2]Al Mustansiriyah university, college of basic education.

Abstract: In his paper we describe a restricted class of polyominoes called spinal-convex polyominoes. Spinal-convex polyominoes created by two columns such that column 1 (respectively, column2) with at most two Sc sequence of adjacent ominoes and column 2 (respectively, column1) with at least one Sc sequence of adjacent ominoes. In addition, this study reveals new combinatorial method of enumerating spinal-convex polyominoes.

Keywords: Polyominoes, Spinal-convex, Sc sequence, enumerating.

Set-Theoretical Entropy of Alexandroff Square Homeomorphisms

Fatemah Ayatollah Zadeh Shirazi[1] and Sahar Dakhili[2]

[1]Faculty of Mathematics, Statistics and Computer Science, College of Science, University of Tehran, Tehran, Iran
fatemah@khayam.ut.ac.ir

[2]Faculty of Mathematics, Statistics and Computer Science, College of Science, University of Tehran, Tehran, Iran
dakhilisahar@gmail.com

Abstract: In the following text for Alexandroff square $\mathbf{A}$, and unit square $\mathbf{O}$ (also equal to $[0,1] \times [0,1]$) equipped with lexicographic order topology if $X \in \{\mathbf{A}, \mathbf{O}\}$ for homeomorphism $f : X \to X$ we have $\mathrm{ent}_{\mathrm{set}}(f) \in \{0, +\infty\}$ moreover $\mathrm{ent}_{\mathrm{set}}(f) = 0$ if and only if f^4 is the identity map on X (where $\mathrm{ent}_{\mathrm{set}}(f)$ denotes set-theoretical entropy of f).

Keywords: Alexandroff square, lexicographic order, set-theoretical entropy**.**

Generalized Shift Operators on ℓ^∞

Fatemah Ayatollah Zadeh Shirazi

Faculty of Mathematics, Statistics and Computer Science,
College of Science, University of Tehran, Tehran, Iran
fatemah@khayam.ut.ac.ir

Abstract: In the following text we study the compactness of generalized shift operator on $\ell^\infty(\tau)$.

Keywords: Banach space, compact operator, generalized shift.

On A Class of Analytic Mutivalent Functions Involving Higher - Order Derivatives

Zainab H.Mahmood[1], Kassim A. Jassim[2] and Buthyna N. Shihab[3]

[1]Department of Mathematics, College of Education for Pure Science, Ibn-Al-Haitham, University of Baghdad, Iraq.
zainab_hd@yahoo.com

[2]Department of Mathematics, College of Science, University of Baghdad, Iraq.
kasimmmathphd@gmail.com

[3]Department of Mathematics, College of Education for Pure Science, Ibn-Al-Haitham, University of Baghdad, Iraq.
dr.buthyna@yahoo.com

Abstract: In this paper, we get some interesting geometric concepts of the class of multivalent functions involving higher order derivatives defined on the open unite disk U. We obtain some interesting properties, like, coefficient inequalities, distortion and growth property, closure property, radius of stalikness and radius of convexity and hadamard product.

Keywords Analytic, Multivalent, higher order derivatives.

Local Fusion Graphs of Double Covers of Certain Mathieu Groups and Their Automorphism Groups

Ali Aubad[1], Sameer kadem[2] and Hassan Fadhil AL-Husseiny[3]

[1]University of Baghdad, Baghdad, Iraq.
aubad@scbaghdad.edu.iq

[2] Dijlah University College.
Sameer.kadem@duc.edu.iq

[3]University of Baghdad, Baghdad, Iraq.
mathhassanmath@yahoo.com

Abstract: Let G a finite group and X a subset of G. The local fusion graph denoted by $\mathcal{F}(G,X)$ has a vertex set X with two distinct element $x \neq y \in X$ are adjacent if the group generated by x and y, $<x,y>$, is dihedral group, of order 2n, n odd. In this paper we prove that the local fusion graphs for Mathieu groups and their Automorphism groups has diameter 2.

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Study of a Forwarding Chain With Respect to Operators in the Self-Maps Sub-Category

Fatemah Ayatollah Zadeh Shirazi[1] and Maryam Haghjooyan[2]

[1]Faculty of Mathematics, Statistics and Computer Science, College of Science, University of Tehran, Tehran, Iran.
fatemah@khayam.ut.ac.ir

[2]Faculty of Mathematics, Tarbiat Modares University, Tehran, Iran.
haghjooyanmaryam@gmail.com

Abstract: In the following chain we study some backwarding, forwarding and stationary chains in the category Set with respect to some well-known operators like composition, finite product and disjoint union.

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