ICAA 2012

International Conference on Applied Analysis and Algebra

Editors

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Yildiz Technical University, Istanbul, Turkey

FOREWORDS

The "International Conference On Applied Analysis And Algebra (ICAAA2012)" jointly organized by Yıldız Technical University, Putra University of Malaysia, and Malaysian Mathematical Sciences Society will be held on 20-24 June 2012 in Istanbul, Turkey.

The aim of this conference is to bring the math community working in the new trends of applications of math together in a wonderful city of the world, Istanbul. This conference is dedicated to Prof. Ravi P. Agarwal on his 65th birth anniversary.

The organization scheme of this conference was formed by Organizing, Scientific and Local Committees. The Scientific and Organizing Committees are formed by form different Universities worldwide. Ten worldwide distinguished plenary speakers are invited.

There have been quite a number of applications from different regions. It was a very difficult task to select abstracts among all these applications. Although, there were many good submissions that we had to reject, we tried to do our best to accommodate many speakers in order to have a better and reach scientific meeting which will provide interactions, exchanges among the participants.

Besides the scientific program, in such short time, we also tried to offer some social activities (such as boat trip for sight seeing, city tour, etc.) where we believe that these occasions will provide informal discussions which will serve the purpose of our meeting.

We also observed that many talks will be delivered by young researchers. This fact was very welcome by the committees.

The talks that are going to be delivered cover a wide range of mathematics which was also one of the goals of this organization. Among the topics that are going to be presented are mostly applied oriented talks on analysis, algebra, statistics, computer mathematics, discrete mathematics, geometry, etc. We believe that this richness will provide the basis for interdisciplinary collaborations.

We also would very much thank to all presenters and participants for their interest in our conference and believe and hope that each of them will get the maximum benefit from this meeting.

Finally, we also would to thank to Prof.Dr.İsmail Yüksek who is Rector of Yıldız Technical University (Host University), Putra University of Malaysia, and Malaysian Mathematical Sciences Society for their support. We thank to the plenary speakers that accepted our invitation and spend their precious time by sharing their ideas in our conference. We also thank to all members of organizing committee. We also thank to the academic staff of both Mathematics and Mathematics Engineering Departments of Yıldız Technical University.

We are sure that there are many people and may be some other organizations that may have been forgotten to be mentioned explicitly here, hoping their understanding, we thank all that have put their effort to make this occasion possible.

We welcome each and every one of you to this conference; we wish a very enjoyable and productive conference and hope to meet again in different occasions.

Sincerely yours,

Prof. Dr. Mustafa Bayram, Chair
On behalf of the Organizing Committee

MESSAGE FROM CO-CHAIR

"In the name of Allah, the Most Compassionate and the Most Merciful"

Thus first of all we are very grateful to Allah (s.w.t) that provided the life to meet all of us during this memorable occasion and all praise to be upon Muhammad (s.a.w) who is guidance for the entire universe.

It is a great honor for me to be a part of this International Conference on Applied Analysis and Algebra (ICAAA 2012) and welcome all the sepeakers as well as participants. I sincerely thank Prof. Ismail Yuksek, the Rector of Yildiz Techinal University being a host for this annual conference and also welcome and acknowledge all participants of our conference. Further I just like to state that this conference is the joint activity among Yildiz Technical University, University Putra Malaysia and Malaysian Mathematical Sciences Society. Therefore I personally thank all our organizers for their dedication and sincere contribution to make this conference as a success.

I also thank all the member of the organizing committee in particular chairman of the conference **Prof. Mustafa Bayram** and his team for their hard work and commitment as well as their efficiency. I believe that this year is much better than the last year and I am sure future will be better than today.

As we all know that the aim of this conference is to bring all of us together as mathematicians working in the recent developments and new trends if possible in their applications in a wonderful city of the world, **Istanbul**. The organizing committee is also delighted to **dedicate this memorable event to Prof. Ravi P. Agarwal on his 65th birth anniversary.** We just like to say that the words are not enough to express how much we appreciate his presence during this conference and wishing Prof. Agarwal very happy birthday and many more.

I also make a friendly suggestion to the all participant that the outcome of this conference will be published in various prestigious journals. Please take note and advantage as well to fit your work in excellent quality with one of the related journal. Do not miss the opportunity.

Once again I make pray by saying O Allah! Grant blessings and peace to our master Muhammad (s.a.w) to the number of the particles of the universe, and to all his Family and Companions. And all praise be to Allah, the Sustainer of All the Worlds. May Allah grant all of us happiness in this world and in the hereafter (Amen).

Thank you all,
Prof. Dr. Adem Kilicman, Co-Chair
University Putra Malaysia

Foreword by PRESIDENT
Malaysian Mathematical Sciences Society
(PERSAMA)

It is my privilege to welcome you at the International Conference on Applied Analysis and Algebra (ICAAA 2012) and thank to Yildiz Technical University for all the hard work in preparation for it.

PERSAMA is honoured to be one of the co-organisers of this conference in conjunction with dedication to Prof Ravi P. Agarwal on his 65^{th} birth anniversary. We hope for more interactions, among us as well as among leading mathematical scientists of the international community. This conference will provide the opportunity for mathematicians to share their latest ideas of applied analysis and algebra. In addition, we hope for possibility of applying the research outputs into other disciplinary areas.

I wish that all our delegates and participants will depart from this international conference with the satisfaction of having a very fulfilling pleasant and rewarding experience.

Last but not least, once again I would like to express my gratitude to Yildiz Technical University for giving PERSAMA an opportunity to be part of this prestigious conference.

Prof. Dr. Mohd Salmi Md. Noorani
President,
Malaysian Mathematical Sciences Society

Foreword by Director of the INSPEM

First and foremost I would like to thank the organizers of the ICAAA 2012 conference for inviting me to pen a few words of welcome in this souvenir pamphlet.

On behalf of the Institute for Mathematical Research (INSPEM) Universiti Putra Malaysia (UPM) I would like to welcome all speakers and participants to the conference. I would like also to take this opportunity to congratulate the organizers for having successfully planned and implemented all the programs in this conference. Planning of such a conference where the number of participants is big does indeed require meticulous attention and planning. In my view the organizing committee has done an excellent job in this respect. I am sure an equal focused attention will be given to ensure an efficient running of the conference.

On behalf of the mathematics community of UPM I would like also to take this opportunity to extend our heartiest congratulations to Prof Ravi Agarwal to whom this conference is dedicated to on the occasion of his 65th birthday. May he prosper, enjoy the best of health and continue to contribute to the advancement of mathematics

This conference is the second in the series of conferences organized by Yildiz University and Universiti Putra Malaysia. The first one was held in 2011 in the same venue. This second conference is indeed significant as it is held under the ambit of an MOU signed by the two universities early in the year. This will mark an important milestone in the implementation of programs under the MOU. We will continue to identify more common activities that can be carried to ensure that the networking that has been established will further bloom and flourish.

To all participants may this conference be an exciting one in which we shall share our ideas and findings with fellow participants. This is also an opportunity to renew old acquaintances and start new ones. I wish everyone fruitful deliberations in this conference and may we meet again in the not too distant future.

Prof Dato' Dr. Kamel Ariffin Mohd Atan
Director, Institute for Mathematical Research (INSPEM), Universiti Putra Malaysia.

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ABSTRACTS

Partial Differential Equations and Convolutions

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Abstract: In this study, we consider partial differential equations with convolutions term. Further, by using the convolution we propose a new method to solve the partial differential equations and compare the several properties before and after the convolution. In this new method when the operator has some singularities then we multiply the partial differential operator with continuously differential functions by using the convolution to remove the singularity. We also study the existence, uniqueness as well as the smoothness of the new equations. In order to show numerical examples, the following types of problem will be considered

$$G(x, y) * P(D)u = f(x, y)$$

where P(D) is a differential operator. For the computational purpose the computer algebra package *MAPLE* will be used to solve recurrence relations with associated boundary conditions.

Keywords: Convolution, PDE.

Well-Posedness of Fractional Parabolic Equations

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Abstract: Many problems in viscoelasticity [1-3], dynamical processes in self-similar structures [4], biosciences [5], signal processing [6], system control theory [7], electrochemistry [8], diffusion processes [9] and linear time-invariant systems of any order with internal point delays [10] lead to differential equations of fractional order. For more details of fractional calculus see [11]-[15]. The

study of existence and uniqueness, periodicity, asymptotic behavior, stability and methods of analytic and numerical solutions of fractional differential equations have been studied extensively in a large cycle works (see, for example, [16]-[41], and the references therein). In the present paper we consider the initial value problem for the fractional differential equation

$$\frac{du(t)}{dt} + D_t^{\frac{1}{2}} u(t) + A(t)u(t) = f(t), 0 < t < 1, \ u(0) = 0$$

in a Banach space E with the strongly positive operators $A(t)$. The well-posedness of this problem in spaces of smooth functions is established. In practice, the coercive stability estimates for the solution of problems for $2\mathrm{m}-\mathrm{th}$ order multidimensional fractional parabolic equations and one dimensional fractional parabolic equation with nonlocal boundary conditions in space variable are obtained. The stable difference scheme for the approximate solution of this problem is presented. The well-posedness of the difference scheme in difference analogues of spaces of smooth functions is established. In practice, the coercive stability estimates for the solution of difference schemes for the fractional parabolic equation with nonlocal boundary conditions in space variable and the multidimensional fractional parabolic equation with Dirichlet condition in space variables and the $2\mathrm{m}-\mathrm{th}$ order multidimensional fractional parabolic equation are obtained.

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Compact Linear Operators on Certain BK Spaces

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Abstract: We give the characterisations of matrix transformations from the spaces of sequences that are strongly bounded, strongly summable and strongly summable to zero, with index p, by the Cesaro method of order 1 into the spaces of bounded, convergent and null sequences. Furthermore, we compute or establish estimates of the Hausdorff measure of noncompactness of bounded linear operators between these spaces and apply our results to derive necessary and sufficient conditions for those operators to be compact.

Keywords: Strong Summability and Boundedness, Matrix Transformations, Compact Operators, Hausdorff Measure of Noncompactness.

2010 MSC: 46A45, 40H05.

Hybridizable Discontinuous Galerkin Methods for Higher Order Partial Differential Equations

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Abstract: In this talk, we introduce a family of discontinuous Galerkin methods called *hybridizable* discontinuous Galerkin (HDG) methods. The distinctive feature of the methods in this framework is that the only globally coupled degrees of freedom are those of an approximation of the solution defined only on the boundaries of the elements. Since the associated matrix is sparse, symmetric, and positive definite, these methods can be efficiently implemented. We begin with introducing these methods in the simple framework of second order elliptic problem $\Delta u = f$. We then show how to generalize these methods to fourth order elliptic problems, in particular to the biharmonic equation $\Delta^2 u = f$. We rewrite the biharmonic problem as a first order system for separate unknowns u , ∇u , Δu and $\nabla\Delta u$, then we introduce the HDG method for which the only globally coupled degrees of freedom are those of the approximation to u and Δu on the faces of the elements. Therefore, the methods are efficiently implementable. We prove that a suitable choice of the numerical traces results in optimal convergence for all the unknowns except for the approximation to $\nabla\Delta u$ which converges with order $k+1/2$ when polynomials of degree at most k are used. We display numerical results verifying our theoretical findings. Finally, we show how our framework lends itself to a wide range of higher order elliptic partial differential equations.

Evolution of Active Vibration Control of Smart Structures: A Mathematician's Perspective

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Abstract: There has been a steady growth in the interactions between control theory and various branches of engineering. These interactions have been significantly influenced by the increasing role of the dynamical systems perspective in these disciplines. This lecture presents a series of observations, comments and case studies derived from 20+ years of experience on the optimal control theory of the distributed parameter systems and on its applications to active control of smart structures. Governing equations of many practical smart structures involving the control of vibrations can be expressed in terms of partial differential equations that include Heaviside functions and their derivatives due to the presence of finite-size actuator and sensor patches. Such patches lead to discontinuities in the mathematical formulation of the problem governing the vibrations of structural elements used in engineering applications such as beams, plates, shells, etc. This situation often necessitates the implementation of numerical or approximate methods of solution. The control objective is to damp out the excessive vibrations of such structures in an effective and efficient manner by devising an active control mechanism and specifying the optimal control laws applicable in each specific situation. The synergy between theory, computation and applications has been an important element in the evolution of the control theory, especially in view of the fact that the solution of many practical problems led to theoretical developments and similarly mathematics has been instrumental in the solution of many practical problems. An important part of my work was directed to both theoretical and practical aspects of control theory and covered topics such as: (i) Maximum principle (ii) Variational methods, (iii) Direct methods, (iv) Numerical optimization, and (v) Generalization to control problems under the influence of time delays, moving

loads or masses and thermal loads. The applications of these methods to a smart plate using piezo-patch actuators will be discussed to illustrate the main ideas. The presentation concludes by a discussion of possible areas for future research.

Keywords: Optimal Control, Smart Structures, Maximum Principle, Variational Methods, Direct Methods, Numerical Optimization.

Solving Rank One Changed Linear Diophantine Systems

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Abstract: Linear Diophantine systems arise from many areas of mathematics, engineering and computer science. In certain environments, such as integer linear programming, solving a sequence of rank one changed linear Diophantine systems is of interest. Here, we present an efficiently designed method based on the generalized Rosser algorithm (GRA), recently developed by the authors. The approach first finds a particular solution and a basis for the original system and then makes an efficient use of the obtained results to compute the solution of the rank one changed problem. The growth of intermediate results, a computational difficulty for some existing algorithms, is also expected to be controlled. Comparison with some other existing methods affirms the effectiveness of the proposed approach.

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Conjugate Boundary Value Problems

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Abstract: Let $a < a_1 < a_2 < \ldots < a_r < b$ be $(r \geq 2)$ fixed points, and let $n_i\ (\geq 1),\ i = 1, 2, ..., r$ be integers with $\sum_{i=1}^{r} n_i = n$. In this lecture we shall consider the multi-point conjugate (Hermite) boundary value problem

$$y^{(n)} = f(t, y, y', ..., y^{(q)}), \quad 0 \leq q \leq n-1 \tag{1.1}$$

$$y^{(j)}(a_i) = A_{j,i}, \quad 0 \leq j \leq n_i - 1, \quad 1 \leq i \leq r. \tag{1.2}$$

In the literature the special case $r = n$ of (1.2) has been referred to as Niccoletti, and De La Vall´ee Poussin boundary conditions. It is clear that we can fix $\left(y(t), y'(t), ..., y^{(n-1)}(t)\right)$ at two or more points in an infinitely many different ways, and hence there are infinitely many types of boundary value problems; e.g., the best known in the literature are focal point, Lidstone, and complementary Lidstone type of boundary value problems. However, the problem (1.1), (1.2) remains basic and has attracted the maximum interest over a period of almost 40 years. In fact, often known results for (1.1), (1.2) are modeled to other types of boundary value problems. In the monograph

R.P. Agarwal, *Boundary Value Problems for Higher Order Differential Equations, World Scientific, Singapore, 1986*.

We summarized most of the important results for the problem (1.1), (1.2), which were known until 1986 and left several undecided problems. The purpose of this lecture is to highlight important old results, update the status of some of those open problems, and add some new problems to the list.

Approximation, Scale-Space and Wavelets

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Abstract: The talk is on a class of singular integral operators with scale-space properties de- fined by scaling functions that approximate the Gaussian. The derivatives of the scaling functions are mother wavelets that define continuous wavelet transforms. Decomposition and recovery formulas of functions in terms of the scale-space operators and the corresponding wavelet transforms are derived. In the case of Gaussian scale-space and Gaussian wavelet transforms we derive a formula that combines orthogonal Hermite polynomial expansion and Gaussian scale-space and wavelet de- composition. The corresponding problem for B-spline scale-space and their wavelet transforms will also be presented.

Keywords: Approximation, Scale-space, Wavelets.

Foundations of Algebraic Coding Theory and Avenues of Further Research

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Abstract: Algebraic Coding Theory began as the study of binary vector spaces in the Hamming space. Within the last 20 years it has expanded greatly both in its applications and as a branch of pure mathematics. Specifically, the alphabets which have been studied have expanded greatly to a wide variety of algebraic structures and the metrics applied to these spaces have been generalized in numerous ways. Moreover, numerous applications both inside and outside of mathematics have been found for this general theory. We shall present

foundational results for codes in this setting as well discuss open avenues of research for theoretical results and possible applications.

Keywords: Algebraic Coding Theory, Codes over Rings.

Theta Functions and Their Applications

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Abstract: Theta functions are are important in many areas of mathematics and physics including abelian varieties, moduli spaces, soliton theory, Grassmanian algebras, quantum field theory, string theory, integrable systems, etc. We will give a brief introduction to theta functions and some of their applications. If time permits we will describe some explicit computations of half-integer theta-nulls of some families of Riemann surfaces with automorphisms.

Keywords: Theta functions, Integrable systems.

An Optimization of Backpropagation Training by Conjugate Gradient on Indonesia Weather Forecasting

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Abstract: Weather is the phenomena in the atmosphere which is an important factor and influence on the various activities of our life. Weather forecasting is a complex problem. In this work, the conjugate gradient is implemented in training of backpropagation for weather forecasting. Indonesia climatic data are used as parameters input included air temperature, humidity, air pressure, rainfall, length of solar radiation, and wind speed. The results reveal that the proposed method is quite fast in training and the forecast result has a good accuration.

Keywords: Backpropagation, Conjugate Gradient, Weather Prediction.

The *F*-Chromatic Index of the Cartesian Product of Some Graphs

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Abstract: Let $G(V,E)$ be a graph and f be a function from V to a subset of positif integer. An *f*-coloring of graph G is a generalized edge-coloring such that every vertex v in V has at most $f(v)$ edges colored with a same color. The minimum number of colors needed to f-color G is called an f-chromatic index of G. Any graph G has *f*-chromatic index equal to $\Delta_f(G)$ or $\Delta_f(G)+1$, where $\Delta_f(G)=\max_{v\in V}\{d(v)/f(v)\}$. In this work, we show that f-chromatic index of the cartesian product of some graphs are $\Delta_f(G)$. We also provide an algorithm to construct an f-coloring on these graphs.

Keywords: Algorithm, f-Chromatic Index, f-Coloring.

Blow Up in Finite Time of Solutions of a Reaction-Diffusion Problem

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Abstract: In this work, we prove the blow up in finite time and the maximal time of existence of aura during migraine in the human brain wich is considered as a propagation of wave of depolarization through the cells. We introduce a state function $0 \le u(t,x) \le 1$ that reflects the presence of the aura (u=0 in a normal tissue and $u=1$ if this tissue is completely depolarized i.e. the aura is at

its peak). The variation of u is given by the following reaction-diffusion problem:

$$(P)=\begin{cases} u_t - v\Delta u = bu(u-\theta)(1-u)\chi_{\Omega} - \alpha u \chi_{\Omega^c}, \Omega \cup \Omega^c \\ u(0,x)=0, \Omega\cup\Omega^c \\ \dfrac{\partial u}{\partial \eta} = 0, \partial(\Omega\cup\Omega^c)/\Gamma \\ u=1, \Gamma \end{cases}$$

where Ω is the grey matter (cerebral cortex) of the brain and Ω^c is the white matter, χ_{Ω} and χ_{Ω^C} are the characteristic functions of Ω and Ω^c, $v>0$ is the diffusive coefficient supposed constant, $\theta \in]0,(1/2)[$ is the reaction threshold of the grey matter and $\alpha > 0$ is the absorption coefficient in white matter, $b > 2\alpha$ is the amplification coefficient of the grey matter, η is a unit normal vector of $\partial(\Omega\cup\Omega^c)$ The method used here is one of the most efficient techniques for studying this type of problem since it combines the techniques of a priori estimates and the differential inequalities.

Keywords: Blow Up, Reaction-Diffusion Problem, Migraine with Aura, Maximal Time of Existence.

2000 Mathematics Subject Classification: 35K40, 35K55, 35K57.

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Rational Ball Functions for Monotonic Interpolating Curves

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Abstract: In this paper, a curve interpolation scheme is developed using the rational cubic Ball representation. The scheme has parameters that can be used either to change the shape of the curve or to increase its smoothness. Conditions are derived for preserving monotonicity, and for achieving either C^1 or C^2 continuity. Some numerical results are presented.

Keywords: Interpolation, Rational Cubic Ball, Monotonicity, Continuity.

Exponential Stabilization of the Full Von Kármán Beam

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Abstract: The one-dimensional full von Kármán beam is stabilized using a dissipative effect through heat conduction acting on the longitudinal component and a frictional damping acting on the transversal component of the beam. We shall prove that solutions decay to zero exponentially by coupling the system (namely, the longitudinal component) with only one heat equation according to Green and Naghdi theory and one "light" damping for the other component. Precisely, we will consider the system:

$$\begin{cases} u_{tt} - D_1\left[u_x + \frac{1}{2}(w_x)^2\right]_x + \gamma\theta_{tx} = 0 \\ w_{tt} + K_1 w_t - D_1\left[\left(u_x + \frac{1}{2}(w_x)^2\right)w_x\right]_x + D_2 w_{xxxx} = 0 \\ \theta_{tt} - l\theta_{xx} + K_2\theta_t + \gamma u_{tx} = 0 \end{cases}$$

In $\Omega \times (0,\infty)$, where $\Omega = [0,L]$ and D1, D_2, K_1, K_2 and γ are a positive constants. We complement this system with some boundary conditions and initial data.

Keywords: Stability, Full Von Kármán Beam, Thermal Effect.

Codes in Matlab and Numerical Solution of One-Dimensional Transient Heat Conduction Equation

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Abstract: In this work, we consider the one-dimensional transient heat conduction equation in a simple form. We are interested in the temperature evolution versus time T(x; t) which satisfies our problem, given an initial temperature distribution. The first step in the finite differences method is to construct a grid with points on which we are interested in solving the equation. The next step is to replace the continuous derivatives of equation 2 with their finite difference approximations. The attached MATLAB code shows an example in which the grid is initialized, and a time loop is performed.

Keywords: Method of Lines, Heat Transfer, Numerical Results, Codes in Matlab.

Choquetness of C(X) with a Set-Open Topologies

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Abstract: Let X be a completely regular hausdorff space, $C(X)$ the set of all continuous real-valued functions on X and λ non-empty family of compact subsets of X. The set $C(X)$ is equipped with a topology which has as subbase the collection:

$$\{[A,V]: A \in \lambda \text{ and } V \text{ is an open subset of } R\},$$

where $[A,V] = \{f \in C(X): f(A) \subset V\}$. *The* set $C(X)$ equipped with this topology is denoted by $C_\lambda(X)$ and it is said to have a *set-open topology* (this is a generalization of the well-known compact open topology). One of the most important completeness properties that may have a topological space is the property of being a Choquet space, this is a property defined by means of a topological game and that lies between completely metrizable and Baire space properties. The aim of this talk is to prove that $C_\lambda(X)$ is a Choquet space if and only if X is paracompact.

Keywords: Function Space, Topological Game, Set Open Topology.

On Stability of Continuous Fusion Frame

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Abstract: In this work, I consider continuous fusion frame and among the other results, I state and prove some stability of perturbation of continuous fusion frame. For example I give a useful condition under which two Bessel continuous families of subspaces are continuous frame of subspaces.

Keywords: Hilbert Space, Continuous Frame of Subspace.

Advanced Modeling in Finance using the PIDE, Numerical Methods and Matlab

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Abstract: In this Lecture /Workshop we will discuss some advance financial problems that can be tackled by numerical methods. For this purpose, first the stuck markets will be mode by using the stochastic differential equations and ordinary differential equations. Then we model some derivative markets problems (specially the American options) by using the partial differential equations and Partial Integro-Differential Equations (PIDE). Finally, by using efficient numerical methods and use the Matlab programming, the mention models are solved. In fact**,** there are (at least) two different potential users of this work: 1- Researchers in finance wishing an introduction to numerical methods. 2- Researchers in a quantitative discipline (such as mathematics, engineering, or computer science) who would like to see how their skills may come handy when dealing with finance.

Keywords: Derivative Market, American Options, Initial and Free Boundary Value Problems in Finance, Inverse Problem, Method of Lines, Matlab Programming.

Numerical Solution of a Space-Time Fractional Derivative of Groundwater Flow Equation

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Abstract: The classical Darcy law is generalized by regarding the water flow as a function of a non-integer order derivative of the piezometric head. This generalized law and the law of conservation of mass are then used to derive a new equation for groundwater flow. Two methods including Frobenius and Adomian Decomposition method are used to obtain an asymptotic analytical solution to the generalized groundwater flow equation. The solution obtained via Frobenius method is valid in the vicinity of the borehole. This solution is in perfect agreement with the data observed from the pumping test performed by the institute for groundwater study on one of their borehole settled on the test site of the University of the Free State. The test consisted of the pumping of the borehole at the constant discharge rate Q and monitoring the piezometric head for 350 minutes. Numerical solutions obtained via Adomian method are compared with the Barker generalized radial flow model for which a fractal dimension for the flow is assumed. Proposition for uncertainties in groundwater studies was given.

Keywords: Groundwater Flow Equation, Integro-Differential Equations, Adomian and Frobenius Methods, Uncertainties.

Symmetries and Conservation Laws for Schrodinger Type Equations

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Abstract: We present the invariance, exact solutions, conservation laws and double reductions of the Nonlinear Shrodinger Equation with damping and driving terms. The underlying equation is used to model a variety of resonant phenomena in nonlinear dispersive media, inter alia. For the purpose of our analysis, the complex equation is construed as a system of two real partial differential equations.

Keywords: Symmetries, Conservation Laws, Schrodinger Equations.

Breast Cancer Diagnosing by using Eigen-Values and Moment Variants

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Abstract: In this paper, we have investigated two main methods for comparing breast cancer image with normal image. The first method depended upon considering eigen-values for the two images by using the value of the simple linear correlation while the second method was by considering moments of the two images. Cluster analysis for variables was used to distinguish between images of breast.

Keywords: Image Processing.

Fuzzy Hyperideals and Fuzzy Bi-Hyperideals in Fuzzy Semihypergroups

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Abstract: We introduce the concept of fuzzy (left, right) hyperideal and fuzzy bi-hyperideal in fuzzy semihypergroup through the approach of fuzzy space introduced by Dib (1994) and fuzzy hypergroup introduced by Fathi (2010). It is a generalisation of the concept of fuzzy (left, right) ideal and fuzzy bi-ideal in fuzzy semigroup of Dib and Galhum (1997). We give a relationship between our fuzzy ideals and fuzzy bi-hyperideals and the classical ones, which are through the approach of Rosenfeld.

Keywords: Fuzzy Space, Fuzzy Hypergroup, Fuzzy Semihypergroup, Fuzzy Hyperideals, Fuzzy Bi-Hyperideals.

Interpolation in Three Dimensional Spaces Minimizing a Functional Involving the Laplace Operator

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Abstract: In this paper we discuss an interpolation problem in three dimensional spaces when the domain lies on the unit sphere. Suppose that a smooth function f is given and defined on the ground tract s of the satellite orbiting the earth and that the satellite does not return to the same point on the earth until many orbits have been completed. We investigate the existence and uniqueness of a function u in a Sobolev space which agrees to f on s and minimizing some energy integral involving biharmonic operator.

Keywords: Interpolation, Functional, Biharmonic Operator.

On Sandwich Theorem of P-Valent Functions Involving Dziok - Srivastava Operator

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Abstract: The aim of this paper is to investigate some properties of the subordination and superordination for p-valent functions associated with Dziok - Srivastava operator.

Keywords: Subordination, Superordination, Hypergeometric Function, Multivalent Function.

Lie Ideal and Generalized Derivations in emiprime Rings

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Abstract: Let R be an associative ring with center $Z(R)$. *For* each $x, y \in R$ denote the commutator $xy - yx$ by $[x, y]$ and the anti-commutator $xy + yx$ by $x \circ y$. An additive subgroup L of R is said to be Lie ideal of R if $[L, R] \subseteq L$. An additive mapping $F : R \to R$ is called generalized inner derivation if $F(x) = ax + xb$ for fixed $a, b \in R$. for such a mapping F, it is easy to see that $F(xy) = F(x)y + xd(y)$ for all $x, y \in R$. This observation leads to the following definition given in [Communication Algebra 26(1998), 1149-1166]. An additive mapping $F : R \to R$ is called generalized derivation with associated derivation d if $F(xy) = F(x)y + xd(y)$ for all $x, y \in R$. In the present paper we shall show that $L \subseteq Z(R)$ such that R is semiprime ring satisfying several conditions.

Keywords: 16W25, 16N60, 16U80.

Crypto Genetic System with Chaotic Attractor for Data Masking

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Abstract: We have seen in recent years a very rapid growth of work using Genetic Algorithms (GAs) which are stochastic optimization algorithms based on mechanisms of natural selection and genetics. Operation is extremely simple. We start with an initial population of potential solutions (chromosomes) arbitrarily chosen. We evaluate their performance (fitness). Based on this performance we create a new population of potential solutions using simple evolutionary operators such as: selection, crossover and mutation. and we repeat this cycle until we find a satisfactory solution. Their scope is very broad. Besides the economy and the finance, they are used for optimization of functions, they are found in optimal control theory or in repeated game theory and differential. Their application in cryptography, which is a science which allows us to protect data to make them unintelligible to unauthorized persons, was initiated in 1993 by Spillman, Janssen, Nelson and Kepner, and their work was to break an encryption system using a genetic algorithm. Also, A. Tragha and al. have proposed their Improved Cryptography Inspired by Genetic Algorithms (ICIGA).In this work, we present a new approach of a cryptosystem based on the principle of genetic algorithms which we have strengthened by the use of one chaotic attractor for masking the cipher text (cryptograms).

Keywords: Genetic Algorithms, Cryptography, Stream Cipher, Chaos, Attractor, Logistic Map.

Soliton Solutions for Some Evolution Equations

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Abstract: In this paper, the topological (dark) as well as non-topological (bright) soliton solutions of nonlinear evolution equations are obtained by the solitary wave ansatz method. Under some parameter conditions, exact solitary wave solutions are obtained. Note that, it is always useful and desirable to construct exact solutions especially soliton-type (dark, bright, kink, anti-kink, etc...) envelope for the understanding of most nonlinear physical phenomena.

Keywords: Exact Solutions, Topological and Non-Topological Soliton, KP-BBM, Landau- Ginzburg-Higgs Equations.

Stability of Nonlinear Differential Equation with Delay by Fixed Point Technique

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Abstract: This work is devoted to the study of the stability of the following nonlinear differential equation with delay

$$x'(t) = -a(t)x^3(t) + b(t)x^3(t - r(t)).$$

The method used here “fixed-point technique” is one of the most efficient techniques for studying this type of equations.

Keywords: Nonlinear Neutral Differential Equation, Contraction Mapping, Stability, Krasnosselski’s Theorem.

2000 Mathematics Subject Classification: 34K20, 47H10.

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The Comparison of Extended Hyperbolic Tangent and the Extended (G'/G) Expansion Method in Solution of the Double Sine-Gordon Equation

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Abstract: Nonlinear partial differential equations have significant rule in various fields of science and engineering such as Fluid Mechanism, Plasma Physics, Optical Fibers, Solid-state Physics, Chemical synthesis, physics-chemistry and geochemistry. In this article, two methods of extended hyperbolic tangent and the extended (G'/G) expansion method in solving of the double sine-Gordon equation are used as below:

$$u_{xt} = \sin u + \sin 2u$$

These methods make nonlinear partial differential equations to a common differential equation and cab be used for integral and non-integral equations. Finally, we comparison these two methods in solution of the double sine-Gordon equation and we would demonstrate that these methods are similar in certain circumstances.

Keywords: Extended Hyperbolic Tangent, the Extended (G'/G) Expansion Method, the Double Sine- Gordon Equation, Nonlinear Partial Differential Equations.

Comparing the Results of Transforming Differential Method and Adomian Method in Solving Third Order Nonlinear Delay Differential Equation

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Abstract: Transforming differential method is a Numerical and Analytical Method for solving functional equations. In this method, Computation is reduced greatly without any linearization, discretezation and making perturbation in problem and leads to an acceptable answer with high accuracy. In this paper, we intend to compare and analysis the transforming differential method and Adomian method in solving third order nonlinear Delay differential equation which is one of the most important Delay differential equation.

Keywords: Transforming Differential Method, Functional Equations, Adomian Method, Third Order Nonlinear Delay Differential Equation.

About Multiple Limits

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Abstract: Let us define sequences with n indices $n \geq 2 \left\{ a_{i_1,i_2,\ldots,i_n} \right\}$ $(i_1, i_2, \ldots, i_n \in N^+)(I)$ where $a_{i_1,i_2,\ldots,i_n}$ common term (I). We can define

1) "Double limits " $\lim\limits_{(i_1,i_2,\ldots,i_n)\to\infty} a_{i_1,i_2,\ldots,i_n}$

2) " Recurrent limits " $\lim\limits_{i_1\to\infty} \lim\limits_{i_2\to\infty} \ldots \lim\limits_{i_n\to\infty} a_{i_1,i_2,\ldots,i_n}$

3) " Miscellaneous limits " $\lim\limits_{i_1\to\infty} \lim\limits_{(i_2,\ldots,i_n)\to\infty} a_{i_1,i_2,\ldots,i_n}, \ldots \lim\limits_{(i_1,i_2)\to\infty} \lim\limits_{(i_3,\ldots,i_n)\to\infty} a_{i_1,i_2,\ldots,i_n}, \ldots$

We prove theorems: **T1**: for sequence $\left\{ a_{i,j} \right\}$, $(i, j \geq 1)$ if $\lim\limits_{(i,j)\to\infty} a_{i,j} = A$ and for every *i* exist row limits $\lim\limits_{j\to\infty} a_{i,j} = \varphi(i)$ then

$$\lim_{(i,j)\to\infty} a_{i,j} = \lim_{i\to\infty} \varphi(i) = \lim_{i\to\infty} \lim_{j\to\infty} a_{i,j}$$

T2: if $\lim\limits_{(i,j,k)\to\infty} a_{i,j,k} = A$ then for every *i*

I) $\lim\limits_{(j,k)\to\infty} a_{i,j,k} = \varphi(i) \Rightarrow \lim\limits_{i\to\infty} \lim\limits_{(j,k)\to\infty} a_{i,j,k} = A$ II)

$\lim\limits_{j\to\infty} \lim\limits_{k\to\infty} a_{i,j,k} = \xi(i) \Rightarrow \lim\limits_{i\to\infty} \xi(i) = A$

III) $\lim\limits_{(j,k)\to\infty} a_{i,j,k} = \varphi(i) \,\&\, \lim\limits_{j\to\infty} \lim\limits_{k\to\infty} a_{i,j,k} = \xi(i) \Rightarrow \lim\limits_{i\to\infty} \varphi(i) = \lim\limits_{i\to\infty} \xi(i) = A$

T3: if $|X| = n$ elements, $|Y| = m$ boxes then the number of ways to put n elements in m boxes is $S_{m,n} = \sum\limits_{i=0}^{m-1} (-1)^n (m-i)^n C_m^i$

T4: Number of multiple limits is $N = \sum\limits_{m=1}^{n} S_{m,n} = \sum\limits_{m=1}^{n} \sum\limits_{i=0}^{m-1} (-1)^i C_m^i (m-i)^n$.

Brauer-Fitting Correspondence on Tensor Algebra

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Abstract: We show that Brauer-Fitting correspondences as well as the notion of pseudo-blocks of endomorphism algebras are both compatible with the external tensor product of modules and algebras**.**

Keywords: External Tensor Algebra, Brauer-Fitting Correspondence, Pseudo Blocks of Endomorphism Algebras.

2000 Mathematics Subject Classification: 20C20.

The Numerical Solution of Boundary Value Problems (Bvps) by Spline Functions

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Abstract: In this study, we give definition and some properties of spline functions which are necessary for solving boundary value problems. By using spline function, we solve some boundary value problems and compare obtained solution and their exact solution via MATLAB.

Keywords: Boundary Value Problems (BVPs), Spline Functions, MATLAB.

Half-Inverse Sturm-Liouville Problem with Boundary and Discontinuity Conditions Dependent on the Parameter

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Abstract: In this work, half inverse problem for an impulsive Sturm-Liouville operator with eigenvalue parameter, rationally contained in one boundary condition and linearly contained in the jump conditions is considered. It is proven that, if the potential function $q(x)$ is prescribed on the second half part of the interval $(0,1)$ then only one sequence of eigenvalues is sufficient to determine $q(x)$ on the whole interval $(0,1)$ and the other coefficients in the boundary and discontinuity conditions.

Keywords: Sturm-Liouville Operator, Parameter Dependent Boundary Condition, Half Inverse Problem.

Hyponormal Operators and Orthogonality in a Banach Space

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Abstract: In this paper, we introduce some known properties on hyponormal operators defined on a separable complex Hilbert space H, and we give results on normality of these operators. We present also, the orthgonality on the Banach space of all bounded linear operators on *H in* sense of Birkhoff-James, using the familiar Fuglede-Putnam theorem. Other results are also given.

Keywords: Fuglede-Putnam Theorem, Hyponormal, Dominant Operators, Orthogonality.

Approximation Properties of the Baskakov-Durrmeyer Operators

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Abstract: Generalized Baskakov operators were introduced as $B_n^a(f,x)=\sum_{k=0}^{\infty}P_{nk}(x,a)f(\frac{k}{n}),\ x\geq 0,\ k=0,1,2,..,n=1,2$ non-negative constant $a\geq 0$ independent of *n*. In this work we stated a new Durrmeyer type modification of generalized Baskakov operators and for all real valued continous and bounded functions f on (0; 1]. For the operators A_n we establish certain direct theorems in terms of the modulus of continuity of second order, the elements of Lipschitz-type space and the usual modulus of continuity. Our operators defined in A_n has some better approximation properties than the earlier operators mentioned before in related operators.

Keywords: Baskakov Operators, Durrmeyer Operators, Lipschitz-Type Space, Modulus of Continuity.

Is Lebesgue Measure the Only Σ-Finite Invariant Borel

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Abstract: S. Saks and recently R.D. Mauldin asked if every translation invariant σ-finite Borel measure on R*d* is a constant multiple of Lebesgue measure. The aim of this paper is to investigate the versions of this question, since surprisingly the answer is “yes and no,” depending on what we mean by Borel measure and by constant. According to a folklore result, if the measure is only defined for Borel sets, then the answer is affirmative. We show that if the measure is defined on a σ-algebra *containing the* Borel sets, then the answer is negative. However, if

we allow the multiplicative constant to be infinity, then the answer is affirmative in this case as well. Moreover, our construction also shows that an isometry invariant σ-finite Borel measure (in the wider sense) on Rd can be non-σ-finite when we restrict it to the Borel sets.

Keywords: Lebesgue, Borel, Measure, Unique Translation, Isometry, Invariant Σ-Finite.

The Macwilliams Equivalence Theorem and the Local-Global Property

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Abstract: The MacWilliams equivalence theorem for codes over finite fields can be reformulated in terms of the local-global property of the group of monomial matrices: Hamming weight isometries are, by definition, linear maps between two codes such that every codeword in the domain is related to its image by a monomial matrix (which depends on the codeword). The MacWilliams equivalence theorem guarantees that such a locally monomial map is in fact a global: there is a single monomial matrix such that every codeword and its image are related by this matrix. Thus every local monomial map is a global monomial map. In this work we generalize the MacWilliams equivalence theorem by showing, among other things, that the group of all invertible matrices, the group of all invertible lower triangular matrices, the group of all invertible diagonal matrices over finite Frobenius rings have the local-global property. These results lead to many interesting consequences. For n-tuple codes over finite Frobenius rings we show that every support-preserving isomorphism between two codes is a diagonal map. We also show that every Rosenbloom-Tsfasman-weight-preserving isomorphism is a lower triangular map.

Keywords: Macwilliams Equivalence Theorem, Macwilliams Extension Theorem, Frobenius Rings, Weight-Preserving Isomorphisms, F-Partition.

Extremal Properties of Videnskii Polynomials

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Abstract: V.S. Videnskii proved in 1960s inequalities for derivatives of trigonometric polynomials of (half) integer order on an interval shorter than period. He discovered a nice formula for the related extremal polynomials. Recent results (including joint with S.V. Tyshkevich and M.A. Aktürk) about extremal problems of the approximation theory, where the Videnskii polynomials are extremal or supposed to be extremal are presented.

Keywords: Inequalities for Trigonometric Polynomials.

Bifurcation of a Degenerate Cusp Point on the Free Surface

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Abstract: In this work, the degenerate flow structures ‘the cusp on the free surface’ and its bifurcation structures have been studied from a topological point of view. Their bifurcation gives rise to a variety of flow patterns which have previously not been observed theoretically. A normal form transformation is used to simplify the differential equations of a Hamiltonian system. We illustrate how the ideas can be applied to a roll coater.

Keywords: Dynamical Systems in Fluid Mechanics, Incompressible Viscous Fluids.

An Application of Differential Equations in Production Management

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Abstract: Differential equations have been used in social science frequently as used to evidence natural events. In this paper, using different numeric methods solutions have been offered to differential equations that are used in production management. Accordingly, stability of solutions has been examined.

Keywords: Differential Equations, Production Management, Stability.

On Character Amenability, Character Contractibility and Approximate Character Amenability of Banach Algebras

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Abstract: In this research we consider character amenability, character contractibility and approximate character amenability of some various classes of Banach algebras. We characterize character amenability of Banach algebras. We give a strictly positive lower bounded for elements of carrier space of character amenable Banach algebras, and by this obtained result we show that character amenability of Lipschitz algebras and amenability of them are equivalent. In case of character contractibility of Banach algebras, we consider character contractibility module extension Banach algebra and tensor product of Banach algebras and we give some example for group algebras. Finally, by introducing of approximate character amenability, we show that the corresponding class of Banach algebras is larger than that for the classical character amenable. As well

as, we show that the measure algebra M(G) is approximately character amenable if and only if G is discrete and amenable, and if the Segal algebra S(G) is approximately character amenable then G is an amenable group.

Keywords: Approximate Character Amenability, Banach Algebras, Character Amenability, Character Contractibility, Group Algebras, Lipschitz Algebras.

Fine Spectra of Upper Triangular Double-Band Matrices over the Sequence Space $l_p, (0 < p < 1)$

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Abstract: The main purpose of this paper is to determine the fine spectrum with respect to the Goldberg's classification of the operator $B^t(\tilde{r},\tilde{s})$ defined by a double sequential band matrix over the sequence space l_p. Additionally, we give the approximate point spectrum, defect spectrum and compression spectrum of the matrix operator $B^t(\tilde{r},\tilde{s})$ over the space l_p. The operator $B^t(\tilde{r},\tilde{s})$ on sequence space on l_p is defined $B^t(\tilde{r},\tilde{s})\,x = (r_k x_{k+} s_k x_k)$ where, $x = (x_k) \in l_p$, $\tilde{r}$ and $\tilde{s}$ are two convergent sequences of nonzero real numbers satisfying certain conditions. Where, $(0 < p < 1)$

Keywords: Spectrum of an Operator, Double Sequential Band Matrix, Spectral Mapping Theorem, the Sequence Space l_p Goldberg's Classification.

Aggregation Methods in Dynamical Systems and Applications in Population Dynamics

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Abstract: A mathematical model of artificial pelagic multi-site fisheries is considered. The model is a stock-effort dynamical model of a fishery subdivided into fishing zones, such as fish aggregating devices (FADs) or artificial habitats (AHs). The aim of this work is to investigate the effects of the number of artificial sites on the global activity of the fishery. In our model, the stock corresponds to a fish population moving between artificial sites, on which they are harvested by fishing fleets. We consider a linear chain of identical fishing zones. Fish movements between the sites, as well as vessels displacements, are assumed to take place at a faster time scale than the variation of the stock and the change of the fleet size. We take advantage of these two time scales to derive a reduced model governing the dynamics of the total harvested stock and the total fishing effort. We show that there exists an optimal number of fishing sites that maximizes the total catch at equilibrium.

Keywords: Population Dynamics, Aggregation of Variables, Dynamical System, Stability.

A Boundary Integral Equation with the Generalized Neumann Kernel for a Mixed Boundary Value Problem in Unbounded Multiply Connected Regions

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Abstract: A uniquely solvable boundary integral equation with the generalized Neumann kernel is presented for solving two-dimensional Laplace's equation in unbounded multiply connected regions with mixed Dirichlet-Neumann boundary condition. Some numerical examples are given to show the accuracy of the proposed method.

Keywords: Mixed Boundary Value Problem, Riemann-Hilbert Problem, Fredholm Integral Equation, Generalized Neumann Kernel.

Differential Calculus on Quantum '$ax+b$' Group

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Abstract: It is known that, in order to construct a noncommutative differential calculus on quantum groups and Hopf algebras, one takes into consideration the associative algebra of functions on the group. In this work, we present a noncommutative differential calculus on the Quantum $ax+b$ group which is introduced by Woronowicz and Zakrzewski [1].

Keywords: Quantum $ax+b$ Group, Hopf Algebra, Differantial Calculus.

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Performance Evaluation and Ranking of Some Departments in Islamic Azad University Zahedan Branch by the DEA with Fuzzy Parameters

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Abstract: In this research, departments of Islamic Azad University, Zahedan branch as decision making unit are considered subject to factors of professors, the average number of students and educational facilities as the input and average numbers of graduate students, research work and student satisfaction as the output are considered. After determining the factors affecting, technical efficiency values of departments are measured by CCR and BCC models. Further, evaluation of experts by interval of the most pessimistic and the most optimistic comments a group of experts determined, then the efficiencies are merged and are posed as a fuzzy interval and finally fuzzy interval are ranked by introducing the average index rating.

Keywords: Data Envelopment Analysis (DEA), Fuzzy Parameters, Optimization.

Numerical Approximation of Fractional Burgers Equation

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Abstract: In this work, we study local and global solutions of an evolution problem governed by Burgers equation. We have generalized the Burgers equation with a degree of fractional Laplacian in the main part and a degree algebraic nonlinear part. Our results prove the existence, uniqueness and regularity of solutions of Cauchy problem for the fractional Burgers equation.

Keywords: Fractional Burgers Equation, Finite Volume Methods, Approximations.

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Asymptotic Dynamics of the Slow-Fast Hindmarsh-Rose Neuronal System

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Abstract: This work addresses the asymptotic dynamics of a neuronal mathematical model. The aim is first the understanding of the biological meaning of existing mathematical Systems concerning neurons such as Hodgkin-Huxley or Hindmarsh-Rose models. The local stability and the numerical asymptotic analysis of Hindmarsh-Rose model are then developed in order to comprehend bifurcations and dynamics evolution of a single Hindmarsh-Rose neuron. This has been performed using numerical tools borrowed from the nonlinear dynamical system theory.

Keywords: Neuron Model, Asymptotic Dynamics, Bifurcation, Chaos.

An Exact Computing of Szeged Index of Some Molecular Graphs

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Abstract: Szeged index of a molecular graph are most important for scientists. In this paper, counting topological index called "Szeged index"; of some nanotubes and nanotori are determined. Some open questions are also included.

Keywords: Molecular Graph, Szeged Index, Nanotubes and Nanotori.

The Relationship between Some Kinds of Ideal in the Order

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Abstract: This work will discuss one of the structures in Mathematics Algebra, namely Order. Simply put, the order is a ring that meets certain criteria. For R is a ring which is of order, defining the R-ideal is difference with defining ideal (regular) in R as it is known in general. An R-ideal in R is certainly an ideal (regular) in R. However, in general, an ideal (regular) in R is not a R-ideal in R. However, in certain circumstances, the ideal (regular) in R is also an R-ideal. In addition to R-

ideal, in order also known notion that some other ideal. In this paper will be assessed the relationship between several types of ideal in the order.

Keywords: Ideal, Invertible, Order, Reflexive, Quotient Ring.

Numerical Methods for Solving Parabolic Boundary-Value Problems

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Abstract: In this work, we purpose some numerical methods for solving parabolic boundary values problems. First, we give some algorithm for solving our problem. In the end of this paper, we give codes in Matlab.

Keywords: Parabolic Equation, Numerical Method, Boundary Value Problem, Codes in Matlab.

Nonlinear Volterra Type Integral Equations in Noncompact Metric Space

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Abstract: In this work, we consider one of the possibility generalizations of the nonlinear Volterra integral equations in the case when the independent variable belongs to arbitrary noncompact metric space. Sufficient conditions are obtained for the existence of solutions of the Volterra type integral equations in the homogeneous and nonhomogeneous case.

Keywords: Volterra Type Integral Equations (Vties), Metric Space, Banach Space.

MSC Clasification 2010: 45D05, 30L99, 46B26.

Stagnation-Point Flow over a Stretching/Shrinking Sheet in a Nanofluid Cu-Water with Suction or Injection

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Abstract: An analysis is performed to study the heat transfer characteristics of steady two-dimensional stagnation-point flow of a nanofluid Cu-water over a permeable stretching/shrinking sheet. The stretching/shrinking velocity and the ambient fluid velocity are assumed to vary linearly with the distance from the stagnation point. The effects of uniform suction and injection on the flow field and heat transfer characteristics are numerically studied by using an implicit finite difference method. Results for the skin friction coefficient, local Nusselt number, velocity profiles as well as temperature profiles are presented for different values of the governing parameters. It is found that the solutions for a shrinking sheet are non-unique. The results indicate that suction delays the boundary layer separation, while injection accelerates it.

Keywords: Nanofluid, Stagnation-Point, Stretching / Shrinking, Suction / Injection, Heat Transfer, Dual Solutions.

New Method to Calculate Determinants of *n*x*n* Matrix, by Reducing Determinants to 2nd Order

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Abstract: In this paper we will present a new method to calculate of nxn order determinants. This method is based on Dodgson- Chio's condensation method, but the priority of this method compared with Dodgson – Chio's and minors

method as well is that those method decreases the order of determinants for one, and this new method automatically affects in reducing the order of determinants in 2nd order.

Keywords: New Method to Calculate Determinants of nxn Matrix.

Σ - Quasi Centralizers and Inner Derivations in a Closed Ideal of a Complex Banach Algebra

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Abstract: In this paper we show that, for a closed ideal J of a unital complex Banach algebra A and for a σ –quasi centralizer element a of J in A we have (i) under certain conditions if b is an element in the center of J and $\pi : J \to BL(X)$ is an irreducible representation of J on the Banach space X, then $\pi(ba)$ is a scalar operator. (ii) If $\sigma_A(a)$ has empty interior and $D_A{}^J$ is the restriction of the inner derivation of a to J then $(D_A{}^J)^3 = 0$.

Keywords: Σ - Quasi Centralizers - Inner Derivations – Quazi Center.

Higher Order Differences of Some Random Processes

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Abstract: The work relates to difference analysis suggested in some joint papers of first author. Such an analysis is provided us with a new method for studying random or deterministic time series and orbits of discrete dynamical systems. The motivation is that some natural information processing systems deal with the information contained in signal's difference structure. For instance, the visual cortex responds to contrast rather than to uniform luminance. In difference analysis we are interested not in actual dynamics of a given system but in how the dynamics is constructed: a given orbit is separated into two others evolving in a different time identified with the order of differences. These two constituents are studied independently. The difference method reveals some new aspects in dynamical systems such as some asymptotic bi-stability of difference orbits and a difference substitute for Lyapunov exponent. A development of the difference analysis presented in this work consists of two points. We first consider the Markov processes on one-dimensional lattice (random walk) and prove a formula for probability distribution of higher order differences. on the other hand, it is well known that the diffusion equation (FPK, or Fokker-Planck-Kolmogorov equation) can be derived from some simple difference equations describing a one-dimensional random walk. The second point of this presentation discusses a difference transform for FPK equation.

Keywords: Difference Analysis, Random Processes, Fokker-Planck-Kolmogorov Equation.

A-Statistical Approximation of Certain Positive Linear Operators Constructed by Means of Q-Lagrange Polynomials

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Abstract: In this paper we prove some approximation results via A-statistical convergence for the q-analogue of Chan-Chyan-Srivastava polynomials. We also study the rate of A-statistical convergence of approximating positive linear operators by using the notion of modulus of continuity and Lipschitz class.

Keywords: Lagrange Polynomial, Q-Lagrange Polynomial, Chan-Chyan-Srivastava Polynomial, A-Statistical Convergence, Positive Linear Operators, Modulous of Continuity, Lipschitz Class, Rate of A-Statistical.

Positive Solutions for a Nonlinear Boundary Value Problem

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Abstract: Our mean objective in this paper is to investigate the existence of positive solutions for a nonlinear boundary value problem. Our arguments are based on the use of the Banach contraction principle, Leray Shauder nonlinear alternative, properties of the Green function and Guo-Krasnosel'skii fixed point theorem in cone, in the case where the nonlinearity function is either superlinear or sublinear.

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A Coupled System of Nonlinear Differential Equations via Differential Transform Method

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Abstract: A coupled system of nonlinear differential equations appears in mathematically modeled dynamical systems. It is great of importance to solve such systems. In this paper, a coupled Burger's equation is solved. After the Galerkin expansion the Coupled Burger's equation transformed into a system of coupled nonlinear Differential Equations which are solved by using DTM. This method is very efficient and results are very suitable.

Keywords: Coupled Nonlinear System, DTM, Coupled Burger's Equation.

Numerical Simulation of a Time-Delayed Stochastic Dynamical System

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Abstract: In this paper efficient numerical solution of some time-delayed stochastic dynamical models is presented. Under certain conditions existence and uniqueness of the solutions are proved. Using Maple computer algebra system simulations of the numerical solutions for different noise levels are illustrated in the figures.

Keywords: Time-Delayed Stochastic Models, Brownian-Motion, Numerical Simulations, Maple.

On the Strong Convergence of Modified S-Iteration Process for Asymptotically Quasi-Nonexpansive Mappings on Cat (0) Space

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Abstract: In this paper, we give the strong convergence theorems for the modified S-iteration process of asymptotically quasi-nonexpansive mappings on CAT (0) space which extend and improve many results in the literature.

Keywords: CAT (0) Space, Asymptotically Quasi-Nonexpansive Mapping, Strong Convergence, Iterative Process, Fixed Point.

A New Kind of Double Chebyshev Polynomial Approximation on Infinite Interval

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Abstract: In this presentation, we introduce a new kind of Chebyshev polynomial in two variables that can be useful and efficient for the solutions of some problems defined on very large domain or on an infinite interval. We then propose a solution procedure with the fundamental properties of mentioned polynomials as recurrence relation, operational and product matrices. Additionaly, validity and applicability of our study is demonstrated by an example.

Keywords: Double Chebyshev Series, Orthogonal Polynomial Approximation, Unbounded Domain.

On a New Application of Almost Increasing Sequences

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Abstract: Bor [H. Bor, a note on absolute summability factors, Internat. J. Math. & Math. Sci. 17 (1994), 479-482.] has proved a theorem on $\left|\bar{N}, p_n\right|_k$ summability factors of an infinite series. In the present paper, we have generalized this theorem on the $\varphi - \left|A, p_n\right|_k$ summability factors, under weaker conditions by using an almost increasing sequence instead of a positive non-decreasing sequence.

Keywords: Absolute Matrix Summability, Almost Increasing Sequences, Infinite Series.

Similarities Between Mathematical Statistic and Research in Second Language Learning

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Abstract: In this paper we want to investigate the relationship between statistic and research in second language learning. Then we will investigate why do so many language teachers draw back in terror when confront with large doses of numbers, tables, and statistics? Why do other teachers accept at face value or reject without reason studies that contain numerical data?

Keywords: Mathematical Statistic, Second Language Learning, Numerical Data.

The Capitulation Problem for Certain Biquadratic Fields

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Abstract: We study the capitulation problem for certain number fields K of degree 4. Let K_2^1 be the Hilbert 2-class field of K , K_2^2 be the Hilbert 2-class field of K_2^1, $C_{K,2}$ be the 2-component of the ideal class group of K and G_2 the Galois group of K_2^2 / K . We suppose that $C_{K,2}$ is group of type (2.2); then K_2^1 contains three extensions $F_i / K,$ \, $i = 1,2,3.$ the aim of this paper is to study the capitulation of the 2-ideal classes in $F_i,$ \, $i = 1,2,3,$ and to determine the structure of G , for the following cases:

- ✓ Case of biquadratic bicyclic number field of Q.
- ✓ Case of quartic number field of Q.

Keywords: Quadratic Number Fields, Hilbert Class Fields, Class Group Unit's Group.

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Breast Cancer Diagnosing by using Eigen-Values and Moment Variants

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Abstract: In this paper, we have investigated two main methods for comparing breast cancer image with normal image. The first method depended upon considering eigen-values for the two images by using the value of the simple linear correlation while the second method was by considering moments of the two images. Cluster analysis for variables was used to distinguish between images of breast.

Keywords: Image Processing, Eigenvalue, Cluster.

Stationary Solution for the Stochastic Equation of a Viscous Gas in One Spatial Dimension

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Abstract: The study focuses on the discredited stochastic equation of a viscous gas using lagrangian coordinates. Applying Ito's formula to a suitably chosen functional allows us to obtain an a priori estimate which gives us both the existence and uniqueness of the global stochastic solution. Indeed, we first start by proving the existence and uniqueness of the local deterministic solution. Then, by introducing an adequate stopping time, we prove the existence and uniqueness of the local stochastic solution. Finally, the a priori estimate allows us to prove the existence and uniqueness of the stochastic global solution. Now, concerning the existence of an invariant measure, we get the assumptions of the Hasminski's theorem which allows us to obtain the existence of a stationary solution.

Keywords: Stationary Solution, Discretization.

Good Interpolation Points for Rational Interpolation

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Abstract: Good interpolation points are very important, because the conditioning of the interpolation problem highly depends on their location. In this study, the conditioning of polynomial interpolation and of rational interpolation with pre-assigned poles is measured by the respective Lebesgue constants. We investigate the Lebesgue constant $\Lambda_n\left(x_0,\ldots,x_n;\xi_1,\ldots,\xi_m\right)$ for rational interpolation with pre-assigned poles (denoted $\xi_1,\ldots,\xi_m$) at the equidistant interpolation points $x_i, 0 \le i \le n$ and summarize the main results with

respect to the Lebesgue constant for polynomial interpolation. We also present the best Lebesgue constants in existence for rational interpolation with pre-assigned poles. The new results are based on a fairly unknown rational analogue of the Chebyshev orthogonal polynomials.

Keywords: Linear Interpolation, Rational Interpolation, Lebesgue Constant, Condition Number.

Laplace Adomian Decomposition Method for Numerical Study of the Stagnation Point Flow

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Abstract: Based on the presented method of [1–3], the purpose of this study is to apply the Laplace Adomian Decomposition Method (LADM) for obtaining the analytical and numerical solutions of a nonlinear differential equation that describes a laminar steady flow of an incompressible, viscous fluid near a stagnation point [4]. By using this method, the similarity solutions of the problem are obtained for some typical values of the parameters. Then for obtaining the computational solutions we combined the obtained series solutions by the LADM with the Pad´e approximation. The method is easy to apply and give some high accuracy results. Similar problems can be found at [5–7].

Keywords: Laplace Adomian Decomposition Method, Pad´E Approximation, Navier-Stokes Equations, Semi-Infinite Interval, Stagnation Point Flow.

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Generalization of the Secant Method for Nonlinear Equations

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Abstract: The secant method is a very effective numerical procedure used for solving nonlinear equations of the form $f(x)=0$. It is derived via a linear interpolation procedure and employs only values of $f(x)$ at the approximations to the root of $f(x)=0$, hence it computes $f(x)$ only once per iteration. In this note, we generalize it by replacing the relevant linear interpolant by a suitable $(k+1)$ - point polynomial of interpolation, where k is an integer at least 2. Just as the secant method, this generalization too enjoys the property that it computes $f(x)$ only once per iteration. We provide its error in closed form and analyze its order of convergence. We show that this order of convergence is greater than that of the secant method, and it increases as k increases. We also confirm the theory via an illustrative example.This method now requires two initial guesses, but unlike the bisection method, the two initial guesses do not need to bracket the root of the equation. The secant method is an open method and may or may not converge. However, when secant method converges, it will typically converge faster than the bisection method. However, since the derivative is approximated as given by Equation (2), it typically converges slower than the Newton-Raphson method.

Keywords: Secant Method, Converges, Nonlinear Equations, Analyze, Numerical Procedure.

Solutions for Secure Communication with the Network and Optimize the Speed

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Abstract: One of the many resources that can be shared bandwidth in computer networks or the Internet is, in fact, often the public and private organizations in order to facilitate their employees and customers tend to offer many services to OnLine users are on line and bandwidth sharing among users in organizations, this is one of the requirements. Internet or Internet Sharing to share the same practice, there are different solutions of the solutions used in small networks of service ICS (Internet Connection Sharing) is a Microsoft company for small networks that ultimately between 10 There are 20 users seems appropriate, but in larger networks that are more users of the service is poor because of the efficiency and performance suitable not only the risk of information security and network resources to pockets. Although the approaches taken in this paper, front and spy software on your system is not possible but in addition to secure communication when working with passwords and financial information is used, it is used in some email services, which is far too effective.

Keywords: Optimization, Internet, Networking, Communication, Cost Reduction.

Convergence of a Class of Runge-Kutta Methods for Differential-Algebraic

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Abstract: This paper deals with convergence results for a special class of Runge-Kutta (RK) methods as applied to differential-algebraic equations (DAE's) of index 2 in Hessenberg form. The considered methods are stiffly

accurate, with a singular RK matrix whose first row vanishes, but which possesses a nonsingular submatrix. Under certain hypotheses, global superconvergence tbr the differential components are shown, so that a conjecture related to the Lobano IliA schemes is proved. Extensions of the presented results to projected RK methods are discussed. Some numerical examples in line with the theoretical results are included. In this appendix we will analyze the conditions on the coefficients of an explicit Runge-Kutta Method that are necessary and sufficient to guarantee convergence with accuracy of order P. In particular, we will establish the connection between these conditions and the set of rooted trees with no more than P nodes.

Keywords: Initial Value Problems, Runge-Kutta Methods, Differential-Algebraic, Index 2, Convergence, Analyze.

On a Special Type Nearly Quasi-Einstein Manifold

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Abstract: In the present paper, we consider a special type of nearly quasi-Einstein manifold denoted by N (QE) _n. Most of the sections are based on some properties of N (QE) _n. We give some theorems of this manifold in order to be Ricci-symmetric and generalized Ricci-recurrent. In the last section, a special type of nearly quasi-Einstein spacetimes is investigated.

Keywords: Nearly Quasi-Einstein Manifold, Ricci Symmetric, Generalized Ricci-Recurrent Manifold, Spacetime.

A New Development of Tau Method for Numerical Approximation of Heat Equation with Non-Classic Initial Condition

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Abstract: In this paper, we present a new numerical method to solve the one-dimensional heat equation with non-standard initial condition. Our scheme is based on the new matrix formulation technique with arbitrary polynomial bases which are proposed in [1-6]. The method is based on finding a solution in the form of a polynomial in two variables $U_n(x,t)=\sum_{i=0}^{n}\sum_{j=0}^{n}U_{ij}x^i t^j$ with undetermined coefficients u_{ij}. By using the operational matrix of derivative, we reduce the problem to a set of linear algebraic equations. Not only the exact solutions have been achieved, but also the corresponding numerical approximations have been computed.

Keywords: Boundary Value Problem, Heat Equation, Non-Standard Initial Condition, Computational Experiment, Tau Method.

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Uniqueness Theorems for an Impulsive Sturm-Liouville Boundary Value Problem

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Abstract: In this study, an impulsive boundary value problem, generated by Sturm-Liouville differential equation with the eigenvalue parameter contained in one boundary condition is considered. It is shown that the coefficients of the problem are uniquely determined by either the Weyl function or by two given spectra.

Keywords: Inverse Problem, Weyl Function, Spectrum, Sturm-Liouville Problem.

On the Number of Representation of Integers by the Direct Sum of Binary Quadratic Forms with Discriminant -71

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Abstract: In this study, some bases of S4($\Gamma_0(71)$)and S6(($\Gamma_0(71)$ are determined and explicit formulas are obtained for the number of representations of positive integers by all possible direct sums(111 different combinations) of seven quadratic forms from the class group of equivalence classes of quadratic forms with discriminant -71 whose representatives are

$$x_1^2 + x_1x_2 + 18x_2^2,\ 2x_1^2 \pm x_1x_2 + 9x_2^2,\ 3x_1^2 \pm x_1x_2 + 6x_1^2,\ 4x_1^2 \pm 3x_1x_2 + 5x_2^2$$

Keywords: Quadratic Forms, Representation Numbers, Theta Series, Cusp Forms, Spherical Functions, Eisenstein Series.

On Generalized Rough (M, N)-Bi-Hyperideals in Semihypergroups

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Abstract: Recently, in [On quasi-hyperideals in semihypergroups, Commun. Algebra 39 (2011), 4183-4194], Hila et. al. introduced the notion of quasi-hyperideal in semihypergroups, and moreover, the notion of an (m; n)-quasi-hyperideal, n-right hyperideal, and m-left hyperideal in semihypergroups, and relations between them are studied. In this paper we extend these notions, introducing the notion of rough (m; 0)-hyperideals (rough (0; n)-hyperideals), generalized rough (m; 0)-hyperideals (generalized rough (0; n)-hyperideals), rough (m; n)-quasi and bi-hyperideals (generalized rough (m; n)-quasi and bi-hyperideals) and rough m-left hyperideals (generalized rough m-left hyperideals) and establish some of their basic properties in semihypergroups.

Keywords: (M,N)-Quasi(Bi)-Hyperideals, (M,N), Roughi (M,N) Bi-Hyperideals, Generalized Roughi (M,N) Bi-Hyperideals.

Image Encryption using Stream Cipher Based on Nonlinear Combination Generator with Enhanced Security

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Abstract: The images are very largely used in our daily life; the security of their transfer became necessary. In this work a novel image encryption scheme *using* stream cipher algorithm based on nonlinear combination generator is developed. The main contribution of this work is to enhance the security of encrypted image. The proposed scheme is based on the use the several linear feedback shifts

registers whose feedback polynomials are primitive and of degrees are all pairwise coprimes combined by resilient function whose resiliency order, algebraic degree and nonlinearity attain Siegenthaler's and Sarkar, al.'s bounds. This proposed scheme is simple and highly efficient. In order to evaluate performance, the proposed algorithm was measured through a series of tests. These tests included visual test and histogram analysis, key space analysis, correlation coefficient analysis, image entropy, sensitivity analysis, noise analysis, Berlekamp-Massey attack, correlation attack and algebraic attack. Experimental results demonstrate the proposed system is highly key sensitive, highly resistance to the noises and shows a good resistance against brute-force, statistical attacks, Berlekamp-Massey attack, correlation attack, algebraic attack and a robust system which makes it a potential candidate for encryption of image**.**

Keywords: Cryptosystem, Decryption, Image Correlation, Image Encryption, Key Stream, Nonlinear Combination Generator, Resilient Function.

Variational Approach to a Generalized Coupled Lane-Emden System in Two Dimensions

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Abstract: The modelling of several physical phenomena such as pattern formation, population evolution, chemical reactions, and so on gives rise to the systems of Lane-Emden equations and have attracted much attention in recent years. In this talk we consider a nonlinear generalized coupled Lane-Emden system in two dimensions and compute its Noether operators corresponding to a first-order Lagrangian. In addition we present conservation laws of the various cases, which admit Noether point symmetries.

Keywords: Lagrangian, Noether Operators, Conservation Laws, Bidimesional Lane-Emden System, Gauge Function.

Panorama Tools for Predicting Time Series

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Abstract: The prediction can be done firstly by using the knowledge models, that is to say that we know the equations that describe a phenomenon. These models have two drawbacks, the first is that we do not have a knowledge model for all phenomena and the second is that it does not take into account random phenomena. Therefore, we prefer another approach, behavioral modeling. It will describe the phenomenon by observing, measuring it with all the consequences that implies. Our question reduces to this: can we with a series of measures which will provide the following values ?

Keywords: Time Series, Regression, Prediction, Neural Networks.

Nonexistence Results for a Class of Nonlinear Elliptic Equations

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Abstract: In this study, we investigate the question of nonexistence of nontrivial solution of the Robin problem

$$(P)\begin{cases} -\dfrac{\partial^2 u}{\partial x^2} - \displaystyle\sum_{s=1}^{n} \dfrac{\partial}{\partial y_s}(p_s(y)\dfrac{\partial u}{\partial y_s})) + f(y,u) = 0 \, in \; \Omega = R \times D, \\ u + \varepsilon \dfrac{\partial u}{\partial n} = 0 \, on \; \partial\Omega, \end{cases}$$

where

$$p_1 s(y) < 0 \quad \text{or} \quad > 0 \quad (s = 1, \ldots, n)$$

in D are given continuous functions and $f : D \times R \to R$ satisfies

$$(H_1) \left| \begin{array}{l} f(y,y) = 0, y \in D \\ 2F(y,u) - uf(y,u) \leq 0 \end{array} \right.$$

we show that function

$$E(x)=\int_D |u(x,y)|^2\,dy$$

is convex on R. Our proof is based on energy identity. Here

$$D=\prod_{k=1}^{n}(\alpha_k,\beta_k)$$

Keywords: Energy, Convex Function, Identity Integral.

Hamiltonicity in One More Class of Graphs Generalizing Claw-Free Graphs

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Abstract: A graph G is claw free if it dos not contain $K_{1,3}$ as an induced subgraph. A graph G is almost claw-free if for every vertex v of G, $<|N(v)>$ is 2-dominated and the set A of centers of claws of G is an independent set. The class of almost claw-free graphs has been introduced by Ryjacek and contains the class of claw-free graphs. Matthews and Sumner have proved that if G is a 2-connected claw-free graph of order n such that the minimum degree of G is greater or equal to $(n-2)/3$, then G is Hamiltonian. Broersma and al. have generalized that result and have proved that if G is a 2-connected almost claw-free graph of order n such that the minimum degree of G is greater or equal to $(n-2)/3$, then G is Hamiltonian. We generalise these results by considering the graphs satisfying the following property: for every vertex v in A, there exist exactly two vertices x and y of V/A such that $N(v)$ is included in the union of $N[x]$ and $N[y]$. We extend some other results on claw-free graphs to this larger class of graphs.

Keywords: Graph Theory, Hamiltonicity, Claw-Free Graphs, Matching.

Modified Crank-Nicholson Method for One-Dimensional Diffusion Equation with Nonlocal Boundary Conditions

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Abstract: This paper is considred to solve one-dimensional diffusion equation with nonlocal boundary specifications model various physical problems. We used the modified Crank-Nicholson method. The new algorithms are tested on three problems from the literature.

Keywords: One-Dimensional Diffusion Equation, Nonlocal Boundary Conditions, Modified Crank-Nicholson Method.

Invariant Measure for the Stochastic Barotropic Gaz

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Abstract: The study focuses on the discredited stochastic equation of a viscous gas using Lagrangian coordinates. Applying Ito's formula to a suitably chosen functional allows us to obtain an a priori estimate which gives us both the existence and uniqueness of the global stochastic solution. Indeed, we first start by proving the existence and uniqueness of the local deterministic solution. Then, by introducing an adequate stopping time, we prove the existence and uniqueness of the local stochastic solution. Finally, the a priori estimate allows us to prove the existence and uniqueness of the stochastic global solution. Now, concerning the existence of an invariant measure, we get the assumptions of the Hasminski's theorem which allows us to obtain the existence of a stationary solution.

Keywords: Three-Point Boundary Value Problem, Positive Solution, Leray Schauder Nonlin- Ear Alternative, Banach Contraction Principle, Green Function, Guo-Krasnosel’skii Xed Point Theorem.

Identification of Pollution Term in Periodic System

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Abstract: In this paper we want to identify the unknown pollution term in periodic system, for this aim we will used the sentinel theory.

Keywords: Pollution Term, Periodic System, Controllability, Sentinel Theory.

A New Analytic Solution for Biological Population Model using the Reduced Differential Transform Method

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Abstract: In this Letter, the modified version of differential transform method (DTM), which is called the reduced differential transform method (RDTM), is used to contruct expilicit/exact solutions of the nonlinear partial differential equations arising in the spatial diffusion of biological populations. Results obtained by RDTM reveal that RDTM is more effective and has less computational work than other existing methods such as Homotopy perturbation method (HPM), Adomain decomposition method (ADM), and Variational iteration method (VIM). Also, this method is very simple, straightforward and its practices are encouraging for solving other nonlinear PDEs.

Keywords: Reduced Differential Transform Method (RDTM), Biological Population's Model, Analytical Solution.

Cost Optimisation of Construction: Regression Versus Neural Network

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Abstract: Predicting the cost of construction projects is an important task in the management of construction projects. This paper aims at showing the compared results of two different approaches which are regression and artificial neural networks techniques. This study is conducted by using 80 projects, which comes from a research report done in UK. 20% among the data are used for testing purposes. Testing error rates 4.89% in the regression and 2.4 % in the artificial neural network were obtained. Results showed that artificial neural network can produce more accurate results and achieve higher efficiency than regression.
Keywords: Cost Optimisation, Neural Network, Regression.

Study of the Queueing Model of Storage and Transmission Bandwidth Allocation

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Abstract: In this work, we study a queueing model of storage and transmission bandwidth allocation in computer and communication systems, so we are interested to the behavior of a network composed of a queue which contains an infinite number of items of sizes 1; 2; 3 and a bin of capacity C = N (N is finite). An analysis of the stability properties of the bandwidth allocation algorithm First Fit for the distributions concentrated is made on these three sizes. So, in this work we prove that under some hypothesis, the Markov process which defines a queueing system containing an infinite number of items and a bin of a finite capacity describing the First Fit algorithm is ergodic if the “natural”

condition is satisfied, i.e. if the load of the system is less than 1. At first we give the estimation of the wasted space in the network when it works only with two sizes, this result helps us to give the condition of ergodicity for the Markov process in the general case.

Keywords: Ergodicity, Fluid Limits, Multi-Class Queueing Systems, Bandwidth Allocation.

Numerical Model to Forecast Energy Consumption

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Abstract: Forecasting Short-term load in electrical engineering is needed for adequate scheduling and operation management of power systems. It is commonly made by developing models in relations to climate and previous load data. This paper discusses in detail how Fuzzy clustering based on Gustafson-Kessel algorithm is applied to forecast electric load. Results and discussions from real-world case studies based on data from RTE France of electricity consumption for the year of 2011 is presented, showing the appropriateness of the proposed approach in modelling and simulation for forecast of energy consumption in electrical engineering.

Keywords: Fuzzy Logic, Clustering, Modelling, Simulation, Electrical Load Forecasting.

A Characterization of Semi Classical D-Orthogonal Polynomials

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Abstract: In this article we deal with the general theory of d-orthogonal polynomial sequences whose derivative sequences is strictly d-quasi-orthogonal.

Keywords: D-Orthogonal Polynomial, Classical D-Orthogonal Polynomials, Semi Classical D-Orthogonal Polynomials.

On Initial Boundary Value Problem with Integral Condition for a Pseudo-Parabolic Equation

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Abstract: In this paper, we study an initial boundary value problem with integral condition for a pseudo-parabolic equation. The existence and uniqueness of the solution in the functional weighted Sobolev space are proved. The proof is based on two-sided a priori estimates and on the density of the range of the operator generated by the problem considered.

Keywords: Pseudo-Parabolic Equation, Nonlocal Boundary Conditions, a Priori Estimate.

Stable and Bounded Solutions to Modified Liénard Equations

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Abstract: In this work, we make a comparison between some new recent results obtained on the stability and boundedness of solutions of modified Liénard Equations. We also give examples to show the differences between the results established.

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Mathematical Analysis of the Non Linear Epidemic Model

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Abstract: This paper addresses a time-delayed epidemiologic model by experiencing the disease; whenever infected, the disease individuals will return to the susceptible class after a fixed period of time. First, the local and global stabilities of the infection-free equilibrium are analyzed, respectively. Second, the endemic equilibrium is formulated in terms of the incidence rate, and locally asymptotic stability and globally stability. Finally, we applied the Adomian

decomposition method to the system epidemiologic. This method yields an analytical solution in terms of convergent infinite power series.

Keywords: Adomian Decomposition Method, Basic Reproduction Number, Epidemiology, Global Stability, Locally Asymptotical Stability.

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On the Exact Solutions and Conservation Laws of a (2+1)-Dimensional Nonlinear KP-BBM

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Abstract: This talk is devoted to studying the Kadomtsov–Petviashvili-Benjamin–Bona–Mahony (KP-BBM equation. This equation is the modified form of the BBM equation formulated in the KP sense. The Lie symmetry analysis method is used to conduct the analysis of the KP-BBM equation. Exact solutions are obtained which include among others the solitary wave solutions. In addition to this we construct conservation laws for the KP-BBM equation.

Keywords: Two-Dimensional Nonlinear KP-BBM Equation, Lie Symmetries, Simplest Equation Method, Conservation Laws.

A Posteriori Error Estimates for Overlapping and Non Overlapping Domain Decomposition Methods in the Continuous and Discrete Cases

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Abstract: A posteriori error estimates for domain decomposition methods with or without overlap, for second order boundary value problems, are presented. We show that we can pass from one category of decomposition to another (i.e. From non overlapping decomposition to overlapping one). An attempt to find the best parameters in the Robin condition is made. The error estimate in the continuous case is shown to depend on the differences of the traces of the subdomain solutions on the interfaces. After discretisation of the domain by finite elements we adapt the techniques of the residual a posteriori error analysis to get an a posteriori error estimate for the discrete solutions on subdomains.

Keywords: Domain Decomposition, Robin Transition Conditions, a Posteriori Error Estimate, Finite Element Discretisation, Boundary Value Problems.

Algorithms of Representation Generic Group $G_n^{a,b}$

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Abstract: In this work we study the algorithms properties for the group $E_n^{a,b}$. We establish that $G_n^{a,b}$ is a generic group. The implementations from the algorithms are by Maple.

Keywords: Elliptic Curves, Cryptography, Generic Group, Finite Field, Discrete Logarithm.

A New Chaotic System

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Abstract: The aim of this paper is to study of chaotic dynamic system.Therefore the Chen system by replacing the quadratic non-linear in this model; it obtained a differential system keeping their chaotic nature. The stability and chaos out the model presented are theoretically and numerically thanks to implement of the stability of dynamic systems and born of chaos theory.

Keywords: Dynamic Systems, Strange Attractors, Bifurcation-Roads towards Chaos.

Numerical Methods for Solving Elliptic Boundary-Value Problems

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Abstract: Elliptic Partial Differential Equations of second order have been studied using some numerical methods. This type of differential equations has specific applications in physical and engineering models. In most applications, first- order and second-order formulas are used for the derivatives. In this work higher order formulas such as: seven-point and nine-point formulas are used. Using these formulas will transform the partial differential equation into finite difference equations. To solve the resulting finite difference equations the following iterative methods have been used: Jacobi method, Gauss-Seidel method, Successive Over- Relaxation method (SOR) and Two-Grid method. Complete, working Matlab codes for each step are presented. The Matlab codes are straightforward and allow the reader to see the differences in implementation between different cases.

Keywords: Finite Difference Method, Two-Grid Method, Elliptic Equation, Codes and Programs in Matlab.

Classification MSC: 65L12; 65M06.

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Existence Result for a First Order Maximal Monotone Differential Inclusion with a Pseudo-Lipschitz Perturbation

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Abstract: In this work we are interested, in the finite dimensional setting, with the existence of solutions for a first order differential inclusion governed by a maximal monotone operator and a perturbation F satisfying a pseudo-Lipschitz condition. Our problem is of the form

$$\begin{cases} -\dot{u}(t) \in A(t)u(t) + F(t,u(t)), a.e. t \in [0,T]; \\ u(0) = u_0 \in D(A(0)), \end{cases}$$

where E is a finite dimensional space, $A(t): E \Rightarrow E (t \in [0,T])$ is a maximal monotone operator and $F:[0,T]\times E \Rightarrow E$ is a closed valued set-

valued mapping satisfying the pseudo-Lipschitz condition on the second variable, that is,

$$v \in F(t,x) \Rightarrow v \in f(t,x') + (k(t) + \beta \|v\|)\|x - x'\| \overline{B}_E .$$

Keywords: Differential Inclusion, Maximal Monotone Operator, Pseudo-Lipschitz Perturbation.

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On the Lower Bounds for the Minimum Eigenvalue of the Hadamard Product of an M-Matrix and Inverse M-Matrix

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Abstract: In this study, for the minimum eigenvalue $\tau(A \circ A^{-1})$ of the Hadamard product $A \circ A^{-1}$ of an *M*-matrix A and its inverse A^{-1} are considered. Some new lower bounds on $\tau(A \circ A^{-1})$ for the Hadamard product of A and A^{-1} are derived. These bounds improve the results found in [H.B. Li, T.Z. Huang, S.Q. Shen, and H. Li. Lower bounds for the minimum eigenvalue of Hadamard product of an M-matrix and its inverse. Linear Algebra Appl., 420:235-247, 2007] and [Y.T. Li, F.B. Chen, and D.F. Wang. New lower bounds on eigenvalue of the Hadamard product of an M-matrix and its inverse. Linear Algebra Appl., 430:1423-1431, 2009] and [Y.T. Li, X. Liu, X. Y. Yang, C. Q.

Li. Some new lower bounds for the minimum eigenvalue of the Hadamard product of an M-matrix and its inverse. Electronic Journal of Linear Algebra, 22:630-643, 2011].

Keywords: Hadamard Product, *M*-Matrix, Minimum Eigenvalue, Lower Bounds.

The Regularity Results for Nonlinear Boundary Value Problems

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Abstract: In this paper we consider the nonlinear boundary value problem governed by a stationary perturbed Stokes system with mixed boundary conditions (Dirichlet- maximal monotone graph), in a smooth domain. We first establish an existence result and some estimates for weak solutions of its approached problem. A specific regularity of the velocity and the pressure are obtained.

Keywords: Stokes System, Regularity, Variational Formulation, Monotone Maximal Graph.

Regularization and Stability Estimates of Backward Cauchy Problems

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Abstract: In this work, we consider a class of Cauchy problems backward in time associated with a positive self-adjoint unbounded operator on a Hilbert space H. These problems are known to be ill-posed. We approximate this class of

ill-posed problems by well-posed class of problems, using a new modified quasi boundary value regularization method. Some stability estimates for the solutions to the regularized problems are established, and we also show that these solutions are approximate solutions to the corresponding exact solution of the original ill-posed problem.

Keywords: ILL-Posed Problem (IPP), Backward Cauchy Problem (BCH), Quasi-Reversibility Value Method Value Method (QRVM), Quasi-Boundary Value Method (QBVM).

Upwind Method for Pricing Options with Transaction Costs

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Abstract: This paper develops a numerical method for nonlinear partial differential equation arising from European option valuation with transaction costs. The method is based on an upwind finite difference scheme for the spatial discretization and a fully implicit time stepping scheme. We show that the scheme is monotone and stable and propose a Newton iterative algorithm for solving the discretized nonlinear system. Numerical experiments are implemented to show the efficiency and robustness of the method.

Keywords: Nonlinear PDE, Upwind Method, Newton Iterative Method, Option Pricing.

A Fractional Calculus Application in Dynamics of Beams

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Abstract: This paper deals with viscoelastic beam obeying a fractional differentiation constitutive law. The governing equation is derived from the viscoelastic material model. The equation of motion is solved by using the method of the multiple scales. Principal parametric resonances are investigated in detail. The stability boundaries are determined analytically from the solvability condition. It is seen that the order and the coefficient of the fractional derivative have significant effect on the stability boundaries, the natural frequency and the amplitude of vibrations.

Keywords: Perturbation Method, Fractional Derivative, Method of the Multiple Scales.

On Completely Random Design of Breast Cancer in Al-Sader Medical City

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Abstract: In this study, we evaluate breast cancer in Al-Sader medical city in Iraq for the period 2005-2009. The data is analyzed using completely random design, Duncan's multiple range tests and factorial Experiment to explain the significant difference between all variables age, Tumor, occupation, marital status and education. . SSPS program V. 17.0 was used throughout this study to analyze the data and to generate various Tables.

Keywords: Completely Random Design, Duncan's Multiple Range Test and Factorial Experiment.

The Variational Iteration Method for Solving Fuzzy Fractional Differential Equations

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Abstract: In this paper, the variational iteration method has been applied in solving fuzzy linear and nonlinear fractional differential equations with fuzzy initial conditions. This method is illustrated by solving several examples.

Keywords: Variational Iteration Method, Fuzzy Set, Fuzzy Number, Fuzzy Fractional Differential Equation.

A Fuzzy Approach to Closed Loop Supply Chain using Mixed-Integer Linear Programming

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Abstract: Developments in information technology forced firms to construct their purchasing and logistics functions strategically on materials and distribution management as supply chain management. In recent years, increased concern for the environment has lead to new searching to design products and supply chains that are simultaneously economically and ecologically feasible. Multi-echelon closed-loop supply chain system is modelled mathematically as a multi-objective linear programming optimization problem. A numerical example illustrates the applicability of such a multi-objective approach and fuzzy solution procedure.

Keywords: Fuzzy Decision Making, Closed Loop Supply Chain, Multi Objective Mathematical Programming.

A Note on Positive Solutions of Boundary Value Problems on Time-Scale on Infinite Intervals

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Abstract: In this study, we consider the following scond-order m-point boundary value problem on time scales

$$\begin{cases} \left[\varphi_p\left(u^{\Delta}(t)\right)\right]^{\nabla} + h(t)f\left(t, u(t), u^{\Delta}(t)\right) = 0\,, t \in (0, +\infty)_{\mathbb{T}} \\ u(0) = \sum_{i=1}^{m-2} \alpha_i\, u^{\Delta}(\eta_i)\,, u^{\Delta}(+\infty) = \sum_{i=1}^{m-2} \beta_i\, u(\eta_i)\,. \end{cases}$$

We establish new criteria for thr existence of at least three unbounded positive solutions.

Keywords: Time Scale, Boundary Value Problems, Fixed Point Theorem.

Laguerre Series Solutions of a Clas of Delay Differential Equations with the Residual Error Estimation

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Abstract: In this study, a practical matrix method based on Laguerre polynomials is presented to solve the high-order linear delay differential equations [1] with constant coefficients

$$\sum_{k=0}^{m} p_k y^{(k)}(t) = \sum_{i=0}^{I}\sum_{j=0}^{m} q_{ij} y^{(j)}(\lambda_{ij} t + \mu_{ij}) + g(t),\ 0 \le t \le b \qquad (1)$$

under the mixed conditions

$$\sum_{k=0}^{m-1} a_{pk} y^{(k)}(0) + b_{pk} y^{(k)}(b) = \beta_p,\ \ p = 0,1,\ldots,m-1\,,$$

where $y(t)$ is an unknown function, p_k, q_{ij}, λ_{ij}, μ_{ij}, a_{pk}, b_{pk} and β_p are appropriate constants and the function $g(t)$ can be expanded to Maclaurin

series. the aim of this study is to get the approximate solution of Eq. (1) with the conditions (2) as the truncated orthogonal Laguerre series [2, 3]

$$y(t) \cong y_N(t) = \sum_{n=0}^{N} a_n L_n(t)\,,\ \ 0 \le a \le t \le b < \infty$$

where $L_n(t)$, $(n = 0,1,2,...)$ denote the Laguerre polynomials, a_n, $(n = 0,1,2,...,N)$ are unknown Laguerre coefficients, and N is chosen any positive integers such that $N \ge m$. In addition, an error analysis technique based on residual function is developed and applied to some problems to demonstrate the validity and applicability of the method.

Keywords: Laguerre Polynomials Ans Series, Delay Differential Equations, Matrix Method, Residual Error Technique.

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Some Ambarzumyan Type Theorems for Bessel Operator on a Finite Interval

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Abstract: In this study, we deal with an inverse problem for Bessel operator on a general interval. We present some results of the associated with Ambarzumyan theorem by using spectrum and nodal points (zeros of eigenfunction).

Keywords: Spectrum, Ambarzumyan Theorem, Bessel Operator, Nodal Points.

Differential Calculus of the Quantum Superspace R_Q(1/2)

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Abstract: We construct a bicovariant differential calculus on $R\_q(1/2)$ with the help of the covariance point of view using the Hopf algebra structure of $R\_q(1/2)$. In particular, based on this differential calculus, we investigate Cartan-Maurer forms for this q-superspace. Finally, we obtain the quantum Lie superalgebra corresponding the Cartan-Maurer forms.

Keywords: q-Superspace, Hopf Algebra, Noncommutative Differential Calculus, Lie Superalgebra.

Modelling and Analysis of Depletion in a Medical Waste Sterilizer with Ultraviolet Lights

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Abstract: Depletion of medical waste in a sterilizer that consists of concentric cylinders, with a downward helical path in that rotates towards the exit is studied with a convection-reaction model where sterilization is performed by germicidal lamps along the inner and outer walls of the cylinders. A numerical procedure is proposed that operates on the matrix of constant speed waste trajectories and the efficiency of the device is investigated using as the control parameters the radii of the cylinders, and the number and location of UV lights. Suggestions are made for an efficient design.

Keywords: Convection-Reaction, Medical Sterilizer, Ultraviolet Light, Optimal Design.

A Doubly-Connected Planar Domain with Algebraic Domain Functions and Computing Its Bergman Kernel Explicitly

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Abstract: In this work, we find an explicit biholomorphism between Ω_r and an annulus, where $\Omega_r = \left\{ z \in C : \left| z + \frac{1}{z} \right| < r \right\}$ will be referred to as the Bell representative domain. The computation helps find the relationship between the two parameters r and ρ. We explicitly compute the Bergman Kernel of the Bell representative domain, which apriori is known to be an algebraic function.

Keywords: Algebraic Kernel Functions, Bergman Kernel, Szego Kernel, Doubly Connected Domain, Ahlfors Map.

The Convergence Theorems of a New Iteration Process for a Finite Family of Total Nonself Asymptotically Nonexpansive Mappings with Errors in Banach Spaces

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Abstract: In this paper, we define and study the convergence theorems of finite steps iterative sequences with errors for total nonself asymptotically nonexpansive mappings in Banach spaces. The results of this paper can be viewed as an improvement and extension the corresponding results of [N. Shahzad, Approximanting fixed points of non-self nonexpansive mappings in Banach spaces, Nonlinear Anal., 61 (2005) 1031-1039; G. Hu, L. Yang, Strong convergence of the modified three step iterative process in Banach spaces, Dyn. Contin. Discrete Impuls. Syst. Ser. A Math. Anal., 15 (2008) 555-571; L. Yang, Modified multistep iterative process for some common fixed point of a finite

family of nonself asymptotically nonexpansive mappings, Math. Comput. Modelling, 45 (2007), 1157-1169; H. Kızıltunc, S. Temir, Convergence theorems by a new iteration process for a finite family of nonself asymptotically nonexpansive mappings with errors in Banach spaces, Comput.Math. Appl., 61 (2011) 2480-2489.

Keywords: Asymptotically Nonexpansive Nonself-Mapping, Total Asymptotically Nonexpansive Nonself-Mapping, Common Fixed Point, Uniformly Convex Banach Space.

Convergence of S-Iteration Process for Two Asymptotically Quasi-Nonexpansive Mappings in Convex Metric Space

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Abstract: The purpose of this paper is to study the S-iteration process to approximate a common fixed point of two infinite families of asymptotically quasi-nonexpansive mappings in convex metric spaces. Under suitable conditions, some convergence theorems are proved.

Keywords: Asymptotically Quasi-Nonexpansive Mapping, Strong Convergence, Common Fixed Point, Convex Metric Space.

Certain Results for a Subclass of Meromorphic Multivalent Functions with Positive or Negative Coefficients

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Abstract: In this paper, I introduce a new subclass of meromorphic multivalent functions. Coefficient inequalities, growth and distortion inequalities, radii of convexity and starlikeness and convex and linear combinations for the functions with positive or negative coefficient belonging to this class are obtained.

Keywords: Meromorphic Function, Coefficient Inequalities, Starlike Function, Linear Combinations.

Bounded Input Bounded Output Stability of Nonlinear Differential Equations with Time Delays

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Abstract: This paper investigates the bounded input bounded output (BIBO) stability in a class of control system of nonlinear differential equations with time-delay. The proofs are based on our studies on the boundedness of the solutions of a general class of nonlinear Volterra integral equations.

Keywords: Boundedness, Volterra Integral Equations, Bounded Input Bounded Output (BIBO) Stability, Differential Equations with Delays.

On Certain Generating Sets of the Special Linear Group of Degree 2 over a Finite Dimensional Algebra over a Finite Field

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Abstract: In this work, we show that the special linear group of degree 2 over a polynomial extension of a prime field *k of* characteristic *p* such that a generator of this extension satisfies a polynomial which is a product of distinct polynomials irreducible over *k can* be generated by two elements of order *p* provided that *p* is greater than 3.

Keywords: Special Linear Group, Finite Field, Polynomial Extension.

The Fine Spectra of a New Operator W On Sequence Space c_0

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Abstract: Many authors have studied the spectrum and fine spectrum of linear operators defined by some particular limitation matrices over some sequence spaces. Weighted mean matrices of operators on ℓ_p have been investigated by Cartlidge [1]. The fine spectrum of the difference operator Δ over the sequence spaces c_0 and c has been studied by Altay and Başar [2]. The purpose of this paper is to determine the spectrum and the fine spectrum of the W matrix over sequence space c_0. The matrix W, which is formed by Murseleen et al., is defined by $W = (w_{nk})$ [3]. In this study we obtained the spectra and the fine spectra for W matrix, which is multiplication of difference matrix and factorable matrix.

Keywords: Spectrum, Fine Spectrum, Factorable Matrix, Difference Operator, Sequence Spaces.

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First Integral Method for Constructing Exact Solutions of Physically Important Nonlinear Partial Differential Equations

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Abstract: In this paper, some exact solutions for Sharma - Tasso - Olver equation and the (3+1)-dimensional Jimbo-Miwa equation are formally derived by using the first integral method, which based on the theory of commutative algebra. These equations play a very important role in mathematical physics and engineering sciences. It is shown that the first integral method, with a computerized symbolic computation, provides a powerful mathematical tool for solving nonlinear evolution equations in mathematical physics.

Keywords: First Integral Method, Sharma - Tasso – Olver Equation, (3+1)-Dimensional Jimbo-Miwa Equation.

Dual Solutions in MHD Flow on a Nonlinear Porous Shrinking Sheet in a Viscous Fluid

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Abstract: In this paper, the problem of magnetohydrodynamic (MHD) flow of a viscous fluid on a nonlinear porous shrinking sheet is studied. The governing system of partial differential equations is first transformed into ordinary differential equations and then is solved numerically by the shooting method. The features of the flow for various governing parameters are presented and discussed in detail. It is found that dual solutions only exist for positive values of controlling parameter.

Keywords: Dual Solutions, Magnetohydrodynamic, Shrinking Sheet, Viscous Fluid.

P-Norm Stability for Steady Solutions of the Barotropic Vorticity Equation in R^2

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Abstract: In this work, we investigate the p-norm stability for vortices of geophysical flows over a surface of variable height that is strict maximizers of the kinetic energy relative to all isovortical flows. Our notion of stability is that of nonlinear stability in the p-norm on the space of vorticities. To illustrate the main result, a numerical example is presented.

Keywords: Nonlinear Stability, Vortices, Rearrangements of a Function, Transport Equation, Barotropic Vorticity Equation, Energy Conserving Solutions.

Newton Optimization Method in the Numerical Solution of the Average

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Abstract: Newton method or touching method is included such as famous methods and more us age. This method has found due to spreadable of mod of use and convergence; is very fast popularity found. By progress of computers: need to solution of mathematic problems: more and more: is felt by number method. Mean time; utility of method of find loot appeared such as a method is presented by Newton. In this paper: first we engaged description of classical Newton method and then the methods of a mean Newton such as the method of Newton geometric mean and Newton harmonics mean are studiedly for improving the use of classical Newton method and present and their rank convergences.

Keywords: Numerical Solution.

A Method for Solution Singular Linear Equations System

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Abstract: In this text, solution of linear equations system will be investigate, I want to show solution singular liner equations system and non-negative definite liner equations system are equivalent some numerical example are given to show the minimal solution obtained for non-negative definite linear equations system satisfy also equivalent linear equations with it.

Keywords: Singular Equations System, Non-Negative Definite Equations System, Equivalent Systems.

Extended Jacobi and Gauss-Seidel Methods for Linear Equations

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Abstract: In numerical linear algebra, the Jacobi and Gauss-Seidel methods are algorithms for determining the solutions of a system of linear equations; they are now mostly used as preconditioners for the popular iterative solvers. In this text an extensions of these methods are proposed and their convergence properties are studied. Some numerical experiments are given to show the efficiency of the new methods.

Keywords: Jacobi, Gauss-Seidel, Extend, Convergence.

Continuous Dependence of Solutions to Mixed Parabolic Problems with Integral Boundary Conditions

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Abstract: In this paper, we study two mixed problems for a parabolic equation associated to two local and nonlocal boundary conditions. The continuous dependence of solutions of mixed problems on the form of boundary conditions is proved; the proof is based on a priori estimate for the difference of solutions of two considered problems.

Keywords: A Priori Estimates, Continuous Dependence, Mixed Problem, Partial Differential Equations.

AMS Mathematics Subject Classification (2010): 35K20, 35K25, 35K30.

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A Note on Some Sequence Spaces of Weighted Means

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Abstract: We show that the sequence spaces a_0^r, a_c^r and a_∞^r are equal to the sets of all sequences whose Cesà ro means of order 1 converge to 0, converge and are bounded. As a consequence of this, we are able to considerably simplify the known results and their proofs in [On the new sequence spaces which include the spaces c_0 and c, Hokkaido Mathematical Journal, 2004], [Some new difference sequence spaces, Applied Mathematics and Computation, 2004], and to add characterizations of some more classes of matrix transformations.

Keywords: Generalised Weighted Means, Dual Spaces, and Matrix Transformations.

Some Results on Generalized Local Cohomology with Respect to an Ideal Containing the Irrelevant Ideal

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Abstract: Let $R_+ = \oplus_{n\geq 0} R_n$ be a graded ring. M, N two finitely generated graded R-modules and let $R = \oplus_{n>0} R_n$. Let $I = I_0 + R_+$ where I_0 is an ideal of R_0. It is well known that, i-th generalized local cohomology module $H_I^i(M,N)$ of N and M with respect to I has a natural grading. For $n \in Z$, we use the notation $H_I^i(M,N)_n$ to denote the n-th graded component of $H_I^i(M,N)$. In this paper we some of the known results about ordinary local cohomology modules $H_{R_+}^i(N)$ to generalized local cohomology module $H_I^i(M,N)$. Indeed, among other things, we obtain some results on the asymptotic behavior of the n-

th graded components $H_I^i(M,N)_n$ of $H_I^i(M,N)$ for $n \to -\infty$, in the following cases:

(i) $i \le g_I(M,N)$, where $g_I(M,N)$ denotes the cohomological finite length dimension of M and N with respect to I.

(ii) $i \le f_I(M,N)$, where $f_I(M,N)$ denotes the finiteness dimension of M and N with respect to I.

(iii) $i \ge cd_I(M,N)$ where $cd_I(M,N)$ denotes the cohomological dimension of M and N with respect to I.

Also, we prove that certain sub modules and factor modules of $H_I^i(M,N)$ are Artinian for some i.

Keywords: Generalized Local Cohomology, Finiteness.

On the Finiteness Properties of Generalized Local Cohomology with Respect to an Ideal Containing the Irrelevant Ideal

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Abstract: The membership of the generalized local cohomology modules $H_I^i(M,N)$ of two R-modules N and M with respect to an ideal I in certain Serre subcategories of the category of modules is studied from below (i<t). Furthermore, the relations between finiteness of local cohomology and generalized local cohomology modules in several cases are investigated.

Keywords: Generalized Local Cohomology, Finiteness, Serre Subcategories.

Filter Regular Sequence and Generalized Local Cohomology with Respect to a Pair of Ideals

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Abstract: Let (R. m) be a Noetherian local ring. The two notions of filter regular sequence and generalized local cohomology module with respect to a pair of ideals are introduced, and their properties are studied. Some vanishing and non-vanishing theorems are given for this generalized version of generalized local cohomology module.

Keywords: Generalized Local Cohomology, Filter Regular Sequence.

New Fractional Inequalities of Ostrowski Type

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Abstract: In this work we establish a new weighted Montgomery identity for Riemann-Liouville fractional integrals. Then using this new fractional Montgomery identity, we obtain some fractional inequalities Ostrowski type.

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Bursts in Homogeneous Metric Block Codes

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Abstract: In coding theory, there are a lot of works dealing with correcting random errors. However, there is certain communication channels, which are affected by errors corrupted to some consecutive positions rather than at random. Fire, therefore introduced the definition of bursts in 1959. In this work, we give some bounds for block codes correcting burst errors and 2-repeated burst errors in homogeneous metric over the finite ring $\mathbb{Z}_{q^l}$ (q Prime) of q^l elements.

Keywords: Burst, Repeated Burst, Homogeneous Metric.

On Determinantal Representation of the Generalized Fibonacci Numbers, Their Sums and Hessenberg Matrices

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Abstract: At this paper, we derive some relationships between permanents of one type of Hessenberg matrices and the generalized Fibonacci sequence. In this content, we define one type of Hessenberg matrix family whose lower-diagonal elements are shifting and permanents are generalized Fibonacci numbers. to verify the results, we give Maple 13 source code.

Keywords: Generalized Fibonacci Number, Hessenberg Matrix.

On Some Geometric Properties of a New Paranormed Sequence Space

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Abstract: In this work, we introduce a new sequence space which is defined by the operator $W=\left(w_{nk}\right)$ [1] on the sequence space $\ell\left(p\right)$. We define a modular functional on this space and investigate structure of this sequence space equipped with Luxemburg norm. Also we study some geometric properties which are called Kadec-Klee, k-NUC and Uniform Opial properties and prove that this new space possesses these properties.

Keywords: Luxemburg Norm, Kadec-Klee, K-NUC, Uniform Opial.

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Mathematical Modeling of Epidemic with Contact Tracing

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Abstract: To investigate the effect of contact tracing on spread of HIV/AIDS in a population, a mathematical model is proposed and analyzed. The population is divided into four subclasses of HIV negative (susceptible), HIV positives that do not know they are infected, HIV positive that know they are infected and that of AIDS patients. This model is analyzed using the theory of differential and difference equations. The theoretical analysis and numerical simulations of the model show the spread of HIV/AIDS in different countries.

Keywords: Logistic Differential Equations, Difference Equations, Local Stability, Global Stability.

Smallest Salem Element in the Field of Laurent Series in Characteristic q

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Abstract: The study of Pisot and Salem numbers unexpectedly or exceptionally appeared in number of quite different branches of mathematics. Much is known about Pisot numbers. In comparison, little is known about Salem numbers. There are still many open questions about Salem numbers including determining the infemum of the set. In this work we have proved that there is no smallest Salem series in the field of Laurent series in characteristic q. We have also given the smallest Salem series of algebraic degree n.

Keywords: Finite Fields, Formal Power Series, Salem Series.

Existence of Positive Solutions for M-Point Boundary Value Problem with Sign Changing Nonlinearity on Time Scales

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Abstract: In this paper, we make use of the four functionals fixed point theorem to verify the existence of at least one symmetric positive solution of a third order m-point boundary value problem on time scales such that the considered equation admits a nonlinear term f whose sign is allowed to change. The discussed problem involves both an increasing homeomorphism and homomorphism, which generalizes the p-Laplacian operator.

Keywords: Symmetric Positive Solution, Fixed-Point Theorem, Time Scales, M-Point Boundary Value Problem, Increasing Homeomorphism and Homomorphism.

Evaluate Double Fuzzy Integrals using Simpson's Rule

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Abstract: In this paper, the double fuzzy Riemann integrals and their numerical integration are proposed. At first, we introduce a double fuzzy Riemann integral whose integrand is a fuzzy-valued function and limits of integration are crisp real numbers. Then, we introduce a double fuzzy integral whose integrand is a fuzzy function and also the limits of integration are fuzzy numbers. For this purpose, we prove the theorems to show the α-level set of the double fuzzy integrals which are closed intervals where end points are double crisp integrals. We apply the double Simpson's rule in order to approximate these double integrals. Also, we present an algorithm to approximate the value of the membership function of the double fuzzy integral in a given point like r in 0-level. Finally, two numerical examples are solved to illustrate the efficiency of the proposed method.

Keywords: Double Fuzzy Integrals, Fuzzy Functions, Fuzzy Numbers, Double Simpson's Rule, Alpha-Level Sets.

Preprocessing Techniques in SCVRP Model: Case of Rubbish Transportation Problem in Kecamatan Ilir Barat II Palembang South Sumatera Indonesia

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Abstract: Rubbish transportation activities in Palembang can be considered as one of the application of Vehicle Routing Problem (VRP). We call it Symmetric Capacitated Vehicle Routing Problem (SCVRP) since we allow two way direction routes. We focus on rubbish transportation of Kecamatan Ilir Barat II Palembang, one of the biggest districts in Palembang to be simplified using preprocessing techniques to achieve simpler SVCRP model. This technique can simplify the model through some stages such as strengthening the bounds of constraint, eliminating redundant variables or fixing the variables (Savelsbergh, 1994). The results show that preprocessing techniques can create simpler SCVRP formulation and easily solve the problem with aid of optimization tool.

Keywords: Preprocessing Techniques, Symmetric Capacitated Vehicle Routing Problem (SCVRP), Optimal Routes.

On Rational Triangles and Elliptic Curves

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Abstract: An elliptic curve E defined over Q is an algebraic variety which forms a finitely generated abelian group, and the structure theorem then implies that $E(Q)=Z^r \oplus E(Q)_{tors}$ for some $r \geq 0$; this value r is called the rank of E. The aim of this presentation is to introduce a new family of elliptic curves with torsion group $Z/2Z \times Z/2Z$ and rank at least 3. In other words, for infinitely many values of k, the rank of E (Q (k)) is at least 3.

Keywords: Elliptic Curves, Ranks, Torsion Group, Heron's Triangle.

Nonlinear Model for HIV/SIDA Epidemic

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Abstract: In this paper we study a nonlinear model for HIV/SIDA eidemic. First, we write the mathematical model of phenomena. Secondly, we disccus somes results concerning this model. Somes applications are given at the end this work.

Keywords: Nonlinar Model, Hiv/Sida, Differential Equation, Epidemic.

On (A, B)-Derivations in Bci-Algebras

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Abstract: The notion of (regular) (α,β)-derivations of a BCI-algebra X is introduced, some useful examples are discussed, and related properties are investigated. Condition for a (α,β)-derivation to be regular is provided. The concepts of a $d_{(\alpha,\beta)}$-invariant (α,β)-derivation and α-ideal are introduced, and their relations are discussed. Finally, some results on regular (α,β)-derivations are obtained.

Keywords: BCI-Algebras, (α,β)-Derivation, Regular (α,β)-Derivation.

Foliated CR-Submanifolds

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Abstract: The concept of Cauchy Riemann (CR)-submanifold, first introduced by Bejancu [Proc. Am. Math. Soc. 69 (1978)] in complex geometry, as a generalization of totally real and holomorphic submanifolds of Kähler manifolds, was further extended to other ambient spaces, such as: Sasakian, cosymplectic, locally conformal Kähler, (para-) quaternionic. Such a submanifold comes naturally equipped with some canonical foliations, which have been investigated by many authors. I will shortly review what is currently known about these foliations and will present some new results using the theory of ruled submanifolds. Moreover, some characterizations are provided for these foliation to become Riemannian, i.e. With bundle-like metric.

Keywords: Cauchy Riemann Submanifold, Foliation, Bundle-Like Metric.

Some Characters of Quotients Operators on Hilbert Space

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Abstract: The quotients operators are introduced in order to extend the notion of closed operators. In this paper, we present this class of operators and study their basic properties: Boundedness, quotient by generalized inverse, inevitability, semi-closure, sum, product, and power of quotients, limit of sequence of quotients operators, extension, adjoint, symmetry, self-adjoint, and closure. Further characters of quotients operators such as: The nilpotent and idempotent characters, compactness, normality, hyponormality, paranormality will also be studied. At the end of this work, some open questions linked to the subject will be exposed.

Keywords: Quotient Operator, Closed Range, Generalized Inverse, Normal, Compact Operator.

AMS Classification: 47 Axx

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Graphs with Irregularity Less Than 4

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Abstract: Albertson has defined the irregularity of a graph G as the summation of $|d(u)-d(v)|$ over all edges $e=uv$, where $d(u)$ is the degree of vertex u. Recently, this graph invariant gained interest in chemical graph theory. Albertson has obtained a tight upper bound on the irregularity $4n^3/27$. In this work, I will obtain all graphs with irregularity less than 4.

Keywords: Irregularity, Graph Invariant, Graph.

A New Projection Algorithm to Solve Variational Inequalities Problem

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Abstract: Among the most methods used to solve the variational inequalities problem (VIP), there exists an important class known as of projection methods, these last are based primarily on the fixed point reformulation. The first proposed methods of projection suffered from several difficulties such as the restrictive theoretical assumptions (strong monotony, the condition of Lipschitz,. . .), the expensive calculation which appears in projections because these last coincide with a optimization problem which must be solved by adequate procedures. Moreover, the great number of projections necessary to evaluate in order to determine a step which must satisfy the some linear research procedure. Several studies are completed; in particular those of A.N. Iusem, Solodov and Svaiter, Wang et al. With an aim of resolving these difficulties and many developments were brought to improve the algorithmic behavior of this type of methods. In the

same form of the algorithms of projection presented by the authors quoted above and under the same convergence hypotheses, we have introduced a new algorithm with a simple linear research procedure and less expensive in the same way we have proposed to take a fixed displacement step satisfying a condition which ensures a faster convergence towards a solution. The algorithm is well defined and the theoretical results of convergence are suitably established. In order to give a judgment about the behavior of this new algorithm, we have carried out a comparative numerical study between these algorithms. The results obtained by this algorithm show clearly the impact of our modifications expressed by significant reduction of number of iterations and in computing time comparing with the other algorithms.

Keywords: Variational Inequalities Problem, Pseudomonotone Operators, Fixed Point Problem.

Explicit Form of Fundamental Units of Certain Quadratic Fields and Period Eight

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Abstract: In this work, for all real quadratic fields $K = Q\left(\sqrt{d}\right)$ such that $d = a^2 + b \ \left(a, b \in \mathbb{Z},\ 0 < b \leq 2a\right)$ is a positive square free integer congruent to 2 modulo 4 and the period k_d of the continued fraction expansion of the quadratic irrational number $\omega_d = \sqrt{d}$ is equal to 8, we describe T_d, U_d explicitly in the fundamental unit $\varepsilon_d = \dfrac{T_d + U_d\sqrt{d}}{2}(>1)$ of $Q\left(\sqrt{d}\right)$ in the case of b is congruent to 1 modulo 4.

Keywords: Fundamental Unit, Continued Fraction, Period.

The Zariski Topology on the Prime Spectrum of a Semimodule (ZTPSM)

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Abstract: In this work, the prime spectrum $Spec(M)$ of M is the collection of all prime $k-$subsemimodules for any semimodule M over a commutative semiring R with identity. We study $Spec(M)$ with its Zariski topology and we prove that this space is spectral space under some conditions. We investigate property of topology space.

Keywords: Prime $k-$Subsemimodules (Pkss), Prime Spectrum (Ps), Zariski Topology (Zt), Spectral Space (Ss).

Visman-Gray Manifold with Vanshing Conhormanic Tensor

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Abstract: In the present paper, we investigate the geometric meaning of vanishing conharmonic curvature tensor of Viasman-Gray manifold. We prove that, the conharmonic flat Viasman-Gray manifold of dimension greater than four is a locally conformal Kahlerian manifold with vanishing scalar curvature tensor. Finally, we construct an example about nearly Kahlerian manifold with vanishing conharmonic tensor.

Keywords: Viasman-Gray Manifold, Conharmonic Tensor, Conharmonic Transformation.

The Domain Decomposition Method with the Boundary Integral Equation for the Bi-Laplacian

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Abstract: Here, we will focus on domains decomposition methods based on the geometry where the original boundary value problem is reduced to local sub-problems Involving suitable matching conditions. When we suggest conditions on the boundary of the Direchlet type or of the Neumann type on the local boundaries, of the sub- domains, the solutions of the local sub-problems define an integral equations system. Then, in the domains decomposition methods, we need to find the complete Cauchy data on the skeleton. These results in a variational formulation, to find either the Direchlet data or the Neumann data on the skeleton, and the remaining data are determined by the local problems and the matching conditions. By using boundary integral equations, we can solve this integral equations system. We will interpret that as pseudo-differential operators, and via the symbolic computation of these operators, we can give the properties of these operators which allow us to establish the existence and the uniqueness of the solution.

Keywords: Boundary Element Methods, Domain Decomposition, Pseudo Differential Operator, Guarding Inequality.

New Bayes Estimators with Modify Loss Function

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Abstract: Standard Bayes estimation will be introduced dependence on squared error loss function, and on the other hand a new loss function will be anticipated.

The main aim of this research is to find the estimator of parameter Weibull distribution. Using simulation study, we find the best estimator based on M.S.E and M.P.E.

Keywords: Loss Function, Fisher Information, Weibull Distribution, Bayes Estimator.

Comparison of Proportional Hazards Models and AFT Models

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Abstract: The field of survival analysis has experienced phenomenal growth during the second half of the 20th century. Among the methodological developments of survival analysis that had a profound impact, are cited, the proportional hazard models (PH) to examine the effects of covariates on the hazard function model and accelerated failure time (AFT), which is presented as an alternative to the model (PH) proposed. In the AFT model, the effect of covariates is measured, not on the hazard function, as in a proportional hazards model, but directly on the survival function.

In this work, we make a comparative study between the two parametric models and we outline the main models of each.

Keywords: The Model of Accelerated Failure Time, Proportional Hazards Model, Maximum Likelihood.

On Initial-Boundary Value Problems for Elastodynamic Model of Quasicrystals

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Abstract: This study is related to the dynamic problems of quasicrystals. The quasiperiodicity of these structures results in an additional field, called phason. For this reason, mathematical models for quasicrystals are more complicated

than usual crystals. In literature, static equations for elasticity have a common formulation, but for dynamic elasticity there are different arguments. In this work, we consider initial-boundary value problems for elastodynamic model, and present a method based on symbolic computations.

Keywords: Quasicrystals, Elastodynamics, Initial-Boundary Value Problems.

Common Fixed Points in Normed and Metric Spaces

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Abstract: In this work, we introduce the concept of occasionally weakly biased maps which is an appreciable generalization of weakly biased maps. Further, we use this notion to show the existence and uniqueness of common fixed points for four maps satisfying different contractive conditions in a normed space as well as in a metric space. Our results are variants of some interesting results, mainly, of Shahzad and Sahar, Ciric and Ume and some references therein.

Keywords: Occasionally Weakly Biased Maps, Common Fixed Point Theorems, Normed and Metric Spaces.

A Predictor-Corrector Scheme for Solving Fractional Differential Equations

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Abstract: In this paper, we discuss an Adams-type predictor-corrector method for the numerical solution of fractional differential equations. This method is based on numerical integration techniques applied to an equivalent nonlinear and Volterra integral equation. Numerical illustrations to demonstrate utility of the method are given. The classical approach leads to an algorithm with very high

arithmetic complexity. Therefore we derive an alternative that leads to lower complexity without sacrificing too much precision.

Keywords: Fractional Differential Equation, Caputo Derivative, Numerical Solution, Predictor-Corrector Method.

Linearization of Systems of Second Order Differential Ordinary Equations

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Abstract: In this paper we give necessary and sufficient conditions under which a system of second order ODE can be linearized under fiber-preserving transformations. We prove the existence of an affine connection and present these results in the Tanakian point of view. We determine class C for systems of (second order) ODE.

Keywords: System of Second Order ODE, Under Fiber-Preserving Transformations, Tanakian Point of View.

A Contraction Theorem in Generalized Non-Archimedean Fuzzy Metric Spaces

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Abstract: In the present work we introduce the notion of generalized Non-Archimedean Fuzzy Metric Spaces as a generalization of Non-Archimedean fuzzy metric spaces in the sense George and Veeramani [George A, Veeramani P, on some results in fuzzy metric spaces, Fuzzy Sets and Systems 1994;

64:3959] which permits us to obtain Banach-Grabiec contraction and Edelsteins theorem in this space. Also we give some property and examples on this space.

Keywords: Fuzzy Metric Space, Non-Archimedean Fuzzy Metric Space, T-Norm, Contraction Mapping.

Weak Fuzzy Metric Spaces and Generalized Ekeland's Variational Principle

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Abstract: In the present work we introduce the notion of weak Fuzzy Metric Spaces as a generalization of fuzzy metric spaces in the sense George and Veeramani [George A, Veeramani P, on some results in fuzzy metric spaces, Fuzzy Sets and Systems 1994; 64:395-9] which permits us to obtain Generalized Ekeland's variational principle in this space. Also we give some property and examples on this space.

Keywords: Fuzzy Metric Space, Weak Fuzzy Metric Space, T-Norm, Generalized Ekeland Variational Principle.

New Results of Immersion Tree in Hypercube

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Abstract: The study of an immersion of a graph G in a graph H means seeing if G is isomorphic in one under graph of H. We consider the case where G is a tree and H is a hypercube. It was demonstrated that all the trees are embedding in the hypercube Q_n; in fact it is a question of finding the smallest dimension n of the hypercube for which a given tree is embedding. Then we talk about the cubical

dimension of this tree. In this paper, we define two new class of trees wich we give there cubical dimension.

Keywords: Hypercube, Tree, Embedding, Isomorph, C_n-Valuation.

Proper Nearly Perfect Sets in Graphs

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Abstract: In this work, we present a new combinatorial problem, called the Nearly Perfect Bipartition Problem, which is motivated by a computer networks application. The leads to a new graph parameter $PN_{p(G)}$ which equals the maximum cardinality of a proper nearly perfect set. We show that the corresponding decision problem is NP-hard, even when restricted to graphs of diameter 3. We present several bounds for $PN_{p(G)}$ and determine the value of $PN_{p(G)}$ for several classes of graphs.

Keywords: Nearly Perfect Sets, Domination, Diameter.

Integral Equation Methods for the Laplacian with a More General Condition That Neumann

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Abstract: The integral equation method allows reducing the boundary value problem to an equivalent problem posed only on the edge of the field. Unfortunately, a drawback that can meet him, if the boundary value problem has more general boundary conditions which lead us to a problem of formalization on the edge. To overcome this difficulty we propose a resolution.

Keywords: Boundary Element Methods, Tangential Derivative, Pseudo Differential Operator.

On Some Critical Exponent for Fractional Differential Equations

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Abstract: In fractional analysis several authors quoted expose them critical, considering that they play a big role in the study of the existence and non-existence of the solutions. In this presentation one tries to compare and comment on them.

Keywords: Fractional Derivatives, Critical Exponent.

Some Fixed Point and Coincidence Point Results

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Abstract: In this paper, we consider fixed point theorems on partial metric spaces. We studied weakly compatible functions on partial metric spaces, and we prove that under some conditions these functions have a unique point of coincidence and common fixed point.

Keywords: Common Fixed Point, Coincidence Point, Complete Metric, Contrac-Tion, Partial Metric, Weakly Compatible.

Different Approaches on the Matrix Divide and Generalization of Cramer's Rule

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Abstract: In this study, the different approachs of the matrix divide and the Generalization of Cramer's Rule and some examples were given.

Keywords: Matrix, Divide, Matrix Divide, Cramer's Rule, Generalization of Cramer's Rule.

Evaluation and Optimization of Water and Dam Projects Koohrang 3

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Abstract: Many projects for water supply throughout the world that can typically transfer between water and the construction of large dams Hvzhay cited. Water transfer schemes between the two basins of origin and destination Hvzhay due to changes in the natural diet of the sensitivity of the water is higher than other plans. What Mhmast, rules and regulations about the making of this project is to minimize losses and maximize their benefits. Dam and Tunnel Koohrang three stages designed to cause a prolonged period of time, including a unique design that has many fields of study. Aim of this study was to evaluate the design and optimization of the dam Water diversion is necessary. In this study with regard to potential water transfer tunnel hydraulic, hydrological information and conditions Social and technical area, while the optimal cropping pattern, use the maximum hydraulic design capacity and estimate the economic logic of various scenarios, we have the proper evaluation of the project and the optimal value for the barrier height, we estimate Koohrang. Basis of our work to achieve this goal, the integration of Modeling Tnayj System software in Weap, Optimization methods and techniques of engineering economics is.

Keywords: Optimization, Dam Height, Economics, Engineering.

On Sandwich Theorem of P-Valent Functions Involving Dziok - Srivastava Operator

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Abstract: The aim of this paper is to investigate some properties of the subordination and superordination for p-valent functions associated with Dziok - Srivastava operator.

Keywords: Subordination, Superordination, Hypergeometric Function, Multivalent Function.

Complex Multiplicative Runge-Kutta Method

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Abstract: In this paper, a powerful tool, the complex multiplicative Runge-Kutta method, for mathematical modeling of a wide set of problems in science and technology is proposed. One can design a tailor-made calculus for any imaginable problem, inheriting all properties of the problem to be solved. A big class of solutions of problems in science and technology are either exponential, trigonometric, or a combination of both. So the most suitable calculus for this kind of problems appears to be the complex multiplicative calculus as the exponential nature of the solution is already incorporated. Furthermore, the solution of many problems in science and technology can not be obtained in closed form, and a numerical approximation becomes inevitable. So the most self-evident approach is to combine the most powerful tool to solve differential equations numerically, i.e. The Runge-Kutta Method, with the calculus that incorporates the exponential nature of the solution. Therefore, based on the theory of multiplicative calculus the Runge-Kutta Method is elaborated.

Additionally the complex multiplicative Runge-Kutta Method is applied to certain problems and the results are compared with the exact solutions.

Keywords: Multiplicative Calculus, Complex Multiplicative Calculus, Runge-Kutta Method, Mathematical Modeling.

Fixed Point Theorems for Some Generalized Symmetric N-Cone Banach Spaces

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Abstract: In this paper generalized symmetric n- normed spaces and generalized symmetric n-cone normed spaces are introduced. Showing that, in certain cases, generalized symmetric (n-1)-cone norm can be derived from the generalized symmetric n-cone norm in such a way that the convergence and completeness in the generalized symmetric n-cone norm is equivalent to those in the derived generalized symmetric (n-1)-cone norm, we prove the Fixed Point Theorem for some generalized symmetric n-cone Banach spaces.

Keywords: Symmetric N-Normed Space, Symmetric N-Cone Banach Space, Fixed Point Theorems.

New Definitions and Theorems via Different Kinds of Convex-Dominated Functions

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Abstract: In this paper, we establish several new convex dominated functions and then we obtain new Hadamard type inequalities.

Keywords: Convex Dominated Function, Hadamard Inequality, M-Convex Function, S-Convex Function in the Second Sense.

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The Characterisations of Some Classes of Linear Operators Between Some Sequence Spaces

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Abstract: In this study, after some basic definitions and theorems, the general theories of FK, BK, AK and AD spaces are introduced. Then some special sequence spaces defined by I.J. Maddox are introduced and their topological structures are studied. Afterwards the β -dual, also known as the generalized Köthe-Toeplitz dual, is defined and some properties of β -dual of the space $\ell(p)$ are examined. In the light of this information the classes $(\ell(p), l_\infty(q))$, $(\ell(p), c_0(q))$ and $(\ell(p), c(q))$ are characterized where $0 < p_k \leq 1$ and $q = (q_k)$ is bounded sequence. The necessary and sufficient conditions for these characterisations are listed in a table. Finally as an application of our general results, the classes $(\ell(p), l_\infty)$, $(\ell(p), c_0)$ and $(\ell(p), c)$ are characterized.

Keywords: FK Spaces, BK Spaces, Dual Spaces, Sequence Spaces, Matrix Transformations.

Analysis of the Differential-Algebraic Equations (Daes) for Multibody Dynamics

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Abstract: In this work, the Equations of Motion (EOMs) of the Multibody Dynamics is derived for a railway vehicle bogie. Lagrange dynamics is used as common approach in applied mathematics and mechanics for computational differential-algebraic equations (CDAEs). Differential equations of motions are formulized as in the generalized symbolic mathematics and applied in the Matlab's MuPad Symbolic Math Toolbox. Finally, the results are compared using eigenvalues with previous studies in the same area with a success.

Keywords: Computational Differential-Algebraic Equations (Cdaes), Multibody Dynamics (MBD), Eigenvalue Analysis, Lagrange Dynamics, Railway Vehicles.

Purely Periodic Beta-Expansion with Pisot and Salem Unit Basis

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Abstract: The present paper deals with beta-expansion in algebraic function fields. First, we will characterize the purely periodic *beta*-expansion by occuring the conjugates of beta when *beta* is a Pisot or Salem unit series. Second, we give a lower bound of the length of the period for every rational in Pisot or Salem unit bases.

Keywords: Finite Fields, Beta-Expansion, Pisot Series, Salem Series.

Bayesian Estimation of the Periodic Autoregressive Model by the Gibbs Sampling

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Abstract: Our present work is devoted to the problem of estimation the parameters of a linear model of regression from which the errors result from a satisfactory process to an autoregressive model with periodic coefficients, in time. The followed method is based, on the one hand, on the technique of the Gibbs sampler and, on the other hand, on the Bayesian inference in the analysis of the time series. Our objective consists in generalizing the results got by Chib (1991), with the case of a model of regression of which the process of errors is non stationary more precisely satisfactory with a periodic autoregressive model where the variance of the process of innovation is periodic or constant. Series of simulations are carried out with an aim of checking the effectiveness of the elaborate results and of comparing the estimator of Gibbs (EG) to the estimator of least square.

Keywords: Model of Regression, Autoregressive Model with Periodic Coefficients, Bayesian Inference, Gibbs Sampler.

Boundary Value Problems for Impulsive Fractional Integro-Differential Equations with Non-Local Conditions

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Abstract: In this study, we establish some conditions for existence and uniqueness of the solutions to semilinear fractional impulsive integrodifferential evolution equations with non-local conditions by using Schauder's fixed point theorem and contraction mapping principle.

Keywords: Caputo Fractional Derivative, Boundary Value Problem, Existence and Uniqueness, Fixed Point Theorem, Impulsive Integrodifferential Equation, Nonlocal Condition.

Computational Solution of Mathematical Linear Peridynamics Model using Finite Element Method

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Abstract: Peridynamics is a recently developed theory of solid mechanics that replaces the partial differential equations (PDE) of classical continuum theories with integral-differential equations (IDE). Mathematical model and computer algorithm are developed to calculate material cracking and fracture for linear peridynamics model was tested, the data and exact solution for the one-dimensional problems using continuous and discontinuous Galerkin finite element methods for discretizing. The solution and error estimation as well as numerical results for different cases are discussed.

Keywords: Nonlocal Continuum Theory, Peridynamics Linear Model, Galerkin Method, Finite Element Method.

Comparing Methods of Polynomial Interpolation Error

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Abstract: Estimating errors in solving problems is one of the most crucial parts of numeral analysis. In numeral calculations the degree of errors can be estimated. Different methods have been, hitherto, presented in order to determine interpolative polynomials of a function at distinctive points. Moreover, there have been a number of ways to calculate interpolative polynomials errors which were associated with proving some theorems. In this study some of these demonstration methods of proving were more exhaustive than the third one. The reader might find the third method ambiguous, the details of which will be followed in the paper.

Keywords: Interpolation, Error, Numerical Analysis.

Solving Singular Boundary Value Problems using Modified Daftardar-Jafari Iterative Method

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Abstract: In this paper, we apply the suggested iterative method by Daftardar and Jafari hereafter called Daftardar-Jafari method for solving singular boundary value problems. In the implementation of this new method, one does not need the computation of the derivative of the so-called Adomian polynomials. The method is quite efficient and is practically well suited for use in these problems. Some illustrative examples have been presented.

Keywords: Singular Boundary Value Problems, Daftardar-Jafari Iterative Method, Non-Linear Problems.

A New Stochastic Method for Ranking

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Abstract: The stochastic efficiency measure of Decision Making Unit (DMU) is defined via joint probabilistic comparisons of inputs and outputs with other DMUs, and can characterized by solving a chance constrained programming problem. In this paper we propose a method for ranking stochastic efficient. The Andersen and Petersen (AP) model [Management Science 39 (1993)] is the special case of proposed model. Example, which illustrates possible uses of this approach, is also supplied.

Keywords: Data Envelopment Analysis (Dea), Ranking, Stochastic Programming.

Process Capability/Incapability Analysis in the Presence of Autocorrelation

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Abstract: Performance of capability and incapability indices for AR, MA and ARMA models in the presence and absence of auto correlation is checked. Considering arithmetic mean and median as average, the performance is evaluated using power/OC curves for normal and non-normal distributions. It is shown that, in the absence of autocorrelation, the strength of different indices does not differ significantly. However in the presence of autocorrelation they do differ. The most efficient capability/incapability indices, in the presence of auto correlation, are observed. Certain transformations, which help synchronizing the behavior of a variety of indices, are suggested.

Keywords: Capability Index, Incapability Index, Autocorrelation, Power Curves.

The Blood Inflammation Diagnosis Based on Some Intelligent Techniques

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Abstract: This research provides new methods to diagnose inflammation of the blood, which is caused by certain diseases which can not be known before ascertaining the number of red and white blood cells that depend on a specific area that refers to the case of a person who is subject to the test and determine whether there is illness or not and to what extent the disease has mastered him (if found). To achieve this we have done this paper by using fuzzy logic, Neural Network and by recruiting the ability of each one of them in this diagnosis.

Keywords: Fuzzy Logic, Neural Networks, Diagnosis.

About a New Class of Bifurcations Generated by Piecewise Linear Maps

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Abstract: The purpose of this paper is to study the occurrence of a new bifurcation phenomena for piecewise smooth maps. These phenomena are part of a rich new class of bifurcations which we call border-collision bifurcations. Border collision bifurcations have been defined for continuous piecewise smooth maps depending on parameters [1-4]. In the simplest case of one dimensional map, border-collision bifurcations occur, as a parameter is varied, when a fixed or periodic point of the map collides with the set of points (called border) where the map is not differentiable. We are interested in a family of two-dimensional piecewise map $F: IR^2 \to IR^2$ depending on three reel parameters, given by two maps F_1, F_2 defined in the regions R_1, R_2, respectively: We're

$$F_1 : \begin{pmatrix} x \\ y \end{pmatrix} \mapsto \begin{pmatrix} 1-ax-by \\ x \end{pmatrix}, R_1 = \{(x,y) : x \geq 0\}$$

$$F_2 : \begin{pmatrix} x \\ y \end{pmatrix} \mapsto \begin{pmatrix} 1+ax-by+c \\ x \end{pmatrix}, R_2 = \{(x,y) : x < 0\}$$

defined by linear functions, as we recall, a,b, and c are real parameters. We examine the specific bifurcation phenomena that result from the piecewise-linear structure of this map. We show how the model displays abrupt period-doubling bifurcations and a variety of different border-collision bifurcations. These results are illustrated by a numerical experiment.

Keywords: Piecewise Linear Maps, Attractor, Border Collision Bifurcations, Chaos.

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Wiener Chaos Expansion under G-Brownian Motion

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Abstract: The notion of G-expectation, a type of nonlinear expectation proposed by Peng has received very strong attention in recent years, under which the canonical process is a G-Brownian motion and the related stochastic calculus especially G-Itô's integrals have been established. In this paper we prove the equivalent theorem of Wiener chaos with respect to G-Brownian motion in the framework of sublinear expectation space. Moreover we establish some relationship between Hermite polynomials and G-stochastic multiple integrals. An equivalent of the orthogonality of Wiener chaos was found.
Keywords: G-Expectation, G-Brownian Motion, Hermite Polynomials, G-Stochastic Multiple Integrals, Wiener Chaos.

Clique Identification in Flight Route Problem

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Abstract: *Clique* is a subset of a directed graph which has at least three vertices. For each pair of vertices P_i and P_j in these subsets, both $P_i \rightarrow P_j$ and $P_j \rightarrow P_i$ is true. The subsets are made largest possible; in the sense that it is impossible to

add other vertices into these subsets. By identifying *clique* we can know the relationship among the airports so that known which cities can be traversed to go from one city to another. It also can know which airports are busy or large airport of on every island in Indonesia. *Clique* identification is done on the flight route Sriwijaya Air and Garuda Indonesia. Each clique consists of only three cities, and includes Jakarta. The cities that form the *clique* are Banda Aceh, Medan, Batam, Pekanbaru, Palembang, Semarang, Surabaya, Banjarmasin, Balikpapan, Ujung Pandang, Gorontalo, Manado, Ambon, Kendari, Palu, Ternate, Denpasar, Kupang, Timika, Biak, and Jayapura. The number of airports that make up *clique* on Sriwijaya Air flight is less than the Garuda Indonesia flight. The number of *clique* that can be formed on Sriwijaya Air flight more than on Garuda Indonesia flight.

Keywords: Clique, Flight Route, Relationship Among Airports in Indonesia.

Fixed Point Techniques and Stability for Neutral Nonlinear Differential Equations with Unbounded Delays

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Abstract: We use the contraction mapping theorem to obtain stability results of the scalar nonlinear neutral differential equation with functional delay;

$$x'(t) = -ax(t) + b(t)x^2(t - r(t)) + c(t)x(t - r(t))x'(t - r(t)).$$

Keywords: Contraction Mapping, Stability, Nonlinear Neutral Differential Equation, Integral Equation.

Path Partition in Directed Graph Modeling and Optimization

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Abstract: Many real problems can be modeled as path partition problems in a directed graph. In fact, the latter, especially in the case of directed acyclic graph

(DAG), plays a particular role in the operations of arranging a set of points. Some important areas in which DAGs are used as a model for solving problems are project management, assignment problem, and network, etc. Moreover, we encounter such graphs in schedule problems, the analysis of language structure (computation theory), probability theory, and game theory, etc. Furthermore, the Potential Problem in a graph G has a solution of a certain type if and only if G is an acyclic graph. The problem of construction of path partition in a directed graph is a hard problem and has been studied by several authors. O'Brian has proved that the path partition number of a graph G is such that: $P(G) \leq \left\lfloor \frac{n^2}{4} \right\rfloor$, and from a result given by Alspach, we know that this bound is the best possible. From Ore, we have$P(G) \geq e(G) = \sum_{x \in X_{G^+}} \left(d_G^+(x) - d_G^-(x) \right)$, thus$e(G) \leq P(G) \leq \left\lfloor \frac{n^2}{4} \right\rfloor$. Moreover, Ore has proven that for all DAG, we have $P(G) = e(G) = \sum_{x \in X} \left(d_G^+(x) - d_G^-(x) \right)$. In this paper, we give certain properties characterizing directed acyclic graphs that permit to give a structural representation of such graphs. The algorithm used determines the topological ordering in time $O(n + |U|)$. Moreover, we generalize the result of Ore to any directed graph G satisfying certain properties, and prove that $P(G) = e(G) = \sum_{x \in X_{G^+}} \left(d_G^+(x) - d_G^-(x) \right)$. Furthermore, we generalize the result obtained by Alspach concerning the transitive tournament TT_n and prove that$P(TT_n) = \left\lfloor \frac{n^2}{4} \right\rfloor$. In addition to the above, we prove, for all $n \geq 4$, the existence of a directed graph G of order n not isomorphic to TT_n such that $P(G) = e(G)$. From this result and the topological ordering of G, we give an efficient algorithm that permits the construction of a minimal path partition for all directed acyclic graphs with time complexity$(n^2 + |U|n)$. We also study the tournament having a unique Hamiltonian circuit and exactly $|U| - |X| + 1$ elementary circuits. We develop an efficient algorithm that allows to set a minimal path partition of T_n, where the running time $T(n)$ is $O(n^2)$.

Spinor Representation of Curves on Surface

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Abstract: In this study, it is shown that the Darboux Frame equations for curves on surface in R^3 can be reduced to a simple equation for a vector with two complex components and spinor representations of Darboux Frame and Frenet Frame are compared.

Keywords: Curve, Surface, Frenet Frame, Darboux Frame, Spinor.

A Fractional Order Nonlinear Dynamical Model of Interpersonal Relationships

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Abstract: In this work, we introduce a fractional order nonlinear dynamical model of interpersonal relationships. We give a detailed stability analysis of mutual apathy and positive fixed points. A numerical simulation is also presented to verify the obtained results.

Keywords: Fractional Model, Initial Value Problem, Stability, Numerical Solution.

On the Conditional Local Entropy Function

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Abstract: In this paper, firstly, we recall some basic properties of the conditional entropy function without going into details.After that, we define the conditional

local entropy function. Finally, we prove some important results relating to this function.

Keywords: Dynamical System, Entropy Function, Conditional Expectation, Conditional Entropy Function, Local Entropy Function, Conditional Local Entropy Function.

Fast Decryption Algorithm for RSA

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Abstract: We propose a fast decryption algorithm which speeds up the RSA decryption processing time by computing $C \equiv M^{\varepsilon} \bmod q$ rather than computing $C \equiv M^{\varepsilon} \bmod n$ clasically. The proposed algorithm can be thought as modification of CRT decryption algorithm or mixed of RSA asymmetric cryptosystem with Pohling-Hellman symmetric cryptosystem.

Keywords: Public-Key Cryptosystem, RSA, Fast Decryption.

Continued Fraction Expansions of Some Functions of Positive Definite Matrices

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Abstract: In this paper we recall some results of matrix functions with real coefficients. The aim of this paper is to provide some properties and results of continued fractions with matrix arguments. Then we give continued fractions expansions of some inverse of hyperbolic and circular functions $\arcsin(A)$, $\operatorname{arcsh}(A)$, $\arccos(A)$ and $\arccos h(A)$ where A a positive definite matrix is.

Keywords: Continued Fraction Expansion, Positive Definite Matrix, Functions of Matrices, Sequence of Matrices Convergence.

New Sequence Spaces Defined by Difference Matrix β^m of Order m and Factorable Matrix

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Abstract: In this work, we define new sequence spaces by combining generalized weighted mean and difference operator B^m of order m . Afterward based on this construction, we investigate topological structures which are completeness, *AK*-property, AD – property. Also, we compute the $\alpha-, \beta-$and $\gamma-$ duals, and obtained bases for these sequence spaces. Finally, necessary and sufficient condition on an infinite matrix belongs to the classes $(c(u,v,B):l_\infty)$ and $(c(u,v,B):c)$ are established.

Keywords: Difference Sequence Space, Generalized Weighted Mean, *AK*-Property and AD – Property, $\alpha-, \beta-$and $\gamma-$ Duals and Bases of Sequences, Matrix Mappings.

On the Estimation of Exponential Sums Associated with a Quintic Form

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Abstract: It has been shown that the estimation of an exponential sum associated with a two-variable polynomial can be derived from the estimating of the cardinality of the set of common solutions to congruence equations associated with the partial derivatives of the polynomial. By an application of this principle we will present in this talk a method of determining an exponential sum

associated with a quintic of the form $f(x,y) = ax^5 + bx^4y + cx^3y^2 + tx + sy + m$ over the ring Z_p where p is an odd prime. An explicit estimate of the cardinality of the set of solutions common to the partial derivative polynomials f_x and f_y associated with $f(x,y)$ will be first determined by examining the indicator diagrams associated with the Newton polyhedra of both polynomials. By applying results of our earlier works we will derive an explicit estimation of the upper bound of the sum in terms of the p-adic sizes of some invariants associated with the polynomial.

Keywords: Exponential Sums, Cardinality of Solutions, Newton Polyhedron.

On Wallman Compactification

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Abstract: A topological space X is said to be spectral if it is homeomorphic to the spectrum of a ring equipped with the Zariski topology. In 1969 Hochster has proved that spectral spaces are compact and sober. This work deals with space such that its Wallman compactification is a spectral space and space such that its Wallman compactification is a sober space.

Keywords: Spectral Sets, Spectral Topology, Compactification of Topological Spaces, Alexandroff Compactification, Wallman Compactification, Sober Spaces.

Convergence and Solution of Fourth-Order Boundary Value Problems in Off Step Points

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Abstract: Non-polynomial spline is used for solution of the fourth-order linear boundary value problems in off step points. We obtained the classes of numerical methods for a specific choice of the parameters involved in Non-polynomial

spline. The end conditions consistent with the boundary value problems are derived. Truncation errors are given. A new approach convergence analysis of the presented methods is discussed. Two examples are considered for the numerical illustration. However, it is observed that our approach produce better numerical solutions in the sense that max$|e_i|$ is minimum.

Keywords: Differential Equations, Boundary Value Problems, Non-Polynomial Spline in Off Step Points, Convergence Analysis, Numerical Results.

PD Type Learning Control for High Performance of DC Motor Tracking Error

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Abstract: Iterative learning control (ILC) is based on the notion that the performance of a system that executes the same task multiple times can be improved by learning from previous iterations.ILC can be applied to a controlled system that repeatedly has to execute the same trajectory, the same motion or the same operation .In this article frequency based ILC approach has been considered , including the previous cycle learning configuration, current cycle learning configuration, previous and current cycle learning configuration. The convergence of learning algorithms is theoretically analyzed and is achieved as the number of iterations tends to infinity. The theoretical are illustrated by simulation. The results of simulations of a DC motor model prove clearly the efficiency of the control by iterative learning.

Keywords: Iterative Learning Control, DC Motor, Controlled System, Previous Iteration.

Toplogical Centers and Factorization Properties

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Abstract: In this paper, we study the Arens regularity properties of module actions and we extend some proposition from Baker, Dales, Lau and others to general case. We establish some relationships between Topological centers of module actions and factorization properties of them.

Keywords: Arens Regularity, Bilinear Mapping, Topological Center, Module Action, Factorization, Weakly Compact.

A Penalty Approach to Box Constrained Variational Inequality ($VIP(l,u,F)$)

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Abstract: We propose a penalty approach to box constrained variational inequality problems $VIP(l,u,F)$ in which the $VIP(l,u,F)$ is replaced by a sequence of nonlinear equations containing a penalty term. We show that if the penalty parameter tends to infinity the solution of this sequence of equations converges to that of $VIP(l,u,F)$ when the function F involved is continuous and strongly monotone and C contains the origin .The algorithmic aspect of this approach is developed with theoretical arguments properly are established and numerical results are presented to con.rm the theoretical findings.

Keywords: Fractional Differential-Algebraic Equations (Fdaes), Variaitonal Iteration Method.

Green's Function to a Third Order Boundary Value Problem by Green's Functional Concept

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Abstract: In this work, by Green's functional concept, we concentrate on the derivation of a Green's function to a third order linear ordinary differential equation with variable coefficients involving linear conditions. to this end, a system of four integro-algebraic equations called the special adjoint system is constructed. and a condition for existence of the unique solution to this system is given. The unique solution of this special adjoint system is Green's functional with four components. According to this condition, the special adjoint system is reduced to an integral equation yielding the first component of Green's functional. This component corresponds to Green's function for that problem. The theoretical presentation is illustrated by an application.

Keywords: Green's Function, Ordinary Differential Equation, Adjoint Problem.

Active Optimal Control of Thermally-Induced Vibrations in a Plate

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Abstract: A Maximum principle is derived to obtain the optimal control of the thermally-induced vibrations of a rectangular plate that consists of a central thermoelastic host layer and two outer piezoelectric layers. A convex performance index is introduced as a weighted quadratic functional of the displacement and velocity which is to be minimized at a fixed terminal time using continuous piezoelectric actuators. The control expenditure is included in the objective functional as a penalty term. The Maximum principle given involves a Hamiltonian which contains an adjoint variable as well as the control function. The problem is reduced to solving a system of partial differential equations for the state variable and the adjoint variable subjected to boundary, initial and terminal conditions. The method of solution involves Galerkin expansion technique to transform the original problem into the optimal control of lumped parameter system where the optimal control is determined by the developed maximum principle. A numerical example is given to demonstrate the applicability and the efficiency of the proposed method.

Keywords: Maximum Principle, Optimal Control, Plate, Piezoelectric Actuator.

Parametric Estimation of Moving Average and Simulation (PEMA)

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Abstract: We study a method for estimating parameters of a moving average process. The results show that the estimator is convergent and asymptotically normal. The estimator (RIVE) is based on the idea that all the information for the parameters is transmitted through the sample and the noise effect becomes negligible when n tends to infinity. We present results of numerical simulations on the asymptotic behavior of the estimator of J. Durbin for a model MA(1) using the software R.

Keywords: Stationary Process (SP), Asymptotic Property (AP), Iteration Method (IM).

Best Proximity for Set-Valued Contractions

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Abstract: Let A and B be nonempty subsets of a metric space and a set-valued mapping $T: A \to B$. Our considerable interest is to find an element x in A that is as close to Tx in B as possible. In other words, if the fixed point inclusion $x \in Tx$ has no exact solution, then it is contemplated to find an approximate solution x in A such that the error $d(x,Tx)$ is minimum. Indeed, best proximity point theorems investigate the existence of such optimal approximate solutions, called best proximity points, to the fixed point inclusion $x \in Tx$ when there is no exact solution. The purpose of this article is to establish best proximity point theorems for contractive non-self multi-applications, yielding global optimal approximate solutions of certain fixed point inclusions (resp. equations).

Keywords: Approximate Solution, Fixed Point, Proximity Point, Contractive Multi-Mapping, Cyclic Multi-Mapping.

Existence and Uniqueness Solution of a Quasistatic Electro-Elastic Antiplane Contact Problem with Tresca Friction Law

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Abstract: We study the Antiplane fractional contact models for electro-elastic materials, both in Quasistatic case. The material is assumed to be electro-elastic and the friction is modeled with Tresca's law and the foundation is assumed to be electrically conductive. First we establish the existence of a unique weak

solution for the model. Moreover, the proof is based on arguments of evolutionary inequalities.

Keywords: Antiplane Shear Deformation, Electro-Elastic Material, Evolutionary Inequalities, Weak Solution.

On an Asymptotic Analysis for a Transmission Problem

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Abstract: This work consists in the asymptotic analysis of the solution of a transmission problem in a bounded domain of R^P $(p = 2,3)$ with a thin layer. We use a method based on hierarchical variational equations to model the effect of the thin layer by a problem with appropriate transmission conditions.

Keywords: Asymptotic Analysis, Approximate Transmission Conditions, Helmholtz Equation, Thin Layer.

A Conceptual Model for Transport through Porous Media

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Abstract: A mathematical and numerical model is developed for a nonlinearly solute transport in a two-dimensional homogeneous porous media. The movement of solute through the study domain can be described by a coupled set of nonlinear partial differential equations that are generated by combining balance equations with constitutive relationships. The model takes into account the flow dynamics of saltwater and freshwater using the concept of equivalent freshwater head. Governing equations are combined into nonlinear coupled partial differential equations in only two variables namely, the concentration and the equivalent head.

The computational scheme is based on the relaxation method and iterates between the two equations. A system of nodal points is imposed over the study domain. Numerical integration is carried out using the Gauss method. Governing differential equations are replaced by a set of n x m simultaneous differential equations, one for each grid point or block. Solution of these equations yields numerical values at the specified nodal points. An initial estimate for both the concentration and head at every node of is given. Local and global coefficient matrices for concentration as well as the vector of known concentrations are formulated. The system of matrix equations is solved, and convergence is checked and satisfied. The developed model is applied for several cases of groundwater contamination and remediation. Plume migration is investigated and clearly constructed for all cases.

Two-Phase Invariance for a Dynamical Mother Body in a Hele-Shaw Problem

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Abstract: A dynamic mother body (DMB) in a Hele-Shaw problem was proposed by T.V. Savina and A.A. Nepomnyashy in [1]. If the initial domain has an algebraic boundary, DMB provides examples to the observation pointes out in [3], $\Omega(t) \underset{t\to T}{\to} 0$ without cusp formation if and only if sinks are placed at the geometric center of the initial domain. The present note extents [1] from a single phase to a two-phase Hele-Shaw flow in which a bounded subdomain $\Omega_1 \subset \Omega$, that is occupied by $fluid_1$ is encompassed by unbounded subdomain Ω_2 ,that is occupied by $fluid_2$, such that their viscosities are different. In such situation the pressure of a phase along the boundary $\partial\Omega$ is influenced by one another and therefore we have to calculate the DMB in the entire region $\overline{\Omega} = \overline{\Omega_1} \cup \overline{\Omega_2}$ .We show that the DMB within the interior subdomain remain

unchanged as in [1], and we identically calculate the DMB within the exterior subdomain since a two-phase problem is reduced to a single phase problem defined in the entire domain $\overline{\Omega}$ bearing in mind the zero surface tension [11].

Keywords: Hele-Shaw, Dynamic Mother Body.

Numerical Solutions of MHD Boundary Layer Flow Due to a Moving Wedge in a Parallel Stream with Induced Magnetic Field

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Abstract: The present analysis considers the steady MHD laminar boundary layer flow of an incompressible electrically conducting fluid caused by a continuous moving wedge in a parallel free stream, with a variable induced magnetic field parallel to the wedge walls outside the boundary layer. The governing system of partial differential equations is first transformed into a system of ordinary differential equations, using a similarity transformation, which is then solved numerically using a finite-difference scheme known as the Keller-box method. Numerical results are obtained for the velocity profiles and the skin friction coefficient for various values of the moving parameter λ, the wedge parameter β, the reciprocal magnetic Prandtl number α and the magnetic parameter S. Results indicate that when the wedge and the fluid move in the opposite directions, multiple solutions exist up to a critical value λ_c of the moving parameter λ, whose value depends on the values of S and β.

Keywords: Similarity Solutions, MHD Flow, Falkner-Skan Equations, Boundary Layer Flow.

On Some Nonlinear Integral Inequalities

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Abstract: The purpose of this paper is to establish some nonlinear Gronwal-Bellman integral inequalities in the case of functions of two independent variables which can be used as handy tools in the theory of partial differential and integral equations. An application is given to illustrate the efficiency of the obtained results

Keywords: Integral Inequality, Submultiplicative Function, Nondecreasing Function, Partial Differential Equations.

Existence Results of Nontrivial Solutions for a Class of Semi Linear Elliptic Systems

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Abstract: The aim of this work is to establish under some appropriate assumptions on the nonlinear terms the existence of weak solution for some nonlinear elliptic system with homogeneous Dirichlet boundary conditions. The method used is based on the Schauder fixed-point theorem.

Keywords: Topological Degree, Homotopy, Fixed Point.

The Exact Bispectra for Spatial Bilinear Processes

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Abstract: The aim of this paper is to give the exact spectrum and bispectrum for spatial bilinear processes in terms of the transfer functions.

Keywords: Spatial Bilinear Models, Bispectrum, Frequency Domain Analysis.

Quasilinearization of the Initial Value Problem for Difference Equations with "Maxima"

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Abstract: The object of investigation of the paper is a special type of difference equations containing the maximum value of the unknown function over a past time interval. This equations are adequate models of real processes which present state depends significantly on their maximal value over a past time interval. The appropriate mixed boundary value problem is set up. An algorithm based on the monotone-iterative technique is suggested to solve approximately the given mixed problem. Every successive approximation of the unknown solution is the unique solution of an appropriately constructed initial value problem for a linear difference equation with "maxima" and a formula for its explicit form is given. Also, each approximation is a lower/upper solution of the given mixed problem. the suggested algorithm is realized as a computer program and it is applied to several examples, illustrating the advantages of the suggested scheme.

Keywords: Difference Equations with "Maxima", Initial Value Problem, Approximate Solution, Computer Realization.

Existence and Stability of a Stationary Solution for a Simplified Tumor Growth Model

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Abstract: The aim of this work is to study a problem of existence and stability related to a tumor growth mathematical model. Based on a classical mathematical model for tumor growth describing proliferating, quiescent and

necrotic cells, we propose to calculate explicitly the stationary solution and discuss the stability with respect to these three cells. Some open problems and mathematical challenges are presented in the conclusion.

Keywords: Fractional Mathematical Modeling, Proliferating Cells, Stationary Solution, Tumor Growth**.**

Segmentation of MR Images using Information Fusion Models

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Abstract: The paper presents a study and an evaluation of the segmentation of MR images using the multispectral fusion approach in the possibility theory context. The process of fusion consists of three parts: (1) information extraction, (2) information aggregation, and (3) decision step. Information provided by T1-weighted,T2-weighted and PD-weighted images is extracted and modeled separately in each one using FPCM (Fuzzy Possibilistic C-Means) algorithm, fuzzy maps obtained are combined with an operator which can managing the uncertainty and ambiguity in the images and the final segmented image is constructed in decision step. Some results are presented and discussed.

Keywords: Fusion, Possibility Theory, Segmentation, FPCM, MR Images.

Survey on Solving of Schrödinger Equation by using Perturbation Methods

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Abstract: In this paper, we have a survey on current numerical methods such as Constant Perturbation Methods (CPM) for finding Eigen vectors and Eigen values of the Hamiltonian system of the Schrodinger equations. Sturm-Liouville

Equations play an important role for description large amounts of Physical and Mechanical systems also it can appear in some problem at differential equation. A special case of that equation called Schrodinger equations is base for quantum Physic. A coupled Schrodinger system is non-autonomous system is a second order of differential equation that appears in, a molecular system, Electronic theory and atomic physics.

Keywords: Differential, Equations, Nonlinear, Perturbation, Schrodinger.

Stability of Queuing Network System with Two Stations and N Classes

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Abstract: In this paper we study the ergodicity of the queuing network system with two stations and N classes " N is a multiple of 4" with $\left(\frac{N}{4}-1\right)$ feedbacks at the first station and $\frac{N}{4}$ feedbacks at the second one under the FIFO policy and the usual conditions $\rho_1 = m_1 + \sum_{l_1=4}^{N} m_{l_1} + \sum_{l_2=5}^{N-3} m_{l_2} < 1$ and $\rho_2 = \sum_{l_3=2}^{N-2} m_{l_3} + \sum_{l_4=3}^{N-1} m_{l_4} < 1$. By using the uid model criterion presented by Rybko, Stolyar and Dai, we show that if $\rho_1 \le \rho_2$ then the uid model is stable and the stochastic queuing network system is ergodic.

Keywords: Stability, Multi-Class Queuing Systems, FIFO Policy, Fluid Model

2000 Mathematics Subject Classification: 60K25, 68M20, 90B22.

Study of Third-Order Three-Point Boundary Value Problem with Dependence on the First Order Derivative

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Abstract: The study of boundary value problems for certain linear ordinary differential equations was initiated by Ilíin and Moiseev [3] Since then more general boundary value problems for certain nonlinear ordinary differential equations been extensively studied by many authors, see[1, 2, 4]. By using the Leray-Schauder nonlinear alternative, the Banach contraction theorem and Guo-Krasnoselískii Theorem we discuss the existence, uniqueness and positivity of solution to an third order three-point nonhomogeneous boundary value problem.

Keywords: Nontrivial Solution, Positive Solution, Fixed Point Theoremn, Cone.

Commuting Regular Rings

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Abstract: In this work, we introduce the notion of commuting regular rings," A ring R is called a commuting regular if for each $x, y \in R$, there exists $z \in R$ such that $xy = yxzyx$", and discuss some properties of commuting regular ring. We observe that a commutative semisimple ring with identity can be imbedded in a commuting regular ring which is neither a semiprime ring nor a zero ring. We also show that if $R[G]$ is a commuting regular ring, then R is a commuting regular ring.

Keywords: Commuting Regular Rings, Commutative Semisimple Rings, Group Rings.

Boundary Value Problem for Operator Differential Equations of Third Order

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Abstract: In the paper we receive the conditions providing regular solvability of boundary value problem for operator-differential equations with disconnected coefficient; moreover the principal part of operator- differential equations contains a normal operator, whose spectrum is in a angular sector. In addition the estimates of operator norms of Intermediate derivatives, which are of Independent mathematical interest, are given.

Keywords: Normal Operator, Boundary Value Problem, Discontinuous Coefficients.

Growth of Difference Operators and Its Applications

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Abstract: The theory of difference equations is based on the definition

$$\Delta x(n) = x(n+1) - x(n), n \in N = \{0,1,2,3,...\}. \tag{1}$$

Many authors [1, 17 – 19] have defined the same operator Δ as

$$\Delta x(n) = x(n+\ell) - x(n), \quad n,\ell \in N. \tag{2}$$

Further study based on the definition of Δ given in (2) never happened. Observing the absence of literature based on the definition (2), E.Thandapani, M.M.S.Manuel and G.Britto Antony Xavier [2] considered the definition (2) and further studied and developed the theory into new heights. For convenience, and

to avoid ambiguity the operator defined in (2) was labelled as Δ_ℓ and by defining it's Δ_ℓ^{-1} , many interesting results on number theory were obtained.

The theory was further extended to sequence of complex numbers and for real ℓ . With the usual theory on difference equations, one can study the qualitative properties of solutions like monotonicity, oscillatory and weakly oscillatory. But after the introduction of Δ_ℓ , when ℓ is real, and if the solutions of a difference equation happens to be complex sequences, new properties like rotatory, expanding and shrinking, spiral and weblike were observed. This is something new in the literature of difference equations. For a detailed study on this, one can refer [2 – 9].

The theory was further extended and new results obtained by the introduction of higher kinds of difference operators $\Delta_{\ell_1,\ell_2,\dots,\ell_n}$ called the generalized difference operator of the nth kind for any real or complex sequence and for real $\ell_i, i = 1,2,\dots,n.$

Infact we define $\Delta_{\ell_1,\ell_2,\dots,\ell_n}$ as

$$\Delta_L\, u(k) = \sum_{r=0}^{n} (-1)^{n-r} \left\{ \sum_{A \in \mathrm{P} = \cup r(L)} u(k + \sum_{\ell \in A} \ell) \right\},$$

Where $L = \{\ell_1, \ell_2, \dots, \ell_n\}$

$$\text{r(L)} = \text{set of all subsets of size r from L and}$$

$$\mathrm{P}(L) = \bigcup_{r=0}^{n} r(L) = \text{power set of } L.$$

Many interesting results on number theory were obtained and the results obtained can be found in [10 – 12, 14 – 16].

Popenda, for a specific need defined Δ as

$$\Delta_\alpha\, x(n) = x(n+1) - \alpha x(n), \qquad (3)$$

Where $\alpha \in \{1,2,3,...\}$. This definition of Δ was used to study the qualitative properties of a particular class of difference equations and after that no one handled it and no further study took place. Recently we have generalized this definition and labelled it as $\Delta_{\alpha(\ell)}$ and defined as

$$\Delta_{\alpha(\ell)} x(n) = x(n+\ell) - \alpha x(n), \ell \in [0,\infty). \qquad (4)$$

Many new interesting results on number theory are now available in the literature by defining the inverse $\Delta^{-1}_{\alpha(\ell)}$.

Keywords: 39A10, 39A12.

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Deformations of Sl(2) and Osp(1|2)-Modules of Symbols

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Abstract: We consider the sl(2)-module structure on the spaces of symbols of differential operators acting on the spaces of weighted densities. We compute the necessary and sufficient integrability conditions of a given infinitesimal deformation of this structure and we prove that any formal deformation is equivalent to its infinitesimal part. We study also the super analogue of this problem getting the same results.

Keywords: Cohomology, Deformation, Weighted Densities, Symbols.

2010 Mathematics Subject Classification: 17B56, 53D55, 58H15.

Comparison Between Newton and Lagrange Polynomials Interpolation

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Abstract: In this paper try to explain interpolation concept and then Newton and Lagrange interpolation methods compare with each other. Whenever we want to investigation functions that haven't order or criterion for them, we have to determine their quantity for some variable quantities from test, and this time is that appears interpolation concept. There are many calculations in Lagrange method, and interpolation degree can acquire only after doing all of calculations. Thus Newton interpolation to be preferred on Lagrange. Because in Newton method even we add some points, we can use previous calculations again and it needs to less calculations.

Keywords: Interpolation, Lagrange, Newton, Function, Calculation.

Diminishing Musyarakah Investment Model Based on Equity

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Abstract: Musyarakah investment contract is given much consideration today by a lot of Islamic financial institutions all around the world. Nevertheless most of their funds are involved in debt financing which certainly does not support the theory that profit sharing contract is better than the debt financing contract due to the sharing of risks and ownership of equity. The focus of this paper is to explore the mathematical model that internalizes musyarakah, the sharing of profit and equity between entrepreneur and investor. The entrepreneur pays monthly-differed payment to buy out the equity belongs to the investor where at the end

of the specified period, the entrepreneur owns the business and the investor exits the joint venture. The model is able to calculate the amount of equity at any time for both parties and hence would be a guide in helping to estimate the value of investment should the investor exits before the end of the specified period. The variables used are familiar in the financial scenario and the concept used is closer to the Islamic principles for justice and fairness. Thus both parties uphold the Islamic values where the entrepreneur pays what is due and the investor receives the non-transparency profit.

Keywords: Mudharabah, Diminishing Musyarakah, Profit Sharing, Equity, Investment Model.

Computing Eccentric Connectivity Polynomial of Bipartite Fullerenes

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Abstract: The eccentric connectivity index of the molecular graph is defined as $x^c(G) = S_{uIV(G)} \deg_G(u) ecc(u)$, where $\deg_G(x)$ denotes the degree of the vertex x in G and $ecc(u) = \max\{d(x,u) \mid x \in V(G)\}$. The eccentricity connectivity polynomial of a molecular graph G is defined as $\xi^c(G,x) = \sum_{a \in V(G)} \deg_G(a) x^{ecc(a)}$.

In this paper this polynomial is computed for an infinite class of fullerenes. The study of some molecular-graph-based structure descriptors (or topological indices) has been undergoing in the last few years. A topological index is a graphic invariant used in structure-property correlations. Hundreds of topological indices have been introduced and studied, some of them even before Wiener's use of the sum over all shortest-path distances of a (molecular) graph for modeling physical properties of alkanes in1947, see [1, 2]. The quantity that later became known as the Wiener index is not only one of the most famous

topological indices; it provides also an archetypal example of a life-cycle of a successful topological invariant. A story usually goes as follows: In the early phases an invariant is employed in a number of structure-property studies. After it proves useful, its basic mathematical properties are studied. A number of generalizations usually follow, by considering modified and weighted versions. A positive feedback loop is started, with modified versions being employed in more studies and attracting more attention. Finally, a mature stage is reached when the invariant is interpreted as an evaluation of a suitably defined polynomial or its derivatives, thus enabling further refinement and widening the field of possible applications. We now define the eccentric connectivity polynomial of a graph G, as $\xi^c(G,x)=\sum_{a\in V(G)}\deg_G(a)x^{ecc(a)}$. Then the eccentric connectivity index is the first derivative of $\xi^c(G,x)$ evaluated at $x=1$. In this paper we compute this topological index for some bipartite fullerene graphs.

Keywords: Eccentric Connectivity Index, Eccentricity Connectivity Polynomial, Fullerene, Diameter of Graph.

Approximation Exponents for Algebraic Formal Power Series in Characteristic q

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Abstract: In 1992, B.Mathan has studied the rational approximation for algebraic function in characteristic $p>0$. He was particulary interested in elements satisfying an equation of the type $f=Af^{(p^s)}+\dfrac{B}{Cf^{(p^s)}}$. At the end of his paper, he has given the approximation exponent of some examples of this elements that satisfies f^2 in $F2(X)$ and he asked whether for an irrational element f of $Fp((X^{(-1)}))$ such that there exists a positive integer e with

$f^e Fp(X)$ one may have $v(f)=2$ (where f is not quadratic). A Lasjaunias has continued this work; he has given, under some conditions, the approximation exponent of such elements. For the same objective, we give in the present paper, some results concerning the approximation exponent of elements satisfying f^e in $Fp(X)$ with $\gcd(e,p)=1$.

Keywords: Diophantine Approximation, Formal Power Series, Continued Fraction.

Adaptive Control for Synchronization Chaotic Dynamical Systems

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Abstract: Chaotic behavior can occur in systems of autonomous ordinary differential equations as few as three variables. In this paper we have a survey on the adaptive control methods of chaotic dynamical system with unknown parameters base on Lyapunov stability theory. Then we present a control on two different Chen and Rossler chaotic systems. Using Maple software show us accuracy of method.

Keywords: Dynamical Systems, Synchronization, Stability Nonlinear.

Numerical Solutions of Three Dimensional Elliptic Partial Differential Equations by using Finite Differences Method

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Abstract: In this paper we have a study on numerical methods for solving PDE such as Finite Difference Methods, Finite Elements Methods and Finite volume Methods. Then we apply FDM methods for solving system of Matrix equations

and its application on PDE that able us to solve 3D Poisson equation with Neumann and Dirichlet conditions. Finally we solve Laplace Equation with FDM on spherical domain. using MatLab codes show us accuracy of results.

Keywords: PDE, FDM, Equations.

Canard Cycles of Finite Codimension with Two Breaking Parameters

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Abstract: We consider two dimentional slow-fast systems which canard cycles occurring in the layer equation obtained for $\varepsilon = 0$. The canard cycles under consideration may be broken by two independent mechanisms: either a turning point or jump between two contact points. Each of these mechanisms is associated to a parameter permitting a generic breaking of the canard cycles. For this reason the canard cycles under consideration are called canard cycles with two breaking parameters. They also pass through two independent horizontal levels parametrized by u, v. Then, for a given systems we have a whole 2-parameter family of canard cycles Γ_{uv}. The properties of the system depend on four slow-fast divergence integrals, which are functions of u, v and also of a parameter λ -first, in terms of these integrals we obtain an upper bound for the total number of limit cycles bifurcating from the region containing the canard cycles. Next, the codimension of each canard cycle is defined in terms of these integrals. The cyclicity of a canard cycle of finite codimension c is bounded by $c+1$. We give conditions on the four slow divergence integrals in order to have a versal c-unfolding. If $c = 2$ the versal parameters are just the two breaking parameters, but if $c \geq 2$, we need the (c2)-dimensional parameter λ to obtain a versal unfolding.

Keywords: Slow-Fast System(SFS), Bifurcation(B),Canard Cycle(CC), Liénard Equation (LE).

Pullback Diagram in Locally C*-Algebras

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Abstract: Let $(A, s(A))$ be a locally C^* – algebra. We know that for each $p \in s(A)$, $A_p = A / N_p$ (where $N_p = \{a \in A : p(A) = 0\}$) and $b(A) = \sup\{a \in A : \|a\|_\infty = \sup\{p(a) : p \in s(A)\} < \infty\}$ are C^* – algebras. In this work, we first describe the pullback construction in category of locally C^* – algebras. Then consider a pullback diagram of Frechet locally C^* – algebras. We demonstrate under which conditions constructions of the above mentioned C^* – algebras associated to these Frechet locally C^* – algebras become pullback diagrams of C^* – algebras. Also we show that family of pullback diagrams obtained of the first case is an inverse system and initial pullback diagram is its inverse limit.

Keywords: Frechet Locally C^* – Algebra, Invese System, Invese Limit and Pull Back Diagram.

A Note on Hilbert Modules over L.M.C. H*-Algebras

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Abstract: Let $(E, (|.|_\lambda)_{\lambda \in \Lambda})$ and $(F, (|.|_\gamma)_{\gamma \in \Gamma})$ are l.m.c. H^*-algebras. First we define the injective tensor product $E \otimes F$ of E and F and we show that it is limit inverse of $\hat{E}_\lambda \otimes \hat{F}_\gamma$, where $\hat{E}_\lambda \otimes \hat{F}_\gamma$ is the completion of $\hat{E}_\lambda \otimes_{alg} \hat{F}_\gamma$ of the H^* – algebras $\hat{E}_\lambda$ and $\hat{F}_\gamma$. Then we define the exterior tensor product of

Hilbert modules V and W over locally m-convex H^*-algebras E and F, respectively. Also we show that $E \otimes F$ – module $V \otimes W$ and $\lim_{\leftarrow(\lambda,\gamma)} (\hat{V}_\lambda \otimes \hat{W}_\gamma)$ are unitary equivalent.

Keywords: L.M.C. H^*-Algebra, Hilbert Module over L.M.C. H^*-Algebra, Injective Tensor Product and Unitary Equivalent.

Fixed Point Theorems for (ψ, φ) – Weak Contractions in G – Cone Metric Spaces

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Abstract: The purpose of this paper is to establish some common fixed point theorems for mappings satisfying (ψ, φ) – weakly contractive conditions in G – cone metric spaces. We extend and generalize some existing results in literature.

Keywords: Weakly Contractive Condition, G – Cone Metric Spaces, Fixed Point.

The Approach of Linear Parametric Approximation for Numerical Solving of Fuzzy Nonlinear Equations

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Abstract: In this approach (The linear parametric approximation), the nonlinear functions is approximated by a piecewise linear functions. The obtained solution has desirable accuracy and the error is completely controllable. Then with

extension this approach, we propose a new two-step iterative method for solving fuzzy nonlinear equations. Finally some numerical examples are given to show the efficiency of the proposed approach to solve same equations in the other references.

Keywords: Taylor Linear Expansion, Linear Parametric Approximation, Nonlinear Fuzzy Function.

Optimization without Topology

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Abstract: The importance of the vector optimization is well known acknowledging its numerous applications. One of the most important problems in this field is characterization of the solution set. This paper deals with a vector optimization problem, under a real linear vector space, without any particular topology. Some necessary and sufficient conditions are addressed to characterize the (approximate) optimal/efficient solutions. Scalarization tools and algebraic concepts are used, and also some separation theorems are established. The provided results can be useful in sketching numerical algorithms and establishing duality results.

Keywords: Vector Optimization, Algebraic Interior, Vectorial Closure, Separation.

Optimal Investment with Bounded Var for Power Utility Function

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Abstract: In this work, we consider the optimal investment problem for Black-Scholes type financial market with bounded VaR measure on the whole investment interval $[0,T]$. It should be noted that it is impossible to calculate the

explicit form of the VaR risk measure for the random financial strategies. This is the main difficulty in such problems. We propose some method to overcome this difficulty by applying optimisations methods in the Hilbert spaces. We first formulate the Black-Scholes model for price process. All optimization problems and their solutions are given. We then deduce the explicit form for the optimal strategies.

Keywords: Portfolio Optimization, Stochastic Optimal Control, Utility Maximization, Risk Constraints, Value At Risk (Var).

Spectral Gap of Multi Color Exclusion Processus

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Abstract: In this work, we consider a system of particles in the d-dimensional lattice driven by Markov generator, we start with a model of multi space processus and we look for the spectral gap of multi color processus in the homogeneous case, this by using the matrix representation.

Keywords: Exclusion Process, Particles System, Spectral Gap, Markov Process.

Generalized Contraction Mapping in Fuzzy Metric Spaces

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Abstract: In the present paper we introduce generalized contraction mapping in fuzzy metric space and conclude some fixed-point theorems for fuzzy metric space in the sense of George and Veeramani [George A, Veeramani P, on some results in fuzzy metric spaces, Fuzzy Sets and Systems 1994; 64:395-9] are given.

Keywords: Fuzzy Metric Spaces, Generalized Contraction Mapping, Quasi Contraction Mapping.

FI-Semi Projective Modules and Their Endomorphism Rings

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Abstract: In this paper we have studied the properties of FI-Semi projective module related with generalized Hopfian and variants of supplemented modules. Finally discuss the endomorphism ring of FI-Semi projective Modules.

Keywords: Semi Projective, Generalized Hopfian, Supplemented Modules.

Image Restoration by the Evolution Equations

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Abstract: Image restoration by use of equations of evolution has aroused and continues to generate significant interest because of the opportunities it offers to smooth an image while preserving its discontinuities. Since the seminal work of Perona and Malik [6] and ROF [2], many enhancements have been made to best meet the requirements of the restoration (removal of noise without altering the contours for example), especially for grey scale images. Practical applications of these methods of restoration are numerous and affect various fields (photography, medical, etc.)... In this paper, we propose a new model of evolution equations for image restoration based on a functional energy different from that found in the literature. The resulting PDE [3, 4, and 5] is then characterized by the possible integration in the diffusion process of a priori information on specific structures of the image you wish to restore [1]. We present some results obtained by this model on different images.

Keywords: Image Restoration, Evolution Equation, Image Processing

MSC2010 classification: 35D05, 35D10, 46E35.

Thermal Convection in a Fluid Overling a Porous Medium Affected by Rotation and Solute

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Abstract: A linear stability analysis is performed for a horizontal porous layer superposed a fluid layer affected by rotation and solute on both layers. Flow in porous medium is assumed to be governed by Darcy'-Brinkman low. Numerical solutions are obtained by using the method of Legendre polynomials. We conclude that the fluid becomes more stable when the rotation of the fluid decreases. Also, we conclude that as the depth ratio between the two layers increases the thermal Rayleigh number decreases till specific value from the wave numbers then reflected the relationship.

Keywords: Navier-Stokes Equation, Darcy-Brinkman Low, Legendre Polynomials, Salt Concentration.

A Boundary Value Problem with Integral Condition

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Abstract: In this paper, we study a boundary value problem with multi-variables integral type condition for a class of parabolic equations. We prove the existence, uniqueness and continuous dependence of the solution upon the data in the functional wieghted Sobolev spaces. Results are obtained by using a functional analysis method based on two sided a priori estimates and on the density of the range of the linear operator generated by the considered problem.

Keywords: Nonlocal Condition, Weighted Sobolev Spaces, Energy Inequalities, Parabolic Equation.

Embeddings of Finite Triality Groups of Type ${}^3D_4\left(p^n\right)$

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Abstract: A square matrix over the complex field with non-negative integral trace is called a quasi-permutation matrix. Thus, every permutation matrix over C is a quasi-permutation matrix. For a given finite group G, let $p(G)$ denote the minimal degree of a faithful permutation representation of G. The minimal degree of a faithful representation of G by quasi-permutation matrices over the rational and the complex numbers are denoted by $q(G)$ and $c(G)$ respectively. Finally $r(G)$ denotes the minimal degree of a faithful rational valued complex character of G. In this paper we will calculate $p(G)$ for triality groups of Type ${}^3D_4\left(p^n\right)$, where p is odd.

Keywords: Character Table, Lie Group, General Linear Group, Quasi–Permutation Representation, Rational Character.

On Skew Armendariz Rings

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Abstract: Rege and Chhawchharia introduced the notion of an Armendariz ring. They defined a ring R (associative with identity) to be an Armendariz ring if whenever polynomials

$$f(x) = a_0 + a_1x + ... + a_mx^m;\ g(x) = b_0 + b_1x + ... + b_nx^n \in R[x]$$

satisfy $f(x)g(x) = 0$, then $a_ib_j = 0$ for each i; j. (The converse is always true.) Throughout this paper R denotes an associative ring with identity. A ring R is

called semicommutative if for any $a,b \in R$, $ab=0$ implies $aRb=0$. The name Armendariz ring was chosen because Armendariz had noted that a reduced ring (i.e., $a^2=0$ implies $a=0$) satisfies this condition. Zhongkui Liu and Renyu Zhao studied a generalization of Armendariz ring, which is called weak Armendariz ring. They have shown that, if R is a semicommutative ring, then the ring $R[z]$ and the ring $R[x]/(x^n)$ are weak Armendariz. For an endomorphism α of a ring R, Hong, Kim, and Kwak [called R an α-skew Armendariz ring if whenever polynomials

$$f(x)=a_0+a_1x+...+a_mx^m;\ g(x)=b_0+b_1x+...+b_nx^n \in R[x;\alpha]$$

satisfy $f(x)g(x)=0$, then $a_i\alpha^J(b_j)=0$ for each i and j. In this article, we study the generalization of weak α-skew Armendariz ideal and investigate their properties.

Keywords: Armendariz Ring, Semiprime Ideal, Semicommutative, Quotient Ring, Central Element.

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Proposing a New Algorithm in Solving the Problems of Liner Planning

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Abstract: Linear planning is the most widely used optimization model. The wide application range of this model in different states of planning, scheduling, sources allocation, the issues of transformation and networks theories, as well as lost of the other aspects of decision making in industries, economics, and armored affairs necessitate the existence of very strong ,efficient, and reliable methods. Simplex method was raised by George Dantzic in 1947 to answer this requirement. There after, researchers and scholars of research in operation presented numerous articles and instruction about improving the simplex method which is mostly based on the corner by corner simplex method searching. In this paper, a new design is presented instead of the simple method, which is fundamentally different from the simplex method. Using this design, no spot to spot searching is considered for reaching to the optimal point, but rather the dimension of problem atmosphere is reduced in each stage of repetition and most importantly the number of repetition stages of this method is equal to the number of problem variants.

Keywords: Algorithm.

An Application of Mathematics Theorems in Game Theory

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Abstract: This paper is based in the game theory that is a branch applied mathematics with relate to strategy and prediction of behavior a completed science with a diverse range applications. In this paper we researched on DEA models in Game theory. In conclusion we found conditions of being convex and concave when we want to select a foreman from studying community.

Keywords: Game Theory, Convex, Coalition, Decision Theory, Date Envelopment Analysis.

An Iterative Method with Eight-Order Convergence for Solving Nonlinear Equations

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Abstract: Modification of Newton's method with higher-order convergence is presented. The new method requires three-step per iteration. Analysis of convergence demonstrates that the order of convergence is 8. Some numerical examples illustrate that the algorithm is more efficient and performs better than classical Newton's method and other methods.

Keywords: Nonlinear Equation, Iterative Method, Three-Step, Iterative Method, Convergence Order, Efficiency Index.

Cesaro Partial Sums of Certain Analytic Functions

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Abstract: The aim of the present paper is to consider geometric properties such as starlikeness and convexity of the Cesaro partial sums of certain analytic functions in the open unit disk. By using the Cesaro partial sums, we improve some recent results including the radius of convexity.

Keywords: Analytic Function, Univalent Functions, Starlike Functions, Unit Disk, Cesaro Partial Sums.

Chebyshev Polynomials and Compare Them with Macharin Series

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Abstract: The aim of this paper is to use chebishef polynomials for minimizing pack error in internalizing the function. We also present the suggestion of one order of ascending polynomials which is base of processing non-algebraic or high efficacy polynomials. It is shown than how chebishef polynomials can be used in establishing polynomial estimations from a series of maclarin character. Finally by changing chebishef polynomials into chebishef series, we will compare their error rate with maclarin and power series.

Keywords: Chebishef Polynomial, Maclarin, Error, Estimation.

Lie Hypergroups

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Abstract: We define Lie hypergroups and study their embedded and immersed subhypergroups. In particular we investigate the properties of the connected component of the identity, the universal covering and fundamental group of a Lie hypergroup. We also study the quotients and orbits in a Lie hypergroup.

Keywords: Lie Groups, Lie Hypergroups.

Numerical Modeling of MHD Swirling Flow

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Abstract: In this work, a numerical modeling of the convection in cylindrical configurations with and without magnetic field was considered. The finite volumes method has been used to resolve the equations of continuity, momentum

(Navier-Stokes), energy and electric potential. The equations of mathematical model are a partials differential equations, nonlinear elliptic, complex and coupled. The SIMPLER and TDMA algorithms [1] are used to solve this system and obtain a solution. The computer code developed here is validated via comparisons with numerical and experimental data founded in the literature. Stability diagrams are established according to the numerical results of this investigation. These diagrams highlight the dependence of the critical Reynolds numbers ReCr with the values of the Richardson Ri and Hartmann Ha numbers. [2-7]. The results obtained in this study will possibly allow the researchers and industrialists to know the oscillatory modes of a low Prandtl number fluid with magnetic field, in order to improve the quality of the semiconductors obtained during the crystal growth.

Keywords: Numerical Modeling, Finite Volumes Method (VFM), SIMPLER Algorithm, Rotating Flow, Magnetic Field, Liquid Metal.

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Bayesian and Maximum Likelihood Solutions an Asymptotic Comparison Related to Cost Function

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Abstract: A.Wald showed that if the rule of minimax exist,it is also a rule of bayesian decision in comparaison with the most disadvantageous law, that is to say a rule of Bayes in comparaison with the law which would maximize(among all law) the risk of Bayes.The purpose of the present work to etablish a resultat similar , to that of A.Wald, between Bayes estimator and maximum likelihood estimator.We reduce the problem by invariance of the law a priori.We take a measure of Haar.We construct a sequence of cost functions for which Bayes estimator and maximum likelihood estimator are asymptotically equal.

Keywords: Cost Function, Haar Measure, Bayesian Solution, Maximum Likelihood Solution, Topological Group, Multivoc Function, Measurability, a Priori Law.

Application of Hilbert Transforms to Fault Detection in Electric Machines

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Abstract: In this study we investigated the possibility of fault detection due to broken bars in the induction machine rotor using spectral analysis of the stator currents. The modulus of the Fourier transform of the stator current is usually used to detect the presence of this type of defect. The numerical method presented in this work is based on the Hilbert transform applied to the modulus of the stator current spectrum. This method shows the possibility of improving the detection of faults in electrical machines. The results of this method are validated experimentally on a test bench with an induction motor of 5.5-kW.
Keywords: Hilbert Transform, Phase Spectrum, Diagnosis of Induction Machines.

An Overview on the Box-Pierce Portmanteau Test

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Abstract: The idea from which was built in the Box-Pierce portmanteau test is simple and heuristic. In fact, if the proposed model was correct, then the empirical residuals computed using the fitted model would be a realization of a sequence of normal random variables with zero mean and $\sigma^2_{Z_t}$ variance. With this in mind, it is clear that the autocorrelations $\widehat{r}_k$ of the sequence $\widehat{Z}_t$ would be null for $k \neq 0$. So, it is natural to consider the expression $S_{BP} = N\sum_k \widehat{r}_k^{\,2}$ to build a statistical test. We know that $\widehat{Z}_t$ has a Gaussian distribution. Then under the hypothesis H_0 : "$\widehat{r}_k = 0\ \forall k \neq 0$" the S_{BP} statistic is distributed according to a χ^2 distribution. Moreover, the value of S_{BP} is close to zero if H_0 is true. But, the Box-Pierce test performances are not satisfactory. So, a lot of works suggesting improvements of the portmanteau test have emerged. We quote the main

contributions, namely the Ljung-Box statistic S_{LB} which is none other than the Box-Pierce statistic in which we replace the normalization constant $\frac{1}{N}$ by $\frac{N-k}{N(N+2)}$ which is the approximate variance of r_k established by Moran. A second statistic was proposed by Li and McLeod, which consists of adding the constant $\frac{m(m+1)}{2N}$ to the statistic S_{BP}. The same authors have introduced another statistic which is a variant of that Ljung-Box, by replacing in the statistic S_{BP} the autocorrelations of residues by the autocorrelations of squared residuals. and finally, Monti further amends the Ljung-Box statistic by replacing the autocorrelations of the residuals by the partial autocorrelations of the residuals. The performances of the Box-Pierce test and its derivatives have not been satisfactory. Therefore improvements of the portmanteau test have been proposed by Dufour and Roy's. Their contribution is a generalization of the initial portmanteau statistic. Starting from a quadratic form $S=(r-v)^t\,\Sigma^{-1}(r-v)$, where r the vector of the autocorrelations of the residuals is, v is a constant vector and Σ is a positive definite matrix, Dufour and Roy show that Box-Pierce statistic and its derivatives are special cases of their own. Moreover Kwan and Sim propose four types of portmanteau statistics using stabilizing transformations of the variances. Finally, Peña and Rodriguez introduce a statistic based on the determinant of the matrix of autocorrelations of the residuals with some variants. Because of the weakness of the performance of Box-Pierce portmanteau test and their derivatives, some more types of portmanteau statistics have been proposed in order to improve the efficiency of the test by radically changing the form of the statistic proposed by Box and Pierce.

Keywords: Random Processes, Time Series, ARMA Models, Residuals, Portmanteau Test.

Behavior of the Means of Production in the Event of Disruptions

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Abstract: It is characterized by the following four points:

- Holding groups in turbulent

Holding groups in turbulent conditions security system. In the event of moderate disturbance, maintaining groups on the network avoids the degeneration problem. In case of major disturbances such as voltage collapse or loss of synchronism, the good behavior of the groups limits the scope and depth of the incident. As such, it is essential to ensure coherence between the functioning of groups and their associated protection systems and the defense plan.

Controlling the safe operation of the electrical system (or security of the system) is defined as the ability to:

- Ensure the normal operation of the System;
- Limit the number of incidents and avoid major incidents;
- Limit the consequences of major incidents when they occur.

This definition allows an active approach to improving safety. It grows to define the unacceptable consequences of incidents, identify initiating events and parades set to limit the risks.

The issue of safety is therefore long been a defining issue for the operator of the system. It is further strengthened today by the difficulties in implementing new transmission facilities due to increasing environmental constraints. This forces the system operator to use the existing network to even more limitations. It is essential in these conditions, to guarantee the security level if you do not want to increase the likelihood.

Keywords: Safety, Security System, Controlling, Electrical System.

Method of Lines Applied to Solve Heat Transfer for Phase Change Materials

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Abstract: This paper presents a numerical thermal analysis of heat conduction of paraffin. We applied method of lines and finite difference method to solve this problem.

Keywords: Method of Lines, Heat Transfer, Phase Change, Numerical Results, Codes in Matlab.

The Numerical Solution and Implementation of an Efficient 3D Image Registration Method

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Abstract: Image registration can be defined as the process of establishing pixel by pixel correspondences between two (or more) images of the same scene or object that can be taken at different times, from different angles or by different modalities. In this paper we present an efficient 3D image registration method. Our method is based on adjusting divergence and curl of image displacement field, which determines pixel correspondences between images. An image registration procedure might be decomposed into three major components: The problem statement, the registration paradigm and the optimization procedure. Our method minimizes a similarity metric such as the sum of squared differences and uses Lagrange multipliers method to solve the optimization problem governed by the divergence and curl equations. In our implementation, the minimization problem is reduced to solving Poisson equations. We solve the

existing Poisson equations with Finite element (FEM) and Multigrid methods seperately. Computational examples indicate that both solution approaches produce similarly good registration quality but that the cost associated with the multigrid approach is, on the average, less than that for the FEM.

Keywords: Optimization, Image Registration, Lagrange Multipliers, Variational Calculus, Finite Element, Multigrid Method.

AMS classification: 65D18, 65J05, 97N40.

Application of Wavelet Enhanced Neumann Expansion Method to Approximate Solution of Stochastic PDEs

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Abstract: A wavelet enhanced Neumann expansion scheme (WENES) is employed in the numerical solution of a set of linear stochastic partial differential equations with additive Gaussian noise. So far in the applications of the WENES in the literature only Haar wavelet basis was used. The present paper exploits some other orthogonal wavelet bases including Legendre and Hermite wavelet bases. Numerical validity of WENES with these bases is studied. Results of numerical simulations are provided.

Keywords: Wavelet Enhanced Neumann Expansion Method, Stochastic Pdes, Legendre and Hermite Wavelet Bases.

Weighted Bernstein Inequality on Several Intervals

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Abstract: V. Totik proved a generalization of Bernstein inequality for the derivative of polynomials valid for compact sets in the real axis. Here give a weighted version of Totik's inequality valid for the sets consisting of several intervals. Let $E=U_{j=1}^{l}\left[a_j,b_j\right]$ be a set consisting of $l>1$ disjoint intervals, $a_1<b_1<a_2<\ ...\ <a_l<b_l$ let P_n be the set of real algebraic polynomials of degree $\le n$,

$$\left\|f\right\|_E=\sup_{x\in E}\left|f(x)\right|.$$

Theorem: Let ε be an arbitrary positive number, w be any function which is continuous positive on E. Then there exists an n_0 depending on ε, w and E. such that

$$\left|p_n'(x)w(x)\sqrt{\sum_{j=1}^{l}\left|(x-a_j)(x-b_j)\right|}\right|\le n(1+\varepsilon)\left\|p_nw\right\|_\varepsilon$$

for every polynomial $p_n\in P_n,\ n\ge n_0$.

The theorem is sharp even for the case $w\equiv 1$. Namely, it is not possible to omit multiplier $(1+\varepsilon)$ on (*).

Keywords: Polynomial, Bernstein Inequality, Several Intervals.

Cellular Automata Based Byte Error Correcting Codes over Ternary Fields

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Abstract: Cellular automata have modular and regular structure which can be constructed with VLSI economically. On account of this, in recent years, this feature has become an important tool for error correcting codes. Cellular

automata based byte error correcting codes analogous to extended Reed-Solomon codes over binary fields was studied by Chowdhury et al. Further, Bhaumik et al. have improved the coding-decoding scheme. In this study, we extend cellular automata based double-byte error correcting codes from binary fields to ternary fields.

Keywords: Cellular Automata, Byte Error Correcting Code, Ternary Field.

Geometric Perspective on the Methods of Bivariate Lagrange Interpolation and Ols

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Abstract: In this study, the consumer prices for Germany and Turkey between 2006 and 2011, real GDP and unemployment data were geometrically interpreted by using Lagrange interpolation and OLS method. The coefficients of linear regression model were obtained by matrix display of OLS method. The interpolation polynomials were considered in bivariate situation and a different formulation was aimed. Thanks to the considered methods it will be possible to have an idea about the unemployment rate status in Germany and Turkey.
Keywords: Lagrange Interpolation, OLS, Regression, Geometrical Display, Matrix Display.

Discontinuous Galerkin Methods with an Application for Elliptic Problems

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Abstract: In this work, we begin by the describing Discontinuous Galerkin Methods. Our model problem is about one dimensional elliptic two-point

boundary value problem. We will give the existence, uniqueness and convergence of the method's solution on the problem. We will be given its code in MATLAB and solve problem with DGM.

Keywords: Discontinuous Galerkin Methods, Convergence, Matlab, Numerical Schemes.

Solvability of Hiv/Aids System And Comparison of the Results with Modified Decomposition

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Abstract: The proof of a new result concerning the conditions for solvability of HIV / AIDS is presented and illustrated with a few examples and comparison with new methods.

Keywords: Adomian Decomposition Method, Power Series, HIV/Aids Epidemic.

Jacobsthal-Lucas Numbers as Permanents of Periodic Tridiagonal Matrices

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Abstract: In this paper, we study on Jacobsthal-Lucas numbers. We obtain Jacobsthal-Lucas numbers with even and odd subscript as permanents of two different periodic tridiagonal matrix. When we investigate permanents, we use the contraction method.

Keywords: Jacobsthal-Lucas Numbers, Periodic Tridiagonal Matrix, Permanents, Contraction Method.

The Method of Identifying Mathematical Model of Industrial Process of Polymerization

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Abstract: The work presents identification method, allowing receiving a mathematical model of industrial processes of polymerization according to data of regular maintenance taking into account interference correlation. The method for receiving optimum estimates of model parameters, which can be employed to control the process, has been suggested.

Keywords: Plastic Materials, the Value of Mean-Root-Square Error (MRQE).

Existence of Berge's Strong Equilibrium with Pseudocontinuous Functions

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Abstract: In their paper [2], prove the existence of Nash equilibrium with weak continuity assumption on payoff functions of a finite number of players called “pseudocontinuity”. To get strong stability of the Nash equilibrium, [1] prove the existence of Berge’s strong equilibrium with strong continuity assumption on payoff functions of finite number of players (upper semicontinuous). The aim of this paper is to prove the existence of equilibrium in [1] with pseudocontinuity.

Keywords: Nash Equilibrium, Berge's Strong Equilibrium, Pseudocontinuous Function.

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Class of Finite Operators

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Abstract: Let H be a separable infinite dimensional complex Hilbert space, and $L(H)$ denote the algebra of all bounded linear operators on H. The class of finite operators is the class of operators for which the distance of the identity operator I and the derivation ranges is maximal; where the derivation range of the operator A is noted by δ_A, $\delta_A : L(H) \to L(H)$, $X \to AX - XA$. This is équivalent to $0 \in \overline{W(AX - XA)}$, (The closure of numerical range of the operator $AX - XA$). In this paper we present some properties of finite operators and give some classes of operators which are in the class of finite operators, and find for witch condition $A \otimes W$ is a finite operator in $L(H \otimes H)$, and gave a géneralisation of Stampfly theorem.

Keywords: Finite Operator, Approximate Reduced Spectra, R1.
AMS Classification: Primary 47B47, Secondary 47B10, 47A20.

The Numerical Solution of Partial Differential-Algebraic Equations (Pdaes) by Multivariate Pade Approximation

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Abstract: In this paper, Numerical solution of Partial Differential-Algebraic Equations (PDAEs) is considered by Multivariate Padé Approximations. We

applied this method to one example. First Partial Differential-Algebraic Equation (PDAE) has been converted to power series by two-dimensional differential transformation, and then the numerical solution of equation was put into Multivariate Padé series form. Thus we obtained numerical solution of Partial Differential-Algebraic Equation (PDAE).

Keywords: Partial Differential-Algebraic Equation (Pdaes), Two-Dimensional Differential Transformation, Multivariate Padé Approximation.

Two New Different Kinds of Convex Dominated Functions and Inequalities Via Hermite-Hadamard Type

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Abstract: In this paper, we establish two new convex dominated functions and then we obtain new Hadamard type inequalities related to these definitions.

Keywords: Convex Dominated Function, Hermite-Hadamard Inequality, Q(I)-Functions, P(I)-Functions.

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Ostrowski Type Inequalities Via H-Convex Functions with Applications for Special Means and PDF's

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Abstract: In this paper, we establish some new Ostrowski type inequalities for the class of h-convex functions which are super-multiplicative or super-additive and nonnegative. Some applications for special means and PDF's are given.

Keywords: Ostrowski's Inequality, H-Convex, Super-Multiplicative, Super-Additive.

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A Fundamental System of Units of Numbers Field of Degree 3, 4 and 6[1]

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Abstract: There is a close link between a Fundamental System of Units of some number fields, the resolution of some Diophantine Equations, the cycle of continued fractions and some Cryptography Protocols (see J. Buch- Mann [2]). Also, the regulator of a number field K, based on the knowledge of a Fundamental System of Units, is a capital piece in calculating the class number of K, and consequently the Hilbert class field tower, and building codes on this number field, (see V. Guruswami [3]). This, in addition to many other applications, justifies the determination for such a FSU. If K is an algebraic extension of degree $n = r + 2s$ over the rational numbers field Q, with r is the number of real embeddings and $2s$ the number of complex embeddings of K, Dirichlet established that group of units U_K of K is generated by $r + s - 1$ units. The group of units U_K is then told of rank $r + s - 1$. The set of all generators $S = \{\varepsilon_1, \varepsilon_2, ..., \varepsilon_{r+s-1}\}$ forms what so called a Fundamental System of Units of K. If $n = 4$ or 6, let $M_n = D^n \mp d > 1$, d / D^n, d, $D \in \mathbb{N}^*$;

H.-J. Stender [4] and [5] assumes that Mn is square free, this allows him to use directly the Bernstein units [1] to calculate a fundamental unit of each of the quadratic fields $K_{2,4} = Q\left(\sqrt{M_4}\right)$ and $K_{2,6} = Q\left(\sqrt{M_6}\right)$, and a fundamental unit for the cubic field $K_{3,6} = Q\left(\sqrt[3]{M_6}\right)$. Consequently, the author determines a

Fundamental System of Units of the number fields $K_6 = Q\left(\sqrt[6]{M_6}\right)$ and $K_4 = Q\left(\sqrt[4]{M_4}\right)$.

Now we consider $M_n = (D_n)^n \mp D_n > 1$, where $D^n = tv^n \pm 1 \neq 0$ and $t, v \in \mathbb{N}^*$;

Here, the positive sign commutes with the negative one in the expression of M_n and D_n, that is to say:

$$\begin{cases} Case\,"-" & : M_n = \left(D_n\right)^n - D_n \text{ et } D_n = tv^n + 1, \\ Case\,"+" & : M_n = \left(D_n\right)^n + D_n \text{ et } D_n = tv^n - 1, \end{cases}$$

In both cases, v^n divides M_n $\left(v^n / M_n\right)$, i. e., we have the form $M_n = m_n v^n$. Obviously: $K_n = Q\left(\sqrt[n]{M_n}\right) = Q\left(\sqrt[n]{m_n}\right)$, but m_n no longer admits a parameterization similar to that of M_n; Consequently, the Bernstein units [1] are no longer valid. In this paper, we assume that m_n is square free, and hence M_n contains a square accept if $v = 1$, (the case " $v = 1$" coincides with that of stender), and we establish Fundamental System of Units of the number fields

$K_n = Q\left(\sqrt[n]{M_n}\right)$, $n \in \{4, 6\}$ and $K_{3,6} = Q\left(\sqrt[3]{M_6}\right)$;

and of course we calculate a fundamental unit to the quadratic subfields

$K_{2,4} = Q\left(\sqrt{M_4}\right)$, and $K_{2,6} = Q\left(\sqrt{M_6}\right)$

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Hardy Spaces Associated with Laguerre Operators and Their Applications to Hyperbolic Equations

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Abstract: In this paper, we prove multiplier theorems and their applications to estimates for wave equation in Hardy spaces associated with a Singular second order partial differential operator. Using these results, we discuss some recent progress in hardy spaces.

Keywords: Hardy Space, Laguerre Operator, Hyperbolic Equation.

Solving the Vibration of the Current-Carrying Wire in a Magnetic Field using Variational Iteration Method

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Abstract: In this paper, Variational Iteration Method (VIM) is proposed to solve the dynamic oscillation of a current-carrying wire in a magnetic field generated by a fixed current-carrying conductor parallel to the wire. Two linear springs are considered to restrict the wire to a rigid wall. For a special case, the periodic solution of the problem is obtained by VIM and compared with numerical solutions for different parameters. The results show the high accuracy of this method and methods can be easily extended to solve other non-linear vibration equations and so can be found applicable in engineering.

Keywords: Current-Carrying Wire, Non-Linear Equation, Linear Elastic Springs, Variational Iteration Method.

Application of Frailty Models to Survival Data

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Abstract: In this regard, we will devote ourselves to the study of frailty models Alioum and Commenges (1996) in the case of survival data Cox (1972). Arbitrarily censored and truncated Finkelstein et al. (1993) and focus on estimating the parameters of our model Turnbull (1976) and Frydman (1994). The necessity of applying frailty models Vaupel et al. (1979) to analyze survival data arises when the assumption of a homogenous population seems questionable. We will apply our model to epidemiological data.

Keywords: Model of Survival, Censored and Truncated Data, Frailty Models.

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Note on the Nullity of Graphs Respect to Matching Number

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Abstract: The nullity of a graph is defined as the multiplicity of the eigenvalue zero in the spectrum of the adjacency matrix of the graph. In this paper we investigate the nullity of graphs. Let $G=(V,E)$ be a graph and $e \in E(G)$. Then the subgraph by G/e is the subgraph of G obtained by removing the edge e from G. Denoted by $G/\{v_1, v_2, ..., v_k\}$ means a graph obtained by removing the vertices $v_1, v_2, ..., v_k$ from G and all edges incident to any of them. The adjacency matrix $A(G)$ of graph G with vertex set $v(G)=\{v_1, v_2, ..., v_n\}$ is the $n \times n$ symmetric matrix $a[ij]$, such that $a_{ij}=1$ if v_i and v_j are adjacent and 0, otherwise. The characteristic polynomial $\Phi(G,x)$ of graph G is defined as.

$$\Phi(G,x)=\det(A(G)-xI)$$

The roots of the characteristic polynomial are the eigenvalues of graph G and form the spectrum of this graph. The number of zero eigenvalues in the spectrum of the graph G is called its nullity and is denoted by $\eta(G)$. Suppose $r(A(G))$ be the rank of $A(G)$, namely its adjacency matrix $A(G)$. It is well – known fact that

$$\eta(G)=n-r(A(G))$$

Keywords: Characteristic Polynomial, Nullity, Matching, Product Graphs.

Numerical Radius and Unitarily Invariant Norms

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Abstract: In this work, we show that if H is a Hilbert space, then Ky Fan's dominance theorem for unitarily invariant norms holds for $B(H)$ if and only if

H is separable or finite dimensional. Also, if H is a separable Hilbert space with an orthonormal basis $\{e_n\}_{n\in N}$, then the equality $\|\cdot\|=\|\sum_{i=1}^{\infty}(S_i)\cdot(e_i\otimes e_i)\|$ holds for every unitarily invariant norm $\|\cdot\|$ on $B(H)$, where $S_i(T)$ is the ith s-number of an operator T on H. In related to numerical range, we determine the maximum (minimum) in the class of unitarily invariant norms $\|\cdot\|$ such that

$\|T\|\leq w(T)(\|T\|\geq w(T))$

for every bounded operator T in $B(H)$. Here, $w(T)$ denotes the numerical radius of T.

Keywords: Hilbert Space, Numerical Ranges, Numerical Radius, Unitarily Invariant Norms.

Stability of Some Functional Equations Defined in Quasi-Banach Spaces

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Abstract: In this paper the general solution of the functional equation derived from a kind of quadratic and additive functions will be established. Also the Hyers–Ulam–Rassias stability of this equation in quasi-Banach spaces will be investigated.

Keywords: Functional Equation, Stability.

Associated Prime Submodules

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Abstract: Throughout this paper R is a commutative ring with identity and all modules are unitary. Prime submodules have been studied by many authors. A submodule N *of an* R-module M is said to be prime (or p-prime) if $rx\in N$

for $r \in R$ and $x \in M$, implies that either $x \in N$ or $r \in p = (N : M)$. Various papers on prime submodules are devoted to the generalization of related results of prime ideals to prime submodules; see for example [1]. In a recent paper of this case, Divaani-Aazar and Esmkhani [2] introduced the notion of associated and supported prime submodules as a generalization of associated and supported prime ideals and extended some of the most important results concerning associated prime ideals. For instance, they proved that for any multiplication module M *over* a Noetherian ring R, if $0 = \cap Q_i$ is a minimal primary decomposition of the zero submodule of M, then $AssP\ M = \{rad(Q_i) : i = 1, 2, ..., n\}$. to see the main properties of the sets of associated and supported prime submodules one is refereed to [2]. Recall that an R-module M is called a multiplication module if for each submodule N of M, $N = IM$ for some ideal I of R. In this paper, we will try to develop this theory and give some relations between associated, supported, maximal and prime submodules.

Keywords: Associated Prime Submodules, Prime Submodules, and Quasi Multiplication Modules.

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Weak α-Skew Armendariz Ideal

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Abstract: In this article, we introduce the concept of weak α-skew Armendariz ideal and investigate their properties. Moreover, we prove that, I is a weak α-skew Armendariz ideal if and only if $I[x]$ is a weak α -skew Armendariz ideal. As a consequence, we show that, R is a weak α -skew Armendariz ring if and only if $R[x]$ is a weak α-skew Armendariz ring. Recall from [10] that a one-sided ideal I of a ring R has the insertion of factors property (or simply, IFP) if $a,b \in I$ implies $aRb \subseteq I$ for $a,b \in R$. Observe that every completely semiprime ideal (i.e., $c^2 \in I$ implies $c \in I$) of R has the IFP (or R is semicommutative).

Keywords: FP, Weak Skew Armendariz Ideal, Armendariz Ring, Semiprime Ideal, Semicommutative Quotient Ring, Central Element.

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System Involving Critical Sobolev Exponent and Weights on Elliptic System Involving Critical Sobolev Exponent and Weights

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Abstract: This paper is devoted to the existence of positive solutions for a semi linear elliptic system involving critical Sobolev exponent and weights. We study the effect of the behavior of weights near their minima on the existence of solutions for the considered problem.

Keywords: Critical Sobolev Exponents, Palais-Smale Condition, Semi Linear Elliptic Systems.

Differential Equations in Scales of Banach Spaces

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Abstract: This work presents a fundamental result in the theory and the application of ordinary differential equations and partial differential equations. Our concentration is based on the method of Picard. We examined certain linear

differential equations and nonlinear in an abstract setting by entering into scale of Banach spaces in a simpler form.

Keywords: Banach Spaces, Differential Equations, Ovsjannikov Method, Scale of Banach Spaces.

Hybrid Adaptive Synchronization of Hyperchaotic Systems with Fully Unknown Parameters

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Abstract: In this work, an adaptive control scheme is developed to study the hybrid synchronization behavior between two identical and different hyperchaotic systems with unknown parameters. This adaptive hybrid synchronization controller is designed based on Lyapunov stability theory and an analytic expression of the controller with its adaptive laws of parameters is shown. The adaptive hybrid synchronization between two identical and different hyperchaotic systems is taken as two illustrative examples to show the effectiveness of the proposed method. Theoretical analysis and numerical simulations are shown to verify the results.

Keywords: Hybrid Synchronization, Adaptive Control, Unknown Parameters, Hyperchaotic.

Numerical Investigations of Stagnation Point Flow over a Stretching Sheet with Conjugate Boundary Conditions

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Abstract: In this study, the numerical solution of stagnation point flow over a stretching sheet with convective boundary conditions is considered. The transformed boundary layer equations are solved numerically using a Shooting

method. Numerical solutions are obtained for the local heat transfer coefficient, wall temperature as well as the velocity and temperature profiles. The features of the flow and heat transfer characteristics for various values of the Prandtl number, stretching parameter and conjugate parameter are analyzed and discussed.

Keywords: Boundary Layer Flow, Convective Boundary Conditions, Stagnation Point, Stretching Sheet.

The Profile of Blowing-Up Solutions to a Nonlinear System of Fractional

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Abstract: In this talk, we present blowing-up solutions to non-linear system of fractional differential equations. Moreover, not only the profile of the blowing-up solutions will be presented but also a bilateral estimates of the blow-up time. Our method of proof relies on comparisons of the solution to the system in question with solutions of subsystems obtained from the system in question by dropping either the usual derivatives or the fractional derivatives.

Cofiniteness of Local Cohomology Modules

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Abstract: Let R denote a commutative Noetherian (not necessarily local) ring, and I an ideal of R of dimension one. The main purpose of this note is to generalize, and to provide a short proof of, K. I. Kawasaki's Theorem that the category $M(R,I)_{cof}$ $I-$cofinite modules over a commutative Noetherian local ring R forms an Abelian subcategory of the category of all R-modules.

Consequently, this assertion answers affirmatively the question raised by R. Hartshorne for an ideal of dimension one in a commutative Noetherian ring R.

Keywords: Cofinite Modules, Noetherian Rings, Local Cohomology Modules.

On Fuzzy Subgroups with Operators

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Abstract: The aim of this paper is to define the fuzzy subgroups with operators "m–fuzzy subgroups", m–normal fuzzy subgroups and study some of its roperties.

Keywords: Fuzzy Sets, Fuzzy Subgroups, Normal Fuzzy Subgroups, M–Groups M–Fuzzy Subgroups, M–Normal Fuzzy Subgroups, M-Homomorphism.

Electric Load Consumption Prediction using Statistical Approaches

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Abstract: Modeling and forecasting of electrical load demand are crucial and essential for the operation, control and planning for electricity companies. In this paper, the pragmatic exponential smoothing approaches which are considered as a most popular forecasting means are used to forecast the next day for electrical load consumption. Load demand information from a real-world case study based in electricity market of mainland France is used for validation and checking. Comparison between various statistical methods is made showing the best techniques and a good one for electric load prediction.

Keywords: Electric Load Consumption, Statistical Approaches, Exponential Smoothing Model, Forecasting, Root Mean Square Error.

Akiyama-Tanigawa Matrix and Related Combinatorial Identities

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Abstract: In this work, we define the generalized Akiyama-Tanigawa matrix and investigate the relationship between it and the Stirling numbers of the second kind. Also, we give the generating function for any column or row of the generalized Akiyama-Tanigawa matrix. As a consequence, we find some new identities on Stirling numbers of the second kind. In addition, some applications are given.

Keywords: Akiyama-Tanigawa Matrix, Congruences, Generating Function, Stirling Numbers of the Second Kind.

Implicit and Explicit Algorithms for a System of Nonlinear Variational Inequalities in Banach Spaces

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Abstract: In this paper, we consider a general system of nonlinear variational inequalities (in short, GSVI) in the setting of Banach spaces. We first establish the equivalence between GSVI and a system of fixed point problems. By utilizing this equivalence, we construct an implicit algorithm of Mann's type for solving GSNVI. We also propose another explicit algorithm of Mann's type for solving GSVIB. Finally, under very mild conditions, we prove the strong convergence of the sequences generated by the proposed algorithms.

Keywords: General System of Nonlinear Variational Inequalities, Inverse Strongly Accretive, Strongly Accretive and Strictly Pseudocontractive Mappings, Sunny Nonexpansive Retraction.

Performance Evaluation of Shewhart Control Charts

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Abstract: The variability control charts are meant for monitoring the variability in process due to special causes. Shewhart control charts for asymmetric control limits are explored and are compared with the charts based on symmetric limits. The other desirable properties like Unbiasedness, monotonicity, efficiency, consistency, robustness, invariance, and locally most powerful tests, are discussed for Shewhart control charts. Probability limits (not 3 sigma control limits) are used for the construction of control charts. It is observed that asymmetric limits resulted in completely unbiased control charts which also possess other desirable properties.

Keywords: Variability Control Charts, Shewhart Control Charts, Control Limits.

The Henstock-Kurzweil Integral of Set-Valued

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Abstract: A theory of integration of compact convex set-valued is provided by applying the Henstock integral has been studied by She Xiang Hai, Fang Di Kong and Ji Shu Chen. The aim of this paper is to give a similar characterization of the Henstock-Kurzweil integrability for a more general class of set-valued function. More over, we compare the Henstock-Kurzweil integral with Debrue and Aumann ones.

Keywords: Henstock-Kurzweil Integral, Set-Valued.

On Pointwise Statistical Convergence of Order α for the Function Sequences

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Abstract: In this article, we introduce the concepts of pointwise statistical convergence of order α and strongly p-Cesaro summability of order α for the function sequences.

Keywords: Function Sequences, Statistical Convergence, Cesaro Summability.

Simulation of Sinc-Galerkin Approximation for Nonlinear Boundary Value Problems by using Maple

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Abstract: A powerful technique based on "Sinc-Galerkin" method is presented for obtaining numerical solutions of second order nonlinear Dirichlet-Type boundary value problems (BVPs). The method is based on approximating functions and their derivatives by using the Whittaker cardinal function. Without any numerical integration, the differential equation is reduced to a system of algebraic equations via new accurate explicit approximations of the inner products; therefore the evaluation is based on solving a matrix system. The solution is obtained by constructing the nonlinear (or linear) matrix system using Maple and the accuracy is compared with Newton Method and Simulated in Graphical and Numerical manner.

Keywords: Maple, Sinc-Galerkin Method, Sinc Basis Function, Nonlinear Matrix System, Newton Method.

Axisymmetric Large Deflection Analysis of Shallow Spherical Shells

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Abstract: Geometrically nonlinear axisymmetric bending of shallow spherical shells under rotational symmetric transverse load is investigated numerically. A system of ordinary differential equations is transformed to a set of algebraic equations by the finite difference method using the forward, backward and central differences of $O(h^2)$. The solution is obtained by the Newton-Raphson method. The shell model on which the formulation in the current study is based does not include transverse shear deformation. The thickness of the shell is considered to be uniform and the material of the shell is assumed to be homogeneous and isotropic. The boundary conditions along the edge and the conditions at the apex of the shell are satisfied exactly. Sensitivity analysis is made for two geometrical parameters: i) the ratio of the base radius to the thickness of the shell (c), ii) the parameter of depth (η). At each point six unknowns are considered, three displacement components and three stress resultants. Convergence studies are performed. The accuracy of the results is checked by comparing them with the solutions of plates and shells in the open literature and good agreement is obtained.

Keywords: Axisymmetric Large Deflection Analysis of Shallow Spherical Shells.

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Operators on Some Vector-Valued Orlicz Sequence Spaces

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Abstract: In this note, we give some sequences of operators which have the same function with a basis for some vector-valued Orlicz sequence spaces. Also, we characterize the space $B\left(h_M\left(X\right), Y\right)$ of continuous operators from $h_M\left(X\right)$ into Y where M is an Orlicz function, X, Y are Banach spaces and $h_M\left(X\right)$ is the space of all $X-$valued sequences $x=\left(x_k\right)$ such that

$$\sum_{k=1}^{\infty} M\left(\frac{\left\|x_k\right\|}{\rho}\right)<\infty \text{ for all } \rho>0.$$

Exactly, we obtain that each $T\in B\left(h_M\left(X\right), Y\right)$ is equivalent, under certain conditions, to any sequence $A=\left(A_k\right)_{k=1}^{\infty}$ of operators $A_k\in B\left(X,Y\right)$.

Keywords: Representations of Functionals, Orlicz Sequence Spaces, Operator Spaces.

Vector-Valued FK-Spaces Defined by a Modulus Function and Infinite Matrix

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Abstract: In this work is devoted to studying on the sequence space $\lambda\left(A, X_k, r, f, s\right)$ defined by a modulus function f and an infinite matrix A

and constructed its $FK-$structure under some conditions. Finally, we exposed some inclusion relations among, the variations of the space. The vector-valued sequence space $\lambda(A, X_k, r, f, s)$ as a paranormed space which is a most general form of the space investigated in $[7]$.

Keywords: Sequence Spaces, Modulus Function.

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Some Geometric Properties of Linear Metric Space $\left(V(\lambda, p), d\right)$

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Abstract: In this study, we consider the space $V(\lambda, p)$ with an invariant metric. Then, we examine some geometrical properties of the linear metric space $\left(V(\lambda, p), d\right)$ such as property (β), (H) property and k-NUC property.

Keywords: Linear Metric Space, Property (β), K-NUC Property, (H) Property.

Numerical Solutions of Linear and Nonlinear Klein-Gordon Equations using Reproducing Kernel Hilbert Space Method

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Abstract: In this paper, we investigate the effectiveness of the Reproducing Kernel Method (RKM) in solving time dependent partial differential equations. We proposed a reproducing kernel method for solving the Klein-Gordon equation with initial and boundary conditions based on the reproducing kernel theory. We consider the homogeneous, non-homogeneous, linear and nonlinear Klein-Gordon equations with initial and boundary conditions. Some numerical examples have been studied to demonstrate the accuracy of the present method. The results obtained from the method are compared with the exact solutions and other methods. Results of numerical examples show that the presented method is simple, effective and easy to use. Comparisons with the exact solutions, the solutions obtained by the Adomian decomposition method (ADM), the variational iteration method (VIM), Homotopy-perturbation method (HPM) show the potential of RKM in solving nonlinear partial differential equations.

The technique described at this juncture can also be applied to other nonlinear evolution equations and systems.

Keywords: Reproducing Kernel Method, Series Solution, Klein-Gordon Equation, Reproducing Kernel Space.

A New Type of Conjugate Gradient Coefficient with Global Convergence Properties

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Abstract: Conjugate gradient (CG) methods play a significant and important role in solving unconstrained optimization. In this paper, a new modification of conjugate gradient coefficient (β_k) with global convergence properties are presented. The global convergence result is established using exact line searches. Numerical result shows that the proposed formula is superior when compared to the other CG coefficients.

Keywords: Conjugate Gradient Method, Conjugate Gradient Coefficient, Global Convergence, Exact Line Search, Unconstrained Optimizations.

A Holditch-Type Theorem for the Polar Moment of Inertia Under the 1-Parameter Closed Planar Homothetic Motion

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Abstract: In this paper, we give the Holditch-Type Theorem for the polar moments of inertia of the closed orbit curves of two linear points and another point which is non-collinear with these points under 1-parameter closed planar

homothetic motions. Furthermore, the obtained results are illustrated by computer-aided examples.

Keywords: Holditch Theorem, Homothetic Motion, Polar Moment of Inertia.

Derivative Operators on the Logarithmic Extension of the Two-Parameter Quantum 3D Space

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Abstract: In this work we introduced derivative operators corresponding to the differential calculus on the logarithmic extension of the two-parameter quantum 3d space. Based on these operators, we obtained the quantum Weyl algebra which reduces to the usual Weyl algebra when the deformation parameters are set to one.

Keywords: Quantum Space, Differential Calculus, Weyl Algebra.

On the Moving Coordinate System on Galilean Plane and Pole Points

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Abstract: In this work, one Galilean plane moving relative to two other Galilean planes, one moving and other fixed, was taken into consideration and the relation between the absolute, relative and sliding velocities of this movement and the shear rotation poles were obtained.

Keywords: Kinematics, Moving Coordinate System, Galilean Plane, Galilean Motions.

Approximation Theory in Intuitionistic Fuzzy 2-Banach Spaces

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Abstract: In this work, we define the concept of intuitionistic fuzzy *T*-convergence by using a sequence of linear operators in intuititonistic fuzzy 2-Banach spaces, and then we study the approximation theory in intuititonistic fuzzy 2- Banach spaces. Afterward, we consider some applications related to the concept.

Keywords: Intuitionistic Fuzzy 2- Banach Space, Intuitionistic Fuzzy *T*-Convergence.

Triple Positive Solutions for System of Nonlinear Second-Order Differential Equations Three Point Boundary Value

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Abstract: In this work, we apply the Legget-Williams fixed point theorems to obtain sufficient con-dition for existence at least three positive solutions of boundary value problems for systems second-order ordinary differential equations of the form

$$\begin{cases} -u''(t)+k^2u(t)= f(t,u(t),v(t)), 0<t<1 \\ -v''(t)+w^2v(t)=g(t,u(t),v(t)), 0<t<1 \\ u(0)=v(0)=0 \\ u(1)=\alpha u(\eta), v(1)=\lambda v(\beta) \end{cases}$$

where

$f:(0,1)\text{ x } [0,+\infty) \text{ x } [0,+\infty)\to[0,+\infty)$; $g: [0,1] \text{ x } [0,+\infty) \text{ x } [0,+\infty)\to[0,+\infty)$

and k, w are positive constants. $0<\eta<1,\ 0<\beta<1,\ 0<\alpha<\alpha_0,\ 0<\lambda<\lambda_0$

Keywords: Nonlinear Second-Order Differential Systems, Positive Solutions, Legget-Williams Fixed Point Theorems, Boundary Condition.

2000 AMS Subject Classification: 34B10, 34B15, 34B14.

Seasonal Dynamic in a SIR Epidemic System

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Abstract: In epidemic SIR model, the cause of seasonal pattern may vary from human force phenomena, such as the succession of school terms and holidays. Using different scales in times and variables, we rewrite a seasonal SIR model as slow-fast dynamical system and we state the existence of an attractor for the switched dynamics between school terms and holidays. This allows us to prove existence of different type of periodic solutions which can be interpreted as an endemic infection or epidemics outbreaks.

Keywords: Seasonal Switched SIR Epidemic Model, Singular Perturbation, Slow-Fast System, Averaging, Periodic Motion.

Euclids Geometry

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Abstract: Innovative method of Euclid for materials compilation was noticed by mathematicians. After a while it found such logic that nobody could add anything to these principles. However, scope of principle book effect is beyond geometry knowledge so that Euclid's Method has been very effective in forming logical thought in west and emerging new knowledge. Euclid's geometry is based on some simple and obvious principles and from which all geometrical theorems so as each theorem confirms the subsequent one. In this paper it is tried

to study the fifth principle of Euclid and present the disadvantages of this principle. Fifth principle is in any way obvious therefore it was questioned as a principle, confirmation of this principle in fact breaks being principle. Then different forms of this principle will be presented and proposed alternatives for this principle will be given.

Keywords: Principles, Proposed Alternatives.

Integral

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Abstract: A common method for calculating integral is to calculate under-carve surface of functions. Various ways have been presented for calculating integral $\int_x^a kdx$; in this paper we study Calvary, john wise and forma methods for calculating $\int_x^a kdx$. Then those methods are compared and the best solutions for this integral will be found. At first method, then John wise method for positive and rational k and after that Forma method for integrating x^n are studied.

Keywords: Integral, Under-Curve Surface, Plane.

MRI &3 Dimension Fourier Transform

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Abstract: The Fourier transform is an important mathematical transformation that is used in many areas of science and engineering, such as telecommunications, signal processing, and digital imaging. We briefly review the Fourier transform in this section. See Bracewell 1999 for a thorough introduction to Fourier transforms. We review the Fourier transform and the classic algorithm for the FFT and present an implementation of the algorithm for the Gamma test. We then present several specific approaches that we have employed for obtaining higher performance. We also briefly review the image-formation mathematics of MRI and ultrasonic imaging and present results obtained by reconstructing sample MRI and ultrasonic images.

Keywords: MRI, Fourier Transform.

On Eigenvalues and Eigenvectors of a Matrix

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Abstract*:* In this paper we seek to find eigenvalues and eigenvectors of a matrix. Theoretically, the eigenvalues of an n×n matrixe like matrix a are calculated by finding the n zeros of $p(\lambda)=\det(\lambda I-A)$, which called characteristic polynomial of A. Then, the respective linear system solved to determine corresponding eigenvectors. In practice, it is difficult to find $P(\lambda)$ and determine roots of the polynomial of degree n, except for small n. Hence, it is necessary to build approximate techniques to find eigenvalues of a matrixe.

Keywords: Eigenvalue, Eigenvector, Characteristic Polynomial, Roots of Polynomial, Approximate Techniques.

Analysis of Errors in Numerical Analysis

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Abstract: As we know much of numerical analysis is concerned with obtaining approximate solution, while maintaining reasonable bound on errors. In this study, we want to focus on complex and crucial problems in numerical analysis or calculation of numerical algorithms. Then we will analyze different numerical methods in this field and after that we choose the best numerical method.

Keywords: Error, Numerical Analysis.

Asymptotic Stability and Regularity in Generalized Local Cohomology

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Abstract: Let R be a positively graded ring with a local base ring and I be a graded ideal of R. Let M, N be two graded R- modules. Some tameness and asymptotic behaviors of graded components of the graded R- module $H_I^i(M, N)$ will be studied. Also the vanishing of graded components of this generalized local cohomology modules with support in different graded ideals in a certain graded rings will be compared, from which a bound for the regularity of the pair (M, N) will be obtained.

Keywords: Graded Generalized Local Cohomology, Tameness, Regularity, Asymptotic Stability.

On the P(X)-Laplacian Problem at Resonance

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Abstract: In this work, we study the resonance problem associated to the $p(x)$ – Laplacian given by $-\Delta_{p(x)}u + f(x,u) = \lambda^* g(x)|u|^{q(x)-2} u$ -in Ω $u / \partial\Omega = 0$ where $\Delta_{p(x)}$ is the *p(x)*-Laplacian operator $\Delta_{p(x)} = \nabla(Iu^{p(x)-2})$ $p(x), q(x)$ are variable exponents, $g(x)$ is a positive weight and $f(x,u)$ is a Carathéodory function. The real number λ^* designs the principal eigenvalue of the homogenous problem. By means of the Leray-Lions Theorem, we establish the existence of at least one non trivial solution.

Keywords: Sobolev Variable Exponent, Weak Solution, Monotone Operator.

The Ishakawa Iteration Method for the Approximation Solution of Ordinary Differential Equations

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Abstract: In this article, Ishakawa Iteration Method is presented to find the approximate solution of ordinary differential equation having initial condition. Additionally, some numerical examples with initial conditions are given to show the properties of the iteration method. Furthermore, the results are compared with the Adomian Decomposition Method, Euler Method, Runge-Kutta Method and Picard Iteration Method. Finally, the present method namely Modified Ishakawa Iteration Method is seen to be very effective and efficient in order to solve different type of the problem.

Keywords: Ordinary Differential Equation, Euler Method, Fix Point, Numerical Analysis, Modified Ishakawa Iteration Method, Picard Successive Iteration Method.

Lagrange Interpolatuion to Compute the Numerical Solutions of Differential Integral Equations

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Abstract: In this project, we discussed about Lagrange interpolation and its use in solving some of equations, these equations include: linear Volterra and Fredholm integral equation of the first and second kind, linear differential equation of arbitrary order n with initial condition. Lagrange polynomials have advantages and disadvantages over other interpolation polynomials. We can improve it, by manipulating its formula. The result of this manipulation is Barycentric formula.

Keywords: Lagrange Interpolation.

Existence of Positive Solution for Fractional Differential Equations

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Abstract: In this talk, we study existence of solutions to nonlinear boundary value problems for fractional differential equation. By using fixed point theorems in a cone, the existence of one positive solution and multiple positive solutions for nonlinear singular boundary value problems is obtained.

Keywords: Cone, Multi Point Boundary Value Problem, Fixed Point Theorem, Fractional Derivative.

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Characterization of $U_1(\mathbb{Z}C_n^+)$ for n≤15

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Abstract: Let $C_n = \langle a : a^n = 1 \rangle$ be a cyclic group of order n, ZC_n its integral group ring and $U_1(ZC_n)$ be the group of normalized units of ZC_n. Symmetric elements of ZC_n, which are fixed under natural involution *, is denoted by ZC_n^+.

We denote the unit group of ZC_n^+ by $U(ZC_n^+)$ and its normalized units by $U_1(ZC_n^+)$. $U_1(ZC_n^+)$ is torsion free part of $U_1(ZC_n)$. $U_1(ZC_n)$ is trivial if and only if for $n=1,2,3,4$ and 6. for $n=5,7,8,9$ and 12, $U_1(ZC_n)$ have been characterized. Characterization of $U_1(ZC_n^+)$ is an extremely difficult problem for greater orders, because it is related to computation of fundamental units. With this work we have completed characterization of $U_1(ZC_n^+)$ up to n =15 by using Maple Software. We also have computed Bass cyclic units for $n=11$ and compare them with normalized units of $Z\mathbf{C}_{11}{}^{+}$.

Keywords: Unit Group, Symmetric Unit, Fundamental Units, Characterization, Generator.

Bernstein Collocation Method for Solving Linear Differential Equations

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Abstract: In this study, a new collocation method based on Bernstein polynomials is introduced for approximate solutions of initial and boundary value problems involving high-order linear differential equations with variable coefficients. Some numerical solutions are given illustrate the accuracy, efficiency and implementation of the method, and the results of the proposed method are also compared with other methods in several examples.

Keywords: Bernstein Polynomials, Linear Differential Equations, Collocation Method, Approximate Solution.

A Note on Ordered Bounded Measures

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Abstract: In this work, some properties of order bounded additive measures are obtained. We consider the space oba (F; E) as a subspace of a (F, E). It is also being given under which conditions a measure is order bounded additive measure.

Keywords: Vector Measures, Riesz Spaces Valued Measures, S-Boundness.

Epimorphism, Dominions and Regular Semigroups

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Abstract: We show that regular semigroups satisfying certain conditions in the containing semigroup is closed. As immediate corollaries, we have got that the special semigroup amalgam $U = [\{S, S'\}; U; \{i, \alpha \mid U\}]$ within the class of left [right] quasi-normal orthodox semigroups, $R[L]$-unipotent semigroups and left [right] Clifford semigroups is embeddable in a left [right] quasi-normal orthodox semigroup, $R[L]$-unipotent semigroup and left [right] Clifford semigroup respectively. Finally, we have shown that the class of all semigroups satisfying the identity $xyz = xz$ and the class of all semigroups satisfying the identity $xy = xyx$ $[yx = xyx]$ are closed within the class of all semigroups satisfying the identities $xyz = xz$ and $xy = xyx$ $[yx = xyx]$ respectively.

Keywords: Epimorphism, Dominion, Left [Right] Regular Band, Left [Right] Clifford Semigroup, R- Unipotent Semigroup, L-Unipotent Semigroup, Left [Right] Quasi-Normal Band, Closed Semi-Group, Zigzag Equations.

Numerical Comparison of Methods for Solving Nonlinear using Higher Order Homotopy Taylor-Perturbation Methods (HHTP)

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Abstract: Rootfinding is a classical problem that still remains an interest to many researchers. A series of hybrid methods called Higher Order Homotopy Taylor-perturbation method via start-system functions (HTTPss) are implemented to give approximate solutions for nonlinear equations, $f(x) = 0$. The techniques serve as alternative methods for obtaining approximate solutions for different types of nonlinear equations. Thus, this paper presents an analysis on numerical comparison between the classical Newton Raphson (CNR), Homotopy Perturbation method (HTPss) and Higher Order Homotopy Taylor-perturbation via start-system (HHTPss). A computational system Maple14 is used for this paper. Numerical and Illustrative results reveal that HHTPss methods are acceptably accurate and applicable.

Keywords: Homotopy Perturbation Method (HTP), Higher Order Homotopy Taylor-Perturbation Method (HHTP), Nonlinear, Start-System Functions.

On the Nonabelian Tensor Square of Some Linear Groups

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Abstract: In this work, we determine the nonabelian tensor square $G \otimes G$ for special orthogonal groups $SO_n(F_q)$ and spin groups $Spin_n(F_q)$, where F_q is a field with q elements.

Keywords: Special Orthogonal Group, Spin Group, Nonabelian Tensor Square.

Nonabelian Tensor Squares and Homological Functors of Centerless Bieberbach Groups with Nonabelian Point Groups: Experimental Results from GAP

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Abstract: Groups, Algorithms, and Programming (GAP) is a system for computational discrete algebra, which emphasis on computational group theory. GAP provides varieties of algorithmic methods to compute with groups of various types including crystallographic groups and polycyclic groups. In this research, GAP is used extensively to help us explore the computation of nonabelian tensor squares and some other homological functors of all centerless Bieberbach groups with dihedral point group of order eight and also of Bieberbach groups with some other nonabelian point groups. Examples on how data are computed will be shown and summarized. General results from the computation of some homological functors will be given.

Keywords: GAP, Nonabelian Tensor Squares, Homological Functors, Bieberbach Group.

Numerical Comparison of 2D Parabolic PDE on Macroscopic Model of Human Brain Tumor Growth using Cellular Automata and Finite Difference

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Abstract: Cellular automata (CA) are rule-based computation model consisting of space and time originally introduced in solving crystal growth and self

replicating system problem. The finite-state of CA can be defined using the transition rule on a regular cell grid at different discrete time steps based on the cell neighborhood. The evolution of state variables for finite-state CA is similar to finite difference scheme (FD) accept that FD is the discretization of 2D parabolic partial differential equation on a regular grid of points based on the formula obtained from the Taylor expansion. In this work, both methods are implemented to solve macroscopic model of human brain tumor growth. The model equation is in form of 2D parabolic equation known as reaction-diffusion equation. This paper presents a numerical comparison between the two methods in order to investigate which approximation is better in terms of accuracy, convergence and computational complexity.

Keywords: Human Brain Tumor Growth, Partial Differential Equation, Cellular Automata Technique (CA), Finite Difference Scheme (FD).

Stagnation-Point Flow over a Stretching/Shrinking Sheet in a Nanofluid Cu-Water with Suction or Injection

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Abstract: An analysis is performed to study the heat transfer characteristics of steady two-dimensional stagnation-point flow of a nanofluid Cu-water over a permeable stretching/shrinking sheet. The stretching/shrinking velocity and the ambient fluid velocity are assumed to vary linearly with the distance from the stagnation point. The effects of uniform suction and injection on the flow field and heat transfer characteristics are numerically studied by using an implicit finite difference method. Results for the skin friction coefficient, local Nusselt number, velocity profiles as well as temperature profiles are presented for different values of the governing parameters. It is found that the solutions for a

shrinking sheet are non-unique. The results indicate that suction delays the boundary layer separation, while injection accelerates it.

Keywords: Nanofluid, Stagnation-Point, Stretching- Shrinking, Suction-Injection, Heat Transfer, Dual Solutions.

A Chi-Squared Type Goodness-Of-Fit Test for the Birnbaum-Saunders Distribution and Its Applications in Reliability

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Abstract: In this paper a modified chi-square goodness-of-fit test based on Rao-Robson-Nikulin statistic Y_n^2 is developed for the Birnbaum-Saunders distribution with unknown parameters by using the maximum likelihood estimators (MLE). A Monte Carlo method is employed to generate samples size for studying empirically the behavior of the statistic Y_n^2.

Keywords: Pearson's Chi-Squared Test, Modified Chi-Squared Test, Birnbaum-Saunders Distribution, Estimation, Reliability.

A Characteristic Finite Difference Method for the Time Fractional Advection-Dispersion Equation

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Abstract: In this work, we consider the numerical solution of a time fractional advection dispersion equation, which is obtained from the standard advection-dispersion equation by replacing the first order time derivative with a fractional derivative of order α, where $0 < \alpha < 1$. The main purpose of this work is to extend the idea on Crank-Nicholson method to the time-fractional advection dispersion equations. We prove that the proposed method is unconditionally stable. Numerical experiments are carried out to support the theoretical claims.

Keywords: Crank-Nicholson Difference Schemes, Initial Value Problems for Time Fractional Advection-Dispersion Equations, Eigen-Values, Stability, Convergence.

Special Smarandache Curves in E_1^3

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Abstract: In this study, we determine some special Smarandache curves in E_1^3. We give some characterizations and consequences of Smarandache curves.

Keywords: Lorentz, Frenet Invariant, Smarandache Curve.

Mathtoken-Based Automated Marking Technique for Free-Response Mathematics Assessment

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Abstract: Mathtoken-based automated marking technique is a computational model of human marking processes that are involved in the marking of free-response mathematics assessments. The technique is based on string similarity method that considers the structural similarity of mathtokens that represent mathematical terms. The mathematical framework of the computational technique is supported by the concepts from multiset theory. Within this framework, mathematical equations and expressions are modeled as multisets of mathtokens. The process framework is based on adaptations of basic techniques in textual information retrieval. The implementation of the technique employs

our own correctness measure. The mathtoken-based automated marking technique has been tested on constructed responses of nine questions on solving linear algebraic equations in one variable. The results of the agreement analysis on the correctness scores of the nine questions show that the Krippendorff's alpha reliability coefficient recorded an average value of 0.862. The results indicate that the correctness scores produced by the automated marking method are reliable and thus are comparable to human marking method.

Keywords: Free-Response Mathematics Assessment, Automated Marking, Multiset Theory, String Similarity Method, Information Retrieval.

Certain New Families of Special Polynomials

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Abstract: In this paper, the general-Sheffer polynomials family is introduced by using operational methods. The generating function for General-Sheffer polynomials is derived and a correspondence between these polynomials and the Sheffer polynomials is established. Further, differential equation, recurrence relations and other properties for these polynomials are obtained within the context of the monomiality principle. This article is first attempt in the direction of introducing a new family of special polynomials, which includes many other new special polynomial families as its particular cases.

Keywords: General-Sheffer Polynomials, Appell-Sheffer Polynomials, Monomiality Principle, Operational Techniques.

On the Solutions of Riccati Types Convolution Differential Equations and Differential Transform Method

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Abstract: In this paper, we apply the differential transform method (DTM) to solve Riccati types convolution differential equations. Further we compare the results with successive approximation method and Kronecker convolution products. We also make an error analysis and estimate the error bound by providing some examples.

Keywords: Convolution Product, Kronecker Convolution Product, Matrix Riccati Convolution Differential Equations, Differential Transformation Method, Continuous Matrix Solutions.

On Metrics Compatible with Hamming Distance

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Abstract: A Hamming compatible metric is an integer-valued metric on the words of a finite alphabet which agrees with the usual Hamming distance for words of equal length. We define a new Hamming compatible metric, compute the cardinality of a sphere with respect to this metric, and show this metric is minimal in the class of all "well-behaved" Hamming compatible metrics.

Keywords: Hamming Distance, Discrete, Metric, and Minimal.

Regular Second Order Differential Operators with Mixed Nonlocal Boundary Conditions

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Abstract: In this work, we study a second order differential operator with mixed nonlocal boundary conditions combined weighthing integral boundary condition with another Wentzell type two point boundary condition. Under certain conditions on the weithing functions and on the coefficients in the boundary conditions, called regular boundary conditions, we prove that the resolvent have a maximal decreasing with respect to the spectral parameter at infinity in $l_p(0,1)$, for $p \geq 1$ for. Furthermore, the studied operator generates in $l_p(0,1)$, an analytic semigroup for $p \geq 1$. The obtained results are then used to show the correct solvability of a mixed problem for a parabolic partial differential equation with regular boundary conditions.

Keywords: Analytic Semigroup, Nonlocal Boundary Conditions, Regular Boundary Conditions.

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Special Involute-Evolute Partner D -Curves in E^3

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Abstract: In this paper, we take into account the opinion of involute-evolute curves which lie on fully surfaces and by taking into account the Darboux frames of them. We illustrate these curves as special involute-evolute partner D-curves in E^3. Besides, we find the relations between the normal curvatures, the geodesic curvatures and the geodesic torsions of these curves. Finally, some consequences and examples are given.

Keywords: Involute-Evolute, Darboux Frame, Normal Curvature, Geodesic Curvature, Geodesic Torsion.

Stable High Order of Accuracy Difference Schemes for Hyperbolic IBVP

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Abstract: The abstract Cauchy problem for the hyperbolic equation

$$u''(t) + Au(t) = f(t), 0 < t < T, u(0) = \varphi, u'(0) = \psi$$

in a Hilbert space with the self -adjoint positive definite operator is considered. The third and fourth orders of accuracy difference schemes for the approximate solution of this problem are presented. The stability estimates for the solutions of these difference schemes are established. A numerical method is proposed and results of numerical experiments are presented in order to support the theoretical statements.

Keywords: Abstract Hyperbolic Equation, Stability, Initial Boundary Value Problem.

Exact Solutions of Benjamin-Bona-Mahony-Burgers Type Nonlinear Pseudo-Parabolic Equations

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Abstract: In this paper, we consider some nonlinear pseudo-parabolic Benjamin-Bona-Mahony-Burgers (BBMB) equations. These equations are of a class of nonlinear pseudo-parabolic or Sobolev type equations

$$u_t - \Delta u_t - \alpha \Delta u = f(x, u, \nabla u)$$

where α is a fixed positive constant, arising from the mathematical physics. Tanh method with the aid of symbolic computational system is employed to investigate exact solutions of BBMB type equations and the exact solutions are found. The results obtained can be viewed as a verification and improvement of the previously known data.

Keywords: Nonlinear Pseudo-Parabolic Equation, Benjamin-Bona-Mahony-Burgers (BBMB) Type Equation, Sobolev Type Equation, Tanh Method.

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Zeros of the Fibonacci and Lucas Polynomials and Their Derivatives

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Abstract: This study is focused on the Fibonacci and Lucas polynomials and their derivatives. We find the roots of the derivatives of Fibonacci and Lucas polynomials using hyperbolic functions. We list the roots of the first ten derivaties of both Fibonacci and Lucas polynomials.

Keywords: Fibonacci Polynomial, Lucas Polynomial.

The Eccentric Connectivity Index of Vph [m,n] Nanotorus

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Abstract: The eccentric connectivity index, proposed by Sharma, Goswami and Madan, has been employed for study physical and biological properties of molecules. The eccentric connectivity index $\xi(G)$ of the graph G is defined as $\sum_{v\in V(G)} \deg(v) ecc(v)$ where $\deg(v)$ is the degree of a vertex v and $ecc(v)$ is the largest distance between u and any other vertex v of G. In this paper we obtain an expression for the eccentric connectivity index of VPH [m,n] nanotori for first time.

Keywords: Eccentric Connectivity Index, Molecular Graph, VPH [m,n] Nanotorus.

Some Properties of Almost Primal and *N* Almost Primal Ideals in Commutative Rings

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Abstract: In the present paper we study almost primal and *n* almost primal ideals in commutative rings and give some properties and some characterizations of them. We also, study properties of primal and *n* almost primal ideals in two types of rings, the ring that obtained by localizing it at multiplicative systems and the ring that formed from the product of two given rings and give some characterizations of these ideals in these two types of rings.

Keywords: Primal Ideal, Almost Primal Ideal, *N* Almost Primal Ideal, Localization.

On Univalent Harmonic Meromorphic Functions Involving Hypergeometric Function

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Abstract: In this paper we introduce a subclass of univalent harmonic meromorphic functions defined in the exterior of the unit disk by using hypergeometric functions. We derived sufficient coefficient conditions; distortion theorem, extreme points and other interesting results are also investigated.

Keywords: Univalent Functions, Meromorphic Functions, Harmonic Functions, Starlike Functions, Hypergeometric Functions.

Fixed Point Techniques and Stability for Neutral Nonlinear Differential Equations with Unbounded Delays

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Abstract: In this work, we use the contraction-mapping theorem to obtain stability results of the following scalar nonlinear neutral differential equation with functional delay

$$x'(t) = -a.x(t) + b(t).g\left(x(t-r(t))\right) + c(t)x'(t-r(t)).$$

These results are easy to state but complicated to prove.

Keywords: Contraction Mapping, Stability, Nonlinear Neutral Differential Equation, Integral Equation.

2000 Mathematics Subject Classification: 34K20, 47H10.

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A New Subclass of Multivalent Functions by Applying (Rafid) Fractional Calculus with Generalized Hypergeometric Functions

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Abstract: In the present paper, we have introduced a new subclass of multivalent functions by applying (Rafid) fractional calculus with generalized hypergeometric functions. Here we obtain main result and distortion theorems.

Keyords: Multivalent Function, Dziok-Srivastava Linear Operator, Distortion Theorems, Fractional Calculus, Hypergeometric Function, (Rafid) Fractional Calculus.

Norms of Composition Operators with Linear Fractional and Rational Symbol

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Abstract: for only analytic map $\varphi : D \to D$, the composition operator C_φ is bounded on the hardy space , but there is no known procedure for precisely computing its norm. This paper considers the situation where φ is a linear fractional map. We determine the conditions under which $\|C\|$ is given by the action of either C_φ or C_φ^* on the normalized reproducing kernel functions of H^2 . We also introduce a new set of conditions on φ under which we can calculate $\|C\|$; moreover, we identify the elements of H^2 on which such an operator C_φ attains its norm. Several examples are provided.

Keywords: Norm, Hilbert Space, Liner Fractional Symbol, Composition, Kernel Function.

Computing on the Non-Potent Groups

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Abstract: A finitely presented group G is said to be n-potent if for some integer $n, G = G_n$ where $G_n = \langle [x, y^n] | x, y \in G \rangle$. A group G is called non-potent if $G \neq G_n$ for every integer n. For a non-potent group G, we define $d = \inf\{|G : G_n| : n \geq 1\}$ as the non-potency index of G. In the study, we give certain infinite classes of finitely presented groups which are non- potent and have finite non-potency index. Our groups are the $(l, m | n, k)-$groups and their extensions of deficecency zero and -1.

Keywords: Finitely Presented Groups, N-Potent Groups.

Spinors and Special Functions for Solving Equation of N^th Degree

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Abstract: We try to show Galois Theory can be more complete. It is clear every equation up to fourth degree is solvable but all equations $n \geq 5$ are not solvable in radical and they are solvable if Galois group of them is solvable. At first we illustrate every equation of nth degree can be reduced by using Bring-Jerrard transformation. Furthermore if we use spinors and special functions such as

Jacobi's elliptic functions, theta functions and hypergeometric function equations may solve and instead of explore solvability in the groups A_n, S_n, Z_n and D_n consider other groups such as E_6, E_7 and E_8 the roots of equations higher than 5th degree even 7th and 8th degree can be expressed in terms of these mentioned functions. The question is that whether exist any analytic method to solve equation of nth degree.

Keywords: Complete Galois Theory, Bring-Jerrard Transformation, Spinors, Special Functions, Elliptic Functions, Theta Functions, Hypergeometric Function.

Local Existence of Classical Solution to the Nonlinear Schrödinger Equation in a Weighted Sobolev Space

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Abstract: In this paper, we study the local existence of classical solution to the one dimensional space of nonlinear Schrödinger equation with a small initial data in a some Weighted Sobolev space. The nonlinear term is assumed satisfying the Gauge invariance type nonlinearity condition.

Keywords: Classical Solution, Gauge Invariance, Sobolev Space, Weighted Sobolev Space.

Quality of Teaching Accounting in Technical and Vocational Centers

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Abstract: Given the increasing economic and social needs of society, the need for fundamental changes in the accounting profession has been revealed more than ever. According to the accounting profession in Iran, many experts claim that accounting graduates, lack the knowledge and skills to meet the needs of professional accounting. Important goal of accounting education programs should establish a foundation for the development of permanent learning by students. The study also evaluated the quality of accounting education at the undergraduate level prior to its application in the labor market from the perspective of students and their teachers. Using the results of this study, Students, scholars of accounting degree can be successful in obtaining jobs. Research methods from the standpoint are applied and descriptive-collaborative. T-tests and questionnaires of Friedman's hypothesis are used as research tools. The population of students enrolled in accounting courses, teachers working in vocational centers is among statistical society which has been selected in 2011. The study showed that both groups of students and teachers agree that current practices in accounting education and professional technical centers for students to gain professional skills related to accounting activities are not effective.

Keywords: Accounting, Education, Program Approved Accounting Courses Expert, Job Market, Teachers, Students.

Global Classical Solutions for Coupled Reaction-Diffusion Systems without Growth Conditions on the Nonlinearities

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Abstract: The aim of this work is to prove the global existence in time of classical solutions for reaction-diffusion systems with strong coupling in the diffusion and without any growth conditions on the nonlinear reactive terms. This extends some similar results in the case of a diagonal diffusion-operator associated with nonlinearities preserving the positivity and the total mass of the solutions or for which the total mass is a priori bounded.

Keywords: Reaction-Diffusion Systems, Comparison Theorem, Global Existence.

Quintasymptotic Prime Ideals and Local Cohomology Modules

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Abstract: Let R be a commutative ring. Let N denote a non-zero Noetherian R -module and I an ideal of R. It is shown that the sequence of associated prime ideals $R(I^n)_a{}^{(N)}$, $n = 1,2$ is ultimately constant for large n. Here $(I^n)_a{}^{(N)}$ denotes the integral closure of I_n with respect to N. Using the quintasymptotic primes of I with respect to N, we also show that, whenever (R,m) is Noetherian local and N finitely generated quasi-unmixed of dimension d then the local cohomology module $H_I^d(N)$ vanishes if and only if there exists a multiplicatively closed subset S of R such that $m[S]$ and the topologies induced by $\{((I^n)_a^{(N)})\}_{n\geq 1}$ and $\{S((I^n)_a^{(N)})\}_{n\geq 1}$ are equivalent. As a special of

this characterization we obtain the main results of Marti-Farre, Call-Sharp and the third author. Finally, some consequences are given.

Keywords: Quintasymptotic Primes, Local Cohomology, Integral Closure, Noetherian Module, Ideal Topologies.

A Kind of Product of Submodules

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Abstract: In this paper, all rings are commutative with identity and all modules are unitary. Let M be an R-module; the idealization of M, R(M), introduced by Nagata in [11], and many papers have been devoted to this concept. Idealization is useful for generalizing results from rings to modules and constructing examples of commutative rings with zero-divisors (see [2] and [9, Section 25]). Let K^1 and K^2, be submodules of M. In this article, we construct an algebraic object by K^1 and K^2, denoted by $K^1 K^2$, called product of K^1 and K^2. We show that $K^1 K^2$, with appropriate operations, has an R(M)-module structure. Our main aim of this paper is to study some of the most important properties of R(M)-module MM = M^2.

Keywords: Commutative Ring, Product of Submodules, Idealization

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On the Nonabelian Tensor Squares of Bieberbach Groups with Abelian 2-Groups as Point Group

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Abstract: The torsion free crystallographic groups are called Beiberbach groups. These groups are polycyclic since they are extensions of polycyclic groups. In this paper, we investigate the Bieberbach groups with elementary abelian 2-groups as point group. These groups are metabelian and their nonabelian tensor squares are nilpotent of class at most 2. Based on some results of the nonabelian tensor squares of these groups, the properties of the subclass of metabelian groups whose nonabelian tensor squares are abelian will be determined and the

construction of some conditions for the nonabelian tensor square for any group to be abelian will be presented.

Keywords: Nonabelian Tensor Square, Bieberbach Group, Point Group.

Marangoni-Driven Boundary Layer Flow Past a Flat Plate in a Nanofluid

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Abstract: The problem of steady Marangoni boundary layer flow and heat transfer in nanofluids is studied using different types of nanoparticles. The general governing partial differential equations are transformed into a set of two nonlinear ordinary differential equations using unique similarity transformation. Numerical solutions of the similarity equations are obtained using the Runge-Kutta-Fehlberg method. Three different types of nanoparticles are considered, namely Cu, Al_2O_3 and TiO_2, by using water as a base fluid with Prandtl number Pr = 6.2. The effects of the nanoparticle volume fraction ϕ and the constant exponent m on the flow and heat transfer characteristics are obtained and discussed.

Keywords: Boundary Layer, Marangoni Convection, Nanofluid, Numerical Solutions.

Some Properties of a Nonlinear Difference Equation

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Abstract: In this work, we investigate some properties of a nonlinear difference equation.

Keywords: Difference Equation, Stability.

Linear Differential Equations with Entire Coefficients Having the Same Order and Type

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Abstract: The value distribution theory of a meromorphic function founded by R. Nevanlinna play an important role in the study of the growth and oscillation of solutions of linear differential equations in the complex plane. Recently, many authors investigated the case when the coefficients have the same order. In this work, we will investigate the growth of solutions of a class of linear differential equation with entire coefficients having the same order and type.

Keywords: Linear Differential Equations, Growth of Solutions, Finite Order.

Some Vector Valued Multiplier Difference Double Sequence Spaces in 2-Normed Spaces Defined by Orlicz Functions

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Abstract: In this paper, we study certain difference double sequence spaces using an Orlicz Function, a bounded sequence of positive real numbers in 2-normed spaces and give some relations related to these sequence spaces.

Keywords: Difference Double Sequence Spaces, 2-Norm, Orlicz Function, Paranorm.

On *Π*-Closeness and *Π*-Normality in Topological Spaces

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Abstract: Separation axioms concern the ways of separating points and subsets in topological spaces. π-Normality, one of the separation axioms, is a weaker version of normality. It was introduced by Kalantan in 2008. π-Normality lies between normality and almost normality (resp. quasi normality). It is a topological property but neither a productive nor a hereditary property in general. A set A in a space X is said to be a *closed domain* if it is the closure of its own interior, or equivalently if it is the closure of some open set. The complement of a closed domain set is called an *open domain*. A set A in a space X is said to be π*-closed* if it is the finite intersection of closed domain subsets and the complement of a π-closed set is called π*-open*. Two subsets A and B of a space X are said to be *separated* if there exist two disjoint open subsets U and V of X such that $A \subseteq U$ and $B \subseteq V$. A space X is said to be π*-normal* if any pair of disjoint closed subsets A and B of X, one of which is π-closed, can be separated by two disjoint open subsets. the importance of this property is that it behaves slightly different from normality, almost normality and quasi normality. A space X is said to be an *almost regular* if any closed domain (or π-closed) set A and for each $x \notin A$, there exist two disjoint open subsets U and V of X such that $x \in U$ and $A \subseteq V$. A space X is said to be an *almost completely regular* if any closed domain (or π-closed) set A and for each $x \notin A$, there exists a continuous function $f : X \to [0,1]$ such that $f(x) = 0$ and $f(A) = \{1\}$. The finite union (intersection) of π-closed (resp. π-open) subsets is π-closed (resp. π-open) and the finite product of π-closed (resp. π-open) subsets is π-closed (resp. π-open). The main aim of this paper is to study π-closed and π-open sets in subspaces and in the infinite product spaces. Some various properties and counterexamples of these sets are presented. By using

these properties, we prove that π-normality is an additive property and we show that both almost regularity and almost complete regularity are hereditary properties with respect to π-open and closed domain subspaces. We investigate that there is a version of π-normality analogous to the Teitze Extension Theorem for normal spaces by adding some conditions.

Keywords: Closed Domain, -Closed, -Normal, Almost Regular and Almost Completely Regular.

Study of Predator-Prey Model with Modified Leslie-Gower and Holling-Type II Schemes Incorporating a Term Refuge

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Abstract: In this study we present a two-dimensional continuous time dynamical system modelling a predator-prey food chain based on a modified version of the Leslie-Gower scheme and on the Holling-type II scheme incorporating a term refuge. The main result is given in terms of boundedness of solutions, existence of an attracting set and global stability of the coexisting interior equilibrium.

Keywords: Differential Equations, Leslie-Gower, Holling-Type II, Boundedness, Lyapunov Function, Stability, Term Refuge.

On the Study of a Fractional Differential Problem with Impulses in the Positive Half-Ray

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Abstract: We intend to present in the expected oral talk new results regarding existence and uniqueness of the solution to some fractional differential equation

submitted to an infinite number of impulses in the positive half-ray. We shall deal with the Caputo fractional derivative for its practicality. The obtained results are based on a nonlinear alternative of Leray-Schauder and some iterative processes leading to the unique solution of the given problem. Regarding the theory of Fractional Differential Equations I must point out that it is booming and the early used models are promising. So, there has been in the last few years a great deal of models using fractional derivative in order to get rid of unwanted parameters that investigators were used to implementing in their models. on the other hand, the introduction of impulsive conditions in a given problem shows that the solution undergoes some abrupt changes throughout its evolution, and so such fluctuations must be taken into account in order to get a realistic solution close to the real one.

Keywords: Caputo's Fractional Derivative, Impulsive Conditions, Leray-Schauder Fixed Point Theorem.

The Padovan Sequences in Finite Groups

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Abstract: In this paper, we study the Padovan sequences modulo m. Also, we define the Padovan orbit of a 2-generator group G for a generating pair $(x,y)\in G$ then we examine the lengths of the periods of the Padovan orbit. Furthermore, we obtain the Padovan lengths of the polyhedral groups $(2,2,2)$, $(n,2,2)$, $(2,n,2)$, $(2,2,n)$ and the binary polyhedral groups $\langle 2,2,2\rangle$, $\langle n,2,2\rangle$, $\langle 2,n,2\rangle$, $\langle 2,2,n\rangle$ for generating pair (x,y).

2000 Mathematics Subject Classification: 11B50, 20F05, 20D60, 15A36

Keywords: Padovan Sequence, Padovan Length, Polyhedral Group.

Global Bounds for a Coupled Reaction-Diffusion System with a Triangular Diffusion Matrix and Nonlinearities of Exponential Growth

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Abstract: In this work we prove global boundedness in time of classical solutions to reaction diffusion with triangular diffusion matrix on a bounded domain in R^n. The system in question is

$$\begin{cases} u_t = a\Delta u - f(x,t,u,v), \\ v_t = c\Delta u + d\Delta v + \rho f(x,t,u,v) \end{cases} \quad t>0,\ x\in\Omega\subset R^n (n\geq 1)$$

where Ω is a smooth bounded domain in R^n, $c\in R$ is a constant, a, d, ρ are positives real constants and f is a regular function satisfying $f(x,t,0,\eta)=0$ and $f(x,t,\xi,\eta)\leq k\varphi(\xi)e^{\sigma\eta}$ for all $t>0,\ x\in\Omega,\ \xi\geq 0,\ \eta\geq 0$ for some positive constant k.

Keywords: Reaction-Diffusion Equations, Positivity of Solutions, Global Existence, Uniform Boundedness, Comparison Principle, Contraction Mapping Principle, Contraction Semigroups.

AMS (MOS) subject classification: 35B40, 35B45, 35K55, 35K65.

The Finite Element Approximation of Evolutionary Hamilton-Jacobi-Bellman Equations

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Abstract: The paper deals with the theta-scheme with respect to the t-variable combined with a finite element spatial approximation of evolutionary Hamilton-Jacobi-Bellman equations (HJB equation), it involves a weakly coupled discrete system of parabolic quasi-variational inequalities (PQVs). Its result to time

energy behavior is proved. In addition, the PQVs are transformed into coercive discrete system of elliptic quasi-variational inequalities. A new iterative discrete algorithm is also proposed to show the existence and uniqueness. Moreover, its convergence is established. Then a simple proof to asymptotic behavior in uniform norm is given. Furthermore the proposed approach stands on a discrete stability property in uniform norm with respect to the right-hand side and the boundary condition.

Keywords: HJB Equation, Theta-Scheme, Finite Element, Stability Analysis, Asymptotic Behavior.

N-Dimensional (α, β)-Fuzzy Ideals of Hemirings

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Abstract: In this paper, we introduced N-dimensional fuzzy point and obatain fundamental properties. On the bases of N-dimensional fuzzy point we introduce the notions of N-dimentional (α, β)-fuzzy ideals of hemirings, where α, $\beta \in \{\in, q \in \vee q, \in \wedge q\}$ with $\alpha \neq \in \wedge q$. So we construct twelve different types of fuzzy ideals in hemirings. N-dimentional (α, β)-fuzzy ideals of hemirings is more genralization of fuzzy ideals in hemirings and (α, β)-fuzzy ideals of hemirings. Moreover we give some characterizations Theorems of N-dimentional (α, β)-fuzzy ideals of hemirings. Finally, we introduced N-dimensional prime (α, β)-fuzzy ideals of hemirings and related properties.

Keywords: Hemiring, N-Dimensional (α, β)-Intuitionistic Fuzzy Ideal, N-Dimensional $(\in, \in \vee q)$-Intuitionistic Fuzzy Ideal.

Asymptotic Stability of Some Delay Differential-Algebraic Equations

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Abstract: In this work, we prove that for Hessenberg delay DAEs of retarded type, the direct linearization along the stationary solution is valid. This validity is obtained by showing the equivalence between the direct linearization and the linearization of the state space form of the original problem, which is assured to be legitimate. Thus the study of the asymptotic stability of the stationary solution can be transformed to the study of the null solution of the linearization of the original problem.

Keywords: Delay Differential-Algebraic Equations (Ddaes), Asymptotic Stability, Delays.

Equation of Free Surface of a Long Gravity Wave in a Rectangular Basin

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Abstract: The study established in this manuscript is to find the equation of free surface of a long gravity wave in a rectangular basin with horizontal bottom. Applying the shallow water theory and approximating by perturbation scheme called “small parameter Poincare”. The unknown function at a free surface is developed in small parameter ε series which is the main objective in this work. For illustration, we take as example a progressive wave and the numerical simulations were performed to interpret the mathematical model.

Keywords: Free Surface, Long Gravity Waves, Shallow Water Theory.

Dynamic Programming for an Optimal Investment and Consumption Problem

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Abstract: In this work, we investigate an optimal investment and consumption problem for an investor who trades in a Black–Scholes financial market which consists a bank account and a risky asset. We assume that an agent makes investment and consumption decisions based on hyperbolic absolute risk aversion (HARA) or power utility functions. By using the dynamic programming method we are faced with the problem of solving a certain partial differential equation (PDE) called Hamilton-Jacobi-Bellman (HJB). After solving this PDE, the classical verification theorem is given to validate the optimality of the candidate solution to the HJB equation.

Keywords: Black-Scholes Market, Power Utility Function, Optimal Investment and Consumption, Dynamic Programming, Hamilton-Jacobi Bellman Equation.

Results of Compactness in Transport Theory with General Boundary Conditions

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Abstract: The aim of this work is to give a systematic analysis of results compactness for transport equations where the returning flow is related to outflow by a boundary operator bounded for a large class of measures whose supports are spaces speeds and under certain conditions on the collision operators. We present a simple and different from that established in [5]. It illustrates, the one hand, the fact that these results obtained are independent properties operator at the edges (indeed, he need only be bounded)) and,

secondly, the role dominant part of neutron techniques in demonstrations. This analysis is very useful in understanding the asymptotic behavior solutions.

Keywords: Asymptotic Behavior, Compactness, Collision Operators, Transport Equations.

Exact Controllability of Piezoelectric Body with Adhesion

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Abstract: In this work, we present a model for the adhesive, quasi-static and frictionless contact between an electro elastic body and a rigid foundation. The contact is modeled by Signorini's conditions with adhesion. We study also the exact controllability of this model using the Hilbert Uniqueness method. We know a coupled elastic-electric control acting on the whole boundary drives the system to rest after time large enough but here we introduce another control acting on just part of the boundary and we try to adapt the Hilbert Uniqueness Method to this situation and see if we keep the same results and regularities of this method.

Keywords: Piezoelectricity, Adhesion, Signorini'conditions, Exact Controllability, Hilbert Uniqueness Method (Hum).

On the Multiplicity of a Class of Tenth Degree Number Fields

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Abstract: E. Artin had conjectured in 1925 that the non-isomorphic fields never have coinciding discriminants and he asserted that this could be proved using class field theory. Five years later, A. Scholz and O. Taussky have provided the first counter examples for Artin's conjecture with the aid of class field theory and

they gave families of 4 non-isomorphic complex cubic fields. According to Hermite, there exist only a finite number of number fields having a given degree and a given value of the discriminant. However, for a fixed degree and signature, this number is not known generally. We especially are interested in the determination of a maximum number of number fields of degree 10 having a given discriminant that contain a subfield of degree 5 having a fixed class number, narrow class number and Galois group. In this work, we present lists of the first coincidences of 52 (resp: 50; 40; 48; 22; 6) non-isomorphic number fields with same discriminant of degree 10 of signature (6,2) (resp: (4,3), (8,1), (2,4), (0,5), (10,0)) containing a quintic field.

Keywords: Discriminant, Non-Isomorphic Fields, Relative Quadratic Extension, Quintic Field.

Macwilliams Identity for Codes over Trees

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Abstract: In this work, the MacWilliams identity is established for binary linear codes over trees which are a special family of posets.

Keywords: Poset, P-Code, P-Weight, Poset Metric, Macwilliams Identity, Weight Enumerator, Trees.

On Upper and Lower Faintly β*g-Continuous Multifunctions

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Abstract: Continuity of functions is one of the most considerable and main topics in the theory of classical point set topology and several branches of

mathematics. A good number of papers dealing with continuity of functions have come out and a great number of them have been extended to the setting of multifunctions. This shows that both functions and multifunctions are important tools for studying properties of spaces and for forming new spaces from former available ones.The aim of our paper is to introduce and study upper and lower faintly β*g-continuous multifunctions that are a generalization of upper and lower β*g-continuous multifunctions in topological spaces.We get some characterizations of these multifunctions and give several of their properties.We also investigate β*g-compact, β*g-Hausdorff spaces in the context of multifunctions.

Keywords: Upper Faintly β*g -Continuous Multifunction, Lower Faintly β*g - Continuous Multifunction, β*g -T_2, β*g -Compact.

Δ-Statistical Convergence in a Paranormed Space

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Abstract: In order to extend convergence of sequences, the notion of statistical convergence was introduced by Fast and Schoenberg. The main purpose of this article is to study the concept of statistical convergence from difference sequence spaces which are defined over paranormed spaces.

Keywords: Difference Sequence, Statistical Convergence, Paranormed Space, Strongly *P*-Cesaro Summability.

Dichotomy in the Parabolic Equations

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Abstract: This talk is devoted to the numerical analysis of abstract semilinear parabolic problem $u'(t) = Au(t) + f(u(t)),\ u(0) = u^0$, in some general Banach space E. We are developing a general approach to establish the discrete dichotomy in a very general setting and prove shadowing Theorems that compare solutions of the continuous problem with those of discrete approximation in time. It is well-known fact that the phase space in the neighborhood of the hyperbolic equilibrium can be split in a way that the original initial value problem is reduced to initial value problems with exponential decaying solutions in opposite time direction. We use the theory of compact approximation principle and collectively condensing approximation to show that such a decomposition of the flow persists under rather general approximation schemes. The main assumption of our results are naturally satisfied, in particular, for operators with compact resolvents and condensing semigroups and can be verified for finite element as well as finite difference methods.

Keywords: Dichotomy for Semilinear Differential Equations, Compact Convergence of Resolvents, Condencing Operators.

Fuzzy Soft Gamma Ring

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Abstract: We attempt to study fuzzy soft ring theory by using fuzzy soft sets. We introduce fuzzy soft rings generated by fuzzy soft sets, by using some algebraic operator intersection, union, and ve OR on this structure and generalize to give some properties of them. We will study definition of fuzzy soft ideal and derive some results on them and show examples related to this structure, respectively. Consequently fuzzy soft gamma ring are introduced and homomorphic image and inverse image are given and illustrated by many examples.

Keywords: Ring, Fuzzy Soft Ring, Soft Ring.

Characterizations of Generalized Fuzzy Subhyperalgebras of Boolean Hyperalgebras

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Abstract: This paper deals with a special hyperalgebra, called Boolean hyperalgebra which is redefined in it. We introduce the concepts of generalized fuzzy subhyperalgebras and generalized fuzzy hyperideals of Boolean hyperalgebras. A necessary and sufficient condition for a fuzzy subset of Boolean algebra to be a generalized fuzzy subhyperalgebra (hyperideal) is proved. Images and inverse-images of generalized fuzzy subhyperalgebra (hyperideal) under Boolean hyperalgebra homomorphism are studied.

Keywords: Boolean Hyperalgebra Generalized Fuzzy Subhyperalgebra, Generalized Fuzzy Hyperideal.

Cellular Automata Approaches for Image Processing

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Abstract: Cellular automata (CA) and processing on images have common characteristics. Both operate on grid lattice space and redefine grid value after operation or processing. Cellular automata are parallel and time discrete system

and the reason of its popularity comes from the ability of demonstrating large complex system using basic and simple rules. For many years power of CA have attracted many researchers from many different fields like physic, biology, medicine, electronic, computer science etc. Naturally CA had been used in image processing tasks such as enhancement, segmentation, feature extraction, compression. There are many state transaction functions were defined and implemented to process images. Important concept of CA is neighborhood which demonstrates cells around the center cell. Von Neumann and Moore are most used and widely-known neighborhood approaches of CA. Conventional image enhancement and feature extraction techniques for image processing have some weak side like a technique on different images may provide different success level of results. In this study I investigated CA for image processing like border extraction and noisy filtering and compared result with the conventional image processing techniques.

Keywords: Cellular Automata, Image Processing.

On the Numerical Solution of Boundary Value Problems by the Generalized Bernstein Polynomials

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Abstract: In this work, approximate solutions of some boundary value problems are obtained by the Generalized Bernstein polynomials. To show the efficiency of the Generalized Bernstein polynomials, some examples are presented. Comparisons with exact solution show that the Generalized Bernstein polynomials are effective and powerful method for the solution of boundary value problems.

Keywords: Generalized Bernstein Polynomials, Galerkin Method, Boundary Value Problems.

The Solution of Fractional Differential Equations (Fdes) with Green's Function Method

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Abstract: In this work, we give a general definition and some properties of the fractional Green's function which is necessary for solving fractional differential equations. By using Green's function method, we solve some fractional differential equations and compare obtained solution and their exact solution with aid of computer software. The results indicated that proposed method is promising and encouraging to solve other type differential equations.

Keywords: Fractional Differential Equations, Green's Function Method.

Radically Perfect Prime Ideals in Prüfer Domains

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Abstract: The notion of set theoretic complete intersection of ideals has been extensively investigated in the literature in the cases when the underlying ring is Noetherian. We aim at extending this notion to rings that need not be Noetherian by calling an ideal I of a ring R radically perfect if the height of I is equal to the infimum of the number of generators of ideals of R whose radical is equal to the radical of I. The main objective of this work is to relate the height and the number of generators of ideals in a Prüfer domain R and determine conditions on R so that the prime ideals of R and also those of the polynomial rings over R are radically perfect.

Keywords: Set Theoretic Complete Intersection, Radically Perfect Ideals, and Prüfer Domains.

On Solvability of Nearly Odd-Order Groups

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Abstract: An important family of groups, namely groups in which every real element is central were firstly introduced in [1] and were called nearly odd-order by then. It can be easily seen that nearly odd-order groups are generalizations of odd-order groups. In this article, we will prove the solvability of nearly odd-order groups that are of even order, leaving the odd-order case to the Feit-Thompson's Theorem. This leads to a generalization of Feit-Thompson's Odd Order Theorem.

Keywords: Finite Group, Nearly Odd-Order Group, Solvability.

References

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About Some Special Ue- Rings

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Abstract: Ue- Rings, i.e., the rings that have only one proper essential right ideal were investigated by me in 2002. In this lecture some novel properties of these rings will be considered and some new results would be developed.

Keywords: UE (Unique Essential), ACC (Ascending Chain Condition).

On Derivations of Some Classes of Leibniz Algebras

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Abstract: In the paper we describe the derivations of complex *n*-dimensional naturally graded filiform Leibniz algebras NGF_1, NGF_2 and NGF_3. We show that

the dimension of the derivation algebras of NGF_1 and NGF_2 equals $n-2$, while the dimension of derivation algebra of NGF_3 is equal to $2n-1$. the second part of the paper deals with the description of the derivations of complex n-dimensional filiform Leibniz algebras obtained from naturally graded non Lie filiform Leibniz algebras. It is well known that this class of algebras in dimension n is split into two classes denoted by FLb_n and SLb_n. Here we found that for $L \in FLb_n$ we have $n-1 \leq \dim Der(L) \leq n+1$ and for algebras L from SLb_n the inequality $n-1 \leq Der(L) \leq n+2$ holds.

Keywords: Leibniz Algebras, Gradation, Derivation.

On Bayes Estimators with Extension of Jeffery Prior Information using Weibull Distribution

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Abstract: In this paper, Jeffery prior information and extension of Jeffery prior information for estimating the parameter Weibull distribution is presented. Through simulation study the performance of this estimator was compared to the standard Bayes with Jeffery prior information with respect to the mean square error (MSE) and mean percentage error (MPE). We found the extension of Jeffery prior information gives the best estimator.

Keywords: Bayes Estimation, Jeffrey Prior Information, Extension of Jeffery Prior Information, Simulation Study.

New Approach to Fresnel Transforms of Generalized Functions

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Abstract: We discuss certain space of strong Boehmians for a class of Fresnel transforms. The Fresnel transform and its inverse are extended to the context of Boehmian spaces. Some of their properties are established.

Keywords: Fresnel Transform, Generalized Function, Boehmian.

Iterative Method for Approximating a Common Solution of Split Equilibrium Problem and Fixed Point Problem for a Nonexpansive Semigroup

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Abstract: In this paper, we introduce and study an iterative method to approximate a common solution of split equilibrium problem and fixed point problem for a nonexpansive semigroup in real Hilbert spaces. The results presented in this paper extend and generalize some previously known results in this area.

Keywords: Split Equilibrium Problem, Split Variational Inequality Problem, Fixed-Point Problem, Nonexpansive Semigroup.

Pricing Power Options within the Heston Framework

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Abstract: Numerous studies have presented strong empirical evidence that certain financial assets may exhibit stochastic volatility or jumps. This evidence discredits the constant volatility assumption within the Black-Scholes environment. This work investigates the valuation of power options when the variance follows a square-root mean reverting process. A closed form representation of the characteristic function of the process is derived from the partial differential equation (PDE) of the replicating portfolio, instead of using the martingale measure. The characteristic function is essential for the computation of the power option prices via the Fast Fourier Transform technique.

Keywords: Option Pricing, Power Option, Partial Differential Equation (Pde), Stochastic Volatility, Characteristic Function, Fast Fourier Transform.

A Juvenile –Adult Model

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Abstract: In this work, we consider a system modeling two populations competing for resource in the same region. We investigate the existence of positive stationary solutions and their long term behavior. Bifurcation results are established.

Keywords: Maximum Principle, Principal Eigenvalue, Bifurcation.

The Structure of Simplicial Sets in Digital Images

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Abstract: In this paper we recall some basic properties from digital topology and by using the definition of digital simplicial complexes; we define the digital simplicial maps, face maps and degenerate maps in digital images due to some adjacency relations. Then we conclude that the relations between face and degenerate maps are satisfied in dijital images. Consequently we construct simplicial sets in digital images and gave the categorical definition of simplicial sets in digital images.

Keywords: Digital Image, Adjecency Relation, Simplicial Map, Face and Degenerate Map, Simplicial Set.

An Estimating of the P-Adic Sizes of Common Zeros to Partial Derivative Polynomial

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Abstract: The exponential sum, $S(f,q)$ can be derived from the estimate of the cardinality $|V|$, the number of elements contained in the set $V = \{x \bmod q \,/\, f_x \equiv 0 \bmod q\}$ where f_x is the partial derivatives of f with respect to x. The cardinality of V in turn can be derived from the *p*-adic sizes of common zeros of the partial derivatives f_x. This paper presents a method of determining the *p*-adic sizes of the components of (ζ,η) a common root of partial derivative polynomials of $f(x,y)$ in $Z_p[x,y]$ of degree nine based on

the p-adic Newton polyhedron technique associated with the polynomial. The degree nine polynomial is of the form

$$f(x,y) = ax^9 + bx^8y + cx^7y^2 + sx + ty + k.$$

The estimate obtained is in terms of the p-adic sizes of the coefficients of the dominant terms in f.

Keywords: Exponential Sums, Cardinality, p-Adic Sizes, Newton Polyhedron.

On a Local Countability Property of C(X), Equipped with a Set-Open Topology

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Abstract: By $C(X)$, we denote the space of all continuous real-valued functions on a topological space X. The space X is supposed to be completely regular and we consider on $C(X)$ the set-open topology which has as a subbase the family $\{[A,V]: A \in \alpha, V \in I(R)\}$, where α is a family of compact subsets of X, $I(R)$ is the collection of all open bounded intervals of R and $[A,V] = \{f \in C(X): f(A) \subset V\}$. $C(X)$ Equipped with this topology is denoted by $C_\alpha(X)$. Some of the countability properties of $C_\alpha(X)$ as the verification of first axiom of countability, the Frechet property, the countable tightness, and the fact for the points of $C(X)$ to be G_δ- subsets of X were studied by McCoy R.A. & Ntantu I. [4]. The sequentiality of $C_\alpha(X)$ was not treated in this paper. In [2], Gerlits J. & Nagy Zs. gave a necessary condition for $C(X)$ to be sequential when it is equipped with the pointwice convergence topology. In this work, we give a necessary condition for $C_\alpha(X)$ to be sequential with Some Particular Conditions on the Family α.

Keywords: Function Spaces, Set-Open Topology, Countable Tightness, Frechetnerss, Sequentialiy.

Solution of Non-Linear Equations by the Predictor- Corrector Method

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Abstract: Purpose of this study is offering some iterative methods of predictor-corrector for solution of non-linear system. This combinatorial method is made of regula- false and Newton methods. Non-linear system shows that modern predictor-corrector methods have better performance than previous methods.

Keywords: Non-Linear Equation, Regula- False Method, Newton's Method, Predictor-Corrector Methods.

Fractional Boundary Stabilization of Beam with Source Term

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Abstract: This paper is concerned with the beam problem with interaction between a polynomial source and a dissipation of fractional order. By using the potential well we prove the global existence and exponential energy decay rates of solutions.

Keywords: Exponential Decay, Fractional Derivative, Positive Definite Function, Weakly Singular Kernel.

Shrinkage Covariance Matrix Approach for Detecting Significant Gene Set

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Abstract: Microarray is one of the significant achievements in biotechnology history and was developed at the end of the last century. This accomplishment has allowed researchers to examine the whole expressions levels of thousands of genes at the same time. We construct an extension of a classical multivariate

procedure for determining the significance in gene set across experimental conditions using Hotelling's T^2 statistic. This test requires that the number of observations (n) exceeds the number of genes (p) in the set but in microarray studies it is common that $n<p$. As a result, the combined sample covariance matrix is not invertible and therefore the distribution of the resulting statistic is either unknown or insufficient. The shrinkage of sample covariance matrix is applied to guarantee that the resulting matrix is non-singular. This study compares the proposed method with other commonly used multivariate tests using simulated data sets. Our shrinkage covariance matrix approach shows promising results for detection of differentially expressed gene sets compared to other methods. This research provides a new platform and opportunities for further research or studies in microarray-based gene sets.
Keywords: Hotelling's T^2, Shrinkage Covariance Matrix, Differentially Expressed Gene Sets, Gene Set Analysis.

A Subclass of Multivalent Harmonic Functions

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Abstract: In this paper we introduce a class of multivalent harmonic functions starlike of order γ using the Dziok-Srivastava operator. Necessary and sufficient coefficient bounds and convolution condition for this class are determined.
Keywords: Multivalent Harmonic Functions, Generalised Hypergeometric Functions, Dziok-Srivastava Operator.

Characterization of the Group of Symmetric Units in Z_2Q_{4n} of Generalized Quaternion Groups Q_{4n}

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Abstract: For a commutative ring *R* with identity and a group *G*, the natural involution * of the group *G*, which maps every element to its inverse, can be extended linearly over *R*. The elements of the group ring *RG* which are fixed under this involution are called symmetric elements. The set of symmetric units consists of units of *RG* which are fixed under this involution. A group *G* is called "good", for its group ring *RG*, when symmetric units form a subgroup in the unit group of *RG*. Many studies have dealt with the problem of when the symmetric units of RG form a multiplicative group. This paper presents a characterization of symmetric units in Z_2Q_{4n} of Generalized Quaternion Groups Q_{4n} for small *n*, which occupy huge amount of the groups in this category.

Keywords: Good Group for RG, Unit Group of Group Rings, Involution, Symmetric Units, Generalized Quaternion Groups.

Complex Factorization of the *K*-Fibonacci and *K*-Lucas Numbers

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Abstract: Let $k \geq 1$ be a positive integer. Recently it is introduced two new number sequences called *k*-Fibonacci and *k*-Lucas. For $n \geq 1$, *k*-Fibonacci and *k*-Lucas numbers are recurrently defined by $F_{k,0} = 0$, $F_{k,1} = 1$ and $F_{k,n+1} = kF_{k,n} + F_{k,n-1}$ and $L_{k,0} = 2$, $L_{k,1} = k$ and $L_{k,n+1} = kL_{k,n} + L_{k,n-1}$. For $k = 1$,

we obtain the well-known Fibonacci and Lucas numbers. In this study, we obtain the complex factorizations of k-Fibonacci and k-Lucas numbers.

Keywords: *K*-Fibonacci Number, *K*-Lucas Number, Complex Factorization.

On the Complexity of Bipartite Graphs

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Abstract: The complexity of a graph is the number of its spanning trees. In this paper, we present some upper bounds for the complexity of bipartite graphs in terms of the number of vertices, the number of edges and the sum of the squares of degrees of these graphs.

Keywords: Bipartite Graph, Spanning Trees, Upper Bound.

The Space of Weak Orthomorphisms

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Abstract: In this paper, It is shown that the relation between orthomorphism and weak orthomorphism in a Riesz spaces and studying some properties of weak orthomorphisms.

Keywords: Extended Orthomorphism, Order Dense.

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On the Fundamental Forms of the Generalized B-Scroll with 2nd Degree in the Euclidean N-Space

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Abstract: In this paper, we investigate the first fundamental form, the second fundamental form of the generalized B-scroll with 2^{nd} degree in the Euclidean n-space. And also the third fundamental form of the generalized B-scroll with 2^{nd} degree is studied in the Euclidean n-space too.

Keywords: Fundamental Forms, B-Scroll, Euclidean N-Space.

Strongly Almost Summable Sequence Spaces Defined by an Orlicz Function in *N*-Normed Spaces

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Abstract: In this paper, we define some new strongly almost summable sequence spaces in *n*- normed spaces defined by Orlicz functions and we investigate some topological properties of these spaces.

Keywords: Strongly Almost Summable Sequence, *N*-Norm, Orlicz Function.

A Study of Naghdi's Shell with a Unilateral Contact of a Rigid Obstacle

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Abstract: Several problems in mechanics, physics, control and those dealing with contacts, lead to the study of systems of variational inequalities. In this study we considered a shell modeled by Naghdi's equations with a unilateral contact of a rigid body. This model has been studied by Blouza and Le Dret [5] but without contact. In this paper, we studied the existence, uniqueness and continuity of the deformation of this shell with respect to the data. We propose to approximate the model by a finite element method.

Keywords: Shells, Finite Element Methods.

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Anti-Jamming Defense in Wireless Networks using Channel Hopping and Error Correcting Code

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Abstract: Wireless networks are progressively becoming more affordable, due to its vulnerability to Jamming (DOS attack) which disrupt the operation of broadcasting system, this paper aims to implement NS-2 simulator by adding new layer named "Multi-Radio Layer" to support multi-radio multi-channel in order to increase network capacity and implement jamming defender model to improve the resiliency of multi-radio networks against jamming attack using channel hopping and error correcting code (ECC) , also construct reactive jammer model to achieve the risk of jamming attack on wireless networks. The paper investigates the performance of our simulation model and verifies the mathematical model introduced by [1]. The results showed by this paper are similar to that mathematical model.

Keywords: Throughput, Goodput, Blocking Probability, Jamming, Interference.

Introduction of Cryptosystems by Polybasic Algebraic System

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Abstract: On the basis of polybasic algebraic system a formal model of the cryptosystem has been constructed. Within the framework of this model, main types of cryptosystems have been distinguished.

Keywords: Cryptosystem Model, Polybasic Algebraic System.

Decomposition Theorems on CR-Submersions of Kaehler Manifolds

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Abstract: Kobayshi in 1987 initiated the study of submersion of a CR-submanifold of a Kaehler manifold, after he observed the similarity between the distributions on CR-submanifold of an almost Hermitian manifolds and the distribution required by the submersion. Shahid Ali then extended this study further in the setting of Kaehler and nearly kaehler manifolds. In the present paper we consider the Riemannian submersion of CR-submanifold and call it the CR-submersion, and obtain many decomposition theorems on such submersion by imposing conditions on CR-submanifold and its distributions.

Keywords: Riemannian Submersions, CR-Submersions, Decomposion Theorems, Totally Geodesic Submanifolds, Product Manifolds.

P-Matrices for the Action of Steenrod Powers on Polynomial Algebra

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Abstract: In this study, we defined particular matrices which we called them *P*-matrices and showed that they can be used to calculate the action of Steenrod powers on product of two generators. Then we gave an algorithm to obtain these matrices.

Keywords: Steenrod Powers, Polynomial Algebra.

Dual Identities in Fractional Difference Calculus within Riemann and Caputo

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Abstract: We investigate two types of dual identities for Riemann and Caputo fractional sums and differences. The first type relates nabla and delta type fractional sums and differences. The second type represented by the Q-operator relates left and right fractional sums and differences. These dual identities insist that in the definition of right fractional differences we have to mix both the nabla and delta operators.

Keywords: Right (Left) Delta and Nabla Fractional Sums, Right (Left) Delta and Nabla Riemann and Caputo Fractional Differences, Q-Operator, Dual Identity.

The Strongly Lp Summing Sublinear Operators Non Commutative Case

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Abstract: We introduce in this paper the concept of strongly $1_{\{p\}}$-summing sublinear operators in the non commutative case and characterize this class of operators by given the extension of the "Pietsch domination theorem". Some properties are shown.

Keywords: Banach Lattice, Completely Bounded Operator, Operator Space, Strongly $1_{\{p\}}$-Summing Operator, Sublinear Operator.

The Graphics Tests

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Abstract: To do a good analysis of a series of observations, simply select the appropriate probability distribution: it is one of the most important problems of statistical modeling. To validate a model, are the statistical tests. There are several types of tests for the actual data; however they are almost non-existent when the data are bivariate. In this work, we develop some one-dimensional classical tests and introduced new graphics tests of multivariate normality: The Andrews test and the test of Lhoste generalized. Then, apply these tests to bivariate medical data in the health sector Frantz Fanon of Annaba.

Keywords: Andrews Test, Lhoste Test, Graphic Test.

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On Cyclic and Constacyclic Codes over $S_4 = F_2 + uF_2 + u^2F_2 + u^3F_2$

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Abstract: Cyclic and constacyclic codes over finite chain rings have been studied extensively in the literature. The general structure of these codes was laid out by Dinh and Permouth in 2004. Cyclic codes over $\mathrm{Z}_2 + u\mathrm{Z}_2$ and $Z_2 + uZ_2 + u^2Z_2$ were studied by Abualrub and Şiap in 2007. Constacyclic codes over $F_2 + uF_2$ were also studied by Abualrub and Şiap in 2009 and by Qian et al in 2006. In this work we study cyclic and $(1+u^2)$ -constacyclic codes over the ring $S_4 = F_2 + uF_2 + u^2F_2 + u^3F_2$, which is a finite chain ring of size 16. We define the Lee weight and the Gray map on this ring. We obtain a number of optimal binary linear codes of various lengths as images of cyclic and constacyclic codes over $S_4 = F_2 + uF_2 + u^2F_2 + u^3F_2$.

Keywords: Finite Chain Rings, Cyclic Codes, Negacyclic Codes, Constacyclic Codes.

Unification of Probability Theory on Time Scales (UPTTS)

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Abstract: The theory of time scales which is the unification of continuous and discrete analysis was introduced by Stefan Hilger in his Ph. D. thesis in 1988. In this paper we introduce probability theory on time scales. We modify some concepts of delta-probability theory on time scales: Probability Functions, unified random variables and some probabilistic inequalities.

Keywords: Unification of Probability Theory, Time Scales, Delta Probability, Delta Expected Values.

Comments on Copulas Functions and Finance

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Abstract: In this paper we discuss some about dependence and copulas functions and then focus on modeling the dependence structure between risks, an essential activity which is needed in the assessment of risk, we will restrict ourselves to the field of banking.

Keywords: Dependence, Copulas Functions, Concordance, Risk Management.

On Fine Spectra and Subspectra (Approximate, Defect and Compression) of Operator with Periodic Coefficients over ℓ_1

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Abstract: In recent years a number of papers have appeared which consider the spectra and/or fine spectra of various classes of matrices defined over several sequence spaces. The fine spectra on sequence spaces are different from the three parts of the ordinary spectrum, which are point spectrum, continuous spectrum and residual spectrum. Also there are the other spectra which are the approximate point spectrum, the defect spectrum and the compression spectrum. In this work, our purpose is to investigate fine spectra and subspectra which are approximate point spectrum, defect spectrum and compression spectrum of operator with periodic coefficients over ℓ_1.

Keywords: Fine Spectra, Sequence Spaces, Operator with Periodic Coefficient.

Linear and Nonlinear Abstract Elliptic Equations with Vmo Coefficients and Applications

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Abstract: The goal of the present talk is to study the parameter dependent nonlocal boundary value problems (BVP) for linear differential-operator equation

$$\varepsilon a(x)u^{(2)} + A(x)u(x) + \varepsilon^{\frac{1}{2}} A_1(x)u^{(1)}(x) + A_0(x)u(x) = f(x) \quad (1)$$

and the BVP for nonlinear equation

$$a(x)u^{(2)}(x) + B(x,u,u^{(1)})u(x) = F(x,u,u^{(1)}) \quad (2)$$

with discontinuous top-order coefficients, where a is a complex valued function, ε is a small parameter and $A = A(x)$; $A_k = A_k(x)$ are linear and B is a nonlinear operators in a Banach space E : Here the principal coefficients a and A may be discontinuous. More precisely, we assume that a and $A(.)A^{-1}(x_0)$ belong to the Sarason class V M O:
The uniform separability of the problem (1) is obtained. We prove that the corresponding differential operator generated by problem (1) is positive and is a generator of analytic semigroup in vector-valued L^p spaces. Moreover, the exsistence and uniquness of maximal regular solution of the nonlinear problem is derived.

AMS: 34G10, 35J25, 35J70.

Graphical Representations of Maps of Surfaces

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Abstract: We deal with the graphical representations of surfaces of different classes, the visualisaton of mappings between them and animations of transformations of surfaces. For this purpose we use our own software and its extensions.

Keywords: Surfaces, Maps, Visualization, Animation.

On Exponential Stability of Dynamic Equations on Time Scales

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Abstract: In this paper, we investigate the exponential and uniform exponential stability of the trivial solution to the system of dynamic equations on time scales. We formulate certain inequalities by using Lyapunov functions to guarantee the

exponential and uniform exponential stability and we give some examples to support our theoritical results.

Keywords: Exponential Stability, Uniform Exponential Stability, Lyapunov Function, Time Scales.

Some Inequalities for Operator Convex Functions

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Abstract: In this work, new Hermite-Hadamard's type inequalities and new integral inequalities for operator convex functions are given. Convex functions play an important role in many areas of mathematics and life. They are especially important in the study of optimization problems, probability theory, graphical analysis, geometry, computer, economy, finance, optic, art. The inequalities given in this work are more general than the inequalities given by different authors previously.

Keywords: Hermite-Hadamard's Type Inequalities, Operator Convex Functions, Selfadjoint Operators.

Subclass of Meromorphic Univalent Functions with Positive Coefficients Defined by Linear Derivative Operator

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Abstract: We introduce and study subclass a of meromorphic univalent functions defined in the punctured unit disk **U** by making use of a linear derivative operator. We obtain coefficient estimates, distortion and growth theorems, partial sums and integral representation. Also we obtain some results related with **s**−neighborhoods on **A**, inclusive properties, Radii of starlikeness and convexity and integral operator.

Keywords: Meromorphic Univalent Function, Hadamard Product, Linear Derivative Operator, Integral Representation, Neighborhoods, Integral Operator.

Fractional Calculus Operators of a New Class of Uniformly Convex Functions

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Abstract: In the present paper, we study a new class of analytic and univalent functions with negative coefficients defined by using a certain fractional differential and fractional integral operators. We obtain good results, like, Characterization property, Growth and Distortion theorem and results involving modified Hadamard product. We also study Integral transform of the class WAGG ($\mu,\gamma,\eta,\theta,\alpha,\ell$).

Keywords: Univalent, Convex, Starlike, Uniformly Convex, Fractional Calculus Integral.

AMS Mathematics Subject Classification: 30C40.

On Certain Class of Harmonic Univalent Functions Defined by Integral Operator

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Abstract: In this paper, we have introduced the class $H(n, k, \alpha, \lambda, \gamma, \beta)$ of harmonic univalent functions defined by integral operator. We obtain some results, like, coefficient bound, distortion bounds, extreme points, convex combinations and convolution for the harmonic univalent functions in this class.

Keywords: Harmonic Univalent Function, Integral Operator, Distortion Bounds, Extreme Points, Convex Combination, Convolution.

AMS Mathematics Subject Classification: 30C40.

On Algorithm of Loop Invariants

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Abstract: In the present paper, we study loop invariants. We obtain new algorithm of a loop invariant.

Keywords: Algorithm, Loop Invariants.

AMS Mathematics Subject Classification: 30C40.

Epimorphisms and Heterotypical Identities II

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Abstract: An identity μ is said to be preserved under epis in conjunction with an identity τ if whenever S satisfies τ and μ, and $\alpha : S \to T$ is an epimorphism in the category of all semigroups, then T also satisfies τ and μ; or equivalently, whenever U satisfies τ and μ and $\mathrm{Dom}(\mathrm{U},\mathrm{S}) = \mathrm{S}$, then S also satisfies τ and μ. For any word u, the content of u (necessarily finite) is the set of all variables appearing in u and is denoted by $\mathrm{C}(\mathrm{u})$. An identity $\mathrm{u} = \mathrm{v}$ is said to be heterotypical if $\mathrm{C}(\mathrm{u}) \neq \mathrm{C}(\mathrm{v})$. A nontrivial permutation identity $\mathrm{x}_1\mathrm{x}_2 \ldots \mathrm{x}_n = \mathrm{x}_{i1}\mathrm{x}_{i2} \ldots \mathrm{x}_{in}$ is called seminormal if $i_1 = 1$ and $i_n = n$. We find some classes of heterotypical identities who are both sides contain repeated variables and are preserved under epis in conjunction with any seminormal identity.

Keywords: Epimorphism, Seminormal Identity, Heterotypical Identity.

Modules with Chain Conditions on F-Small Submodules

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Abstract: In this paper we define f-small and f-supplement submodules and investigate the chain conditions on such submodules. Obviously we see that any module with ACC (DCC, resp.) on f-small submodules satisfies ACC (DCC, resp.) on small submodules. We show that any (amply) Rad-supplemented module with ACC on small submodules is (amply) f supplemented.

Keywords: F-Small Submodule, F-Supplement Submodule, F-Lifting Module.

Skew Cyclic Codes over an Infinite Family of Rings

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Abstract: We consider an infinite family of rings which an extension of the binary field. These rings have two Gray maps to the binary field which we show to be conjugate. We equip the rings with automorphisms and use it to define skew cyclic codes over them. Morever, we obtain the Gray image of skew cyclic codes.

Keywords: Binary Codes, Gray Maps, Skew Polynomial Ring, Skew Code.

A Reverse of Hölder Inequality in Variable Exponent Lebesgue Spaces

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Abstract: In this work, we prove a theorem in variable exponent Lebesgue spaces which is known as a reverse of Hölder inequality in classical Lebesgue spaces.

Keywords: Variable Exponent Lebesgue Spaces, Hölder Inequality.

Parallel Surfaces of Spacelike Ruled Weingarten Surfaces in Minkowski 3-Space

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Abstract: In this work, spacelike parallel surfaces and their some basic properties are presented in Minkowski 3-space. Then a theorem for spacelike parallel ruled surface is given to understand how parallel surface of a spacelike ruled surface becomes again a spacelike ruled surface. As a trivial result, it is seen that all parallel ruled surfaces which are developable ones are ruled Weingarten surfaces. Finally, after introducing parallel surfaces of spacelike ruled Weingarten surfaces, some properties of that kind surfaces are obtained in Minkowski 3-space.

Keywords: Developable Ruled Surface, Ruled Weingarten Surface, Parallel Surface, Parallel Ruled Surface.

Reidemeister Torsion of Product Manifolds and Its Applications to Quantum Entanglement

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Abstract: Using symplectic chain complex, a formula for the Reidemeister torsion of product of oriented closed connected even dimensional manifolds is presented. In applications, the formula is applied to Riemann surfaces, Grassmannians, projective spaces and these results will be applied to manifolds of pure bipartite states with Schmidt ranks.

Keywords: Symplectic Chain Complex (SCC), Product Formula for Reidemeister Torsion (PFRT), Riemann Surfaces (RS), Grassmannians (G), Quantum Entanglement (QE).

Optimal Control Problem for Stationary Quasi-Optic Equation

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Abstract: In this paper, the optimal control problem was taken up for stationary equation of Quasi Optic. For stationary equation of Quasi Optic, at first judgement relating to existence and eniqueness of boundary value problem was given. By using this judgement, the existence and uniqueness of the optimal control problem solutions was proved. Then we state a necessary condition to an optimal solution. We proved differentiability of functional and obtained the formula for its gradient. By using these formulas, the necessary condition for solvability the problem is stated as the variational principle.

Keywords: Stationary Equation of Quasi Optic, Boundary Value Problem, Optimal Control Problem, Variational Problem.

On Exact Decay Condition for the Variable Exponent Hardy Type Inequality

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Abstract: There are several sufficient conditions for the variable exponent Hardy type inequality

$$\|u(.)\|_{p(.)} \le C\|xu(x)\|_{p(.)} \tag{1}$$

to hold in the infinite interval $(0,\infty)$ (see, f.e. [1], [2], [3]), where the positive constant C does not depend on arbitrary absolutely continuous function $u:(0,\infty)\to(-\infty,\infty)$. For basic notations and boundedness of classical integral operators in the variable exponent Lebesque spaces $L^{p(.)}$ $(0,\infty)$ see, f.e. In [4].

By this note, we assert that it holds the inequality (1) if the exponent p satisfies the log regularity condition at zero and a Zigmund type decay condition at infinity. Moreover, the decay condition is sharp in the class of exponents that are monotony near infinity.

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Algebraic Tendencies to Multiple Representations

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Abstract: When you teach Math, the tendencies of your students are of great importance. The students, of course, do not have the same level of understanding capabilities. This is our main problem. But it is possible to learn about their tendencies to algebra or math. These tendencies can be determined by using Leslie Matrix Method on the population of 120 students and their approaches to a specific problem are examined.

Keywords: Leslie Matrix, Eigen Values, Eigen Vectors, Tendency.

Quintic B-Spline Collocation for Linear and Nonlinear Fredholm and Volterra Integral Equations

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Abstract: The collocation method based on quintic B-spline has been developed for solution of linear and nonlinear Fredholm and Volterra integral equations. The solution is collocated by B-spline and then the integral equation is approximated by the Newton-Cotes formulas. The error analyses of proposed numerical method are studied theoretically. The presented method is tested with seven examples, and numerical results are given to illustrate the efficiency of the proposed method. The RMS errors in the solutions are tabulated in table 4 which shows that our method can be applied for large values of n.

Keywords: Linear and Nonlinear Fredholm and Volterra Integral Equations, Quintic B-Spline, Newton-Cotes, Error Analyses.

On the Convergence of Lagrange Interpolation to Solve Special Type of Second Kind Ferdholm using Piecewise Constant Function

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Abstract: In this paper Lagrange functions together with the quadrature rule are used for numerically solving second kind integro differential equation of the second order. The main problem is reduced to nonlinear system of algebraic equations. Some numerical examples are dedicated for showing efficiency and validity of the method.

In this paper we may use piecewise constant functions for the special type of second kind integro differential equation of the first order. The main problem is reduced to linear system of algebraic equations. Some numerical examples are dedicated for showing efficiency and validity of the method.

Keywords: Second Kind Integro Differential Equation, Block Pulse Functions, Collocation Points, Lagrange Functions, Quadrature Rule.

A Mixed Nonlocal Problem for a Boussinesq Hyperbolic Equation

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Abstract: This paper deals with the solvability and uniqueness of a mixed nonlocal problem for a Boussinesq hyperbolic equation that combines a classical (Drichlet) and a non local constraint. a functional analysis method, based on the priori estimate and on the density of the operator rang, was the main used tool for proving the solvability and uniqueness of the given nonlocal problem.

Keywords: Hyperbolic Equation Integral Condition, Apriori Estimate.

Domain Decomposition Methods for Image Restoration

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Abstract: In concrete applications for image processing, one might be interested to recover at best a digital image provided only partial linear or nonlinear measurements, possibly corrupted by noise. Given the observation that natural and man-made images are characterized by a relatively small number of edges and extensive relatively uniform parts, one may want to help the reconstruction by imposing that the interesting solution is the one which matches the given data and has also a few discontinuities localized on sets of lower dimension. In this paper we review concisely both nonoverlapping and overlapping domain decomposition methods for total variation minimization and we provide their properties of convergence to global minimizers. Moreover, we show numerical applications in classical problems of signal and image processing, such as signal interpolation and image inpainting.

Keywords: Image Restoration, Domain Decomposition Methods.

Graph Representation for Fingerprint Classification with Neural Network

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Abstract: Fingerprint classification plays a major role in any large scale fingerprint identification system. While it cannot identify fingerprints uniquely, it is helpful in determining when two fingerprints do not match and also it reduces the time complexity. This paper presents fingerprint classification method based on graph representation of fingerprint image processed with recursive neural networks. The fingerprint directional image is segmented in regions consisting of pixels with the same direction. From the segmentation of the directional image a relational graph compactly summaring the macro-

structure of the fingerprint is derived. Recursive neural networks are trained on a structured representation of the fingerprint image. The proposed method improves accuracy and matching speed of the classical algorithms.

Keywords: Fingerprint Classification, Graph Representation, Neural Network.

Some Notes on Multiplication Lattice Modules

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Abstract: Let L be a multiplicative lattice and M be a lattice module over L. In this study, we investigate the relationship between the concepts of prime, semiprime, primary elements of M and prime, primary elements of L. Especially, we consider various properties of semiprime elements including minimal semiprime elements in a restricted class of lattice modules over L called multiplication lattice modules.

Keywords: Multiplication Lattice Module, Primary Element, Semiprime Element.

On the Primary Spectrum of Commutative Rings

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Abstract: Let R be a commutative ring with identity and let $\Pr im(R)$ be the set of primary ideals of R. By defining a variety for any ideal of R over $\Pr im(R)$, that is, $V(I)=\{Q\in \Pr im(R): I\subseteq \sqrt{Q}$ such that $I\in I(R)\}$, it can be shown that this family satisfies all axioms of topology denoted as $Q-Spec(R)$. In this

study, we investigate the Zariski topology on $Q-Spec(R)$ and some properties of primary spectrums directly related to this topology.

Keywords: Primary Spectrum, Zariski Topology.

Periodic Solutions for a Class of Autonomous Newton Differential Equations

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Abstract: In this work, we provide sufficient conditions for the existence of periodic solutions of the second order autonomous differential equation

$$\ddot{x} = -\nabla_x V(t,x)$$

in R^n , where

$$V(t,x) = \frac{\|x\|^2}{2} + \varepsilon\, W(t,x)$$

with $W(t,x)$ a 2π periodic function in the variable t, ε is a small parameter, $x \in R^n$ and

$$\nabla_x V(t,x) = \left(\frac{\partial V}{\partial x_1}, \; . \; . \; . \; , \; \frac{\partial V}{\partial x_n} \right)$$

Note that this is a particular class of autonomous Newton differential equations. Moreover we provide some applications.

Keywords: Periodic Solution, Newton Differential Equations, Averaging Theory.

Some Identities Deriving from the n^{th} Power of a Special Matrix

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Abstract: In this work, we give certain identities related with generalized Fibonacci polynomials by using any 2x2 matrix. For this purpose, we use the determinant and trace of a special matrix. Moreover, we prove that these formulae satisfy the generalized Lucas, Pell-Lucas and Jacobsthal-Lucas sequences which are subsequences of the Horadam sequence.

Keywords: Linear Recurrence Relations, Horadam Polynomials, Generalized Fibonacci Polynomials.

An Aggregate Signcryption Based on Elliptic Curves for Unattended Environments

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Abstract: In this study, we employ elliptic curves to propose an efficient aggregate signcryption scheme. Our approach achieves simultaneously confidentiality (by encrypting), authenticity and integrity (by signing) of data. Moreover, the aggregation process of the scheme reduces communication and space overhead while linear operators of signcryption provide time efficiency. The scheme is especially suitable for disconnected environments where data can be delivered offline or periodically. Therefore, cryptographic techniques such as signcryption should be applied to prevent adversaries from reading, modifying, forging or even erasing information. We further consider security of the scheme and show that the scheme can resist various attacks. Finally, we compare our scheme with the best alternative works in the literature.

Keywords: Cryptography, Elliptic Curves, Signcryption, Confidentiality, Authentication, and Integrity.

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