2nd INTERNATIONAL CONFERENCE ON COMPUTATIONAL MATHEMATICS AND ENGINEERING SCIENCES - CMES2017

20-22 May 2017, Istanbul, TURKEY

ABSTRACT BOOK

THE SECOND INTERNATIONAL CONFERENCE ON COMPUTATIONAL MATHEMATICS AND ENGINEERING SCIENCES (CMES-2017), ISTANBUL, 20-22 MAY 2017

The **Second International Conference on Computational Mathematics and Engineering Sciences (CMES-2017)** will be held from **May 20 to 22, 2017 in Istanbul, Turkey.** It provides an ideal academic platform for researchers and professionals to discuss recent developments in both theoretical, applied mathematics and engineering sciences. This event aims also to stimulate interactions between researchers in the field of computational mathematics and their applications in science and engineering, to present the development reached in this areas, and to showcase the computational expertise of our invited speakers and participants.

The organizing Committee

All kinds of information in this book is the responsibility of the authors.

MESSAGE FROM THE GENERAL CHAIRS

Dear Conference Attendees,

We would like to welcome you to the **2nd International Conference on Computational Mathematics and Engineering Sciences (CMES-2017)** in Istanbul, Turkey. This year, the conference program includes 163 extended abstracts selected by the Program Committee from a number of 236 submissions received in response to the call for papers. The program features keynote talks by seven distinguished speakers: Kalyan Chakraborty of Harish Chandra Research Institute Allahabad, Necdet Bildik of Celal Bayar University, Abdellah Rababah of Jordan University, Rifat Colak of Firat University, Abdon Atangana of The Free State University, Dumitru Baleanu of Cankaya University, Devendra Kumar of Rajasthan University and Giri Debasis of Haldia Institute of Technology. The conference also includes contributed sessions, several posters and research highlights.

We would like to thank the Program Committee members and external reviewers for volunteering their time to review and discuss submitted abstracts. We would like to extend special thanks to the Honorary, Scientific and Organizing committees for their hard work in making CMES2017 a successful event. Last but not least we would like to thank all authors for presenting their work at the conference. We hope that you will find the CMES2017 technical program interesting and intellectually stimulating, and that you will enjoy meeting with and interacting with researchers from around the world.

Zakia Hammouch, FST Errachidia Moulay Ismail University Morocco.
Hasan Bulut, Firat University Elazig, Turkey.

TOPICS

Applied Mathematics,

Financial Mathematics,

Control Theory,

Game Theory

Modeling of Bio-systems for Optimization and Control,

Linear and Nonlinear programming and Dynamics,

Artificial Intelligence,

Geometry and Its Applications,

Analysis and Its Applications,

Statistics and Its Applications,

Mathematics Education and Its Applications,

Algebra and Its Applications.

Engineering Sciences

Computer Science

Information technology

Electrical and Electronic Engineering

Ordinary, Partial, Stochastic and Delay Differential Equations

Chaos and Dynamical Systems

Numerical methods and scientific programming

Fractional Calculus and Applications,

Cryptography and its applications

Computational Fluids mechanics, Heat and Mass Transfers.

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PROCEEDINGS

Extended abstracts will be published in some Special Volumes of eight journals.Procedure, Guidelines and Checklist for the preparation and submission of a paper for the Proceedings of CMES-2017 can be found in the journals websitesThe journals in which selected and peer-reviewed full papers of CMES-2017 will be published are:

1. **ITM Web of Conferences, (Web of Science, SCI-E)**
(Editor in Cheif: Prof. Isaline AUGUSTO)
http://www.itm-conferences.org/

2. **An International Journal of Optimization and Control: Theories & Applications (IJOCTA) (ULAKBIM)**
(Editor in Cheif: Prof. Ramazan YAMAN)
(Editor in Field : Prof. Necati OZDEMIR)
http://ijocta.balikesir.edu.tr/index.php/files

3. **Non. Sci. Letters A, (It will be submitted for possible inclusion in SCI)**
(Editor in Cheif: Prof. Ji-Huan HE)
http://www.nonlinearscience.com/journal_2076-2275.php

4. **Mathematics in Natural Science (MNS)**
(Editor in Cheif: Prof. Abdon ATANGANA)
http://www.isr-publications.com/mns

5. **International eJournal of Engineering Mathematics: Theory and Application**
(Editor in Cheif: Prof. S.G. AHMET and Prof.Hamed DAEI KASMAEI)
http://iejemta.com/

6. **Journal of Modern Technology and Engineering**
(Editor in Cheif: Prof. Mutallimov Mutallim)

http://jomardpublishing.com/journals.aspx?id=1

7. **Hydrology**
(Editor in Cheif: Prof. Abdon ATANGANA)
http://www.mdpi.com/journal/hydrology/special_issues/groundwater_flow

8. **Mathematics in Engineering, Science and Aerospace (MESA)**
(Editor in Cheif: Seenith Sivasundaram)
http://nonlinearstudies.com/index.php/mesa/index

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POSTERS

PLENARY TALKS

FIRAT ÜNİVERSİTESİ 1975
جامعة مولاي إسماعيل
UNIVERSITÉ MOULAY ISMAÏL
كلية العلوم والتقنيات
FACULTÉ DES SCIENCES ET TECHNIQUES

CLASS NUMBERS OF CERTAIN QUADRATIC FIELDS

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Abstract

The talk will be based on some of my recent results with Dr.Azizul Hoque, concerning the divisibility of the class numbers of certain families of real (respectively imaginary) quadratic fields. The main target will be to show the existence of a new family of infinitely many quadratic fields whose class number is divisible by a given integer. The talk will begin with motivation for the problems and will be inclusive.

Keywords: Quadratic fields, Divisibility, Class numbers

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FRACTAL-FRACTIONAL DIFFERENTIATION AND INTEGRATION

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Abstract

New operators of differentiation have been introduced in this paper as convolution of power law, exponential decay law, generalized Mittag-Leffler law with fractal derivative. The new operators aimed to attract more non-local natural problems that display at the same time fractal behaviors. Some new properties are presented, the numerical approximation of these new operators is also presented with some applications to real world problem.

Keywords: Fractal Fractional differentiation; non-locality, non-singularity, numerical approximation.

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A PRACTICAL METHOD FOR ANALYTICAL EVALUATION OF APPROXIMATE SOLUTIONS OF PARTIAL DIFFERENTIAL EQUATIONS

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Abstract

In this talk, a framework is constructed to get more approximate solutions to nonlinear partial differential equations by applying perturbation iteration technique. This technique is reformulated and improved to solve the Fisher's, the Burgers' and regularized long wave equations. Comparison between obtained solutions and the known exact solutions reveals that this technique is highly effective, reliable and accurate in solving nonlinear problems. Convergence analysis and error estimate are also provided by using some related theorems. The basic ideas indicated in this work are anticipated to be further developed to handle nonlinear models.

Keywords: Perturbation iteration method, partial differential equation, nonlinear diffusion, wave equations, convergence.

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STATISTICAL CONVERGENCE OF ORDER α AND STATISTICAL BOUNDEDNES OF ORDER α IN METRIC SPACES

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Abstract

The concept of statistical convergence was first introduced in 1935. It was built in its today meaning in 1950 and it has been worked intensively in the last 30-40 years. Statistical convergence of order alpha was given and studied in 2010 for number sequences. The subject has been a major improvement over the past five to ten years and has been the focus of many mathematicians working on this field. The order of statistical convergence of a sequence of positive linear operators was introduced by Gadjiev and Orhan in 2002 and then the statistical convergence of order α $(0<\alpha\leq 1)$ and strong ρ-Cesàro summability of order α were introduced and studied by Çolak in 2010 for number sequences, using the notion α-density of a subset of the set N of positive integers.

In this talk, using the notations S_d^α, BS_d^α *and* $w_{\rho d}^\alpha$ for the spaces of sequences in question we introduce and give *d*-statistical convergence of order α $(0<\alpha\leq 1)$, d-statistical boundedness of order α $(0<\alpha\leq 1)$, and *d*-strong ρ-Cesàro summability of order α $(\alpha>0)$ for a sequence in a metric space. Furthermore we investigate the relations between the sets of *d*-statistically convergent sequences of order α, between the sets of *d*-statistically bounded sequences of order α and between the sets of *d*-strongly ρ-Cesàro summable sequences of order α for various values of α 's. Also, we establish some relations between these concepts.

Keywords: α-density; statistical convergence; statistical convergence of order α; statistical boundedness of order α; strong ρ-Cesàro summability.

ADVANCES IN DISCRETE FRACTIONAL CALCULUS: THEORY AND APPLICATIONS

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Abstract

In this talk, I will report some new results in the field of fractional calculus and its applications in science and engineering.

Keywords: Discrete fractional calculus; Caputo derivative; Caputo-Fabrizio derivative; Mittag-Leffller kernel.

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MULTI-DEGREE REDUCTION OF SAID-BALL CURVES WITH ENDPOINTS CONSTRAINTS

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Abstract

In this talk, a new approach for multi-degree reduction of Said-Ball curves is investigated. Conditions for continuities and tangent continuities at both bound aries of the curve are given. The distance between the original Said-Ball curve and the degree reduced Said-Ballcurve is measured in L2-norm under the satisfaction of G^0-and G^1-continuity conditions. Several numerical examples, figures, and comparisons show that the proposed methods produce better results than existing methods in the literature.

Keywords: Said-Ballcurves; degreereduction; G^0-continuity; G^1-continuity.

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A THREE FACTOR REMOTE USER AUTHENTICATION SCHEME USING COLLISION RESIST FUZZY EXTRACTOR IN SINGLE SERVER ENVIRONMENT

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Abstract

Due to rapid growth of online applications, it is needed to provide such a facility by which communicators can get the services by applying the applications in a secure way. As communications are done through an insecure channel like Internet, any adversary can trap and modify the communication messages. Only authentication procedure can overcome the aforementioned problem. Many researchers have proposed so many authentication schemes in this literature. But, this paper has shown that many of them are not usable in real world application scenarios because, the existing schemes cannot resist all the possible attacks. Therefore, this paper has proposed a three factor authentication scheme using hash function and fuzzy extractor. This paper has further analyzed the security of the proposed scheme using random oracle model. The analysis shows that the proposed scheme can resist all the possible attacks. Furthermore, comparison between proposed scheme and related existing schemes shows that the proposed scheme has better trade-off among storage, computational and communication costs.

Keywords: Attack; Authentication; Biometric; Password; Smart card.

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ANALYTICAL STUDY FOR NONLINEAR FRACTIONAL DIFFERENTIAL EQUATIONS

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Abstract

Fractional differential equations are the generalizations of differential by the application of fractional calculus. Fractional differential equations are increasingly used to model problems in research areas as diverse as dynamical systems, mechanical systems, control, chaos, chaos synchronization, continuous-time random walks, anomalous diffusive and subdiffusive systems, unification of diffusion and wave propagation phenomenon and others. The most important advantage of using fractional differential equations in these and other applications is their non-local property. In view of the great importance of fractional differential equations in science and engineering, we discuss some analytical techniques for solving nonlinear fractional differential equations. To show the efficiency of analytical techniques, we present some numerical examples. The numerical results are presented graphically. The results show that the analytical scheme is very fantastic and user friendly for solving nonlinear fractional differential equations describing physical problems.

Key words: Fractional differential equations, Analytical methods, Caputo fractional derivative.

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2nd INTERNATIONAL CONFERENCE ON
COMPUTATIONAL MATHEMATICS AND ENGINEERING SCIENCES - CMES2017

20-22 May 2017, Istanbul, TURKEY

PROCEEDINGS

FIRAT ÜNİVERSİTESİ 1975
جامعة مولاي إسماعيل
UNIVERSITÉ MOULAY ISMAÏL
كلية العلوم والتقنيات
FACULTÉ DES SCIENCES ET TECHNIQUES

ANALYTIC SOLUTIONS OF OLDROYD-B FLUID WITH FRACTIONAL DERIVATIVES IN A CIRCULAR DUCT DUE TO TENSION ON THE BOUNDARY

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Abstract

The aim of this talk is to analyze the rotational flow of an Oldroyd-B fluid with fractionalderivatives, induced by an infinite circular cylinder that applies a constant couple to the fluid.Such kind of problem in the settings of fractional derivatives has not been found in the literature. The solutions are based on an important remark regarding the governing equation for the nontrivial shear stress. The solutions that have been obtained satisfy all imposed initial and boundary conditions and can easily be reduced to the similar solutions corresponding to ordinary Oldroyd-B, fractional/ordinary Maxwell, fractional/ordinary second-grade, and Newtonian fluids performing the same motion. The obtained results are expressed in terms of Newtonian and non-Newtonian contributions. Finally, the influence of fractional parameters on the velocity, shear stress and a comparison between generalized and ordinary fluids is graphically underlined.

Keywords: Oldyrod-B fluid; Fractional calculus; Velocity field; Shear stress; Circular duct; Analytic solutions.

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SIMULATION OF WATER-BASED MAGNETITE NANOPARTICLES BETWEEN TWO PARALLEL SURFACES WITH SUCTION/INJECTION

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Abstract

The present work examines the fully developed squeezing flow of water functionalized magnetite nanoparticles between two parallel permeable surfaces. For strongly magnetite fluid three different types of nanoparticles having better thermal conductivity: Magnetite (Fe_3O4), Cobalt ferrite ($CoFe_2O_4$) and Mn-Zn ferrite ($Mn\text{-}ZnFe_2O_4$)) are incorporated within the base fluid (water). Systems of equations containing the nanoparticle volume fraction are rehabilitating in the form of partial differential equations. Resulting mathematical model is converted in the form of ordinary differential equations with the help of compatible similarity coordinates. Results are analyzed for velocity, temperature, reduced skin friction and reduced Nusselt number with variation of different emerging parameters and determine the superb thermal conductivity among mentioned nanoparticles.

Keywords: Squeezing channel, Magnetite nanoparticles, Thermal conductivity, Simulation.

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A NOTE ON A NUMERICAL METHOD FOR SYMMETRIC HAMILTONIAN MATRICES

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Abstract

We present in this study a numerical methods to get eigenvalue of the particular case of structured matrices. Our approach here is based on symplectic reflector defined in R2N×2. Numerical examples are presented.

Keywords: Hamiltonian and Skew-Hamitonian matrices, Symplectic and symmetric matrix, reflecteur symplectic, eigenvalues

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NUMERICAL METHODS OF A MIXED PROBLEM FOR A NONLINEAR KIRCHHOFF MODEL WITH MOVING BOUNDARY

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Abstract

With the use of the coordinate transformation which fixes the boundaries, the finite element formulation is presented for the space variable. Its convergence and error bounds in the energy norm and for the first time derivative in the L^2-norm are established. In particular, the error in the energy norm and for the first time derivative in the L^2-norm is shown to converge with the optimal order $O(h\hat{}r)$ with respect to the mesh size h and the polynomial degree $r \geq 1$. To obtain the fully discrete solution, the generalized-α method is adapted to the semidiscrete formulation. Finally, some numerical simulations that validated the theoretical findings are exhibited.

Keywords: Kirchhoff model, moving boundaries, optimal error estimate, Newmark schemes, generalized-α method, Galerkin finite element method.

M.L.E SPEED OF CONVERGENCE IN NONLINEAR AUTOREGRESSIVE PROCESSES

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Abstract

In this study, we deal with some asymptotic properties of the maximum likelihood estimators of a multivariate parameter for nonlinear autoregressive processes. Under suitable assumptions, theconsistency, the asymptotic normality and the rate of convergence in distribution ($O(n^{-1/2})$) are settled. This rate is the same as in i-d-d case. The method is by the Edgeworth expansions and Berry Essen bounds.

Keywords: Autoregressiveprocess; Berry Essen bound; Edgeworth; Maximum likelihood estimators.

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SIMULATED ANNEALING HYBRIDIZED WITH DYNAMIC PROGRAMMING APPLIED TO SOLVE THE SEQUENCE ALIGNMENT PROBLEM

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Abstract

In this study, a new algorithm based on Simulated Annealing (SA) to solve the sequence alignment problem is proposed, which is named Simulated Annealing with Dynamic Programming (SADP). This new algorithm is a combination of the classical Simulated Annealing (SA) and the Dynamic Programming (DP). This algorithm is implemented to obtain results of pair sequence alignment. Simulated Annealing is a simulation of cooling of a metal to solve an optimization problem. The Dynamic Programming is an optimization algorithm, which transforms a problem into several simple problems. In order to create new solutions of sequence alignment problem, the proposed algorithm applies dynamic programming with very small DNA subsequences into Metropolis Cycle of Simulated Annealing, this approach increases the quality of the solution to the problem of alignment genomic sequences. The parameters of proposed algorithm, for certain instances, are tuned by an analytical method and some parameters have been experimentally calculated. SADP´s results are compared with the classical SA, Simulated Annealing with Previous Solutions (SAPS) and Dynamic Programming (DP). The instances used are specific genes of the HIV (Human Immunodeficiency Virus), SIV (Simian Immunodeficiency Virus), HPV (Human papillomavirus), CPV (Canine Papillomavirus) and HHV (Human Herpesvirus) viruses.

Keywords: Alignment Sequence Problem; Simulated Annealing Algorithm; Dynamic Programming;

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COMMUTATIVITY THEOREMS IN RINGS WITH INVOLUTION: A SURVEY

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Abstract

In this study, we investigate commutativity of ring *R* with involution * which admits a derivation satisfying certain algebraic identities. Some well-known results characterizing commutativity of prime rings have been generalized. Finally, we provide examples to show that various restrictions imposed in the hypotheses of our theorems are not superfluous.

Keywords: Prime ring, involution, commutativity, derivation.

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NEW SOLITARY WAVE SOLUTIONS TO THE (2+1)-DIMENSIONAL CALOGERO-BOGOYAVLENSKII-SCHI AND THE KADOMTSEV-PETVIASHVILI HIERARCHY EQUATIONS

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Abstract

By means of the sine-Gordon expansion method, we construct new solitary wave solutions to the Calogero-Bogoyavlenskii-Schi and Kadomtsev-Petviashvili hierarchy equations. The solutions obtained are complex, hyperbolic and trigonometric function solutions. All the obtained solutions satisfy their corresponding equation (that is equation (3.1) and (3.10)), we carry out the test of satisfaction with help of Wolfram Mathematica 9. We also plot the three- and two-dimensional graphics by using the same code in Wolfram Mathematica 9.

Keywords: Sine-Gordon expansion method; Calogero-Bogoyavlenskii-Schi equation; Kadomtsev-Petviashvili hierarchy equation; complex function solutions; hyperbolic function solutions; trigonometric function solutions.

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A SCHEDULING PROBLEM FOR UNLOADING OPERATIONS INCONTAINER TERMINAL

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Abstract

This study deals with the problem of minimizing the completion time of unloading containers from a train in the dry port MITA in Casablanca/Morocco. The main objective is to solve a real-world optimization problem. In the literature, problems related to unloading containers in a terminal can be classified into three kinds: first, the problems related to the planning of port handling equipment as presented by Lee et al. [1]: problem of allocating resources of a container terminal taking into account the global processing time or the delays. Then the problems using different types of handling equipment and their impact on each other (Bish et al. [2]); Problems related to interference of handling equipment. In this context, we present a new model to minimize the processing time of a waiting train on the railway dry port terminal. This treatment includes the unloading, transport and placement of all containers on the train to storage areas using the available cranes. That is to allocate optimally cranes and storage areas to containers. We present a new Mixed Integer Programming (MIP) model for the scheduling and storage problem taking into account the storage constraints. To test the performance of the proposed model, numerical tests are conducted and analysed. The results show thegood quality of the obtained solutions.

Keywords: Scheduling; Makespan; Optimization; Crane assignment; Container terminal.

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CAPACITY SOLUTION TO A NONLINEAR ELLIPTIC COUPLED SYSTEM IN ORLICZ-SOBOLEV SPACES

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Abstract

We shall give the existence of a capacity solution for a nonlinear elliptic coupled system, whose unknowns are the temperature inside a semi conductor material u, and the electric potential φ, Within the proof we use truncation methods, monotonicity arguments techniques, the integration by parts formula also we use Schauder's fixed point theorem to prove a weak solution, then we introduce a sequence of approximate problems which converges (upto a subsequence) in a certain sense to a capacity solution which have been adapted to non-reflexive Orliczspaces.

Keywords: Capacity solution; Weak solution; Coupled system; Orlicz-Sobolev spaces.

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A NONSTANDARD HIGHER-ORDER PDE FOR EDGE DETECTION IN MEDICAL IMAGING PROBLEMS

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Abstract

In this work, we adress a nonstandard variational energy for important features detection and multiplicatif noise removal in medical imaging problems. Our contribution consists in minimizing a $p(\cdot)$-Bilaplace energy with a variable exponent function $p(\cdot)$. We study the well-posedness of the proposed model and we consider an adaptive choise of $p(\cdot)$ based on the topological gradient method. We give a numerical solution method based on spliting convexity schema and we present several numerical examples to show the robustness of the proposed approach.

Keywords: $q(\cdot)$-Laplace operator; topological gradient; ultrasound imaging; speckle noise.

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EXACT SOLUTION OF THE BLAST WAVE PROBLEM IN DUSTY GAS

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Abstract

The aim of this study is to find the new exact solution of the blast wave problem in one-dimensional unsteady adiabatic flow for generalized geometry in a compressible, inviscid ideal gas with dust particles. The density of the undisturbed region is assumed to vary according to a power law of the distance from the point of explosion. It is observed that the presence of dust particles in the gas yields more complex expression as compared to the ordinary Gasdynamics. The exact solution of the problem in form of a power in the distance and the time is obtained. Further, the behaviour of the total energy carried out by the blast wave for planar, cylindrically symmetric and spherically symmetric flow corresponding to different Mach number of the fluid flow in a dusty gas is presented.

Keywords: Blast wave; strong shock; dusty gas.

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AN INVESTIGATION ON A TWO DIMENSIONAL PROBLEM OF MODE-I CRACK UNDER AN EXACT HEAT CONDUCTION WITH A DELAY

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Abstract

The present study is concerned with a recently proposed heat conduction model: an exact heat conduction model with a single delay term weakened by a finite linear Mode-I crack. The material of the medium is considered to be homogeneous and isotropic. The boundary of the crack is subjected to a prescribed stress distribution and temperature. The thermoelasticity theory with a single delay term developed by Quintanilla, is employed and integral transforms are used to obtain the solution of which is shown to be equivalent to the solution of a Fredholm's integral equation of the first kind. This integral equation is solved numerically by regularization method. The inversion of Laplace transform is also carried out numerically and numerical values of the displacement components, temperature and stresses in the physical domain are computed for copper material by considering different particular case. The results are also presented graphically.

Keywords: Generalized Thermoelasticity; Mode-I crack; Thermoelasticity with a single delay; Dual integral equations; Fredholm's integral equation

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DISCUSSION OF ADVECTION-DIFFUSION PROCESS IN FINITE ELEMENT TECHNIQUES

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Abstract

The aim of this study is to discover numerical behaviour of the advection-diffusion processes using various finite element techniques based on B-splines. These methods are applied for the spatial derivatives and an optimization technique is suggested for the time integration of the resulting system. Note that the optimization technique has also been compared with the Runge-Kutta method. The proposed methods have been shown to be unconditionally stable. Two illustrative examples have also been presented. The computed results are seen to be highly accurate and in very good agreement with the literature.

Keywords: Advection-diffusion process; finite element method; B-splines; Runge-Kutta method; Mathematical modelling

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EVOLUTION PROBLEM GOVERNED BY THE SUBDIFFERENTIAL OPERATOR WITH DELAY

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Abstract

We deal in the present work, with the existence of solutions for differential inclusions governed by the subdifferential operators with time delay, in aseparable Hilbert space. The set-valued perturbation which containsthe delay is scalarly upper semicontinuous. We prove under acompactness condition on the perturbation, that there exists atleast one absolutely continuous solution. Our existence result is obtained thanks to the one proved recently in [1] concerning perturbed problem governed by thesubdifferential operator whose perturbation is a set-valued mapwithout delay and via a discretization method (see [2]).

Keywords: Differential inclusions, subdifferential operator, set-valued map, finite delay, perturbation, scalarly upper semicontinuous, integrable function, absolutely continuous map

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COMBINING CRYPTOGRAPHY WITH STEGANOGRAPHY

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Abstract

In this study, a different cryptographic method is introduced by using Power series transform, codes of ASCII and science of steganographi. Here, we produce a new algorithm for cryptology, we use Expanded Laplace transformation of the exponential function for encrypting the plain text and we use codes of ASCII for support to the confidentiality of the chipertext. After, Chipertext have embedded by steganographic method in another plaintext to hide the existence of chipertext. We show corresponding inverse of Power Series transform for decryption.

Keywords: Cryptology, Encryption, Decryption, Laplace Transform, ASCII, Steganograph

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MISTAKES AND MISCONCEPTION ABOUT "ZERO" IN SOME TOPICS OF MATHEMATICS FOR 8TH GRADERS IN YENIMAHALLE, ANKARA

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Abstract

In this investigation, we targetted to take attention to the number 'zero' that differs in many topics throughout the primary education period and tried to determine the mistakes and misconceptions that the 8th graders make about the concept of 'zero'.This research aims to identify if students make mistakes and misconceptions regarding the number zero, i.e. its' being a natural, rational number, if it is a positive or negative number. Mistakes and misconceptions of students in solution of equations in cases where the variable on each side of the equation is eliminated have been examined. Mistakes and misconceptions of students for "zero" such as "a^0 ", "1/0" on which even the teacher candidates make mistakes in the previous researches, have been studied. In the investigation, the students have been found to have many mistakes and misconceptions about the number 'zero' and some suggestions have been made on these mistakes and misconceptions by researchers.

Keywords: Zero, numbers, mistakes, misconceptions, mistakes and misconceptions about the number 'zero'.

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ON THE EXACT SOLUTIONS OF THE FRACTIONAL (2+1)- DIMENSIONAL DAVEY-STEWARTSON EQUATION SYSTEM

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Abstract

In this study, we construct the exact traveling wave solutions of the fractional (2+1)-dimensional Davey-Stewartson equation system (D-S) that is complex equation system using the Modified Trial Equation Method (MTEM). We obtained trigonometric function solutions by this method that are newly in literature.

Keywords: Modified trial equation method, The fractional (2+1)-dimensional Davey-Stewartson equation system, Trigonometric function solutions.

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EMULATE ARTIFICIAL NEURAL NETWORK TO MAKE A DECISION IN WIRELESS SENSOR

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Abstract

This study presents an Artificial Neural Network Implementation in Arduino Board, simulated Network with Proteus ISIS. Artificial Neurons Network (ANN) is used in the decision and control of dynamic systems which can be with a lack of superfluous information which forces the use of fuzzy logic. The network presents a feed-forward Backpropagation Network. It is the best general purpose network for either supervised or unsupervised learning. The back-propagation algorithm generates a weight for all nodes in the networks, to minimize absolute error committed in fusion data, As the structure used by human being able to reason and not repeat errors. The write-up provided here gives an overview of artificial neural networks, details of the sketch, it's an introduction to some of the basic concepts employed in feed forward networks and the backpropagation algorithm. Its main applications include temperature, humidity, gas sensor and other types of data monitoring, factory automation, home automation, remote monitoring and home device control or surrounding environment to make an exact decision in short time.

Keywords: Multi-Sensor, Wireless Signal, Embedded Systems, Emulate, Arduino, Neral Network, Backpropagation.

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GAIN SCHEDULING LINEAR MODEL OF AN ELECTRO-HYDRAULIC ACTUATOR

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Abstract

In different industrial processes where position and force control are desired, electro-hydraulic systems have a widespread area of utilization. Models of the electro-hydraulic systems include high order nonlinearity. In this study, a gain scheduling linear model corresponded with nonlinear model of a hydraulic force actuator system is developed. The proposed model is constituted in two distinct and consecutive stages. In first step, nonlinear terms caused to nonlinearity are described by means of measurable or observable system parameters and embedded in a nonlinear scheduling parameter. Thus, the scheduling parameter is continuously extracted from real system. In second step, the nonlinear system equation is rearranged by the scheduling parameter and, parameter varying linear model is obtained. The simulations which are performed by using of Matlab-Simulink computer program show that the proposed model rightly fits to the nonlinear system model.

Keywords: Nonlinear model; Electro-Hydraulic System; Parameter varying, Gain scheduling.

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MATHEMATICAL MODELING OF THE SYNTHESIS OF NEW MATERIALS

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Abstract

The aim of this work is developing a mathematical model of the sharp changes in the phase state of a substance. To construct a mathematical model, a phenomenological method of thermal dynamics, magnetic hydrodynamics (MHD) and statistical physics has been created. This approach allows developing a model which can be efficiently used to describe the processes of heat and mass transfer during the inelastic deformation of materials. An important step in the work is an application ofthe above models todescribethe processesof phase formationduringcertaintransformationsof the solid phase of materials.

It is equally important to determine the role of the chemical reactions as one of the most effective methods of phase formation control in polycrystalline systems. Given the above, it is believed that the use of this approach can create models adequately describing the process of changing the state of matter as a result of the high-energy supply in a short period of time.

An important step in modelling is to create the equation of state. The most promising for this class of problems is to use the free energy of the system, taking into account various interaction factors between the particles.

Keywords:Mathematical model, inelastic deformation of materials, equation of state.

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A NEW APPROACH TO INTERVAL MATHEMATICAL MODEL AND APPLICATIONS

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Abstract

An interval may be defined as a convex combination as follows:

$$I = [a, b] = \{x_\alpha = (1-\alpha)a + \alpha b : \alpha \in [0,1]\}.$$

Consequently, we may adopt interval operations by applying the scalar operation point-wise to the corresponding interval points:

$$I \cdot J = \{x_\alpha \cdot y_\alpha : \alpha \epsilon [0,1], x_\alpha \epsilon I, y_\alpha \epsilon J\},$$

with the usual restriction $0 \notin J \; if \; \cdot = \div$. These operations are associative:

$$I + (J + K) = (I + J) + K,$$

$$I * (J * K) = (I * J) * K.$$

These two properties, which are missing in the usual interval operations, will enable the extension of the usual linear system concepts to the interval setting in a seamless manner. The arithmetic introduced here avoids such vague terms as ”interval extension”, ”inclusion function”, determinants which we encounter in the engineering literature that deal with interval linear systems. On the other hand, these definitions were motivated by our attempt to arrive at a definition of interval random variables and investigate the corresponding statistical properties. We feel that they are the natural ones to handle interval systems.

We will enable the extension of many results from usual state space models to interval state space models.

Keywords: Interval Analysis, Interval Matrices, State Space Model, Kalman Filter.

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SOME WAVE SIMULATION PROPERTIES OF THE (2+1) DIMENSIONAL BREAKING SOLUTION EQUATION

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Abstract

In this study, we apply an effective method which is improved Bernoulli sub-equation function method (IBSEFM) to (2+1) dimensional Breaking Solution equation. It gives some new wave simulations such as complex and exponentiel structures. We check up whether all structures verify the (2+1) dimensional Breaking Solution model. Then, we plot three and two dimensional surfaces to obtained solutions by using Wolfram Mathematica 9.

Keywords: Improved Bernoulli function method;Breaking Solution; Complex exponential; wave simulate.

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REVIEW AND CLASSIFICATIONS OF THE RIDGE PARAMETER ESTIMATION TECHNIQUES

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Abstract

Ridge parameter estimation techniques under the influence of multicollinearity in linear regression model were reviewed and classified into different forms and various types. The different forms are Fixed Maximum (FM), Varying Maximum (VM), Arithmetic Mean (AM), Geometric Mean (GM), Harmonic Mean (HM) and Median (M) and the various types are Original (O), Reciprocal (R), Square Root (SR) and Reciprocal of Square Root (RSR). These classifications resulted into proposing some other techniques of Ridge parameter estimation. Investigation of the existing and proposed ones were done by conducting 1000 Monte-Carlo experiments under five (5) levels of multicollinearity (ρ = 0.8, 0.9, 0.95, 0.99, 0.999), three (3) levels of error variance (σ^2 = 0.25, 1, 25) and five levels of sample size (n = 10, 20, 30, 40, 50). The relative efficiency (RF $\leq$ 0.75) of the techniques resulting from the ratio of their mean square error and that of the ordinary least square was used to compare the techniques. Results show that the proposed techniques perform better than the existing ones in some situations; and that the best technique is generally the ridge parameter in the form of Harmonic Mean, Fixed Maximum and Varying Maximum in their Original and Square Root types.

Keywords: Linear Regression Model, Multicollinearity, Ridge Parameter Estimation Techniques, Relative, Efficiency.

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INVESTIGATION OF INDUCTION MOTORS MEDIUM VOLTAGE GRID CONNECTED POWER SYSTEM STABILITY ANALYSIS

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Abstract

Package software that can view power systems from many aspects and meet the needs are developed and made ready for personal use. For example, the analysis of power systems according to their different operating and working types can be made by such programs like Matlab/Simulink, Neplan, Pscad, Etap, and Digsilent. Nearly all of these programs, results are either shown visually or just numeric results are delivered to users without showing the process. These results provide preliminary information about the system in analyzing the complex power systems to operators, operating engineers, and working crafts.

In this research, stability analysis of medium voltage, on grid, induction motor at the takeoff time is viewed with Etap program. Some charts are created such as voltage-time, power-time, moment-time according to dynamic and statical analysis mentioned the engineering system analysis. İt is impossible to make these analyses with classic calculation methods. And that makes developing computer based solution methods necessary in analyzing power systems

Keywords: Motor Starting Analysis, Etap, System Stability

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NUMERICAL BEHAVIOR OF SINGULAR TWO-POINT BOUNDARY VALUE PROBLEMS IN A COMPARATIVE WAY

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Abstract

This study concentrates on discovering numerical behavior of the singular two-point boundary value problems through various numerical techniques. This is carried out in a comparative way by mainly using differential quadrature and finite element methods. Also a discussion has been done by means of advantages and disadvantages of the numerical methods of interest. To properly understand the behavior of the physical processes represented by the model equation, the calculated solutions have been discussed in detail.

Keywords: Singular two-point boundary value problems, differential quadrature method, finite element method, physical behavior

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ROBUST SPEED OBSERVER FOR MECHANICAL SYSTEMS WITH NON-HOLONOMIC CONSTRAINTS

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Abstract

A robust speed observer for unconstrained perturbed mechanical systems has recently developed in [1]. It ensures the global convergence in spite of the presence of unknown disturbances. The observer has high dimension and requires the solution to certain integrals which cannot be derived explicitly a priori. We present in this study a globally convergent robust observer for perturbed mechanical systems with non-holonomic constraints. The mechanical model considered is more general which contains the systems with k-nonholonomic constraints. The observer derived is uniformly globally asymptotically stable with only two states in excess of full order which means that one half of the observer states in [1] are removed. Observer is given by explicit expressions and does not require any solutions of integrals. The effectiveness of this approach is demonstrated through the resultants simulations.

Keywords: Speed observer, immersion and invariance;unknowndisturbances; robust observer.

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SOLUTIONS OF DIFFERENTIAL EQUATIONS THROUGH MONTE CARLO ALGORITHMS

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Abstract

This study aims at effectively producing solutions of ordinary differential equations through the Monte Carlo simulation algorithms. The Monte Carlo simulation is an approach analysing problems encountered in broad range of science. The simulation algorithm is considered to find out solutions of some optional equations. In the light of those issues, we also have opportunity to discuss what a stochastic model is. For the corresponding model, we will have a chance to figure out the ability and efficiency of the algorithm.

Keywords: Boundary value problem, Monte Carlo algorithm, differential equation, stochastic model

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TRANSIENT ANALYSIS WITH THE FOUR-STEP RUNGE-KUTTA METHOD OF INDUCTION MOTOR WITH MATLAB

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Abstract

In this study, Asynchronous Motor equations are converted to DQ axis equations. A state space model was constructed with these equations. State equations were analyzed using the Matlab m. file software using the Four-Step Runge Kutta Method. In this way, the asynchronous motor transients are displayed on the graph screen and their behavior is analyzed.

Keywords: Induction Motor, Four Step Runge Kutta Method, Matlab m-file

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ELASTO-DYNAMIC RESPONSE OF CRACKED INFINITE ORTHOTROPIC ELASTIC STRIP UNDER IMPACT LOADING CONDITIONS

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Abstract

This study deals with the investigation of elasto-dynamic response of a finite crack embedded in an infinite orthotropic strip under suddenly applied stress. The crack is situated symmetrically and oriented in a direction normal to the edges of the strip. Integral transforms are employed to reduce the transient problem to a pair of dual integral equations in the Laplace transformed plane which are solved by iterations in the low frequency domain. To determine time dependence of the parameters, these equations are inverted to yield the analytical expression s of the dynamic stress intensity factor and crack opening displacement (COD). These physical quantities are calculated for different point loading given on the surface of the crack for the composite materials graphite epoxy and glass epoxy. The numerical values thus obtained are depicted through graphs for different particular cases.

Keywords: Orthotropic elastic strip; Impact response; Dynamic stress intensity factor.

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SIMULATION OF TWO DIMENSIONAL SHALLOW WATER EQUATIONS WITH VARIABLE BOTTOM GEOMETRY USING FORCE METHOD

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Abstract

In the present study, the FORCE scheme has been used for the numerical solution of two dimensional shallow water equations with variable bottom geometry. Firstly, the one dimensional equations are solved and the source term is treated using time operator splitting. The method is then extended to two dimensional problem using space operator splitting. The method is applied to the various test problems in one and two dimensions. The results obtained are validated with the earlier works. It was observed that the FORCE method works faithfully to the real life problems but the treatment of source term depends upon the geometry of the problem.

Keywords: Force Method; Shallow Water Equations;Bottom Geometry.

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ON A NONLINEAR EIGENVALUE PROBLEM IN MUSIELAK-ORLICZ SPACES

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Abstract

We consider the eigenvalue problem in an arbitrary Musielak-Orlicz space. We show that the existence of an eigenvalue can be derived from a generalized version of Lagrange multiplier rule.

Keywords: Eigenvalue problem, Musielak Orlicz spaces, Nonlinear elliptic problems

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CRYPTANALYSIS OF APPLICATION OF LAPLACE TRANSFORM FOR CRYPTOGRAPHY

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Abstract

Although Laplace Transform is a good application field in the design of cryptosystems, many encryption algorithm proposals become unsatisfactory for secure communication since cryptanalysis studies are not sufficient. One of the important factors resulting in poor proposals is the fact that security analysis of the proposed encryption algorithms is performed with only statistical tests and experimental results. In this study, a general attack scenario was given in order to conduct security analyses of Laplace Transform based cryptosystems. The application of proposed general attack scenario was shown on recently proposed Laplace Transform based encryption scheme.

Keywords: Laplace Transform; Cryptography; Cryptanalysis; A general attack scenario.

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A NEW RELIABLE TREATMENT OF THE LANE-EMDEN TYPE EQUATIONS

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Abstract

In this study, a new analytic approximate technique, namely the optimal perturbation iteration method, is presented. We applied this technique to singular initial value Lane-Emden type problems, which are nonlinear differential equations which represent many scientific phenomena in astrophysics and mathematical physics, to verify the effectuality and productivity of the method. This technique ensures us to control the convergence regions when necessary. Comparing different methods discovers that the proposed method is highly accurate and has great potential to be a new kind of powerful analytical tool for nonlinear differential equations.

Keywords: Optimal perturbation iteration method, delay differential equations, approximates solutions.

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CERTAIN FRACTIONAL INTEGRALS AND SOLUTIONS OF FRACTIONAL KINETIC EQUATIONS INVOLVING THE PRODUCT OF S-FUNCTION

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Abstract

In this study, our main objective is to establish certain new fractional integral by applying the Saigohypergeometric fractional integral operators and by employing some integral transforms on the resulting formulas, we presented their image formulas involving the product of S-function. Furthermore, We develop a new and further generalized form of the fractional kinetic equation involving the product of S-function. The manifold generality of the S-function is discussed in terms of the solution of the fractional kinetic equation and their graphical interpretation is interpreted in the present study. The results obtained here are quite general in nature and capable of yielding a very large number of known and (presumably) new results.

Keywords: Saigohypergeometric fractional integral operators, fractional kinetic equation, S-function.

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COMBINATION OF LIE TRANSFORMATIONS AND AUXILIARY EQUATION METHOD FOR A CLASS OF NEW KDV-BURGERS-KURAMOTO TYPE EQUATION

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Abstract

For engineering and science, the analytical solutions of nonlinear partial differential equations are important. Therefore, transformations are the most important tools. Generally, the wave transformation, which is also one of the group transformations, is used for the analytical methods. In this work, we consider a class of new KdV-Burgers-Kuramoto type equation and the solutions of the equation are obtained via based on analytical methods where instead of wave transformations, group transformations are proposed. With the group transformations, analytic solutions can be obtained via Auxiliary equation method.

Keywords:A class of new KdV-Burgers-Kuramoto type equation; group transformations; Auxiliary equation method.

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HIDDEN SYMMETRIES WITHIN SOME NEW DERIVATIVES

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Abstract

In this study, the generic (standard) and non-generic (hidden) symmetries of the extended Lagrangians are investigated for the geometries induced by the extended Lagrangian belonging to the motion of a one-dimensional free particle. The standard and hidden symmetries of the induced two-dimensional manifolds within conformable derivative are reported.

Keywords: Killing vectors;Killing-Yano tensors; Conformable derivative; Lagrangian.

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A NOTE ON STURM-LIOUVILLE PROBLEM FOR DIFFERENCE EQUATIONS

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Abstract

In this study, Sturm-Liouville problem, with variable potential function $q(n)$, for difference equations is taken into consideration as follows

$$\Delta^2 x(n-1)+q(n)x(n)+\lambda x(n)=0, n=a,...,b, \qquad (1)$$

$$x(a-1)+hx(a)=0, \qquad (2)$$

$$x(b-1)+kx(b)=0, \qquad (3)$$

where a,b are finite integers with $a\geq 0$; $a\leq b, h$ is a real number, Δ is the forward difference operator, $\Delta x(n)=x(n+1)-x(n)$, λ is the spectral parameter, $q(n)$ is a real valued potential function for $n\in[a,b]$; n is a finite integer. The sum representations of solutions are found. It is shown that these results satisfy the equation by using summation by parts. Asymptotic formulas for eigenfunctions are given.

Keywords: Sturm-Liouville, Casoratian, difference equation, eigenfunction, asymptotic formula.

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NOVEL HYPERBOLIC BEHAVIORS TO SOME IMPORTANT MODELS ARISING IN QUANTUM SCIENCE

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Abstract

In this study, with the help of Wolfram Mathematica 9, sine-Gordon expansion method is used in constructing new hyperbolic function solutions to the two-well-known nonlinear differential equations that arises in nonlinear science, namely; the modified Zakharov-Kuznetsov (mZK) and the (2+1)-dimensional cubic Klein-Gordon (cKG) equations. We also plot the two- and three-dimensional graphics using the same computer program in the Wolfram Mathematica 9.

Keywords: The sine-Gordon expansion method; modified Zakharov-Kuznetsov equation; (2+1)-dimensional cubic Klein-Gordon equation; hyperbolic function solution

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GENERALIZED CESÀRO SUMMABLE DIFFERENCE SEQUENCE SPACES AND THEIR DUAL SPACES

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Abstract

Et [3] introduced some type Cesàro difference sequence spaces $C_p(\Delta^m)$ $(1\leq p<\infty)$, $C_\infty(\Delta^m)$ and determined their Köthe-Toeplitz duals. In this study we continue to examine others relations with related the the sequence spaces $C_1(\Delta^m)$ and $C_p(\Delta^m)$ and determine the rα-duals of the sequence space $C_1(\Delta^m)$.

Keywords: Difference Sequence, Cesàro Summability, Dual Spaces.

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TRIGONOMETRIC FUNCTION SOLUTIONS OF FRACTIONAL DRINFELD'S SOKOLOV -WILSON SYSTEM

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Abstract

In this study, we construct exact trigonometric solutions of the space-time fractional classical Drinfeld's Sokolov-Wilson system by Modified Trial Equation Method (MTEM). These solutions may explain some physical phenomena and lead to researchers in physics and engineering.

Keywords: Modified trial equation method, Fractional Drinfeld's Sokolov-Wilson system.

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FRACTIONAL PROBLEM FOR DIFFUSION OPERATOR WITH IMPULSIVE CONDITION

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Abstract

We consider fractional Stum-Liouville problem for diffusion operator of order $\alpha \in (1,2]$ with impulsive boundary conditions,

$$-D^{\alpha}h(x)\,{}^{C}D^{\alpha}y(t)+\left(2\lambda p(t)+q(t)\right)y(t)=0$$
$$\Delta y|_{t=t_k}=I_k\left(y(t_k)\right),\ \Delta y'|_{t=t_k}=I^{*}_{k}\left(y(t_k)\right),\ t_k\in[0,\pi],\ k=1,\ldots,n$$
$$\alpha_1 y(0)+\beta_1 y'(0)=0,\ \alpha_2 y(\pi)+\beta_2 y'(\pi)=0$$

where $I_k, I_k^{*}:\mathbb{R}\to\mathbb{R}$, $\Delta y(t_k)=y(t_k^{+})-y(t_k^{-})$, $y(t_k^{+})=\lim_{h\to 0} y(t_k+h)$. We provide representation of solution for this problem. By means of a fixed point theorem, the existence of solution for this problem is obtained. Our results are based on Schaefer fixed point theorem.

Keywords. Fractional;Sturm-Liouville; Impulsive.

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MODELING DISTRIBUTED WORKFLOW PROCESSES USING EXTENDED PETRI NETS

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Abstract

A manufacturing cell is a component of a distributed flexible manufacturing system at some factory. This component is itself a distributed subsystem. The contribution introduces modelling distributed workflow processes using extended Petri nets with the new construction which is the interruption routing. Petri nets notation is used for representation of the four main routing constructs as well as for the workflow process. In this study, four main routing construct and the new construct interruption explained and modeled by using extended Petri nets.

Keywords: Workflow, Workflow Building Blocks, Process Modelling, Routing Constructs; extended Petri nets.

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NEW MULTIPLE SOLITON SOLUTIONS OF MODIFIEDKDV-KPEQUATION

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Abstract

Many studies have been carried out on the creation of mathematical models of real life problems in the field of applied sciences. New solution functions have been tried to be obtained by means of methods developed for these nonlinear physical problems.

In this study, new generalized F-expansion methodis used to obtain multiple soliton solutions of modified KdV-KP equation. With this proposed method, new combined and multiple soliton solutions have been found.

Keywords: New generalized F-expansion method; modified KdV-KP equation; multiple soliton solutions.

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OPTIMAL PERTURBATION ITERATION METHOD FOR SOLVING DELAY DIFFERENTIAL EQUATIONS

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Abstract

In this research, we have presented a new analytical technique, namely the optimal perturbation iteration method and have implemented this technique to delay differential equations to carry out an efficient algorithm for the new approximate solutions. We have also tested the accuracy and effectiveness of this method by various examples of linear and nonlinear problems of delay differential equations. Obtained results expose that optimal perturbation iteration algorithm is very effective, reliable, easy to use and simple to perform.

Keywords: Optimal perturbation iteration method, delay differential equations, approximate solutions

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AN APPLICATION OF WEIERSTRASS TRANSFORMATION METHOD TO SOME NONLINEAR PHYSICAL PROBLEMS

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Abstract

In this study, the extended Weierstrass transformation method, that is applied to construct the new wave solutions of some nonlinear partial differential equations such that Tzidzeica-Dodd-Bullough and Liouville equations, is considered. Thus, some new traveling wave solutions including the Weierstrass elliptic functionsare obtained by using this novel method. So, these results can't be found in literature. Also, the behaviour of solutions is determined by two and three-dimensional graphics.

Keywords: Nonlinear problems; Soliton; Weierstrass elliptic functions, Exact solution.

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SPEED SENSORLESS VECTOR CONTROL WITH A STRATEGY OF LINEARIZATION BY STATE FEEDBACK OF INDUCTION MOTOR APPLIED MODEL REFERENCE ADAPTIVE SYSTEM

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Abstract

In this study, we show that the association of the fuzzy logic regulators with a control strategy using the linearization by return of state feedback by using fuzzy regulators for an induction machine without speed sensor, and with adaptation of the rotor resistance. The rotor speed is estimated by using the model reference adaptive system approach (MRAS). This method consists of using two models. The first one is the reference model and the second is an adjustable one in which two components of the stator flux, obtained from the measurement of the currents and stator voltages, are estimated. The estimated rotor speed is then obtained by canceling the difference between stator-flux of the model of reference and those of the adjustable model. This techniqueis lends itself very well to the adjustment and has the badly controllable command of process by conventional traditional methods, and makes it possible to obtain a powerful and robust command with respect to uncertainties on the external parameters and disturbances.

Keywords: Asynchronous actuator, Fuzzy Logic Control, adaptive method with model of reference, Vector control.

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STOCHASTIC RUNGE-KUTTA METHODS IN A GOMPERTZIAN STOCHASTIC MODEL

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Abstract

In this study, a Gompertzian stochastic model is introduced to describe the solid tumour growth. Explicit Runge-Kutta scheme of second order in the weak sense for the Gompertzian stochastic model is considered. Finally we demonstrate the accuracy by computing the errors in approximate solution for our model which have known exact solutions.

Keywords: Stochastic Runge-Kutta scheme, Stochastic differential equations

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TAN (F(xi)/2) -EXPANSION METHOD FOR EXACT SOLUTIONS OF THE (2+1)-DIMENSIONAL POTENTIAL CALOGERO–BOGOYAVLENSKII–SCHIFF EQUATION

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Abstract

In this study, with help of Wolfram Mathematica 9, we consider the $tan\left(\frac{F(\xi)}{2}\right)$-expansion method for investigating the traveling wave solutions of the (2+1)-dimensional Calogero–Bogoyavlenskii–Schiff equation. We find some traveling wave solutions such as trigonometric, hyperbolic, exponential and rational function solutions. Then, we also plot the two- and three-dimensional graphics for some traveling wave solutions obtained in this study by using the same program in Wolfram Mathematica 9.

Keywords: (2+1)-dimensional Calogero–Bogoyavlenskii–Schiff equation;tan$(F(\xi)/2)$-Expansion Method; exact solutions

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ON LACUNARY STATISTICAL CONVERGENCE OF ORDER β FOR SEQUENCES OF FUZZY NUMBERS

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Abstract

In this study, we generalize some lacunary statistically convergent sequence classes of order β using the Orlicz function M and generalized difference operator Δ^m in fuzzy sequences and give some inclusion relations.

Keywords: Fuzzy number, sequence of fuzzy numbers, statistical convergence, lacunary sequence, Orlicz function, difference sequence.

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UNSTEADY FREE-CONVECTIVE EXOTHERMIC FLUID FLOW IN VERTICAL CHANNEL FILLED WITH POROUS MATERIAL

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Abstract

Numerical and analytical solutions for the unsteady and steady free-convective flow in a vertical channel formed by vertical parallel plates with exothermic fluid filled with uniform porous material are presented. The flow is described by Brinkman-extended Darcy and energy equations. In the course of numerical computations to study the effect of the parameters involved, it is found that there is an excellent agreement between the analytical solution and numerical solution at a large value of time. It was also noted that the time required reaching steady-state velocity and temperature field depends on Frank-Kamenetskii parameter.

Keywords: Exothermic, Brinkman-extended, Porous material

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THEORETICAL STUDY OF THE ELECTRON AND PHOTOVOLTAIC PROPERTIES OF CARBAZOLE-BASED OLIGOMERS

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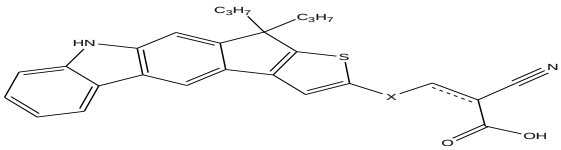
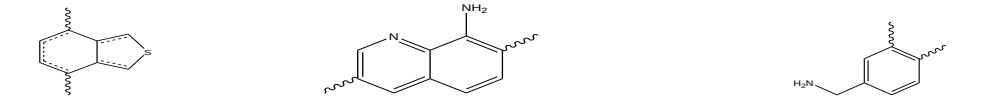
Abstract

Carbazole oligomers (Scheme 1) have been widely studied in recent years thanks to their optoelectronic and photovoltaic properties and their industrial applications. In this work, we were interested in the theoretical study and quantum calculations of the structural, electronic, optical and photovoltaic properties of six conjugated systems. We have grafted three different X groups (Scheme 2) to study the variation of the optoelectronic and photovoltaic properties of these oligomers. We have also added the chromophore (2-Cyanoacrylic acid -CHCCNCO2H), to these oligomers and found that the energy gap decreases. On another hand, the optoelectronic and photovoltaic properties are improved when some donor and acceptor blocs are alternated on the oligomer skeleton since slight band gapes are noticed especially for X2 and X3 molecules with chromophore (average value 2.59eV). Indeed, some higher values of λ_{max} (wave-length absorbed) are obtained and the HOMO and LUMO orbitales are correctly located than their homologs semi-conductors as the Bis-PC60BM. All these allow us to propose such materials as good candidate for some applications in the solar organic cells field. The study was undertaken using the DFT quantum method at B3LYP/6-31G (d, p) levels. To evaluate the carbazole-base systems properties, we have performed the structural optimization without geometrical restrictions on the total potential energy surface (TPES). The nature of extrema was identified by vibrational frequencies computations, all our structures are minima (all frequencies are positive) on the TPESs.



Scheme 1: basic molecule



X_1 X_2 X_3

Scheme 2: Xi groups

Keywords: oligomers; electronic structures, photovoltaic, gap energy

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INFLUENCE OF ALIGNED MAGNETIC FIELD AND CNTS IN TWO DIFFERENT BASE FLUIDS OVER A MOVING SURFACE WITH SLIP EFFECTS

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Abstract

In this study,combine impacts of the inclined magnetic field; velocity slip boundary condition and thermal radiation are analyzed for nanofluid flow moving over a flat surface. Two different kind of Carbon nanotubes are also incorporated, namely: Single wall carbon nanotubes (SWCNTs) and multiple wall carbon nanotubes (MWCNTs). Rheological characteristics of CNT-Water and CNT-Kerosene are studied under the influence of inclined applied magnetic field between $0 \leq \gamma \leq \pi/2$. Exact solutions are obtained for both momentum and energy equation in the form of hypergeometric function. These results are compared with the numerical technique. The course objective of aligned angle of the magnetic field is to use the governing magnetic intensity on the nanofluid and the extending appraisals of aligned angle of the magnetic field produce to upgrade the local skin friction and decline the local Nusselt number. Significant consequences of inclined magnetic field with rest of the physical parameters including radiation parameter, velocity slip and solid volume fraction nanoparticles are presented and analyzed via numerical and graphical illustrations.

Keywords: Carbon nanotubes, aligned magnetic field**,** moving surface, exact solution.

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FLOW OF UNSTEADY SECONG GRADE NANOFLUID PAST A PERMEABLE SURFACE

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Abstract

This investigation studies time dependent flow of second grade nanofluid near a stagnation point past a linearly stretched permeable surface. Analysis is performed in attendance of Thermophoresis and Borwnian motion effects. Series solutions of the system of nonlinear equations are obtained by employing Homotopy Analysis method (HAM). Graphical illustrations depicting influence of dominant parameters on all involved distributions are also given. It is observed that velocity field decreases for increasing values of suction/injection parameter.

Keywords: Impermeable stretched surface; Nanofluid; Stagnation point; Homotopy analysis method.

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ON THE NEW SOLUTIONS OF (3+1)-DIMENSIONAL MODIFIED KDV-ZAKHAROV-KUZNETSEV EQUATION

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Abstract

Using the powerful sine-Gordon expansion method with aid of Wolfram Mathematica 9, we succeed in constructing new travelling wave solutions to the (3+1)-dimensional modified KdV-Zakharov-Kuznetsev equation such as trigonometric function solutions and hyperbolic function solutions, with some solutions complex in nature. We test all the obtained solutions in this study by using program in Wolfram Mathematica 9 and they all satisfy the (3+1)-dimensional modified KdV-Zakharov-Kuznetsev equation. We also plot the 2- and 3-dimensional graphics of the obtained solutions using the same program in Wolfram Mathematica 9. We finally give a comprehensive conclusion to this study.

Keywords: The sine-Gordon expansion method; the (3+1)-dimensional modified KdV-Zakharov-Kuznetsev equation; hyperbolic function solution; trigonometric function solution

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THE DISCRETE HOMOTOPY PERTURBATION SUMUDU TRANSFORM METHOD FOR SOLVING PARTIAL DIFFERENCE EQUATIONS

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Abstract

In this study, a discrete version of homotopy perturbation Sumudu transform method(DHPSTM) is introduced to solve the linear and nonlinear partial difference equations.

Keywords: Discrete homotopy perturbation method; Discrete Sumudu transform method; Partial difference equations.

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SOME PROTOTYPE RESULTS OF THE SYMMETRIC REGULARIZED LONG WAVE EQUATION ARISING IN NONLINEAR ION ACOUSTIC WAVES

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Abstract

In this study, we consider the Bernoulli sub-equation function method for obtaining new exponential prototype structures to th Symmetric Regularized Long Wave mathematical model. We obtain new results by using this technique. We plot two- and three-dimensional surfaces of the results by using Wolfram Mathematica 9. At the end of this manuscript, we submit a conclusion in the comprehensive manner.

Keywords: Symmetric Regularized Long Wave Equation, Bernoulli sub-equation function method, Exponential function solution, Rational function solution, Hyperbolic function solution.

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A NEW DONOR-π-ACCEPTOR COMPOUNDS BASED ON CARBAZOLE, THIOPHENE AND BENZOTHIADIAZOLE FOR PHOTOVOLTAIC APPLICATION AS DYE-SENSITIZED SOLAR CELLS: THEORETICAL STUDY

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Abstract

A large amount of research interest has been devoted to Dye-sensitized solar cells (DSSCs) in the past two decades. Within the donor–π-conjugated spacer–acceptor (D–π–A) architecture [1, 2]. The electron-donating and accepting strengths have been proven to be major control variables for increasing the energy conversion efficiency [3]. In this study, we have designed a series of novel double organic D-π-A (electron donor-π-conjugated-acceptor) based on Carbazole, Thiophene and Benzothiadiazole. The optimized structures and optoelectronic properties of these dyes have been investigated by using the Density Functional Theory DFT/B3LYP/6-31G(d,p) method and Time Dependant Density Functional Theory (TD/DFT) calculations. The trend of the calculated HOMO–LUMO (Egap) gaps nicely compares with the spectral optical data. A low band gap will be expected in polymers containing double donor-acceptor (D-A) repeating units. The bridging effect by C=C(CN)2 on the optoelectronic properties of the studied compounds is investigated. The calculated HOMO-LUMO (Egap) gaps and the wavelength of absorption spectrum (λmax) were compared with the experimental data. The calculated results of these dyes demonstrate that these compounds can be used as potential sensitizers for TiO2 nanocrystalline solar cells. These properties suggest these materials as a good candidate for organic solar cells.

Keywords: Benzothiadiazole; Carbazole; Tiophene; TD/DFT calculations; Donor-Acceptor;

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EFFECTIVE PAIR-POTENTIAL BETWEEN DROPLETS WITH END-GRAFTED POLYMERS WITHIN PICKERING EMULSIONS VERSUS GRAFTING-DENSITY, SOLVENT QUALITY AND MONOMER CONCENTRATION

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Abstract

The aim is a quantitative determination of the effective pair-potential between droplets within Pickering emulsions of (oil-in-water or water-in-oil types), which are protected by end-grafted polymer chains via (uncharged) solid particles. This strong and irreversible grafting mode plays a fundamental role and rend the emulsions more stable, even in the absence of charges. The droplets stabilization is very sensitive to the bath temperature that controls the solvent quality, the number of grafted-polymers per droplet (or grafting-density), and the concentration of monomers that float in the continuous phase (water or oil). The effective interaction between hairy-droplets is a sum of two parts: the steric interaction coming from the excluded-volume forces, and the second is simply the usual van der Waals attraction. Using the Renormalization Theory techniques, we determine the expression of the repulsive part of the overall pair-potential, upon the center-to-centre distance between adjacent hairy-droplets. First, we study all analytic properties of the obtained overall pair-potential, taking into account the solvent quality, the values of the bulk monomer concentration and the grafting-density. Second, these analytic properties enable us to classify the various shapes of the pair-potential in space of the pertinent parameters. In particular, in any case (good and theta-solvents), we observe that for high-grafting-densities (above some critical value) or small monomer concentration (below some critical value), the potentials exhibit a barrier that prevents the coalescence of hairy-droplets. As remark, incidentally, the determined potential expression is very similar to that of the DLVO one. Finally, the discussion is extended to quantify the effects of a chemical mismatch on the mutual interactions between unlike-hairy-droplets.

Keywords: Pickering emulsions, Solid particles, Grafted-polymers, Effective pair-potential, Renormalization Theory, Solvent quality, Monomer concentration effects, Grafting-density effects, Chemical mismatch role.

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BENEFITS OF REVERSE ENGINEERING TECHNOLOGIES IN SOFTWARE DEVELOPMENT MAKERSPACE

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Abstract

In the recent decades, the amount of data produced by scientific, engineering, and life science applications has increased with several orders of magnitude. In parallel with this development, the applications themselves have become increasingly complex in terms of functionality, structure, and behavior. In the same time, development and production cycles of such applications exhibit a tendency of becoming increasingly shorter, due to factors such as market pressure and rapid evolution of supporting and enabling technologies. As a consequence, an increasing fraction of the cost of creating new applications and manufacturing processes shifts from the creation of new artifacts to the adaption of existing ones. A key component of this activity is the understanding of the design, operation, and behavior of existing manufactured artifacts, such as software code bases, hardware systems, and mechanical assemblies. For instance, in the software industry, it is estimated that maintenance costs exceed 80% of the total costs of a software product's lifecycle, and software understanding accounts for as much as half of these maintenance costs. To facilitate the software development process, it would be ideal to have tools that automatically generate or help to generate UML (Unified Modeling Language) models from source code. Reverse engineering the software architecture from source code provides a valuable service to software practitioners. Case tools implementing MDA and reverse-engineering constitute an important opportunity of software development engineers. So MDA and reverse engineering is an important key witch make makerspace more productive and more efficient.

Keywords: Software development; Reverse Engineering; UML behavior; MDA, makerspace;

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INVARIANT SUBSPACE METHOD: APPLICATION TO NONLINEAR DISPERSIVE EQUATION WITH TIME-CAPUTO-FABRIZIO FRACTIONAL DERIVATIVE

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Abstract:

In this study, the method of invariant subspace is used to study nonlinear fifth order dispersive equation with time-Caputo Fabrizio fractional derivative is discussed. To solve the obtained system of ordinary fractional equations, some useful news properties of Laplace transform of Caputo Fabrizio fractional derivative are used. Consequently, a non trivial exact solution of nonlinear fifth order dispersive equation with time-Caputo-Fabrizio fractional derivative is obtained.

Keywords: Invariance subspace method, Caputo-Fabrizio Fractional Derivative, Nonlinear fifth Order Dispersive Equation

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THE NUMERICAL SOLUTION OF FRACTIONAL BRATU-TYPE DIFFERENTIAL EQUATIONS

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Abstract

This study introduce the differential transform method (DTM) to solve the fractional Bratu-typedifferential equation modelling a combustion in numerical slab. For the definition of fractional derivative, the Caputo sense is used. The result corresponds to the exact solution when obtained solution is constructed as power series for some values of fractional order. Finally, some examples are presented to indicate the efficiency of applied method. Comparison of the results obtained by DTM with those obtained by other methods is given.

Keywords: Fractional Bratu-type differential equation; DTM; Caputo sense fractional derivative.

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INCREASING THE CAPACITY OF O-MIMO SYSTEMS USING MGDM TECHNIQUE

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Abstract

The MGDM (Group Mode Division Multiplexing) is a multiplexing technique, which aims to improve the multimode optical fiber's performance by spatially multiplexing the data streams to be transmitted. In this work we study optical MIMO transmission systems (Multi-input Multi-output) optical fiber on an MMF,rimarily graded in-dex (GI) MMFs, specifically adapting the architecture of optical MIMO transmission systems. In this context we studied he optimization of launching and detection conditions in order to increase the capacity of an optical MIMO link using the MGDMtechnique.

Keyword: MGDM, GI-MMF, Optical MIMO capacity of transmission

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MHD MIXED CONVECTION IN A LID-DRIVEN TRIANGULAR CAVITY FOR VARIOUS ELECTRICAL CONDUCTIVITY MODELS

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Abstract

In this study, effects of different electrical conductivity models for magneto-hydrodynamic mixed convection of nanofluids in a lid-driven triangular cavity was numerically investigated with finite element method. Effects of Richardson number, Hartmann number on the convective heat transfer characteristics were analyzed for various electrical conductivity models of nanofluids. Average Nusselt number decreases for higher Hartmann and Richardson numbers. Discrepancies in the local and average heat transfer exist between different electrical conductivity models which is higher for higher values of Richardson number and Hartmann number.

Keywords: Magneto-hydrodynamic; Mixed Convection; Electrical Conductivity; Finite Element Method.

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NUMERICAL SOLUTIONS OF VECTOR STOCHASTIC DIFFERENTIAL EQUATIONS

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Abstract

In this study, we consider systems of stochastic differential equations. We mention about general form of vector stochastic differential equations. Then using numerical methods we obtain approximation solutions. The efficiency of these methods we compare the exact solutions and numarical solutions of our model.

Keywords: Systems of stochastic differential equations; Numerical solutions

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NUMERICAL APPROACH FOR SOLVING TIME FRACTIONAL DIFFUSIONEQUATION

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Abstract

In this study one of the fractional partial differential equations was solved by finite difference scheme based on five point and three point central space method with discretization in time. We use between the Caputo and the Riemann-Liouville derivative definition and the Grünwald-Letnikov operator for the fractional calculus. The stability analysis of this scheme is examined by using von-Neumann method. A comparison between exact solutions and numerical solutions is made. Some figures and tables are included.

Keywords: Fractional diffusion equation, finite difference schemes, explicit method.

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STABILITY ANALYSIS OF DECOUPLED TIME-STEPPING SCHEMES FOR THE SPECIALIZED CONDUCTION SYSTEM/MYOCARDIUM COUPLED PROBLEM IN CARDIOLOGY

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Abstract

The Purkinje network is the rapid conduction system in the heart. It ensures the physiological spread of the electrical wave in the ventricles. In this work, we first prove the stability of the space semi-discretized problem. Then we present four different strategies for solving the Purkinje/ myocardium coupled. The strategies are based on different time discretization of the coupling terms. The first scheme is fully coupled, where the coupling terms are considered implicit. The second and the third schemes are based on Gauss-Seidel time-splitting schemes where one coupling term is considered explicit and the other is implicit. The last is a Jacobi-like time-splitting scheme where both coupling terms are considered explicit. Our main result is the proof of the stability of the three considered schemes under the same restriction on the time step. Moreover, we show that the energy of the problem is slightly affected by the time-splitting schemes. We illustrate the theoretical result by different numerical simulations in 2D. We also conduct 3D simulations using physiologically detailed ionic models.

Keywords: Cardiac electrophysiology, reaction-diffusion, Purkinje network, myocardium, stability analysis, monodomain model, finite element, coupling problem.

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THE CREATIVITY DIMENSION OF INSTRUCTIONAL MATERIALS DESIGNED BY PROSPECTIVE TEACHERS: THE COMPARISON ACROSS DOMAINS

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Abstract

This study aims at revealing the creativity dimension of the materials designed and developed by the second year students studying at the department of Computer Education and Instructional Technology. A part of the participants has completed the process by designing materials in their own field, information technologies; while some of them have done so by designing materials in the field of mathematics. The data have been retrieved from an experimental study of 13 weeks. "Teaching Material Creativity Rubric" developed by the researchers, has been used as the data collection tool. The rubric has been developed in order to evaluate the creativity dimensions of products. While developing the rubric, the creative product evaluation dimensions of Finke et al. (1996) have been a source of inspiration. The products developed by the students have been evaluated through the retrieved data, in terms of their creativity. The rubric developed includes Originality, Practicality & Sensibility, Productivity & Flexibility, Feasibility, Inclusiveness, and Insightfulness dimensions. In this research, the data of the aforementioned dimensions and sub-dimensions have been evaluated. The results present that the creativity level of the products on teaching information technologies, which have been developed by Computer Education and Instructional Technology (CEIT) students, is high. It has been argued that the creativity of domain-specifically developed materials is higher, through literature.

Keywords: Material Design in Computers, Mathematics Teaching, Originality, Applicability, Creativity, Creativity and Domains.

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PERSONALIZATION OF LEARNING SITUATIONS WITHIN A VIRTUAL ENVIRONMENT FOR TRAINING BASED ON FUZZY CLUSTERING

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Abstract

Advances in networks, computers and multimedia technology have changed traditional methods for learning and skills training. Today, Virtual Environments for Training (VET) has been popular, it can provide an environment where virtual reality can be used to create interactive interfaces and real-time software that can control every response and action made by the user. VET have proven to be advantageous to put learners into varied training situations to acquire knowledge and competencies, especially when these situations are taking place in uncontrolled circumstances, or those situations are dangerous, unrealizable, expensive to establish in reality. However individual learners find it difficult to select suitable learning activities for their particular situation because often, there is no personalized service to response to the user needs. Personalization of learning in a VET is a very important way of improving the effectiveness and the quality of the training, yet it also a complex process that requires consideration of several factors such as learner's profiles. The goal is to associate suitable learning activities, pedagogical resources, etc, to each learner based on his profile. However, personalization of learning becomes an issue with the uncertainty and imprecision of data that may contains a learner profile. To address this issue, this study is an attempt to integrate a fuzzy clustering into the process of the personalization of learning.

Keywords: Virtual Environments for Training; personalization of learning; fuzzy clustering.

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THE WEAK SOLUTION OF ANTIPLANE ELECTRO-VISCOELASTIC CONTACT PROBLEM WITH REGULARIZED FRICTION LAW

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Abstract

In this work, we study the unique weak solution of the antiplane electro-viscoelastic problem with regularized friction law. In first time, we derive the variational formulation of continuous problem. Finally, we prove that the weak solution of the antiplane electro-viscoelastic problem with regularized friction law converge to thesolution of the antiplane electro-viscoelastic problem when the parameter ρ is very small.

Keywords: Friction law; formulation variationnelle, electro-visco-elasticity.

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DEVELOPING AN ACHIEVEMENT TEST FOR FRACTION TEACHING: VALIDITY AND RELIABILITY ANALYSIS

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Abstract

The aim of the study is to develop an achievement test that can be used to measure the achievement status of elementary school 4th grader students in terms of their fractions learning in mathematics courses. Examining the literature, it is visible that there are 8 development stages of the achievement test. According to Atilgan (2013), these stages include determining the area to be used for test scores, determining the behaviors representing the area or the statement, writing test items, reviewing the test items, preparing the test form, putting the test on a trial implementation, selecting materials by analyzing them according to the trial implementation, and prognosis of the selected items that generate the statistics of the final test. The "Academic Achievement Test for Fractional Teaching (KÖYABT)", which has been developed in the study, aims at measuring students' status of learning acquisitions included in the elementary school curriculum after fraction teaching. Throughout the development of the achievement test, 16 expert opinions were obtained including those of 5 teachers and 11 academicians. ITEMAN 3.5 package software was employed to analyze the validity and reliability of the test. Statistical analysis of the test reveals that KR-20 Internal Consistency and KR-21 Internal Consistency are 0.90. This value indicates that the consistency of the test is high. The average discrimination of the test is 0.80, which indicates that the test is highly distinctive among students. The average strength of the test has been calculated as 0.67. Therefore, it has been determined that the test should be both easy and distinctive when it comes to measuring the effectiveness of the teaching method. The result of the analysis suggest that when consistency and distinctiveness values are considered, the developed test is not only easy to use but also highly distinctive. Finally, it has been discovered that the academic achievement test for fraction teaching is valid and reliable.

Keywords: Achievement Test, Reliability, Validity, Fraction teaching.

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THE EVALUATION OF THE PROBLEM SOLVING IN MATHEMATICS COURSE ACCORDING TO STUDENT VIEWS

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Abstract

This study was conducted to determine the problem solving skills of the third grade students studying at the department of elementary school mathematics teaching. The study was conducted in the second semester of the academic year of 2015-2016. The study group consists of 47 third year student who study at Ondokuz Mayıs University, Faculty of Education Elementary School Mathematics Teaching ad take the selective course of Problem Solving in Mathematics. Within the scope of this course, the researchers explained subjects related to problem and problem solving, problem solving skills and solved problems during the first 4 weeks of the course. For the rest of the weeks, the students were divided into groups. They have solved two non-routine problems each week for 8 weeks. At the end of each course the problems solved were discussed and the problem situations were dealt within the scope of Polya's problem solving stages. At the end of the process, the students were interviewed through a semi-structured interview form. Two interviews were conducted: before and after the implementation. The method of study is the interview method, which is one of the qualitative research methods. The data of the study were comparatively analyzed via content analysis. In order to check the validity of the scope, the percentage of compliance was calculated via Miles & Huberman's (1996) compliance percentage formula. In light of the retrieved findings, the answers given by the students have been thematized as the stages of problem solving, understanding the problem, implementing the problem, evaluation of the problem, reasons for taking the courses, association problems, ways of finding different solutions, development of procedural skills, creating formulas, mathematical thinking, use of mathematical language, suitability of the course, views on problem solving, and the contribution of the course. When the answers of the students who took the course are examined under these themes, it becomes apparent that they enjoyed and the course very much and obtainted a lot of information, moreover; their perspective on mathematics course has changed and they got the chance to implement the stages of problem solving.

Keywords: Problem, Problem solving, Mathematics, Polya

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PISA QUESTION AND REASONING SKILL

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Abstract

The ability of thinking allows students to make reasonable decisions and make sense of the events they experience throughout their lives (Liu Po-Hung, 2003). In making reasonable decisions, the students have to reason the possibilities that exist in the events for the process of thinking. Harel and Lim (2004); Lesh and Zawojewski (2007) point out that students must be able to think deeply and carefully and make reasonable assumptions for reasoning. It is believed that increasing the reasoning skills enables students to improve their rational and sound decision-making. Therefore, revealing students' mathematical reasoning skills gains significance. The objective of the study is to determine the level of the reasoning skills of the secondary school students. This research has been conducted during the academic year of 2015-2016 with the participation of 51 students in total, from a province in the Black Sea region of Turkey by using random sampling method. Case study method has been used in this study, since it explains an existing situation. In this study, content analysis from the qualitative research methods was carried out. In order to ensure the validity of the scope, agreement percentage formula was used and expert opinions were sought.

The problem named Holiday from the Chapter 1 of the normal units in Problem Solving Questions from PISA (Program for International Student Assessments) (2015), are used as the data collection tool for the study. The problem named Holiday consists of two questions. Applied problems were evaluated according to the mathematical reasoning stages of TIMSS (2003). The findings suggest that the students use proportional reasoning while solving the problems and use the geometric shapes to facilitate the solution of the problem. When they come across problems related to each other, it is observed that they create connections between the problems based on the results of the previous problem. In conclusion, the students perform crosscheck to ensure that their solutions to the problems are accurate.

Keywords: Mathematics, Secondary School, Reasoning

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TECHNOLOGIES OF A CONTINUOUS ULTRASONIC THICKNESS MEASURING

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Abstract

In present work, technologies and means of an ultrasonic thickness measuring of the main metal and welded connections of pipelines with application of the phased antenna lattices with linear scanning and TOFD methods are described. According to a thickness measuring with application of the specialized software the cards of thickness of controlled subjects are received. Results of measurement with use of these technologies, and also the prospects of development of these methods are given.

Keywords: Antenna lattice, digital focusing of the antenna, ultrasonic thickness measuring of welded connections, TOFD method, linear scanning

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TWO-EXPONENTIAL MODEL MAGNETIC CONTROL OF FERROIMPURITIES IN VARIOUS ENVIRONMENTS

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Abstract

Indicative examples of technological environments for which mass-operational characteristics of magnetic control of ferroimpurities not corresponds to the basic exponential model are given and analyzed. The concept of two-exponential model assuming the piecewise and functional description of the key characteristic of control is stated and realized. Possibilities of calculations performance of the actual and potential masses of ferroimpurities, allocated from the technological environment, and the corresponding values of their concentration in this environment are shown.

Keywords: Ferroimpurity, magnetic control, exponential model, mass of ferroimpurities, concentration of ferroimpuruties.

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MEASUREMENT OF DEPTH OF CLOSE LOCATED SUPERFICIAL CRACS BY ELECTROPOTENTIAL METHOD

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Abstract

The researches of signals of the electropotential converter interacting with two close located superficial cracks parallel each other are conducted. The scheme of measurement with the converter electrodes placed in rectangle tops was investigated. Results of the research are important for measurement of depth of superficial cracks of stress-corrosion origin.

Keywords: Electropotential method, measurement of depth of superficial cracks, corrosion cracking energized (stress corrosion), grid of cracks.

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A THREE FACTOR REMOTE USER AUTHENTICATION SCHEME USING COLLISION RESIST FUZZY EXTRACTOR IN SINGLE SERVER ENVIRONMENT

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Abstract

Due to rapid growth of online applications, it is needed to provide such a facility by which communicators can get the services by applying the applications in a secure way. As communications are done through an insecure channel like Internet, any adversary can trap and modify the communication messages. Only authentication procedure can overcome the aforementioned problem. Many researchers have proposed so many authentication schemes in this literature. But, this study has shown that many of them are not usable in real world application scenarios because, the existing schemes cannot resist all the possible attacks. Therefore, this study has proposed a three factor authentication scheme using hash function and fuzzy extractor. This study has further analyzed the security of the proposed scheme using random oracle model. The analysis shows that the proposed scheme can resist all the possible attacks. Furthermore, comparison between proposed scheme and related existing schemes shows that the proposed scheme has better trade-off among storage, computational and communication costs.

Keywords: Attack; Authentication; Biometric; Password; Smart card.

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CLASSIFICATIONS ON THE TRAVELLING WAVE SOLUTIONS TO THE (3+1)-DIMENSIONAL GENERALIZED KP AND JIMBO-MIWA EQUATIONS

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Abstract

In this study, we use the powerful $tan\left(\frac{F(\xi)}{2}\right)$-expansion method with the help of Wolfram Mathematica 9 in investigating the solution structures of three well known nonlinear evolution equations, namely; the (3+1)-dimensional generalized KP and (3+1)-dimensional Jimbo-Miwa equations. We obtain new solutions such as hyperbolic function, exponential function and rational function solutions. We plot two- and three-dimensional graphics of some obtained results using the same program, Wolfram Mathematica 9.

Keywords:$tan\left(\frac{F(\xi)}{2}\right)$-expansion method; the (3+1)-dimensional generalized KP equation; the (3+1)-dimensional Jimbo-Miwa equation; trigonometric function solutions; hyperbolic function solution; exponential function solution; rational function solution

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GAIN SCHEDULING PI CONTROL OF AN ELECTRO-HYDRAULIC ACTUATOR FOR ACTIVE SUSPENSION SYSTEMS

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Abstract

The controller structure of the active suspension system is generally decomposed into two loops namely outer loop and inner loop controllers. Outer loop controller is used to calculate the optimum target force to reject the effects of road disturbances, while, the inner loop controller is used to keep the actual force close to this desired force. The inner loop controller design is challenge because models of the electro-hydraulic systems include high order nonlinearity. In this study, a gain scheduling linear model corresponded with nonlinear model of a hydraulic force actuator system is based. Next, gain scheduling PI controller for the inner loop is designed by using of weighted geometrical center method. The proposed controller structure comprises a feed forward loop. The gain scheduling model is constituted in two distinct and consecutive stages. In first step, nonlinear terms caused nonlinearity are described by measurable or observable system parameters and embedded in a nonlinear scheduling parameter. In this way, the scheduling parameter is continuously extracted from real system. In second step, the nonlinear system equation is rearranged by the scheduling parameter and, parameter varying linear model is obtained. The simulation which is performed by using of Matlab-Simulink computer program show that the proposed gain scheduling controller structure overcomes nonlinear actuator dynamics, and desired force is smoothly traced to the nonlinear system model.

Keywords: Electro-Hydraulic; Nonlinear model; Parameter varying model; PI controller

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HALF INVERSE PROBLEM FOR HILL'S EQUATION

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Abstract

In this study, half inverse problem for Hill equation is considered. It's shown by Hochstadt–Lieberman's method that if the potential function is prescribed $q(x)$ on the interval $\left(\frac{\pi}{2},\pi\right)$, then a single spectrum sufficies to determine $q(x)$ on the whole interval $(0,\pi)$. However, half inverse problem for Hill equation is to construct of the operator in a whole interval by using two spectrum and potential known in a semi interval.

Keywords: Half inverse problem;Hill equation; Inverse spectral problem.

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HALF INVERSE PROBLEM FOR A DISCONTINUOUS INTEGRO DIFFERENTIAL OPERATOR

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Abstract

In this study, we solve a half inverse problem for discontinuousintegro differential operator by using Hochstadt-Lieberman's method. Half- inverse problem for a Sturm-Liouville operator consist in reconstruction of the operator from its spectrum and half of the potential.

Keywords: Integro-differential equation;Discontinuity; Half inverse problem.

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NEW FUNCTION METHOD TO SOLVE THE ZHIBER-SHABAT EQUATION

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Abstract

In this study, we use the new function method to find new exact solutions of the Zhiber-Shabat equation. This equation is very important for the mathematical modelling of the physical problems in real world applications. From this point of view, we obtain traveling wave solution including Jacobi elliptic function by the new function method. So, it can be easily seen that the obtained results for the Zhiber-Shabat equation give us a new behaviour in physical sense.

Keywords: New functionmethod; Zhiber-Shabatequation; Jacobiellipticfunctionsolutions.

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ANALYSIS OF KELLER-SEGEL MODEL WITH CAPUTO AND CAPUTO-FABRIZIO DERIVATIVES

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Abstract

In this work, we analysed the Keller-Segel model with Caputo and Caputo-Fabrizio fractional derivatives. Using the fixed-point theorem, we present the existence and uniqueness of the coupled solutions for both definitions of fractional derivatives. We also analysed uniqueness of the solutions. A comparison of the results obtained is given using *Mathematica.*

Keywords: Keller-Segel model, Caputo fractional derivative, Caputo-Fabrizio fractional derivative.

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REGARDING ON THE NOVEL FORMS OF THE (3+1)-DIMENSIONAL KADOMTSEV-PETVIASHVILI EQUATION

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Abstract

In this study, we have applied the Bernoulli Sub-Equation method to the (3+1)-Dimensional Kademtsev-Petviashvili equation. We have obtained some new analytical solutions such as exponential function and rational solutions by using this technique. We have observed that two analytical solutions have been verified the (3+1)-Dimentional Kadomtsev-Petviashvili equations by using Wolfram Mathematica 9. At the end of this manuscript, we submitted a conclusion in a comprehensive manner.

Keywords: Bernoulli function method; (3+1)-Dimensional Kadomtsev-Petviashvili equation;Exponential function solution; rational function solution.

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DISCRETE FRACTIONAL SOLUTIONS OF A CHEBYSHEV EQUATION

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Abstract

Fractional calculus is a field of applied mathematics that deals with derivatives and integrals of arbitrary orders, and their applications appear in various fields in science, engineering, applied mathematics, economics, such as, viscoelasticity, diffusion, neurology, control theory, and statistics [1-3]. Therefore it has achieved significance during the past three decades. The similar theory for discrete fractional calculus was begun and features of the theory of fractional sums and differences were constituted. Many papers related to this topic have seemed recently [4-5].

In this work, we acquire some new particular solutions of the homogeneous and nonhomogeneous Chebyshev's equations by using discrete fractional nabla operatör.

Keywords: Discrete fractional calculus; Chebyshev equation; Nabla operator.

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AN APPLICATION OF THE NISHIMOTO'S OPERATOR FOR THE RADIALSCHRODINGER EQUATION

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Abstract

Fractional calculus and its generalizations are used for the solutions of some classes of differential equations and fractional differential equations. Fractional calculus tecniques contribute to many fields of science and engineering such as applied mathematics, control theory, economy, nuclear magnetic resonance, geometric mechanics, optics, robot technology, heat transfer and so on [1-4]. In this study, our aim is to obtain fractional solutions of the radial Schrödinger equation via the Nishimoto's operator N^{μ}.

Keywords: Fractional calculus, The Nishimoto's Operator, Radial Schrödinger equation.

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A 3-SCALE HAAR WAVELET COLLOCATION METHOD FOR SOLVING PDEs

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Abstract

In this study, we analyze the performance of a numerical scheme based on 3-scaleHaar wavelets for solving PDEs. For solution process firstly we rewrite the timedependent partial differential equation as a system of partial differential equations by introducinga new variable and then we use finite difference approximation for discretization of timedependent variables and for discretization of spatial variables we use 3-scale Haar wavelets. Bydoing so, we obtain a system of algebraic equations whose solution gives wavelet coefficients forconstructing numerical solution of partial differential equation. To test the accuracy and reliabilityof the numerical scheme based on 3-scale Haar wavelets, we applied it on various test problemswhich consist of variable and constant coefficient, homogeneous and non-homogeneous partialdifferential equations. The obtained results are compared wherever possible with those fromprevious studies. Numerical results are tabulated and depicted graphically.

Keywords:3-Scale Haar wavelets, PDEs, Numerical solution

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DOUBLE DIFFUSIVE MIXED CONVECTION IN A NANOFLUID FILLED CONFINED CAVITY HEATED FROM BOTTOM WALL

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Abstract

A computational solution has been performed to analysis heat and fluid flow double diffusive mixed convection in a nanofluid filled confined enclosure heater from the bottom side. Vertical walls are chosen as adiabatic. Governing parameters are solved via Galerkin finite element method in space and the Crank-Nicolson in time. The study is performed in the range of parameters with different Lewis number, Reynolds number, Richardson number and buoyancy ratio. It is found that all parameters are effective on number of cells inside the cavity. It is observed that heat transfer increases with increasing of nanoparticle volume fraction and decreases with Hartmann number.

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CAPTURING THE BEHAVIOR OF ADVECTION-DIFFUSION PROCESS THROUGH MONTE CARLO SIMULATION

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Abstract

This study investigates physical behavior of the advection-diffusion process using Monte Carlo simulation approaches. This is carried out by walking randomly in the solution region and then the solution is recorded at the end of each random walk at one point at a specified time. Simultaneously solving the model equation has advantages comparison to the numerical methods. For computational purposes, the simulated results are compared with the finite difference results. To properly understand the behavior of the physical processes, the calculated solutions have been discussed in detail. The considered techniques are seen to be promising in realizing the processes.

Keywords: Advection-diffusion process, Monte Carlo simulation, physical behavior, mathematical modelling

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NUMERICAL INVESTIGATION ON MHD FLOW AND HEAT TRANSFER OVER AN EXPONENTIALLY STRETCHING SHEET WITH VISCOUS DISSIPATION AND RADIATION EFFECTS

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Abstract

This study is to examine the steady two-dimensional laminar flow of a viscous incompressible electrically conducting fluid over a continuous surface. In this study DTM-Padé method is used to solve which is a combination of differential transform method (DTM) and Padé approximant. Comparisons between the solutions obtained by DTM and DTM-Padé and are shown that DTM-Padé is the completely powerful method for solving the problems in which boundary conditions at infinity. Also in this study, the effect of Magnetic and Radiation parameters, Prandtl number and Eckert number for velocity and temperature distributions are investigated.

Keywords:DTM, DTM-Padé, MHD,Exponentially Stretching Sheet, Boundary layer flow

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VARIOUS METHODS FOR THE BURGERS EQUATION

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Abstract

This study aims at numerically solving the one-dimensional Burgers equations using up to sixth-order finite difference and sixth-order compact finite difference schemes. These methods are applied for discretizing spatial derivatives and strong stability-preserving third-order (SSP3) time discretization method for the time integration of the resulting system. In addition, the Lax-Wendroff and MacCormack method are adapted to numerically approximate Burgers equation. The proposed methods are demonstrated by two test problems. The produced results are in very good agreement with the exact solution and the literature.

Key Words: Burgers equation; High-order finite difference scheme; Compact finite difference scheme; Lax-Wendroff method; MacCormack method

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ON SOME PROPERTIES OF SEQUENCE SPACES DEFINED BY A SEQUENCE OF MODULUS FUNCTION

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Abstract

In this study, we introduce the generalized new sequence spaces defined by using a sequence of modulus function. We give some topological properties and inclusion relations between these spaces.

Keywords: Modulus function;Paranorm space.

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ON STATISTICAL CONVERGENCE OF SEQUENCES GENERATED BY THE DIFFERENCE OPERATOR OF FRACTIONAL ORDER

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Abstract

In this study, we introduce the concept of statistical convergence for difference sequences of fractional order. Some various properties of this concept of statistical convergence are examined.

Keywords: Sequences; Statistical convergence.

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ON SOME COMPLEX ASPECTS OF THE (2+1)-DIMENSIONAL BROER-KAUP-KUPERSHMIDT SYSTEM

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Abstract

The improved Bernoulli sub-equation function method is used in extracting some new exponential function solutions to the (2+1)-dimensional Broer-Kaup-Kupershmidt system. It is of vital effort to look for more solutions of the (2+1)-dimensional Broer-Kaup-Kupershmidt system, which are very helpful for coastal and civil engineers to apply the nonlinear water models in a harbor and coastal design. All the obtained solutions satisfied the (2+1)-dimensional Broer-Kaup-Kupershmidt system. We also plot the two- and three-dimensional graphics of all the obtained solutions in this study. All the computations and the graphics plots in this study are carried out with the help of the Wolfram Mathematica 9.

Keywords: The improved Bernoulli sub-equation function method; the (2+1)-dimensional Broer-Kaup-Kupershmidt system; complex hyperbolic structure

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NEW GENERALIZATIONS OF EXTENDED GAMMA AND BETA FUNCTIONS

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Abstract

In this study, we introduce a new generalization of extended gamma and beta functions. We also define a new generalization of Pochhammer symbol and Macdonald function by using the new generalized gamma function. Then we investigate their properties.

Keywords: Gamma function; Beta function; Pochhammer symbol; Macdonald function.

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NEW GENERALIZATIONS OF GAUSSANDCONFLUENT HYPERGEOMETRIC FUNCTIONS

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Abstract

In this work, we introduce new generalizations of Gauss and confluent hypergeometric functions by using generalized extended beta functions. We also investigate their properties such as integral representations, summation and transformation formulas, Mellin transforms and difference operators.

Keywords: Beta function; Gauss hypergeometric functions; Confluent hypergeometric functions; Integral representations, Mellin transforms.

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ON A NEW GENERALIZATION OF RIEMANN-LIOUVILLE FRACTIONAL DERIVATIVE OPERATOR

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Abstract

In this work, we introduced a new generalization of Riemann-Liouville fractional derivative operator and by using a new generalization of extended beta function we also defined generalizations of some hypergeometric functions. Then we obtained generalized Riemann-Liouville fractional derivatives of some functions and used them to determine linear and bilinear generating relations for these generalized hypergeometric functions.

Keywords: Beta function; Hypergeometric functions; Riemann-Liouvillefractional derivative; Generating functions.

Acknowledgement: This work was supported by Ahi Evran University Scientific Research Projects Coordination Unit. Project Number: FEF.E2.17.027

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ON A NEW GENERALIZATION OF CAPUTO FRACTIONAL DERIVATIVE OPERATOR

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Abstract

In this work, we introduced a new generalization of Caputo fractional derivative operator and by using a new generalization of extended beta function we also defined generalizations of some hypergeometric functions. Then we obtained generalized Caputo fractional derivatives of some functions and used them to determine linear and bilinear generating relations for these generalized hypergeometric functions.

Keywords: Beta function; Hypergeometric functions; Caputo fractional derivative; Generating functions.

Acknowledgement: This work was supported by Ahi Evran University Scientific Research Projects Coordination Unit. Project Number: FEF.E2.17.026

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NOVEL STRUCTURE TO THE COUPLED NONLINEAR MACCARI'S SYSTEM BY USING MODIFIED TRIAL EQUATION METHOD

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Abstract

In this study, we obtain some new travelling wave analytical solution of the coupled nonlinear Maccari's system. The purpose of this study is research new exact travelling wave solutions of the coupled nonlinear Maccari's system by apply to the Modified Trial Equation Method (MTEM). This method is very efficient and suitable for solving nonlinear differential equations and equation systems. The solutions that we find have not in the literature until recently.

Keywords: Modified trial equation method, Coupled nonlinear Maccari's system, Travelling wave solutions.

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ON EXPONENTIAL STABILITY OF NONLINEAR VOLTERRA INTEGRO-DIFFERENTIAL EQUATIONS WITH CONSTANT TIME-LAG

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Abstract

In the present work, we pay attention to a number of nonlinear Volterra integro-differential equations (VIDEs) with constant time-lag. We define three new Lyapunov functionals (LFs) and employ them to get specific conditions guaranteeing the uniform exponential asymptotic stability (UEAS) of the trivial solutions of the (VIDEs) considered. The results obtained generalize, compliment and improve the results found in the literature from the cases of the without time-lag to the more general cases with time-lag.

Keywords: Non-linear, Volterra integro-differential equations, first order, time-lag, uniform exponential asymptotic stability

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ESTIMATION OF EARTHQUAKE PROBABILITIES WITH NON-PARAMETRIC METHODS IN SEMI-MARKOV MODEL

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Abstract

In this study, it is assumed that the successive earthquakes can not be independent events and the magnitudes of earthquakes and the time of occurrence of earthquakes can not be independent from the time of between successive earthquakes. For this purpose, the usage of the Semi-Markov model has always been seen as appropriate. In addition, probability values are obtained by nonparametric methods. In this study, earthquakes of above 5 ML magnitude which occurred between January 1, 1950 and January 1, 2017 in and around the Marmara Region were examined. The earthquake is divided into 3 cases as low, medium and high severity according to their magnitudes. In this context, transition possibilities for semi-markov kernels, markov renewal functions, and semi-Markov processes are obtained. As a result of this study, the probability of occurrence of earthquake within the interval of the epicenter and the intensity of the earthquake is calculated at the end of any period. Rstudio, Matlab, ARCGIS programmes were used in this study.

Keywords: Semi markov renewal process; Embedded Markov Chain; Stability distribution; Nonparametric methods;Spatial k-means Clustering Algorithm.

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ON THE PROPERTIES OF SOLUTIONS TO NON-LINEAR VOLTERRA INTEGRO-DIFFERENTIAL EQUATIONS WITH MULTIPLE TIME-LAGS

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Abstract

This study is concerned with the non-linear Volterra integro-differential equation with multiple time-lags. We give some sufficient conditions so that solutions of the Volerra integro-differential equation given are absolutely Riemann integrable on $[0,\infty)$ and have bounded derivatives by the Lyapunov-Krasovskii functional approach. The results obtained make improvements and extension of those the results can be found in literature. We give examples to verify the results obtained and for illustrations.

Keywords: Non-linear,Volterra integro-differential equations, first order, time-lag, stability, boundedness

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NON-UNIFORM HAAR WAVELET METHOD FOR SINGULARLY PERTURBED CONVECTION-DIFFUSION EQUATIONS

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Abstract

In this study,we presentnon-uniform Haar wavelet method for solving singularly perturbed convection-diffusion equations. Some problems are solved by using the presented method. The obtained numerical results reveal that our method is reliable and very effective for solving singularly perturbed convection-diffusion problems.

Keywords: Haar wavelet method; convection-diffusion problems; boundary layer.

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LEGENDRE REPRODUCING KERNEL METHOD FOR FRACTIONAL TWO POINT BOUNDARY VALUE PROBLEM

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Abstract

In this research, we present reproducing kernel method for solving fractional two-point boundary value problem. We obtain an approximate solution by given method. Convergence analysis is constituted theoretically. Numerical experiments show that approximate solution uniformly converges to exact solution. Additionally, derivatives of approximate solution are also uniformly convergent to the derivatives of exact solution. The results indicate that the proposed method very efficient for fractional two-point boundary value problem.

Keywords*:* Reproducing kernel; Legendre polynomials; Boundary value problem.

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SOME NOVEL EXPONENTIAL AND COMPLEX STRUCTURAL PROPERTIES OF THE FISHER EQUATION ARISING IN MATHEMATICAL BIOSCIENCE

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Abstract

In this study, we consider the Bernoulli sub-equation function method for obtaining new exponential and complex prototype structures to the Fisher Equation arising in Mathematical biosciences. We obtain new results by using the technique for new properties of model and for more understanding of properties of model. We plot two- and three-dimensional surfaces of the results by using Wolfram Mathematica 9. At the end of this manuscript, we submit a conclusion in the comprehensive manner.

Keywords: Fisher Equation, Bernoulli sub-equation function method, Exponential function solution, Rational function solution, complex structures.

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NUMERICAL STUDY OF CONVECTIVE DRYING OF POROUS MATERIAL

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ABSTRACT

The numerical study of coupled heat and mass transfer in porous media is analyzed in this paper. The mathematical modeling of this phenomenon is obtained with using Philip and Devrai's model. Hence, the system describing temperature and moisture transfer processes within plate of cellular concrete is solved numerically with the finite differential method.

Keywords: Porous media, Drying, Transfer, Philip and Devrai's Model, differential method.

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HYBRID METHODS COUPLING STATIONARY WAVELET TRANSFORM AND ARTIFICIAL NEURAL NETWORKS FOR THE CLASSIFICATION OF HERCYNIAN GRANITOIDS BASED ON THEIR GEOCHEMICAL CHARACTERISTICS: CASE OF AOULI PLUTON (HIGH MOULOUYA, MOROCCO)

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Abstract

This work is part of the supervised classification of a database of 167 samples of Hercynian granitoid rocks of the Aouli pluton (Haute Moulouya, Morocco), using a hybrid method (SWT-ANN-MLP) coupling theStationary Wavelet Transform (SWT) and the artificial neural networks Multi-Layer Perceptron (ANN-MLP). The hybrid method (SWT-ANN-MLP) is applied on a matrix of size (167,20) which corresponds to the contents of major elements, trace elements and rare earth elements, respectively 11 samples of granodiorite, 81 samples of gray granite, 70 samples of pink granite and 5 samples of granite with muscovite.First, the stationary wavelet decomposition was performed by choosing the wavelet Haar and a number of decompositions equal to 2 to represent the database. Then 60% of the database, taken randomly, was used for the formation and the choice of the architecture of the neural network MLP. Finally, unknown test samples (40% of the database) were identified by using the model (SWT-ANN-MLP) determined during the learning phase. The relative performances of this model (SWT-ANN-MLP) were evaluated by the calculation of the coefficient of determination R^2andthe coefficient NSE (Nash-Sutcliffe efficiency).This study made it possible to highlight the supervised classification capacity of the hybrid method (SWT-ANN-MLP) on all the Hercynian granitoid rocks of the Aouli pluton.

Keywords: Supervised classification, stationary wavelet decomposition, SWT-ANN-MLP, Hercynian granitoid, Aouli Pluton HighMoulouya-Morocco.

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USE OF A HYBRID MODEL BASED ON ARTIFICIAL NEURAL NETWORKS-RBF COUPLED TO WAVELET DECOMPOSITION FOR THE CLASSIFICATION OF OPERATING MODES: CASE OF AN INDUSTRIAL INSTALLATION

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Abstract

This work is placed in the context of the detection and diagnosis of the operating faults of an industrial installation. Indeed, the installation in this study is a Methylcyclohexane continuous column from a mixture of toluene / methylcyclohexane in which the mass composition was defined to 23% of methylcyclohexane. The studied system, allows the separation of the more volatile component which is methylcyclohexane contained in the liquid mixture. The present study describes classification methods based on the coupling of the Stationary Wavelet Transform SWT and the Artificial Neural Networks ANN (RBF) type for the classification of different operating modes of a distillation column of methylcyclohexane (C_6H_{11}-CH_3) from a mixture of toluene-methylcyclohexane (C_6H_5-CH_3/C_6H_{11}-CH_3). The model SWT-ANN-RBF (Stationary Wavelet Transform- Artificial Neural Networks- Radial Basis Function) is constituted by the input variables which are: the heating power, the preheating power, the reflux ratio, the feeding rate, the pressure drop and the preheating temperature and the output variable which is the operating speed. Three configurations were proposed in this study and by calculating the performance parameters; only one model was chosen SWT-ANN-RBF which gave a coefficient of determination R^2, A coefficient of Effectiveness NSE close to 1 and a minimum squared error MSE.

Keywords: Classification, Wavelet decomposition, Artificial Neural Network-RBF, Industrial facility, Nash-Sutcliffe efficiency coefficient, coefficient of determination.

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THE PROTECTIVE EFFECTS OF GOLDENBERRY (*Physalisperuviana* L.) EXTRACT AGAINS TO DESTRUCTIVE EFFECTS IN OF TYPE I DIABETES IN LIVER TISSUE OF RATS

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Abstract

Type I diabetes is known as insulin-dependent diabetes mellitus, and the most important factor playing role in its formation is the genetic predisposition. *Physalisperuviana*L. (Goldenberry) is a plant, which has strong antioxidant properties, from Solanaceae family. In this study, it has been investigated the effects of goldenberry on the malondialdehyde (MDA), reduced glutathione (GSH) and total protein which are the indicators of antioxidant defense and the oxidative damages in liver tissue of the rats, on which type I diabetes was induced by STZ.According to the obtained results, among the rats with STZ-induced type I diabetes, it was observed that the level of glutathione (GSH)($p<0.05$) increased and the level of malondialdehyde (MDA) ($p<0.01$) decreased in rats given goldenberry extract. In this study, it was shown that the goldenberry decreased the destructive effects of type-I diabetes by decreasing the lipid peroxidation and increasing the level of glutathione. It is believed that the obtained results would be used in follow-up of diabetic patients and in early diagnosis of the disease in future.

Keywords: Goldenberry (*Physalisperuviana*L.), lipid peroxidation (LPO), MDA, GSH, vitamine.

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ON NUMERICAL SOLUTION OF FRACTIONAL ORDER BOUNDARY VALUE PROBLEM WITH SHOOTING METHOD

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Abstract

In this study, the shooting method is used for calculation of the second order boundary value problem with fractional order. This method is found to be useful during the application and the accuracy of the shooting method which is tested and then some examples are given to illustrate the efficiency of the method with respect to different value of fractional orders.

Keywords: Boundary value problem, shooting method, numerical solution, fractional order boundary value problem.

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A FAMILY OF EFFICIENT TIME STEPPING METHODS FOR SEMI-LINEAR STOCHASTIC DIFFERENTIAL EQUATIONS

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Abstract

In this study, we present a family of efficient time integrators for the following semi-linear Stochastic Differential Equations

$$du(Au + F(u))dt + \sum_{i=1}^{m}(B_i u + g_i(u))dW_i(t) \quad , \quad u(0) = u_0 \in R^d$$

where $W_i(t)$ are iid Brownian Motions, $F, g_i : R^d \to R^d$, $i = 1,2,...,m$ and matrices A, B_i satisfy the zero commutator conditions. New class of exponential integrators are derived by inspring from Geometric Brownian Motion. Strong convergence analysis of the schemes and numerical examples are also included.

Keywords: Stochastic Differential Equations, Exponential Integrator, Geometric Brownian Motion

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UNIFORM DIFFERENCE METHOD FOR SINGULARLY PERTURBED DELAY SOBOLEV PROBLEMS

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Abstract

In this study, the initial-boundary value problem for singularly perturbed delay Sobolev equations are treated. The exponentially fitted difference schemes on a uniform mesh which is accomplished by the method of integral identities with the use of exponential basis functions and interpolating quadrature rules with weight and remainder term in integral form are presented. The stability and convergence analysis of the method is discussed. The fully discrete scheme is shown to be convergent of order 2 in space and time, independently of the perturbation parameter. Some numerical experiments have been carried out to validate the predicted theory.

Keywords: Singular perturbation; Delayed partial differential equation; Sobolev problem; Uniform mesh; Difference schemes.

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NUMERICAL INTEGRATION OF THE AIRY-TYPE EQUATIONS

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Abstract

We consider the numerical integration of the Airy-type second-order nonlinear equations**.** These equations can be obtained by reducing the modified Korteweg-de Vries (mKdV), Schrödinger, Boussinesq equations and the third-order dispersion equation with second-order diffusion-like nonlinearity. [1,2]. Studies on the Airy-type equations are intriguing because of the nature of the problem, which has both oscillatory slow decay and exponentially fast decay. Most of the existing numerical schemes to solve such equation cannot exhibit its correct physical behaviour. This difficulty can be overcome by using symplectic integrators [3] that are combination of splitting methods with Magnus integrators [4,5]. The obtained numerical results compared with the existing solutions in the literature, and found that they are very accurate.

Keywords: Splitting methods; Symplectic integrators; Non-linear Airy-type equations.

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HIGHER ORDER DIFFERENCE SCHEMES FOR SINGULARLY PERTURBED DIFFERENTIAL EQUATIONS WITH DELAY

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Abstract

An initial value problem for linear second order singularly perturbed delay differential equation is considered. Its second-order derivative is multiplied by a small positive parameter ε, which induces boundary layers. Higher order difference schemes are constructed on uniform mesh, which give uniform convergence in the discrete maximum norm. The method is shown to uniformly convergent with respect to the perturbation parameter. A numerical experiment illustrate in practice the result of convergence proved theoretically.

Keywords: Difference Schemes;Singularly Perturbed Problem; Uniformly Convergence.

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A STUDY ON THE IMPROVED TAN$\left(\phi(\xi)/2\right)$-EXPANSION METHOD

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Abstract

In this study, the improved tan$\left(\phi(\xi)/2\right)$-expansion method (ITEM), one of the improved expansion methods, has been applied to Jimbo-Miwa (JM) equation and the Sharma-Tasso-Olver equation using symbolic computation. With the aid of the method, many new and abundant analytical solutions have been obtained. The newly obtained results show that ITEM is a new and significant technique for solving nonlinear differential equations which plays an important role on fluids mechanics, engineering and many diverse physics fields.

Keywords: Improved tan$\left(\phi(\xi)/2\right)$-expansion method, Jimbo-Miwa (JM) equation, Sharma-Tasso-Olver equation, Analytical solution.

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ANALYSIS OF OUTPUT VOLTAGE HARMONICSOF VOLTAGE SOURCE INVERTER USED PI AND PID CONTROLLERS OPTIMIZED WITH ITAE PERFORMANCE CRITERIA

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Abstract

In this study, PI and PID controllers are designed using ITAE (Integral Time Absolute Error) Performance Criteria in order to obtain the controller parameters assuring improved response at selected load. The Three-level AC-DC converter including PI and PID controllers whose parameters are estimated by minimizing errors using ITAE performance criteria are modeled in MATLAB environment. The stability analysis of the control system will be presented. VSI controlled with the PI-ITAE and the PID-ITAE controller are simulated for various loads and the results are analyzed using FFT analysis for observing the total harmonic distortion (THD) of the output voltage. The comparison of the PI-ITAE and the PID-ITAE is presented by taking into consideration their low THD at the inverter output voltage under the same conditions for different types of loads. The quality of the sinusoidal waveform is more important than the quantity in AC. In order to achieve that, we need to reduce the harmonic content in the output.

Keywords: Voltage Source Inverter; Harmonic Analysis; ITAE Performance Criteria.

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ON ASYMPTOTICALLY LACUNARY STATISTICAL EQUIVALENT OF ORDER A IN PROBABILITY

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Abstract

In this study, we introduce and examine the concepts of asymptotically lacunary statistical equivalent of order α in probability and strong asymptoticallylacunary equivalent of order α in probability. We give some relations connected to these concepts.

Keywords: Statistical convergence of order α in probability, Cesaro summability of order α in probability, Lacunary statistical convergence, Asymptotically statistical equivalent

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ON THE INVERSE PROBLEM FOR DIRAC SYSTEM

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Abstract

In this study, we have considered inverse problem on two spectra for Dirac operator. We have obtained the following inequalty concerning the structure of the potentialsdifference.

$$\max|\tilde{p}(x) - p(x)| \leq C'.\,\mathrm{A}$$

$$\max|\tilde{q}(x) - q(x)| \leq C''.\,\mathrm{A}$$

where $\mathrm{A}=\sum_{n=1}^{\infty}\left\{\left|\sigma_n - \rho_n - \frac{b_0{}' - b_0}{n^2}\right| + |\mu_n - \lambda_n - 2(a_0{}' - a_0)|\right\} + |\mu_0 - \lambda_0|$

$$+|\sigma_0 - \rho_0| + |a_0{}' - a_0| + |b'_0 - b_0|$$

Keywords: Dirac system, spectral parameter, potential.

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SYMMETRY SOLUTION ON FRACTIONAL EQUATION

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Abstract

As we know nearly all physical, chemical, and biological processes in nature can be described or modeled by dint of a differential equation or a system of differential equations, an integral equation or an integro-differential equation. The differential equations can be ordinary or partial, linear or nonlinear. So, we concentrate our attention in problem that can be presented in terms of a differential equation with fractional derivative. The fractional derivatives are about three centuries age were presented, but not very popular amongst science and or engineering community [1-2]. Our research in this work is to use symmetry transformation method and its analysis to search exact solutions to nonlinear fractional partial differential equations. For construction a symmetry reductions of a fractional equation we investigated the symmetry properties by using the group analysis method and presented the vector fields the equation based on the point symmetry [3-4]. It is shown that our equation could be transformed into a nonlinear fractional ordinary differential equation with the new independent variable.

Keywords: Groups method, symmetry method, Caputo fractional derivative, Riemann-Liouville derivative.

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NEW EXACT WAVE SOLUTIONS OF SOME EVOLUTION EQUATIONS WITH FUNCTIONAL VARIABLE METHOD

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Abstract

In this study, by using Functional Variable method we are founded some exact solutions of the Space-Time Quadratic Klein-Gordon equation and the nonlinear Coupled Klein-Gordon system. These exact solutions of equations have classified. Also the physical behaviors of the obtained solution functions are examined and graphics are drawn using the Mathematica program. The results clearly show that this method is a mathematical tool for solving some partial differential equations in various scientific and engineering fields.

Keywords: Functional variable method, nonlinear partial differential equations, evolution equations.

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THE MODIFIED SIMPLE EQUATION METHOD FOR NEW EXACT WAVE SOLUTIONS OF SOME NONLINEAR PHYSICAL EQUATIONS

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Abstract

In this study, we are obtained some semi-analytical solutions of the (3+1) dimensional Jimbo-Miwa equation and 1-dimensional Boussinesq equation by using improved Modified Simple Equation method. These equations are appeared in the model of many problems which seems in various fields of engineering and science such as plasma physics, optical fibers, mathematical physics, chemical physics and fluid mechanics. This method has influential and applicative for constructing of exact solutions for some evolution equations in mathematical physics. Also, graphics of solution functions have been drawn using and construe with the Mathematica program.

Keywords: Modified simple equation method, nonlinearpartial differential equations, evolution equations.

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NUMERICAL SIMULATION OF KDV EQUATION BY FINITE DIFFERENCE METHOD

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Abstract

In this study, we apply the sine-Gordon expansion method (SGEM) to the Korteweg-de vries (KdV) equation with dual-power law nonlinearity. SGEM is a combination of the travelling wave transformation and sine-Gordon equation. We have succeed in constructing new solitary wave solutions to the KdV equation with dual power nonlinearity. In addition to finite difference method (FDM) and operators are analyzed. Discretize equation is obtained with the help of finite difference operators. When we used new analytical solution it is considered new initial condition for The KdV equation. It is shown that the FDM is stable for the usage of the Fourier-Von Neumann technique and linear stable. Accuracy of the method is analyzed in terms of the errors in L_2 and L_∞. As well as we apply FDM for obtaining the numerical results and construct a table including numerical and exact solution and absolute measuring error. This comparison is supported with the graphics. Then, we have constructed the two and three dimensional surfaces for all analytical solutions obtained in this study by using Wolfram Mathematica 9

Keywords: The SGEM, the KdV equation; Finite Difference Method; Linear Stability; Numerical Solution.

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A MODIFIED ALGORITHM GENETIC APPLIED TO POWER SYSTEM OPTIMIZATION

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Abstract

As genetic algorithms are stochastic methods, their main problem is the risk of losing good solutions when passing from generation to next one. In this study, a new modified genetic algorithm is proposed to remedy this problem, this modification is based on creating a register containing all the solutions of the current generation to be compared with the solutions of the following population before creating the new generation. This procedure will be repeated for each generation, in this way, we will be sure that the solutions of the last generation are the best and each solution has had its chance of comparison. This algorithm is applied to the most well known models of electrical networks such as IEEE 30, 57 14 and 118, in economic and environmental dispatchings and even multiobjective optimization. The results were very satisfactory where a clear superiority was observed after comparison with other types of genetic algorithms having the same parameters and applied to sames power system networks.

Keywords: Genetic algorithms; Electrical networks; Economic and environmental dispatchings; Multiobjective optimization.

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ANALYTICAL SOLUTIONS OF THE CONFORMABLE FRACTIONAL DIFFERENTIAL EQUATIONS

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Abstract

Fractional differential equations and their applications in physics, applied mathematics, engineering, biology and in many sciences, have a great deal of importance. Obtaining their analytical solutions allow us to understand the phenomena they describe; hence a lot of methods and different definitions of fractional derivatives have been used so far. Recently, a new definition called conformable fractional derivative have been proposed. In this study, some exact analytical solutions to the nonlinear fractional differential equations in the sense of conformable derivative are obtained using the modified trial equation method.

Keywords: Fractional order differential equations; Conformable fractional derivative.

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CHEBYSHEV WAVELET METHOD FOR NUMERICALSOLUTIONS OF PDEs

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Abstract

This study deals with the numerical solutions of one dimensional timedependent coupled Burgers' equation with suitable initial and boundary conditions by using Chebyshev wavelets in collaboration with a collocation method. The proposed method converts coupled Burgers' equations into system of algebraic equations by aid of the Chebyshev wavelets and their integrals which can be solved easily with a solver. Benchmarking of the proposed method with exact solution and otherknown methods already exist in the literature is made by three test problems. The feasibility of the proposed method is demonstrated by test problems and indicates that the proposed method gives accurate results in short cpu times. Computer simulations show that the proposed method is computationally cheap, fast and quite good even in the case of less number of collocation points.

Keywords: Chebyshev wavelet method, Chebyshev collocation, Coupled Burgers' equation, Nonlinear phenomena, Numerical solution.

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INVESTIGATION OF NUMBER SENSE ACHIEVEMENTS ON SECONDARY SCHOOL STUDENTS ACCORDING TO VARIOUS VARIABLES

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Abstract

In this study, it was examined achievement in subscale secondarys chool students' number sense and its subscales according to various variables. Number sense means that people can make logical estimates about various uses area, be able to recognize arithmetic errors and number patterns, to choose the most effective way of calculation (Hope, 1989). Number Sense Scale evaluates number sense consists of three dimensions: Flexibility in Calculation, Conceptual Thinking in Fractions, and Using Benchmark (reference points). Unrelated samples t-test, one-wayAnova, two-wayAnova, and Kruskal-Wallis analyzes were used to determine whether students' achievements in all dimensions and sub-dimensions differed significantly by gender and classlevels. From findings obtained from the research, there was nomeaningful difference in the students' achievement in numerical sense total and sub-dimensions in terms of gender and inusing benchmark (reference points) by classlevel. However, there was a meaningful difference in the totalnumeral sense, flexibility in calculation and conceptual thinking in fractions. It has been determined that this is in favor of 8th grade students.

Keywords: Number sense; Number sense dimensions; Mathematics.

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OPINIONS OF PROSPECTIVE MATHEMATICS TEACHERSABOUT SOME TEACHING-LEARNING MODELS USED IN MATHEMATICS CLASSES

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Abstract

Classical learning system bases on memorization. This situation causes unsuccess of students (Aşkar &Olkun, 2005). It is important teacher in successful of education program. Effective teacher is a person to have ability to achieve the intended learning goals (Perrott, 1982) and must be open-minded, contemporary, self-renewing, taking into account the individual differences (Seiley, 1999). Therefore, it was seen important to determine what teachers will use teaching and learning model in mathematics lessons and in this study, the opinions of 38 prospectiveteachers from 2nd grade mathematics teacher education program were gotten about teaching strategies, methods, techniques, 5E, 7E learning models and conceptualchangetexts on the basis of constructivist learning model. From results, it was found that teaching through invention as strategy and problem solving as techniquecan be used most effectively, teaching through research-examination as strategy, expression and debate as techniques were used most weakly. However, it was determined that 5E, 7E learning models and conceptual change texts can be used effectively in mathematics lessons by the teacher candidates.

Keywords: Teaching-learning strategies; Constructivist learning model; Mathematics lessons.

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BOUNDARY VALUES FOR AN EIGENVALUE PROBLEM WITH A SINGULAR POTENTIAL

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Abstract

In this study we consider the inverse spectral problem

$$\psi''+(\lambda-q(r)-\frac{l(l+1)}{r^2})\psi = 0 \ ,0< r < 1 \ \ ,\psi(1) \ = 0 \quad l=0,1,2,...$$

for the Sturm-Liouville Operator on the interval [0,1]. This determines the three-dimensional Schrödinger equation with from singular symmetric potential. It is well known that the two spectrum uniquely determine the potential function q(τ) in a singular Sturm-Liouville equation defined. In particular we obtain a new proof of Hochstadt's theorem concerning the structure of the difference q(τ)-q($\check{\tau}$).

Keywords: spectrum, invers problem, eigenvalue, second-order differential equation.

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ON INVERSE STURM- LIOUVILLE PROBLEMS WITH SYMMETRIC POTENTIALS

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Abstract

In this study, we consider the inverse problem

$$-y''+q(x)y = \lambda y, \quad hy(0)-y'(0) = 0, \quad hy(\pi)-y'(\pi)=0$$

where q is integrable on $[0,\pi]$ and satisfy the symmetry conditions $q(x)=q(x-\pi)$ almost everywhere in the interval $0\leq x\leq\pi$.We obtained the solution of the inverse Sturm Liouville problem with symmetric potential for finite interval.

Keywords: Inverse problem symmetric potential, fixed point theorem, second-order differential equation.

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QUANTUM ENCRYPTION IN WIRELESS NETWORK TECHNOLOGY

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Abstract

In this study, we propose a novel method for wireless networks utilizing quantum cryptography which is a new research field of computer science. Key distribution in a wireless network is a major security problem. It is a necessary task in wireless networks that the way ofdistribution the keys. Quantum key distribution, cryptographic key value within distribution systems, used for secret key known broadcast between the two nodes is a new key distribution system. BB84, which is one of quantum key distribution protocols, have effective capabilities to solve the security issues for wireless networks. In this study, BB84 based key distribution protocol is proposed for wireless networks.

Keywords: Wireless Network Security; Quantum Key Distribution; BB84 Quantum Key Distribution, Quantum

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POISSON BRACKET ON MEASURE CHAINS

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Abstract

The dual $\hbar^*$ of a Lie algebra $\hbar$ carries a Poisson bracket given by

$$\{F, G\}(\mu) = \langle \mu, \left[\frac{\delta F}{\delta \mu}, \frac{\delta G}{\delta \mu}\right] \rangle$$

for $\mu \in \hbar^*$. Lie–Poisson bracket plays an important role in the Hamiltonian description of many physical systems. This bracket is not the bracket associated with any symplectic structure on $\hbar^*$, but is an example of the more general concept of a Poisson manifold. In this study, we present the generalized Poisson bracket on measure chains which are the arbitrary closed non-empty interval of the reals. The results are presented in the terms of different discrete spaces like $h\mathbb{Z}$and $q^{\mathbb{N}}$.

Keywords: Hamiltonian Systems, Measure Chains, Discretization

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AN INVERSE NODAL PROBLEM FOR DIFFERENTIAL PENCILS WITH COMPLEX SPECTRAL PARAMETER DEPENDENT BOUNDARY CONDITIONS

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Abstract

In this study, we are concerned with an inverse nodal problem for second order differential pencil on a finite interval with complex spectral parameter dependent boundary conditions by using nodal points. We give some reconstruction formulas for potential functions p and q as a limit.

Keywords: Inverse Nodal Problem; Differential Pencil; Eigenvalues.

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THE STABILITY OF THE INVERSE PROBLEM WITH AN INTEGRO-DIFFERENTIAL OPERATOR

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Abstract

In this study, we study following boundary value problem consisting of an integro-differential equation, together with boundary conditions dependent on the spectral parameter. We obtain the asymptotic form of the eigenvalues, and the generalization of corresponding Volterra integral operator is investigated. Then, we prove the stability theorem of the solution of the inverse problem.

$$\ell u(x) := -u''(x) + q(x)u(x) + \int_a^x K(a + x - y)u(y)\,dy = \lambda u(x)$$

$$u(a,\lambda) = 0,\ u'(b,\lambda) + \lambda\alpha u(b,\lambda) = 0,$$

where $\lambda = \rho^2$, $-\infty < a \le x \le b < \infty$, α is a real parameter, *q(x),K(x)* are integrable real functions.

Keywords: Integro-differential equation; Inverse problem; Stability theorem.

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AN INVERSE PROBLEM FOR DIRACOPERATOR AND THE STABILITY THEOREM

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Abstract

This study is devoted to the stability of the solution of an inverse problem for Dirac operators, which have real-valued potentials, together with separated boundary conditions on the interval $[0,\pi]$, as follows. First, we study the asymptotic behaviors of eigenvalues and eigen-vector-functions. Then, by Green function of the Dirac operator and using a form of Riesz basis of eigen-vector-functions and its biorthogonal associated basis, we investigate the stability theorem.

$$\ell y(x) \equiv By'(x) - Q(x)y(x) = \lambda y(x), \qquad 0 \le x \le \pi,$$

$$y_1(0,\lambda)\sin\alpha + y_2(0,\lambda)\cos\alpha = 0, \quad y_1(\pi,\lambda)\sin\beta + y_2(\pi,\lambda)\cos\beta = 0,$$

where

$$B = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}, \qquad Q(x) = \begin{bmatrix} p(x) & 0 \\ 0 & r(x) \end{bmatrix}, \quad y = y(x) = \begin{bmatrix} y_1(x) \\ y_2(x) \end{bmatrix}.$$

Here λ is a spectral parameter, $p(x), r(x)$ are real continuous functions, and α, β are real parameters.

Keywords: Dirac operator; Stability; Inverse problem.

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VIRTUAL CONTROL AND CRACK IDENTIFICATION: 2D HEAT EQUATION

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Abstract

This work deals with a specific inverse problem related to crack identification for the heat equation. In our approach, we consider an over-specified boundary condition on the boundary of the cracked domain. We give a theoretical analysis for identifiability for this inverse problem. Then, we consider a recovering process based on coupling domain decomposition method and minimizing an energy-type error functional. The efficiency of the proposed approach is illustrated by several numerical results.

Keywords: Inverse problem, identifiability, transient heat equation, ill-posed problem, Cauchyproblem, domain decomposition, virtual control.

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A NEW APPROACH FOR NIZHNIK-NOVIKOV-VESELOV SYSTEM

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Abstract

In this study, we establish analytical solutions of Nizhnik-Novikov-Veselov (NNV) system. We apply modified $\exp(-\Omega(\xi))$-expansion function method to seek analytical solutions of NNV system. We obtain some new analytical solutions of NNV system via modified $\exp(-\Omega(\xi))$-expansion function method. Then, for proper parameters, we plot two and three dimensional graphics of some analytical solutions that we obtained by using this method. Numerical results together with the graphical demonstrations clearly present the reliability of this method. Also, it is observed that the proposed method is consonant with the physical structure of such equations.

Keywords: Nizhnik-Novikov-Veselov system; modified $\exp(-\Omega(\xi))$-expansion function method; analytical solutions.

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ANALYTICAL SOLUTIONS OF PHI-FOUR EQUATION

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Abstract

This study bases attention on new analytical solutions of Phi-four equation. The modified $\exp(-\Omega(\xi))$-expansion function methodwhich is one of the analytical methods has been handled for finding analytical solutions of the Phi-four equation. By using this method, dark soliton solutions and trigonometric function solution of the Phi-four equation have been obtained. Also, by using Mathematica 9, some graphical simulations were done to see the behavior of these solutions.

Keywords: Phi-four equation; modified $\exp(-\Omega(\xi))$-expansion function method; dark soliton solutions; trigonometric function solution; Mathematica 9.

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DEVELOPING M-LEARNING PROTOTYPE SYSTEM

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Abstract

In this study, mobile learning (m-learning) is considered as the next form of e-learning using mobile technologies to facilitate education for teachers and learners anywhere and anytime. Engaging the m-learning services in the Malaysian higher education could improve the availability of education. Students' awareness of such technology is a key for success acceptance. The main objective is to propose a students' acceptance model of m-learning in the higher education environment. The study investigates the students' acceptance of behavior intention to use m-learning and its effect on usage behavior in the higher education environment.

Keywords: Improved Mobile Learning Services, Mobile Learning Acceptance Model, Mobile Learning Prototype.

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PREPARATION OF IMPROVED TURKISH DATASET FOR SENTIMENT ANALYSIS IN SOCIAL MEDIA

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Abstract

A public dataset, with a variety of properties suitable for sentiment analysis [1], event prediction, trend detection and other text mining applications, is needed in order to be able to successfully perform analysis studies. The vast majority of data on social media is text-based and it is not possible to directly apply machine learning processes into these raw data, since several different processes are required to prepare the data before the implementation of the algorithms. For example, different misspellings of same word enlarge the word vector space unnecessarily, thereby it leads to reduce the success of the algorithm and increase the computational power requirement. This study presents an improved Turkish dataset with an effective spelling correction algorithm based on Hadoop [2]. The collected data is recorded on the Hadoop Distributed File System and the text based data is processed by MapReduce programming model. This method is suitable for the storage and processing of large sized text based social media data. In this study, movie reviews have been automatically recorded with Apache ManifoldCF (MCF) [3] and data clusters have been created. Various methods compared such as Levenshtein and Fuzzy String Matching have been proposed to create a public dataset from collected data. Experimental results show that the proposed algorithm, which can be used as an open source dataset in sentiment analysis studies, have been performed successfully to the detection and correction of spelling errors.

Keywords: Sentiment Analysis, Social Media, Hadoop, Turkish Dataset

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NOVEL BEHAVIORS TO THE NONLINEAR EVOLUTION EQUATION DESCRIBING THE DYNAMICS OF IONIC CURRENTS ALONG MICROTUBULES

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Abstract

In this work, we consider the Bernoulli sub-equation function method for obtaining novel behaviors to the nonlinear evolution equation describing the dynamics of ionic currents along Microtubules. We obtain new results by using this technique. We plot two- and three-dimensional surfaces of the results by using Wolfram Mathematica 9.

Keywords: Microtubules, the nonlinear evolution equation describing the dynamics of ionic currents along Microtubules, Bernoulli sub-equation function method, Exponential function solution, Rational function solution.

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EMULATE ARTIFICIAL NEURAL NETWORK TO MAKE A DECISION IN WIRELESS SENSOR

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Abstract

This work presents an Artificial Neural Network Implementation in Arduino Board, simulated Network with Proteus ISIS. Artificial Neurons Network (ANN) is used in the decision and control of dynamic systems which can be with a lack of superfluous information which forces the use of fuzzy logic. The network presents a feed-forward back-propagation Network. It is the best general purpose network for either supervised or unsupervised learning. The back-propagation algorithm generates a weight for all nodes in the networks, to minimize absolute error committed in fusion data. As the structure used by human being able to reason and not repeat errors. The write-up provided here gives an overview of artificial neural networks, details of the sketch, it's an introduction to some of the basic concepts employed in feed forward networks and the backpropagation algorithm. Its main applications include temperature, humidity, gas sensor and other types of data monitoring, factory automation, home automation, remote monitoring and home device control or surrounding environment to make an exact decision in shorttime.

Keywords: Multi-Sensor, Wireless Signal, Embedded Systems, Emulate, Arduino, NeralNetwork, Backpropagation.

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INVERSE PROBLEM FOR STURM-LIOUVILLE OPERATORWITH SINGULARITY

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Abstract

In this study, we give the solution of the inverse problem for singular differantial operator. By using McLaughlin and Rundell's method, we also show that a particular set of eigenvalues is sufficient to determine the unknown potential functions.

Keywords: Eigenvalue; Eigenfunction; Inverse problem.

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MATHEMATICAL MODELING OF CHURCH GROWTH

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Abstract

Church has been in an existence for so many years which has actually changed the lives of many people in the society. The growth of church is essential in the sustainability andspread of the church in any society. In this study, an SEIR church model is proposed. Themodel properties is studied with the reproduction number R0 also computed. The steadystates of the church model are studied and the church free equilibrium is found to be locally and globally stable. The church endemic state is found exist whenever R0 > 1. Timedependent controls are included in the church model and Pontryagin's Maximum Principleis explored to characterise the essential condition for promoting church evangelism whichwill lead to active church members. The numerical simulation results indicates that thecombination of all the strategy in order to maximize the church evangelism and have moreunbelievers being converted to become active believers.

Keywords: church, optimal control, bifurcation, centre manifold theory, stability

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ON TWO TYPES OF COUNTABLE DENSE HOMOGENEOUS SPACES

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Abstract

We introduce the concepts of slightly dense set as well as slightly separable space, and use them to introduce two new types of slightly countable dense homogeneous spaces. Several results, relationships, examples and counter-examples concerning these concepts are obtained.

Keywords: Clopen sets, dense set, slight homogeneous space, countable dense homogeneous space.

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RADIATIVE MHD FLOW OF SECOND-GRADE FLUID TOWARDS A STRETCHED SPHERE

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Abstract

This work deals with the magnetohydrodynamic (MHD) stagnation pointflow of a second-grade fluid due to a stretching sphere. Thermal radiation effects are considered in the analysis of heat transfer phenomenon. Joule heating and viscous dissipation effects are also retained. The resulting nonlinear system is computed for the series solutions. Influence of various physical parameters on the velocity and temperature profiles are scrutinizedgraphically. Comparison between Newtonian and second-grade fluids is made. Velocity and temperature profiles in the presence/absence of stagnation point are discussed graphically. Numerical values of skin friction and Nusselt number are also computed and interpreted.

Keywords: MHD stagnation, second-grade fluid, stretching sphere, Simulation.

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A CAPUTO-FABRIZIO FRACTIONAL-ORDER NETWORK MODEL FOR ZIKA VIRUS: NUMERICAL SIMULATIONS AND DYNAMICS

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Abstract

In this work, we deal with a fractional-order Zika virus model via Caputo-Fabrizio derivative. The reproduction number R0 is computed and the steady states are investigated which shown to be locally asymptotically stable in both steady states. An efficient numerical method is used to examine the numerical solution of the Zika virus. It is shown that the numerical and the theoretical results are in good agreement.

Keywords: Zika virus, Caputo-Fabrizio derivative, Numerical simulation, Stability.

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PERCEPTIONS OF HIGH SCHOOL STUDENTS TO USE MOBILE LEARNING IN MATHEMATICS COURSE

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Abstract

Today, with the innovations that technology has provided, the place of mobile devices in our lives is increasing day by day. Depending on these developments, many habits belonging to our daily lives are left to new habits. One of the most important areas where technology contributes to human life is education. The contributions that technology has made at the point of increasing the quality of education continue to increase. In particular, the facilities that mobile devices bring to this area will greatly contribute to increasing the quality of education. In this research, it was aimed to determine the perceptions of high school students regarding the use of mobile learning in mathematics lessons. However, it has been tried to show how much information students have about "Advantages and Disadvantages of Mobile Devices" and "Mobile Device Usage". Despite the fact that we work abroad in this regard, our country is limited in number. The study is important in terms of researching the relation of mobile learning with mathematics teaching and the limited number of studies at the relevant high school level. In order to learn the knowledge and perceptions of students about mobile learning, 450 students in three different high schools in İzmir provinces and districts conducted this study. "Mobile Learning Survey" developed by researchers was used as data collection tool. As a result of this research, it has been found out that when the answers of the students about the use of mobile learning in mathematics are examined, it has been found out that they have a generally positive approach. It is stated that students are aware of these advantages and disadvantages in the direction of students' responses to the items related to advantages and disadvantages of mobile learning. Finally, it has been shown that students are closely related to the use of mobile devices and that they have a great deal of knowledge about the use of these devices in response to the answers given by the students about the use cases of mobile devices.

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SOLVING A PROBLEM OF OPTIMIZING THE INITIAL CONDITION IN A HEAT EQUATION

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Abstract

This study is related to the problem of controlling the initial condition in the linear parabolic equation. It is proved that the Frechet differential of the cost functional can be found via the solution of the adjoint parabolic problem. The necessary conditions for the existence and uniqueness of the optimal solution has been given.

Keywords: Parabolic Equation; Optimization; Frechet differential.

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ON STATISTICAL CONVERGENCE OF FUZZY SEQUENCES

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Abstract

In this study, we introduce several sets of fuzzy numbers using various sequence λ and μ in class Λ. Furthermore, some inclusion results on these sets are obtained.

Keywords: Statistical convergence, Fuzzy sequence.

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STATISTICAL CONVERGENCE OF ORDER αIN AMENABLE SEMIGROUPS

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Abstract

In this study we introduce the concepts of asymptotically statistical equivalent functions of order α and strong asymptotically equivalent functions of order α defined on discrete countable amenable semigroups.

Keywords: Statistical convergence, Cesàro Summability, Amenable semigroups.

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ON DEFERRED STATISTICAL CONVERGENCE OF ORDERαOF SEQUENCES OF FUZZY NUMBERS

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Abstract

In this study, we introduce and examine the concept of deferred statistical convergence of order α of sequences of fuzzy numbers and give some realtions between statistical convergence and deferred statistical convergence of order α of sequences of fuzzy numbers.

Keywords: Fuzzy number, Deferred statistical convergence.

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WEAKLY NONLINEAR ANALYSIS OF INTEGRO-DIFFERENCE EQUATIONS FOR GROWTH-DISPERSAL MODELS

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Abstract

In this work, we study of discrete time and continuous space models with nonlocal resource competition. We consider generalization of logistic and Ricker's equations as intraspecific resource competition models with symmetric nonlocal dispersal and interaction terms. Interaction and dispersal are modeled using convolution integrals. Using linear stability analysis, equilibrium points of these models becomes unstable for some kernel functions and parameter values. To analyse the behaviour of the growth of unstable modes we should account nonlinear terms.

Keywords: Integro-difference equations; Nonlocal interactions; Pattern formation.

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EFFICIENCY ANALYSIS FOR INSURANCE COMPANY WITH DATA ENVOLEPMENT ANALYSIS

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Abstract

Data Envelopment Analysis (DEA) is a method that evaluates inputs and outputs that are measured with different units.The main feature that distinguishes Data Envelopment Analysis from other methods of similar purpose is that it can be evaluated in cases where there are many inputs and outputs. Both in the state and private sectors, DAE is widely used tomeasure relative efficiency.In this study, the financial performances of nonlife-insurance companies which operating in Turkey are evaluated using the data of 2015. The dataset is taken from "The Undersecretariat of Treasury". The relative efficiencies of the companies are analyzed by means of DEA.

Keywords: Data Envelopment Analysis(DEA), Insurance Companies, Efficiency

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ON A PARTIAL DIFFERENTIAL EQUATION WITH PIECEWISE CONSTANT MIXED ARGUMENT

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Abstract

In this work, we deal with a heat equation with piecewise constant mixed arguments. By using separation of variables method, we obtain a formal solution of this equation. Because of the piecewise constant arguments, we get a difference equation. With the help of qualitative properties of the solutions of this equation, we investigate qualitative properties of the solutions of the partial differential equation.

Keywords: Piecewise constant arguments, Heat equation.

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NEW JACOBI FUNCTION SOLUTIONS OF COMBINED KDV-MKDV EQUATION

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Abstract

In this study, we obtain new Jacobi function solutions of combined KdV-mKdV equation which seems in the fluid physics and quantum field theory by using new F-expansion method. With this recommended method combined and multiple the non-degenerative Jacobi elliptic functions are presented in the solution function.

Keywords: New F-expansion method; combined KdV-mKdV equation; combined and multiple Jacobi elliptic function solutions.

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FINITE ELEMENT MODELLING OF A REINFORCED CONCRETE STRUCTURE OCCURING GROUND SETTLEMENT

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Abstract

In this study, the effects on the existing neighbor structures of a new foundation construction are investigated and analyzed. Because of a new foundation construction, ground settlement in an existing reinforced concrete (R/C) structure was occurred and so various damages in basement columns and beamsof the R/Cstructure were formed.Generally, it can be very difficult to be resolve this problem. In order to determine causes of the problem and solve the problem, numerical modelling of the structure was prepared and settlement of some column supports for simulation of real situation was provided in FE analysis. As a result of analyses, it was concluded that damages in columns and beamsstemmed from ground settlement.

Keywords: Numerical modelling; Finite element method; Ground settlement; Reinforced concrete structure.

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THE BOUNDARY CURVATURES OF GRAPH COMMUNITIES

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Abstract

Complex systems are natural or social systems involving large number of nonlinear interacting agents. The necessity to understand the phenomena in these systems has led many investigators to use the new models and use the complex system tools used in other branches. The most interesting feature of these systems is the existence of phenomena that cannot be obtained in a simple way or that cannot be clearly predicted from the structure of the system and from the individual interaction of the actors.

In this study, we aim to present a new clustering respect to Ricci Curvature of the boundary graph emerge from the clustering of the agents. For the global clustering we use the graph communities. Then it is possible to characterize the pressure the phenomenon in the communities.

Keywords: Graph Communities, Boundary Graph, Data Analysis, Complex Networks

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APPROXIMATION PROPERTIES OFDE LA-VALLEEPOUSSIN MEANS FOR SERIES BY NONLINEAR FOURIER ATOMS

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Abstract

As a typical family of mono-component signals, the nonlinear Fourier atoms $e^{ik\theta_a(t)}$; k∈ℤ, defined by the nontangential boundary value of the M Mobius transformation, has attracted much attention in the field of nonlinear and nonstationary signal processing in recent years. In this study, the value of the deviation of a function f fromits de la Vallee-Poussin means V_n (f; x) with respect to the nonlinear trigonometric system for classes of piecewises mooth 2π-periodic functions is estimated.

Keywords: Generalized Hölderspaces; nonlinearFourierbasis; de la Vallee-Poussinmean.

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NEW SOLITON PROPERTIES TO THE OF ILL-POSED BOUSSINESQ EQUATION ARISING IN NONLINEAR PHYSICAL SCIENCE

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Abstract

In this study, with the help of the Wolfram Mathematica 9, we employ the modified exponential function method in obtaining some new soliton solutions to the ill-posed Boussinesq equation arising in nonlinear media. Results obtained with use of technique, and also, surfaces for soliton solutions are given. We also plot the 3D and 2D of each solution obtained in this study by using the same program in the Wolfram Mathematica 9.

Keywords: Ill-posed Boussinesq equation, Modified Exponential Function method, soliton solution.

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KEROSENE OIL BASED SQUEEZING FLOW OF CARBON NANOTUBE BETWEEN TWO RIGA DISKS

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Abstract:

In this study, squeezing flow of carbon nanotubes between two parallel riga disk is investigated through homotopy analysis method. Carbon nanotubes (single-wall and multi-wall) are used as nanoparticles which are homogeneously distributed in the base fluid (kerosene oil). A set of non-linear differential equations for the governing flow is attained by employing suitable transformations through the conservative laws. Behavior of different emerging parameters on the velocity and temperature distributions are sketched graphically and discussed comprehensively. Analysis of skin fraction coefficient and Nusselt number are also elaborated numerically. It is observed that velocity is smaller for squeezing parameter in the case of multi-wall carbon nanotubes when compared with single-wall carbon nanotubes.

Keywords: Squeezing flow; carbon nanotubes; Riga disks.

THE QUADRATICITY OF LINEAR COMBINATIONS OF A QUADRATIC AND A CUBIC MATRIX THAT COMMUTE

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Abstract

Let A_1 and A_2 be an $\{\alpha_1,\beta_1,\gamma_1\}-$cubicmatrixand an $\{\alpha_2,\beta_2\}-$quadraticmatrix, respectively, with $\alpha_1\neq\beta_1$, $\alpha_1\neq\gamma_1$, $\beta_1\neq\gamma_1$, and $\alpha_2\neq\beta_2$. The aim of this work is to characterize all situations wherethelinearcombination $A_3=a_1A_1+a_2A_2$ with $A_1A_2=A_2A_1$ is aquadratic matrix. The results obtained covermany of theresults in theliteraturerelated to idempotencyor involutivity of the linear combinations of an idempotent (orinvolutive) and a tripotent matrix.

Keywords: Quadratic matrix, cubic matrix, linear combination, diagonalization.

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SYNCHRONIZATION OF IDENTICAL AND NON-IDENTICAL CHAOTICDYNAMICAL SYSTEMS

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Abstract

In this study, we present a generalized framework for a synchronization of a coupled chaotic identical and non-identical dynamical systems. We consider two approaches for constructing chaotic unidirectionally synchronized between two identical or non-identical dynamical systems for different dimensions. The first one, is based on the classical Lyapunov stability theory and the second one required the non-linear part of response system to be enough smooth and uses the expansion of such a function. To show the effectiveness and feasibility of those approaches, various numerical simulations are presented.

Keywords: Dynamical systems, synchronization, chaotic system, stabilization, Lyapunov theory, numerical analysis.

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NEW FUNCTION METHOD TO THE (N+1)-DIMENSIONAL NONLINEAR PROBLEMS

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Abstract

In this study, we apply the new function method based on the trigonometric, hyperbolic functions and their basic transformations. Thus, we construct the wave solutions including the Jacobi elliptic functions. Also, some properties of the derived doubly periodic solutions are shown graphically. It can be seen that this method is forceful mathematical tool for the (N+1)-dimensional nonlinear physical problems.

Keywords: New function method; Wave solution; Jacobi elliptic function.

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EDX ANALYSIS, MICROSTRUCTURE AND TRANSPORT PROPERTIES OF MgO DOPED Bi2212 SUPERCONDUCTORS

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Abstract
Superconducting ceramics of $Bi_2Sr_2CaCu_2Mg_xO_{8+\delta}$(x = 0, 0.01, 0.02, 0.03, 0.04, 0.05) are synthesized by simple solid-state reaction route. The influences of Mg doping on microstructures properties and superconducting behavior has been investigated by X-ray diffraction (XRD), Scanning Electron Microscopy (SEM) equipped with energy-dispersive, The DC resistivity versus temperature. X-ray diffraction experiments and SEM observations revealed the degree of texture in the superconductor. The analysis of the X-ray diffraction results reveals that all the samples are composed of only Bi2212 and Bi2201phases. SEM photographs show that the addition of MgO affects the mechanism of the grains growth due to the change of thermodynamic properties. All the samples appear to have a multiphase character as shown by DC resistivity and XRD data. Mg was found to be effective in the formation of the high-Tc phase at 5% of doping in this system. The onset temperature Tc (onset) of all the samples remains within the temperature range 80–82 K.

Keywords: Bi-based high-Tc superconductors; Scanning electron microscopy; X-ray diffraction.

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STUDY OF THE TRIBOLOGICAL BEHAVIOR OF A SLIDING CONTACT BRASS-STEEL COUPLE

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Abstract

The aim of this study is to consider the tribological behavior of a dynamic contact steel-brass couple with electric current. This study looks at a dry contact brass-steel couple where friction and wear are studied in terms of mechanical and electrical parameters. For this reason, a tribometer, pin-rotary disc is used in an atmospheric atmosphere. The test parameters are as follows: The normal load (5-30N) and the sliding speed (0.1 to 0.5 m / s). The duration of each test is 30 minutes. The experimental results show that these parameters have a significant effect on the tribological behavior of the couple studied. The discussion of results is based on observations, using an optical microscope, MEB and a profilometer, worn surfaces and interface phenomena resulting from the process of sliding contact.

Keywords: Brass-steel couple, Dry friction, Morphology, Normal load, Sliding speeds, Wear.

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MEASUREMENT UNCERTAINTY ON A GEOMETRICAL SPECIFICATION IN THREE-DIMENSIONAL MEASUREMENT

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Abstract

The measurement of the parts on a Coordinate Measuring Machine (CMM), is carried out by an operation of palpation, when the feeler comes into contact with the part, the actual contact between the probe and the measured surface is unknown, it is substituted by a estimated or measured contact point. The point is calculated from the taken point coordinates (center of the probe), the approach direction and the radius of the probe. This creates a doubt about the actual position of the point being felt. This doubt is spreading even on the parameters of the associated surface, as well as the geometric construction for the technical verification specifications. In this case, the automation of the calculation of uncertainties of measurement makes it possible to the metrologist to make decisions to declare the conformity of the products. In this context, this article presents an example of a control of a geometrical condition of a part manufactured. To be able to carry out this checking a data-processing model was produced, it made it possible to determine the whole of the parameters characterizing surfaces to be measured, and to calculate uncertainty associated with these parameters, as well as the geometrical defect, which is also attached to an uncertainty.

Keywords: CMM; Association and optimisation; Geometrics specifications; Uncertainty.

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A PACKAGED SOFTWARE FOR SOLUTION OF THE PROBLEM OF OPTIMAL PLACEMENTAND INTEGRATION OF OIL AND GAS PLATFORMS

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Abstract:

The number of the wells to be drilled in order to reach to oil and gas reserves with a sloping route are determined by geology experts. First of all platforms need to be constructed for drilling, and after that communication and transportation lines must be boned which needs sizeable amount of money. Therefore, modelling problems that contains optimal execution of all these process, developing efficient algorithms to solve these problems and designing software systems for these algorithms have great importance.

In this study, the problem of the placament and integration of oil and gas platforms for directional drilling is discussed. In order to solve the problem an approximate solution algorithm which is based on the mathemathical model and solution method that is proposed by the first author is suggested. In the proposed algorithm, the K-Means algorithm for clustering problems is used for deciding optimal placement of platforms and Kruskal algorithm which is known for solving Minimum Spanning Tree problem is used for integrating platforms and a new software system in C# programming language is designed. Taking into consideration that some fuzzy parameters are used in the mathematical models, developing a new fuzzy mathematical model, preparing solution algorithms which is based on the model and preparing interactive software systems that use visual programming techniques has been planned. If some parameters (maximumvalue of drillingangle, drillingcosts) are given as fuzzy number, performance of the program will be higher, flexibility and suitability to the real life circumstances will increase. Thus, decision-maker can make more realist judgments.

Keywords: Oil and gas platforms, optimal placement and integration of platforms, directional drilling in offshore fields, Mathematical modelling, C# programming language, Clustering, Spanning Tree, K-Means Algorithm, Kruskal Algorithm.

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ON MOMENTS GENERATING FUNCTIONS OF SAMPLE EXTREMES OF ORDER STATISTICS FROM DISCRETE UNIFORM DISTRIBUTION

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Abstract

In this study, the moment generating functions of sample extremes of order statistics from discrete uniform distribution are given. Finally, the results of these moment generating functions of order statistics of random variable for the independent and identically discrete uniform distribution are obtained.

Keywords*:* Order Statistics; Moment Generating Functions; Distribution Functions.

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USEFUL INEQUALITIES FOR UPPER AND LOWER BOUNDS OF REPAIRABLE AGING COLD STANDBY SYSTEM

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Abstract

In many engineering systems, cold standby redundancy is an effective way to achieve high system reliability while preserving limited power resources. Cold standby redundancy technique uses one or more redundant components that are unpowered, do not consume any energy and do not fail until being activated to replace a faulty online component. Whenever working component fails, then an available cold standby component, i.e. inactive standby component, is immediately powered up to take over the mission task. Some recent works on the research of the cold standby systems are in Wu and Wu (2011), Levitin et al. (2013), Eryılmaz (2014), Gökdere and Gürcan (2016). Inthis paper, we study a cold standby repairable system consisting of two non-identical components and a single repair facility with one repairman. It is assumed that, one of the two components is operating while the other is in cold standby and also two components follow a geometric process. Under these assumptions, at first we present Laplace-Stieltjes transform of the system lifetime and then we give some useful inequalities about the mean lifetime of the system.

***Keywords*:** Laplace-Stieltjes transform of system, Aging cold standby system, System lifetime, Geometric process.

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SEQUENCES WITH RANDOM INDICE IN CLASSICAL BANACH SPACE

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Abstract

In this study we define sequences with random indice in classical Banach space and analyzing it's some properties. After then we define differences sequence space on sequences with random indice. The difference operation is based on indice, and the generated difference sequence has a free stepwise. And here an important definition is the embedding space. Consequently we showed that l_∞ is a embedding space to c.

Keywords: Sequence Space, Embedding Space, Random Variable.

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AN INTEGRAL FORMULA ON THE LORENTZIAN MANIFOLD

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Abstract

Integral formulas have always been an important tool for studying various analytical and geometric problems on Riemannian manifolds. In Riemannian geometry, integral formulas have been studied by many mathematicians and proven to be a quite useful tool in differential geometry. Perhaps the Reilly's formula is one of the most well known integral formula in Riemannian geometry as well as a very powerful tool for obtaining global results. Nonetheless, a Reilly's Formula in Lorentzian geometry has not been available. On the other hand Reilly formula is actually an integral Bochner formula for gradient vector fields on manifolds with boundary in references.

In this note, The Reilly's integral formula well known for Riemann manifolds is obtained and introduced a aplication about it in n-dimensional Lorentzian space. Also We established a Reilly type formula in spacelike boundry hypersurfaces.

Keywords*:* Reilly's Formula, Lorentzian space

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ON SOME SPECTRAL PROBLEMS FOR DIFFUSION OPERATOR

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Abstract

In this study, we attain several spectral results for Diffusion operator. In particular, the solution functions belong to Paley-Wiener space:

$$PW_{\pi} = \left\{ f \text{ entire}, \ |f(\mu)| \le Ce^{\pi|\operatorname{Im}\mu|}, \ \int_R |f(\mu)|^2 \, d\mu < \infty \right\}.$$

so that required theorems are proved.

Keywords: Diffusion operator; Paley-Wiener space; Sampling theory.

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MULTIPLICATIVE LIE TRIPLE HIGHER DERIVATION ON UNITAL ALGEBRA

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Abstract

Let R be a commutative ring with identity and A be a unital algebra over R: Let N be the set of all non negative integers and L = $\{L_i\}_{i\in N}$ be a family of maps L_i: A$\to$A such that $L_0 = L_A$; the identity map on A. Then L is said to be a multiplicative Lie triple higher derivation on A if $L_i([[x,y],z]) = \sum_{r+s+t=i} [[L_r(x), L_s(y)], L_t(z)]$ for all $x, y, z \in A$ and for each $i \in N$. In this article we show that under certain assumptions every multiplicative Lie triple higher derivation L = $\{L_i\}_{i\in N}$ on A is of standard form, i.e., each component L_i has the form $L_i = \delta_i + \gamma_i$; where $\{\delta_i\}_{i\in N}$ is an additive higher derivation on A and $\{\gamma_i\}_{i\in N}$ is a sequence of mapping $\gamma_i : A \to Z(A)$ vanishing at Lie triple products in A:

LIE ALGEBRA REPRESENTATIONS AND 1-PARAMETER 2D-HERMITE POLYNOMIALS

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Abstract

The representations of the Lie algebras generate in a natural way all known classical special polynomials. This allows one to greatly simplify the theory of orthogonal polynomials by expressing them in terms of the corresponding Lie algebra or Lie group. In this article, the problem of framing the 1-parameter $2D$-Hermite polynomials (1P2DHP) $Z_{m,n}^{(\beta)}(z_1,z_2)$ (which are $2D$ orthogonal polynomials), into the context of the irreducible representations $\uparrow_{\omega,\mu}$ and $\downarrow_{\omega,\mu}$ of the four-dimensional Lie algebra $\mathcal{G}(0,1)$ is considered. This approach stress the mathematical relevance of $2D$-orthogonal polynomials and Lie algebras. Certain relations involving the 1P2DHP $Z_{m,n}^{(\beta)}(z_1,z_2)$ are obtained using the approach adopted by Miller. The linear differential operators serve as useful tools towards obtaining these relations. The analysis has been carried out by generalizing the formalism relevant to 1P2DHP $Z_{m,n}^{(\beta)}(z_1,z_2)$. Certain examples involving $2D$-Hermite polynomials $H_{m,n}(z_1,z_2)$ and Laguerre polynomials $L_{n}^{(\alpha)}(z)$ are obtained as special cases.

Keywords:2D-Hermite polynomials; Lie group; Lie algebra; representation theory; implicit formulae.

POSTER PRESENTATIONS

POSTER PRESENTATIONS WILL BE IMPLEMENTED BETWEEN 21.05.2017 AND 22.05.2017 AT 14.30-18.00

THE ANTIOXIDANT EFFECTS OF GOLDENBERRY (*PHYSALISPERUVIANA* L.) EXTRACT AGAINS TO THE OXIDATIVE EFFECTS OF TYPE I DIABETES IN MUSCLE TISSUE OF RATS

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Abstract

Type I diabetes is known as insulin-dependent diabetes mellitus, and the most important factor playing role in its formation is the genetic predisposition. *Physalisperuviana*L. (Goldenberry) is a plant, which has strong antioxidant properties, from Solanaceae family and, because of its fructose content, plays regulatory role in blood glucose level of diabetics. In this study, it has been investigated the effects of goldenberry on the malondialdehyde (MDA), reduced glutathione (GSH), total protein which are the indicators of antioxidant defense and the oxidative damages in muscle tissues of the rats. According to the obtained results, among the rats with STZ-induced type I diabetes, it was observed that the level of glutathione (GSH) increased and the level of malondialdehyde (MDA) decreased in rats given goldenberry extract. In this study, it was shown that the goldenberry decreased the destructive effects of type-I diabetes by decreasing the serum glucose and lipid peroxidation and increasing the level of glutathione.

Keywords: Goldenberry (*Physalisperuviana*L.), lipid peroxidation (LPO), MDA, GSH, Muscle.

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THE CHARACTERIZATIONS OF NULL QUATERNIONIC CURVE IN R_1^4

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Abstract

It is well known that there exist spacelike quaternionic curve and timelike quaternionic curve in the Minkowski space. However, null quaternionic curves have many propertieswhich are very different from spacelike quaternionic curve and timelike quaternionic curve.In this paper, we introduce the geometric properties of null quaternionic curves inMinkowski space which given by [1]. Later we obtained the conditions for null quaternioniccurves to lie on some subspaces of R_1^4 and and we give some characterizations and theoremsfor these curves.

Keywords: Minkowski space; Kundu-Eckhaus; null quaternionic curves.

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A NOTE ON SIACCI'S THEOREM

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Abstract

Inthisstudy, usingnewkinematical decompositition of the accelerationvectorrelatedtothe osculating plane, we give a new proof and examples for a spacecurves. We also give some special examples and plot figures related to the subject.

Keywords: Spacecurve, Frenetformulae, kinematics, accelerationvector.

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A NEW APPROACH FOR SMARANDACHE CURVES IN THE THE NULL CONE Q^3

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Abstract

Smarandachegeometry is a geometrywhich has at leastoneSmarandachelydeniedaxiom, [2]. An axiom is saidto be Smarandachelydenied, if it behaves in at east twodifferentwayswithinthesamespace.Smarandachecurve is defined as a regularcurvewhosepositionvector is composedbyFrenetframevectors of anotherregularcurve. Inthisstudy, we define specialSmarandachecurvessuch as $x\alpha, x\beta, xy, \alpha y, \alpha\beta, \beta y$-Smarandachecurvesaccordingtoasymptoticorthonormalframe in thenullconeQ^3 and we investigate thecurvatureandtheasymptoticorthonormalframe'svectors of Smarandachecurves. WegivetheoremsrelatedtotheseSmarandachecurves.

Keywords: Smarandachecurve, Asymptoticorthonormalframe, Coneframeformulas.

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NEW GENERALIZATIONS OF SOME MULTIPLE HYPERGEOMETRIC FUNCTIONS

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Abstract

In this work, by using a new generalization of extended beta function we introduced new generalizations of some multiple hypergeometric functions. Wealso obtained their integral representations, transformation formulas and Mellin transforms.

Keywords: Beta function; Multiple hypergeometric functions; Integral representations; Mellin transform.

Acknowledgement: This work was supported by Ahi Evran University Scientific Research Projects Coordination Unit. Project Number: FEF.E2.17.028

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ON A SPECIAL CLOPENNESS

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Abstract

In 2007, Ekici introduced the concept of C^*-sets in topological spaces [5]. The relationships beetween C^*-sets and special spaces were introduced by Ekici in 2007. In 2009, Ekici and Noiri introduced the concepts of BC-sets and AC-sets [3]. The aim of this study is to study a special clopen set in topological spaces.

Keywords: Special set, Clopen set, Topology.

Thiswork is a part of Ayşe Arslan'sMaster of Science Thesis.

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ON APPLICATIONS OF A GENERALIZED MAP

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Abstract

Generalized notions are generalizations of the subjects in topology and near areas, for example analysis etc. There are many papers on these investigations and properties. Generalized sets, topologies, structures, maps etc. The goal of this work is to study a generalized map. Main properties on this generalized map are investigated.

Keywords: Generalized set, Generalized map, Topological space.

Acknowledgement: Thisworkwassupportedby Çanakkale Onsekiz Mart UniversityTheScientificResearchCoordinationUnit, Project number: FYL-2016-811.

Thiswork is a part of Elif Karataş'sMaster of Science Thesis.

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A NEW CLOSED MAPPING

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Abstract

Weakly BR-closed functions were studied by Caldas et al. in 2009 [1]. Applications of weakly BR-closed functions were investigated by Caldas et al. in 2009. Also, Ekici considered generalized mappings for some investigations in 2011 [2]. In this study, a new closed mapping and investigations of this closed mapping are studied.

Keywords: Closed mapping, Closed set, Topology.

Acknowledgement: Thisworkwassupportedby Çanakkale Onsekiz Mart UniversityTheScientificResearchCoordinationUnit, Project number: FYL-2016-810.

Thiswork is a part of Burak Meral'sMaster of Science Thesis.

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THERMAL STABILITY AND ELASTIC PROPERTIES OF $MG_3CUH_{0.6}$ TERNARY HYDRIDE

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Abstract

Theoretical study ofthermal stability and elastic properties of a new intermetallic hydride compound $Mg_3CuH_{0.6}$ have been carried out based on density functional theory (DFT), within local density approximation (LDA). The calculated structural parameter of $Mg_3CuH_{0.6}$ compound is consistent with the experimental data. The calculated heat of formation shows that this compound has strongest alloying ability and structural stability. The elastic constants were determined from a linear fit of the calculated stress-strain function according to Hooke's law. From the elastic constants, the bulk modulus *B*, shear modulus *G*, Young's modulus *E*, Poisson's ratio σ,anisotropy factor *A* and the ratio *B/G* for $Mg_3CuH_{0.6}$compound are obtained. The sound velocities and Debye temperature are also predicted from elastic constants and discussed for the first report. This is the first quantitative theoretical prediction of these properties.

Keywords: Intermetallic hydride; Thermal stability; Elastic properties; DFT.

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INVESTIGATION ON STRUCTURAL, ELASTIC AND THERMODYNAMIC PROPERTIES OF $MGNI_3$INTERMETALLIC COMPOUND

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Abstract

In this work, we have used the density functional theory (DFT) plane-wave pseudo potential method, with generalized gradient approximation (GGA) to investigate the structural, elastic, and thermodynamic properties of the intermetallic compound $MgNi_3$. Comparison of the calculated equilibrium lattice constant and experimental data shows very good agreement. The elastic constants were determined from a linear fit of the calculated stress-strain function according to Hooke's law. From the elastic constants, the bulk modulus *B*, shear modulus *G*, Young's modulus *E*, Poisson's ratio σ,anisotropy factor *A*, and the ratio *B/G*for $MgNi_3$ compound are obtained. Our calculated elastic constants indicate that the ground state structure of $MgNi_3$ is mechanically stable. The calculation results show that this intermetallic crystal is stiff, elastically anisotropic and ductile material. The Debye temperature is also predicted from elastic constants. The temperature dependence of the enthalpy *H*, free energy *F*, entropy *S*, and heat capacity at constant volume C_v of $MgNi_3$ crystal in a quasi-harmonic approximation have been obtained from phonon density of states and discussed for the first report.

Keywords:$MgNi_3$; Elastic properties; Thermodynamic properties; DFT

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20-22 May 2017, Istanbul, TURKEY

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