FINAL INTERNATIONAL UNIVERSITY

3rd INTERNATIONAL CONFERENCE ON COMPUTATIONAL MATHEMATICS AND ENGINEERING SCIENCES - CMES-2018

04-06 May 2018, Girne, CYPRUS

(Turkish Republic of Northern Cyprus)

ABSTRACT BOOK

THE THIRD INTERNATIONAL CONFERENCE ON COMPUTATIONAL MATHEMATICS AND ENGINEERING SCIENCES (CMES-2018), GIRNE, 04-06 MAY 2018

The **Third International Conference on Computational Mathematics and Engineering Sciences (CMES-2018)** will be held in Final International University from **May 4 to 6, 2018 in Girne, Cyprus.** It provides an ideal academic platform for researchers and professionals to discuss recent developments in both theoretical, applied mathematics and engineering sciences. This event also aims to initiate interactions among researchers in the field of computational mathematics and their applications in science and engineering, to present reccent developments in these areas, and to share the computational experiences of our invited speakers and participants.

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MESSAGE FROM THE GENERAL CHAIRS


Dear Conference Attendees,

We would like to welcome you to the **3rd International Conference on Computational Mathematics and Engineering Sciences (CMES-2018)** in Girne, Cyprus. This year, the conference includes 400 extended abstracts, out of 400 submissions received in response to the call for papers, selected by the Program Committee. The program features keynote talks by distinguished speakers such as Abdon Atangana from Free State University, Mourad E. H. Ismail from University of Central Florida Orlando, FL, USA, Şeref Mirasyedioğlu from Başkent University, Turkey, Etibar Penahlı from Bakû State University, Bakû, Azerbaijan, Jose Francisco Gomez Aquilar from Tecnologica Nacional de Mexico, Mexico, Carlo Cattani from Tuscia University, Italy, Vatan Karakaya from Ahi Evran Unıversity, Kırsehir, Turkey, İsmail Yüksek from Antalya Bilim University, Antalya, Turkey, Khalil Ezzinbi from Cadi Ayyad University Marrakesh. The conference also comprises contributed sessions, posters sessions 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 efforts in making CMES-2018 a successful event. We would like to thank all of the authors for presenting their research studies during conference. We hope that you will find CMES-2018 interesting and intellectually stimulating, and that you will enjoy meeting and interacting with researchers around the world.

Hasan Bulut, Firat University Elazig, Turkey.
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Applied Mathematics,
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Control Theory,
Game Theory
Modeling of Bio-systems for Optimization and Control,
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PROCEEDINGS

Extended abstracts will be published in some Special Volumes of famous journals. Procedure, Guidelines and Checklist for the preparation and submission of a paper for the Proceedings of CMES-2018 can be found in the journals websites. The journals in which selected and peer-reviewed full papers of CMES-2018 will be published are follows:

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

2. Journal of Inequalities and Special Functions (E-SCI)
http://www.ilirias.com/jiasf/

3. Journal of Mathematical Analysis (E-SCI)
http://www.ilirias.com/jma/

4. Bulletin of Mathematical Analysis and Applications (E-SCI)
https://www.emis.de/journals/BMAA/

5. Gümüşhane Üniversitesi Fen Bilimleri Enstitüsü Dergisi (ULAKBİM)
http://dergipark.gov.tr/gumusfenbil

6. 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

7. 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

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

9. Journal of Modern Technology and Engineering
(Editor in Cheif: Prof. Mutallimov Mutallim)
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10. Mathematics in Engineering, Science and Aerospace (MESA)
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PLENARY SPEAKER TALKS

MATHEMATICS AS A LANGUAGE OF MIND

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Abstract

In this study, the emphasis will be placed on the importance of mathematical thinking in our lifes and our world of thought. It is to be argued that the real life involving of objects, as stated in Ibn Sina's "Kitabu'ş Şifa Metaphysic" book, is rough and that the delicacy of the relations between these objects can only be understood by reason, in other words, these relations can be explained by the mathematical notions that language of mind. However, it will be evaluated the contributions making development of our scientific knowledge of the logicism, intuitionism and symbolism, which are phases in the historical development of the mathematical thinking. Each of these scientific trends will be briefly mentioned about contributions making the development of the thinking. It will also be argued that the distinction of mathematics with symbolism leads to the stagnation of mathematics or mathematical thought at the same time. Later, the contributions of mathematical studies in the development of the thinking will be explained with examples from the history of mathematics and emphasis will be given to the mistakes of some approaches in mathematics teaching of the present educational system.

Keywords: Mind and logic; Mathematics and real life; Logicism, intuitionism and symbolism

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A NEW PERSPECTIVE ON THE COOPERATION BETWEEN UNIVERSITIES AND INDUSTRY: REFLECTIONS OF INDUSTRY 4.0 ON HIGH EDUCATION

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Abstract

Industry 4.0 is regarded as more than just a basic challenge for mankind. It is a new concept of the industry in which computers and automation will come together in entirely new way, with robotics connected remotely to computer systems that can learned and control the robotics with very little input and effort from human operators. The new and challenging way of industry has not only changed of itself but also the other sectors such as education, especially high education. The concept of Industry 4.0 brings quite significant innovation in terms of both the industry and the university. Today, the industry, because of the need of qualitative force work, is largely in collaboration with universities, and the universities are in collaboration with the industry to catch up with future technologies. This case makes universities reconsider their curriculum, practical implications, collaboration with industry, research fields and students competences.

Keywords: Industry 4.0, High Education, Research, Cooperation.

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REDUCTION OF COMPLEXITY FOR PARTIAL FUNCTIONAL DIFFERENTIAL EQUATIONS AND APPLICATIONS: NEW RESULTS AND OPEN PROBLEMS

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Abstract

The aim of this work is to study the existence of a center manifold for some semilinear partial functional differential equations in fading memory spaces. We assume that the unbounded linear part of the equation satisfies the Hille-Yosida condition. The existence of the centre manifold is obtained, under sufficiently small nonlinearity, as the graph of a fixed point for an integral operator given by a variation-of-constants formula. We use a new reduction principle to prove that the flow on the center manifold is completely determined by an ordinary differential equation in a finite dimensional space. When the nonlinear perturbation is only locally Lipschitzian, we obtain the existence of a local center manifold. As application, we provide many applications for the existence of almost periodic solutions and almost automorphic solutions. Also applications are provided for the stability in critical cases.

Keywords: Partial differential equations, infinite delay, Hille-Yosida operator, integral solution, semigroup, variation-of-constants formula, fading memory space, center manifold, reduction principle.

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INVITED SPEAKER TALKS

SINC-FRACTIONAL DERIVATIVE AND SHANNON WAVELETS

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Abstract

Sinc fractional derivative is a fractional order operator which enable to easily compute the derivative of functions belonging to the Hilbert space defined by Shannon wavelets. By combining this operator with the Shannon wavelet representation it is possible to express these derivatives by some suitable series. These series will be used to solve some differential problems.

Keywords: Fractional operator, Shannon wavelet, sinc-function.

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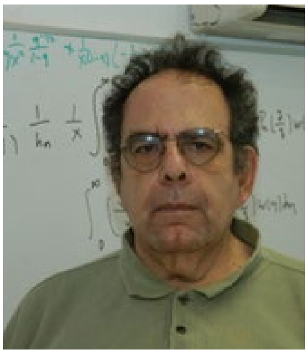

q- SERIES A BRIDGE BETWEEN ANALYSIS AND DISCRETE MATHEMATICS

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Abstract

We discuss the connection between partitions and allied areas of combinatorics and the q-series identities. We shall illustrate this interaction by several examples.

Keywords: q-series identities; Partitions; Discrete Mathematics

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NON-LOCAL OPERATORS WITH SINGULAR AND NON-LOCAL KERNEL: THEORY, METHODS AND APPLICATIONS

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Abstract

The concept of fractional differentiation and integration have captured minds of mankind due to their wider applicability in several fields of science, technology and engineering. Riemann and Liouville introduced the concept with power law kernel. This type imposes singularity to non-singular physical problems and their operators have no crossover properties. Caputo and Fabrizio suggested the concept with non-singular kernel. This new version is local as its associate integral is the average the function and its classical integral and the evolution equation associates to it satisfies the C0 semi-group principle thus is time memoryless. Atangana and Baleanu suggested those with non-singular and non-local kernel. The Atangana-Baleanu fractional derivative have crossover properties including its waiting time distribution, mean square displacement and density distribution. The new operators captured the Brownian motion at earlier time and the power law for latter time. The derivatives are strong forces as their Atangana-Gomez fractional bracket are non-null.

Keywords: Power law, Mittag-Leffler kernel, exponential decay law, crossover, Markovian and non-Markovian property, Atangana-Gomez bracket.

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21ST CENTURY COMPUTATIONAL MATHEMATİCS: AN INTERDISCIPLINARY APPROACH OF SCIENCE, TECHNOLOGY AND ENGINEERING

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Abstract

In the 21st century, scientific and technological innovations have become increasingly important as we face the benefits and challenges of both globalization and a knowledge-based economy. To succeed in this new information-based and highly technological society, all students need to develop their capabilities in science, technology, engineering, and computational mathematics [2]. The theory of computation [1] has been and still is one of the core areas of applied mathematics. It explores the fundamental capabilities and limitations of models of computation. A model of computation is a mathematical abstraction of a computing system. The most important model of sequential computation studied in computer science is the Turing machine, first proposed by Alan Turing in 1936. Mathematical abstractions called models of computation are at the heart of computation and computational thinking. Computation is a process that is defined in terms of an underlying model of computation and computational thinking is the thought processes involved in formulating problems to which solutions can be represented as computational steps and algorithms.

Keywords: Copputational mathematics, Turing Machine, Mathematical abstractions, Interdisciplinary Approach.

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SOME INVERSE PROBLEMS OF THE SPECTRAL THEORY FOR THE DIFFERENTIAL OPERATORS

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Abstract

In this talk, merely one of the variants of the inverse problem will be treated and solved. In particular, we shall give the solutions of the inverse problems for the equations with specified singularities. Some questions of the spectral problems having analogous singularities were considered in [1-4], etc. Also in this, in particular, we investigate the transformation operators for differential operators and their properties. In the theory of inverse problems, regular and singular operators of the Sturm-Liouville type, Dirac systems, Diffusion equations etc., and also in scattering theory play an important role, introduced by B. Ya. Levin [4], transformation operators. In particular, on the semi-axis for special types of equations, we construct the transformation operator under the scattering condition.

Keywords: Spectrum, Transformation operator, Scattering theory.

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SYNCHRONIZATION OF CHAOTIC SYSTEMS INVOLVING FRACTIONAL OPERATORS

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Abstract

Fractional order derivatives with Mittag-Leffler kernel are a good option to design state-observers to synchronize chaotic systems. Complete synchronization can be performed with a so-called unidirectional master–slave topology. The master is describedby a dynamical system in state-space representation whereas the slave is described bya state observer. This topology has been widely studied because of its potential application in secure communications.

Keywords: Fractional observers; Fractional multi-scrolls attractors; Atangana–Baleanu–Caputo derivative of constant and variable-order; Adams method.

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YILDIRIM İSMAIL TOSUN	SIMULATION OF GAS SORBTION KINETICS ON ACTIVE CARBON - REGRESSED MODEL FOR CONTROL TOXIC EMISSIONS OF FLUE GAS	
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ZAKIA HAMMOUCH	ON A NOVEL NUMERICAL METHOD FOR SOLVING FRACTIONAL-ORDER CAUCHY PROBLEMS	
ZEHRA PINAR	ON THE EXACT SOLUTIONS OF TWO-MODE EQUATIONS	
ZUHAL KUCUKARSLAN YUZBASI	TIMELIKE CURVE FLOWS AND INTEGRABLE SYSTEMS IN LORENTZIAN SYMMETRIC SPACE	
ZUHAL KUCUKARSLAN YUZBASI	ON HYPERSURFACE FAMILY WITH A COMMON ASYMPTOTIC CURVE IN THE 4D GALILEAN SPACE G4	
ZULQURNAIN SABIR	INTEGRATED INTELLIGENT PARADIGM FOR NONLINEAR SINGULAR SYSTEM OF LANE-EMDEN EQUATION ARISING IN ASTROPHYSICS	

PENTAGONAL CONE b-METRIC SPACES OVER BANACH ALGEBRAS AND FIXED POINT THEOREMS OF GENERALIZED LIPSCHITZ MAPPINGS

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Abstract

In this paper, we introduce the concept of pentagonal cone b-metric space over Banach algebras as a generalization of cone metric space, cone b-metric space, rectangular cone metric space, rectangular cone b-metric space, pentagonal cone metric space and pentagonal cone b-metric space. Furthermore, some fixed point theorems are proved in this space. We provide some examples to elucidate the validity and superiority of our results.

Keywords: Pentagonal cone b-metric space over Banach algebras; c-sequence; contraction mapping; fixed point.

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Adsorption of chromium (VI) onto Moroccan clay of Kssabi in aqueous solution: kinetic, thermodynamic and surface properties of suspended particles clay studies

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Abstract:

In the environment, chromium exists predominantly in one of two valence states, namely Cr (VI) and Cr (III) forms. It is reported that hexavalent chromium is more toxic than trivalent chromium and more soluble in soil and water. The objective of the present study is to contribute to the removal of hexavalent chrome from aqueous solution by adsorption; the adsorbent used is Ghassoul clay coming from the Kssabi region.
The Experiments were carried out to optimize various experimental parameters such as: initial chromium concentration, pH, temperature, contact time and mass of the adsorbent. The influence of pH on chromium (VI) adsorption was studied at the pH range of 2 to 6. The optimal pH was approximately 2 and the temperature of 298 K was the best fit. The experimental data were well represented by the Langmuir model while the Kinetic analyses showed that the adsorption rates were more accurately represented by a pseudo second-order model. All adsorption processes reached equilibrium in 10minutes. In addition, various thermodynamic parameters, such as Gibbs free energy (ΔG), enthalpy (ΔH) and entropy (ΔS) were calculated. The adsorption process was found to be a spontaneous and exothermic process. The release of the ions by the adsorbent in bi-distilled water was studied by conductivity and pH metric. The point of zero charge (pzc) was also determined.

Keywords: Chromium, Adsorption, Raw Ghassoul, Kinetics, Isotherm, Thermodynamic, pH, Conductivity, Point of zero charge (pzc).

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A novel method for coefficient inverse problem for the kinetic equation

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Abstract

We obtain reproducing kernel functions to investigate the coefficient inverse problem for the kinetic equation. We get approximate solutions by reproducing kernel functions. We present our results by a table. We verify the accuracy of the technique for solutions of a coefficient inverse problem for the kinetic equation.

Keywords: Reproducing kernel method; inverse problem for the kinetic equation; reproducing kernel functions.

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An Alternative Method for the Determination of the Number of Elements of a Given Order in a Direct Product of Two Cyclic Groups

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Abstract

A method for the determination of number of elements of a given order in a direct product of cyclic groups has been in the literature. In this paper, we proposed an alternative algorithm which may be used to find the number of elements of any order in the direct product of cyclic groups. The method proposed uses the idea of Euler phi function, which has been used in the determination of the number of elements of any order in a cyclic group.

Key Words: Cyclic group, elements, order, Euler phi function

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DOUBLE LACUNARY STATISTICAL CONVERGENCE OF ORDER $\tilde{\alpha}$ IN TOPOLOGICAL GROUPS

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Abstract

In this study, we define the concept double lacunary statistical of order $\tilde{\alpha}$ in topological groups, and give some inclusion relations between the set of all double statistically convergent sequences of order $\tilde{\alpha}$ and the set of all double lacunary statistically convergent sequences of order $\tilde{\alpha}$.

Keywords: Statistical convergence; Double sequences.

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Spectral problem for diffusion operator with discontinuity function

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Abstract

In this study, diffusion operator with discontinuity function is considered. Integral equations have been obtained for the solution under certain initial conditions. Furthermore, we obtained integral representations for these solutions. Some equations have been obtained by the kernel functions. By using the characteristic function, asymptotic formulas of eigenvalues with zeros of the characteristic function are obtained. The initial value problem in this study is defined as follows.

$$L := \left\{ -y'' + \left[2\lambda p(x) + q(x) \right] y = \lambda^2 \delta(x) y,\ x \in (0,\pi) \right.$$
$$U(y) = y'(0) = 0, \mathrm{V}(y) = y(\pi) = 0$$

where λ is a spectral parameter, $q(x) \in L_2[0,\pi]$, $p(x) \in W_2^1[0,\pi]$, $a_1, a_2 \in (0,\pi)$, $a_1 < a_2$ and $\delta(x) = \begin{cases} 1\ , & x \in (0,a_1) \\ \alpha^2, & x \in (a_1,a_2) \\ \beta^2, & x \in (a_2,\pi) \end{cases}$ to be $\alpha > 0$, $\alpha \neq 1$, $\beta > 0$, $\beta \neq 1$ are real numbers.

Keywords: Integral equation, Sturm-Liouville equations, Diffusion Operator.

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BLOCK NYSTROM TYPE METHOD AND ITS BLOCK EXTENSION FOR FOURTH ORDER INITIAL AND BOUNDARY VALUE PROBLEMS

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Abstract

The derivation of Block Nystrom type Method (BNTM) which is not normally used as numerical integrator of boundary value problems (BVPs) is considered and directly applied to solve both initial value problems (IVPs) and BVPs in ordinary differential equations (ODEs). Collocation technique is adopted in the derivation of the BNTM which is applied as simultaneous integrator to fourth order ODEs. The BNTM possesses the desirable feature of being self-starting as the implementation is in block form. The paper concludes by solving Numerical examples which establish the effectiveness and accuracy of the method. The superiority of BNTM is established by the numerical values presented.

Keywords: *Fourth Order Ordinary Differential Equation, Collocation, Block Nystrom type Methods, Zero-Stability*

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INTELLIGENT BANKNOTE ISSUING COUNTRY IDENTIFICATION

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Abstract

Technology advancement in recent years has caused an increase in global interactions, tourism, traveling and international trading; in particular with Asian countries which became lately more interactive with the rest of the world, and providing very popular tourism and trading detsinations. However, many of these Asian countries tend to use their own issued local currencies which have impressive and diverse designs thus making it difficult to identify by foreign visitors or traders.

In this paper, we investigate and develop an intelligent identification system for currency issuing countries using image processing and neural networks. We consider the main banknotes of 18 Asian countries, in addition to EURO, US dollar, and Turkish Lira (TL). We construct our own dataset comprising 504 original and pre-processed images of 6 banknotes of each of the 21 currencies. The investigated 18 Asian countries in this work are Afghanistan, Armenia, Azerbaijan, Bangladesh, Bhutan, Brunei, Burma, Cambodia, China, India, Kuwait, Maldives, Pakistan, Saudi Arabia, Sri Lanka, Syria, Tajikstan, and United Arab Emirates.

This work is novel becaue most of the existing banknote identification systems aim to recognize the value or the legitimacy of a banknote, rather than the issuing country. For the implementation purposes, we adopt two learning schemes to train and test the proposed neural identification model by using (50:50) and (75:25) training-to-validation data ratios. The obtained experimental results are successful considering the complexity of this novel identification task.

Keywords: Artificial Intelligence, Image Processing, Neural Networks, Intelligent Banknote Identification, Asian Currency.

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Abstract

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BLOW-UP OF SOLUTIONS FOR SEMI LINEAR FRACTIONAL SCHRÖDINGER EQUATIONS

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Abstract

We consider the Cauchy problem in the whole spatial space, for the semi-linear Schrödinger equation with fractional Laplacian. We present the local well posedness of solutions in an appropriate
fractional Sobolev space. We prove a finite-time blow-up result, under suitable conditions on the initial data.

Keywords: Schrödinger equation; Fractional Laplacian; test function method; Blow-up.

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Recent Results on the Energy Concentration Problem

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Abstract

One of the classical mathematical problems in communication and electrical engineering is the energy concentration problem which can be stated as follows:

Given a bandwidth μ>0, among all signals bandlimited to A= [-μ, μ], find the signal with maximum energy concentration on B = [-T,T] in the time domain. The difficulty in solving this problem lies in the fact that bandlimited functions are entire functions and as such they cannot vanish on any interval of positive length. Nevertheless, the problem was solved by a group of mathematicians at Bell Labs (D. Slepian, H.Landau,and H. Pollak) in the early 1960s for one-dimensional signals and some special cases in higher dimensions; cf. 1,2. In a series of papers published in Bell System Tech. Journal, they showed that the solution is given in terms of the Prolate Spheroidal Wave Functions (PSWF).

In higher dimensions, the problem is more difficult to solve because it depends on the geometry of both sets A and B. The problem is compeletly solved for rectangular regions, but for general regions little is known.

In this talk we will discuss some recent results on solving this problem in higher dimensions.

Keywords: Energy concentration problem, bandlimited functions, prolate spheroidal wave functions.

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THE INFLUENCE OF OPENINGS ON THE BEHAVIOR OF LOW-RISE SHEAR WALLS

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Abstract

A well designed and detailed shear wall can provide the required strength as well as sufficient ductility for resisting lateral loads and can prevent high damages. The increased use of shear wall in buildings has triggered the necessity to study the behavior of the wall under various modeling conditions. In resisting lateral forces, often it becomes necessary to utilize walls that contain openings. The existence of openings in concrete shear walls is still an unexplored field, but it is extremely important that the influence of the characteristics of the openings, such as dimensions, location and type, be established in their bearing capacity. In the present study a typical low-rise shear wall is considered with opening. The stiffness and strength of the wall are reduced by the reduction in concrete area and the discontinuity of the reinforcement due to opening. The objective of the study is to assess the influence of the presence of openings on the concrete walls, based on theoretical studies and also in numerical modeling using Computational ANSYS software, it seeks to present the configuration of the distribution of efforts to some situations of position and dimension of apertures, assessing how these parameters influence the traction tensions, Compression and deformations.

Keywords: Finite Element Analysis; Frequency Response Function; Impulse Response Function.

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THE ADEQUACY OF MODAL TESTING EXCITERS FOR THREE-LAYERED PLATES WITH A VISCOELASTIC CORE

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Abstract

Modal testing is usually conducted to validate dynamic numerical models such as Finite Element Analysis. Excitation methods vary depending on several factors. In general an impact hammer or a shaker is used to excite structures where the output is measured in form of Frequency response function or Impulse response function, as well as mode shapes. In this paper a comparison of data resulted from impact hammer and handheld shaker - which was implemented in the structural dynamics labratory at the university of Tripoli - with Finite element model is conducted on four rectangular plates with free boundary conditions, starting with 6 mm thick steel plate and three other laminated plates with two steel faces and viscoelastic core varying from 1 mm to 2 mm and 3 mm thickness of the core. Results showed that when dealing with plates with viscoelastic core especially 3 mm core, discrepancies in measured frequencies, damping factors and mode shapes between excitation methods is the highest, this is due to the fact that the required excitation energy is increased which means that selection of excitation technique is crucial in this case.

Keywords: Finite Element Analysis; Frequency Response Function; Impulse Response Function.

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Recent Results on the Energy Concentration Problem

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Abstract

One of the classical mathematical problems in communication and electrical engineering is the energy concentration problem which can be stated as follows:

Given a bandwidth $\mu>0$, among all signals bandlimited to A= [-μ, μ], find the signal with maximum energy concentration on B = [-T,T] in the time domain. The difficulty in solving this problem lies in the fact that bandlimited functions are entire functions and as such they cannot vanish on any interval of positive length. Nevertheless, the problem was solved by a group of mathematicians at Bell Labs (D. Slepian, H.Landau,and H. Pollak) in the early 1960s for one-dimensional signals and some special cases in higher dimensions; cf. 1,2. In a series of papers published in Bell System Tech. Journal, they showed that the solution is given in terms of the Prolate Spheroidal Wave Functions (PSWF).

In higher dimensions, the problem is more difficult to solve because it depends on the geometry of both sets A and B. The problem is compeletly solved for rectangular regions, but for general regions little is known.

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Keywords: Energy concentration problem, bandlimited functions, prolate spheroidal wave functions.

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Some Inequalities of Sturm-Liouville Problems Having Special Singularity

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Abstract

In this study, we examine certain stability of Sturm-Liouville problem with having special singularity. We consider two such problems with potentials and and discuss proximity of their spectral functions given that the first eigenvalues of the two spectral problems coincide. Similar stability questions were discussed for regular Sturm-Liouville operators in [1].

Keywords: Stability; Sturm-Liouville Equation; Singularity.

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Some Results on Fractional Integro Differential Equation

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Abstract

In this study, we obtain an integral representation of solution for fractional integro-differential equation and give some numerical results. Many problems can be modelled by fractional integro differential equations from various sciences and engineering applications. Furthermore most problems cannot be solved as analytical, and hence obtaining approximate solutions can be useful.

Keywords: Fractional; Integro Differential Equation; Numerical Solution.

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A Novel Outlook: A Study On Some Differential Equation Systems

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Abstract

In this article, extended modified exp-$\left(-\Omega(\xi)\right)$ method, introduced by Khater et. al, is going to be used for seeking new exact solutions of some important differential equation systems in mathematical physics. The method depends on reducing partial differential equations into ordinary form and assuming the solution as a polynomial functions in a similar way to some well known methods. The difference and power of the method compared to some existing methods is the fact that the number of solutions provided by the present method are more than others. To show efficiency of the method, New coupled Konno-Oono and Wu-Zhang system have been considered. Various exact solutions of the considered equations have been obtained in certain conditions. Additionally, graphical represention and comparisons of the newly obtained solutions have been presented.

Keywords: extended modified exp-$\left(-\Omega(\xi)\right)$ method, New coupled Konno-Oono ; Wu-Zhang system, exact solutions

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ON GEOMETRIC PROPERTIES OF POSITION VECTOR OF CS SURFACES

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Abstract

In this article, we give a mini survey about constant slope (CS) surfaces in different ambient surfaces obtained so far. Also, we investigate geometric properties of position vector of CS-surfaces in Euclidean spaces.

Keywords: Constant slope surfaces; Euclidean spaces; Position vector.

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ON GEOMETRIC PROPERTIES OF POSITION VECTOR OF GCR SURFACES

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Abstract

In this article, we give a mini survey about generalized constant ratio (GCR) surfaces in different ambient surfaces obtained so far. Also, we investigate geometric properties of position vector of GCR-surfaces in Euclidean spaces.

Keywords: Generalized constant ratio surfaces; Euclidean spaces; Position vector.

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New Methods for Exact Solutions of System of Nonlinear Differential Equations

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Abstract

The paper concerns new and generalized methods for solving system of nonlinear ordinary differential equations. Moreover, new exact solutions of biological systems are derived in the paper.

Keywords: System of Nonlinear Differentail Equations; Lotka-Volterra System; Trial equations.

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ESTIMATION OF DAMAGE PATTERNS IN A HISTORICAL MASONRY STRUCTURE

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Abstract

Seismic damage pattern estimation in historical brick masonry structure under different earthquakes are investigated by using calibrated finite element models based on ambient vibration data in this study. Measurements and material tests in situ were made to obtain 3D solid model and mechanical properties of the structure. Firstly, the initial 3D finite element model of the structure was occurred and numerical dynamic characteristics of the structure are obtained. Then ambient vibration tests as well as Operational Modal Analysis were performed in order to obtain the experimental dynamic characteristics of the structure. The initial finite element model of the structure was calibrated by using the experimental dynamic results. Lastly, linear and non-linear time history analyses of the calibrated finite element model of the structure were carried out using the acceleration records of two different level earthquakes.

Keywords: Brick masonry structure, Operational modal analysis, Damage Estimation.

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Existence, Uniqueness, and Stability of Solutions to the Telegraph Equation in Reproducing Kernel Hilbert Spaces

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Abstract

We announce new theorems on the existence, uniqueness, and stability of solutions to the nonhomogeneous telegraph equation in two reproducing kernel Hilbert spaces. We review relevant details of absolutely continuous functions and reproducing kernel Hilbert spaces. We sketch proofs of the existence and stability theorems. We present several numerical examples to illustrate the power and numerical effectiveness of the theory.

Keywords: Reproducing kernel Hilbert space; existence, uniqueness and stability; reproducing kernel functions.

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On Solutions of Higher-Order Fractional Differential Equations

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Abstract

In this work, we use the reproducing kernel method to search higher-order fractional differential equations. We prove that our operator is a bounded linear operator. We give an example to prove how real our theory can be performed in practice.

Keywords: Higher-order fractional differential equations, Hilbert spaces, reproducing kernel functions.

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A New Method for a Nonlinear System of Differential Equations

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Abstract

In this work, we implement the reproducing kernel method to nonlinear differential systems of equations. We prove the applicability and efficiency of the technique by some specific examples. Results present that the method is very impressive.

Keywords: Reproducing kernel functions; Series solutions; Nonlinear systems.

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The effect of freezing and thawing on self-compacting hybrid fiber concretes containing mineral admixtures

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Abstract

In this study, the effect of freezing and thawing on self-compacting hybrid fiber concretes containing fly ash as a mineral additive was investigated. For this purpose, self-compacting concrete containing 2% steel fiber and brass coated steel fiber and also 0%, 0.05% and 0.1% polypropylene fiber were produced. In all mixtures, the cement was replaced with fly ash by 20%. For fresh concrete; flow diameter, propagation time (t50), V-funnel flow time, L-box and J ring tests have been performed. In the hardened concrete, the weight loss, ultrasonic pulse velocity and compressive strength tests of the samples exposed to 50, 100 and 300 freeze-thaw cycles were carried out and compared to samples not exposed to freeze-thaw. Consequently, when the amount of steel and polypropylene fibers in the mixture were increased, the flow diameter decreased. On the other hand, when the amount of fly ash and brass coated steel fiber were increased, the flow diameter increased. As the polypropylene fiber content were increased in the mixtures, the loss of strength due to the freezing-thawing effect reduced.

Keywords: Self-compacting concrete, hybrid fiber, steel fiber, brass coated steel fiber, polypropylene fiber, fly ash, strength, freeze-thaw.

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An efficient numerical technique to solve state-delayed optimal control problems

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Abstract

Time-delay systems are a very important class of systems whose control and optimization have been of interest to many researchers. The presence of delay makes the analysis and control of such systems much more complicated. In this research, an effcient numerical method is investigated to solve a class of time-delay optimal control problems. The necessary optimality conditions are derived in terms of a two-point boundry value problem (BVP) with both delay and advance terms. The latter problem is then reduced into a sequence of linear two-point BVPs without delay and advance arguments. Some illustrative examples are presented to show the performance of the proposed approach. Simulation results verify that the suggested technique is straightforward and reduces the computational effort, effectively.

Keywords: Optimal control; Time-delay system; Numerical method.

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STUDY OF THREE DIMENSIONAL LAMINAR FORCED CONVECTION OF NANO FLUID FLOW THROUGH ECCENTRIC RECTANGULAR ANNULAR DUCT

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Abstract

Heat transfer through the horizontal eccentric annulus between eccentric rectangular ducts with different eccentricities has been investigated for various influential parameters. Boundary conditions are used with constant hot temperature on inner duct and constant cold temperature on the outer duct. The spacing between the two ducts contained TiO_2-water nanofluid with different Solid Volume Fraction (φ = 0, 2, 5, 10 %). The eccentricity was changed with different values (E = 0.025, 0.05, 0.075 m) in left direction and aspect ratio was changed with different values (AR= 0.25, 0.375, 0.5). Results showed that with the increase of aspect ratio, the average Nusselt number increases. Moreover, with the increase in eccentricity value, the average Nusselt number remains constant, and then an increase begins to occur. Further the average Nusselt number increases with the increase in nanoparticle concentration.

Keywords: Laminar, forced convection, eccentric annulus, nanofluid, rectangle duct.

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OPTION OF THE OPTICAL-MECHANICAL POSITIONING OF THE SENSOR AND SAMPLE IN THE MAGNETOMETER. DETERMINATION OF MAGNETIC SUSCEPTIBILITY OF POWDERS AND PARTICLES.

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Abstract

In Faraday's magnetometer it is recommended to apply remotely the located poles hemispheres. In this case (and similar cases) there is a need for expeditious and exact positioning of the measuring sensor (Hall) and the studied sample – for obtaining the most authentic characteristics of induction and its gradient, identification and use of a zone of stability. This problem is solved by the corresponding optical-mechanical system of positioning. It consists of the laser modules promoting aim positioning, the Web camera promoting final positioning. On the received concentration dependences of magnetic susceptibility of powder samples existence of limited line sections is confirmed that gives the chance to define susceptibility of particles. The critical relation to use for the similar purposes of samples (disperse) in the form of colloids and suspensions expresses.

Keywords: Faraday's magnetometer, zone of measurement, optical system of positioning, magnetic susceptibility

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MEASUREMENT OF THE ACTUAL AREA OF CONTACT OF DETAILS ON THE POWER OF THE BEAM OF LIGHT REFLECTED FROM THE CONTACT SURFACE COVERED WITH A FILM

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Abstract

Measurement of the actual area of details contact is important for control of friction and wear of such details. For this purpose, in particular, on a surface of one of details of couple covered with the thinnest layer of lubricant the thin film of coal is putted. On the raised dust surface impose the second detail of couple and squeeze them the application of normal loading. Light spots of contact are measured by planimetry. Instead of direct (labor-consuming) measurement of a large number of the areas of spots of contacts it is expedient to use integrated determination of the actual area of details – on the power of the beam of light reflected from ledges of a contact surface. The optical scheme of the device is developed, the efficiency of which for implementation is shown.

Keywords: Measurement of contact area, details, friction, wear

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On The Temperature Impact on Some Populations

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Abstract

This talk is concerned with a mathematical model for some sea creatures under the effect of temperature. This model, also, will allow us to future estimates of populations can be made under different temperature scenarios.

Keywords: Mathematical modelling; Climate change effect.

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NUMERICAL SIMULATION OF KDV EQUATION VIA FINITE DIFFERENCE METHOD

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Abstract

In the present study,the numerical solutions to the KdV equation with dual power nonlinearity by using the finite difference method are obtained. 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_∞. We present the numerical, exact approximations and absolute error in tables. We compare the numerical solutions with the exact solutions and this comparison is supported with the graphics. Then, we plot the two- and three- dimensional surfaces for the used analytical solutions paper.

Keywords: KdV equation; Finite Difference Method; Linear Stability; Numerical Solution

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STABILIZATION OF A LAMINATED BEAM WITH INTERFACIAL SLIP BY A PARALLEL COMPENSATOR

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Abstract

We consider a structure consisting of a two-layered beam with an adhesive layer bonding the two adjoining surfaces. This model for a two- layered plate in which slip may occur along the interface was derived in by Hansen and Spies [1]. The adhesive layer creates a restoring force which is assumed proportional to the amount of slip. Therefore, we are in the presence of a structural damping due to interfacial slip. It has been shown in [2] that the frictional damping created by the interfacial slip alone is not enough to stabilize the system exponentially to its equilibrium state. Therefore, a natural question that can be asked is: what are the possible additional damping that can ensure the exponential stability and other kinds of stability of the system? In a previous publication [3], we improved the result of Wang, Xu and Yung [2] by investigating the case of an additional viscoelastic damping that acts on the effective rotation angle without resorting to any boundary control. In this paper, we propose to investigate an asymptotic stabilization of the undamped system with boundary displacement feedback.

Keywords: Boundary control, Timoshenko beam, parallel compensator, asymptotic stabilization

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Abstract
by Assane Lo

Stabilization of a laminated beam with interfacial slip by a parallel compensator

We consider a structure consisting of a two-layered beam with an adhesive layer bonding the two adjoining surfaces. This model for a two- layered plate in which slip may occur along the interface was derived in by Hansen and Spies. The adhesive layer creates a restoring force which is assumed proportional to the amount of slip. Therefore, we are in the presence of a structural damping due to interfacial slip. It has been shown by Wang, Xu and Yung; that the frictional damping created by the interfacial slip alone is not enough to stabilize the system exponentially to its equilibrium state. Therefore, a natural question that can be asked is: what are the possible additional damping that can ensure the exponential stability and other kinds of stability of the system? In a previous publication (Electronic Journal of Differential Equations, Vol. 2015 (2015), No. 129, pp. 1{14.), we improved the result of Wang, Xu and Yung by investigating the case of an additional viscoelastic damping that acts on the effective rotation angle without resorting to any boundary control.

In this paper, we propose an asymptotic stabilization of the undamped system with boundary displacement feedback.

Abstract
Assane Lo

An Extension of the Log-Sobolev Inequality to general models of Kac type

Helffer, Sjostrand and Bodineau pioneered the use of the Witten Laplacian formalism to derive the Log-Sobolev inequality in continuous lattice models with restricted interactions. In this paper, we propose an extension of the Log-Sobolev inequality to general models of Kac Type. Our method will use a strong uniform estimate of the two point-correlation functions.

USING FUZZY GRA TO DETERMINE E-WASTE RECYCLING FACILITY LOCATION

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Abstract

Recycling of electronic waste (e-waste) has become crucially important since it handles hazardous waste according to regulations and brings economic benefits to associated role players. One of the strategic issues in creating appropriate e-waste recycling infrastructure is determining the location of e-waste recycling facilities. Selection of an e-waste location requires to consider several tangible and intangible criteria together. This study contributes to this developing literature domain by presenting a Fuzzy Grey Relational Analysis (GRA) model to prioritize the alternative locations for e-waste recycling facilities. The model is used for the case of Turkey and the several scenarios are developed and evaluated to provide flexibility to decision makers.

Keywords: E-waste, Fuzzy GRA, Turkey.

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DIFFERENTIATION OF USING FLATTENING FILTER FREE ENERGY IN VMAT PLANS FOR PROSTATE CANCER

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Abstract

Prostate Cancer the volumetric modulated arc therapy (VMAT) plans with 10 patients using flattening filter (FF) and flattening filter free (FFF) energies were assessed for conformity index (CI), homogeneity index (HI), monitor unit (MU) and 50% the comparison of volume values is aimed. In the study, treatment plans were prepared using 6 MV FF and 6 MV FFF in the Eclipse (ver.13.6) treatment planning system with Varian Trilogy Linear Accelerator. When the planning was completed, CI averaged 0.87, HI averaged 0.44 and MU values ranged from 600 to 680. As a result of planning, when PTV coverage, CI, HI and MU comparisons were made, there was no significant difference when comparing VMAT plans for FFF and FF energy. When we compare the MU values, MU increase by 10% is seen when the flattening filter is removed. In both energy modes, good homogeneity in PTV was achieved with conventional francitation and close dose rates. No significant advantages and disadvantages of the unfiltered energy mode were observed in the assessment of plan quality in terms of CI, HI.

Keywords: Flattening Filter (FF), Flattening Filter Free (FFF), Volumetric Modulated Arc Therapy (VMAT), Conformity Index (CI), Homogeneity Index (HI)

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COMPARISON OF DIFFERENT ALGORITHMS IN THE RADIOTHERAPY PLANS OF BREAST CANCER

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Abstract

Purpose: Assessment of portal dosemetry results of Anisotropic Analytical (AAA) and Pencil Beam Convolution (PBC) dose calculation algorithms indensity modulated radiotherapy (YART) planned breast cancer patients. **Material / Method:** The plans of 10 treated patients will receive 6 MV photon energy and a total of 25 fractions of 50 Gy dose using the inverse IMRT technique, which is reverse planned in the Eclipse (ver.13.6) treatment planning system with Varian Trilogy Linear Accelerator prescribing. For each plan, dose was calculated after optimization using PBC and then AAA algorithms. The quality controls of the plans were made using the Electronic Portal Imaging Device (EPID) by creating individual verification plans for each algorithm. In addition, the maximum and average dose values in the target volume were compared in inverse IMRT plans calculated using PBC and AAA. **Result:** When treatment plans generated by AAA and PBC dose calculation algorithms are analyzed using EPID, For the PBC algorithm, the mean values of ɣArea and ɣAvg are 98.15 ± 1.07 0.40 ± 0.048 and 98.72 ± 1.13 0.37 ± 0.051, respectively, for the AAA algorithm. The PTV Dmax value for the PBC algorithm is 109.3 ± 1.09 and the Dot value is 101.7 ± 0.51. For the AAA algorithm, the PTV Dmax value is 110.6 ± 1.12 and the Dot value is 102.9 ± 0.62. **Conclusion:** When the mean values of portal dosimetry, ɣArea and ɣAvg evaluated using PBC and AAA algorithms were compared, the differences between the algorithms were not statistically significant (p> 0,05). Differences between the algorithms for PTV Dmax and Dort average values are not statistically significant (p> 0.05).

Keywords: Anisotropic Analytical (AAA), Pencil Bean Convolution (PBC), Intensity Modulated Radiotherapy (IMRT), Portal Dosimetry, Breast Radiotherapy

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THE LOCATION-ALLOCATION ANALYSIS OF R&D CENTERS WITH REGARD TO UNIVERSITIES AND TECHNOPARKS

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Abstract

The regulation about R&D Centers in Turkey was published in the official gazette on July 31, 2008. It defines the required obligations, incentives and audit of R&D Centers which are established in Turkey. As the beginning of 2018, 712 enterprises were found eligible to establish R&D Center under this law. Current R&D Centers need to carry out projects with the universities and technoparks to survive. The relationships between R&D Centers, universities and technoparks are mainly related with distance, hence these facilities must be close. In this paper, the location and allocation analysis of R&D Centers with regard to the universities and technoparks is conducted. To do so, 712 R&D Centers, 184 universities and 69 technoparks in Turkey are considered. Then, P-median, P-center and set covering models are applied to analyze the coverage between aforementioned facilities. Computational experiments show the optimal assignments between R&D Centers and universities/technoparks.

Keywords: R&D Centers; Location and Allocation; P-center; P-median; Set Covering.

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THE LOCATION-ALLOCATION ANALYSIS OF R&D CENTERS WITH REGARD TO UNIVERSITIES AND TECHNOPARKS

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Abstract

The regulation about R&D Centers in Turkey was published in the official gazette on July 31, 2008. It defines the required obligations, incentives and audit of R&D Centers which are established in Turkey. As the beginning of 2018, 712 enterprises were found eligible to establish R&D Center under this law. Current R&D Centers need to carry out projects with the universities and technoparks to survive. The relationships between R&D Centers, universities and technoparks are mainly related with distance, hence these facilities must be close. In this paper, the location and allocation analysis of R&D Centers with regard to the universities and technoparks is conducted. To do so, 712 R&D Centers, 184 universities and 69 technoparks in Turkey are considered. Then, P-median, P-center and set covering models are applied to analyze the coverage between aforementioned facilities. Computational experiments show the optimal assignments between R&D Centers and universities/technoparks.

Keywords: R&D Centers; Location and Allocation; P-center; P-median; Set Covering.

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1. Eren Özceylan, Ayşenur Uslu, Mehmet Erbaş, Cihan Çetinkaya, Selçuk Kürşat İşleyen, Optimizing the location-allocation problem of pharmacy warehouses: A case study in Gaziantep, An International Journal of Optimization and Control: Theories & Applications, Vol:7, No:1, 117–129, 2017.
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Numerical Investigation of Acoustics Performance of Low-Pressure Ducted Axial Fan by Using Different Turbulence Model

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Abstract

In this article, capacity and acoustics parameters of low pressure ducted axial fan is numerically investigated with k-w SST, DES and LES turbulence models by using computational fluid dynamics software. One slice of six bladed axial fan operating at 3000 RPM is simulated periodically as low pressure ducted axial ventilation fan. Simulations are run for three different operating point on the performance curve for each turbulence models. Investigation of acoustics parameters are obtained Ffowcs-Williams Hawkings acoustic model to calculate sound pressure levels for related frequencies. Numerical results are compared with the experimental results provided from blade manufacturer company.

Keywords: Ducted axial fan; Numerical modeling; Aero-acoustics; CFD; Turbulence Models.

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BOUNDS FOR ATOM-BOND CONNECTIVITY INDEX

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Abstract

Atom-bond connectivity index, introduced by Ernesto Estrada et al., attracted a great deal of interest in mathematical chemistry.

In this article, we obtain some new and improved bounds for atom-bond connectivity index by using different method.

Keywords: Atom-bond connectivity index; pendant vertex; pendant edge; Comparison Theorem for Integrals.

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BRIEF NOTE ON SYSTEM SIGNATURE AND THE LONG-TERM METHOD

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Abstract

In this article, the system signature of the system is created by using the long-term method and then the transition matrices of each step are calculated. In this way, it is possible to have information about the reliability of the system after each unit becomes failure. Also, in this study, three systems are presented as examples.

Keywords: System reliability, Two state Markov chain, System signature, Long-term method.

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A NEW GENERAL SUMMABILITY METHOD

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Abstract

In this article, a known absolute summability theorem has been generalized for a general absolute matrix summability method by means of A-transform of the series $\sum a_n \lambda_n$, where $A = (a_{nv})$ is a positive normal matrix. Also, some conclusions have been obtained.

Keywords: Absolute matrix summability; Almost increasing sequence; Infinite series; Summability factors.

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IMPROVED BIASED ESTIMATION METHODS IN LOGISTIC REGRESSION

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Abstract

In this study, we propose preliminary test and shrinkage type biased estimators in binary logistic regression model. We impose some sub-space restrictions on parameters so that the non-sample information is used to improve the estimations. We perform Monte Carlo simulations to evaluate the performances of existing estimators and also the new proposed ones. Moreover, a real data example is illustrated to support the simulation results.

Keywords: Biased estimators, Logistic Regression, Preliminary Test, Shrinkage Estimation

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Quantile correlation based penalty estimator

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Abstract

In this study, we propose a new type of correlation based penalty estimator, which is an efficient estimator when there is the problem of multicollinearity, in a multiple regression model when the number of explanatory variables is larger or smaller than the number of observations. Therefore, we conducted a Monte Carlo simulation study and a real word example in order to investigate performance of the suggested estimator.

Keywords: Lasso Regression; Correlation Based Penalty; Quantile Regression

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DISCRETE FRACTIONAL SOLUTIONS OF ASSOCIATED LEGENDRE EQUATION

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Abstract

Fractional calculus and discrete fractional calculus have generated a great deal of interest in recent years. Properties of discrete fractional calculus based on backward difference or nabla operator are developed and introduced. In this work, we begin with some basic definitions and identities of discrete fractional calculus. We are concerned with the homogeneous and non-homogeneous associated Legendre equation. We obtain new fractional solutions via Nabla fractional calculus operator method using the important Leibniz rule.

Keywords: Fractional Calculus; Discrete Fractional Calculus; Associated Legendre Equation.

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ON A NEW FAMILY OF THREE VARIABLES POLYNOMIALS

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Abstract

In this article, we define a new family of three variables polynomials related to well known polynomials and numbers in literature. Then we give the explicit representations and partial differential equations of these polynomials. Finally, we give the interesting applications of these new polynomials.

Keywords: Fibonacci polynomials; Lucas polynomials; Trivariate Fibonacci polynomials; Generating functions.

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Exact solutions of Conformable Benjamin Bona Mahony and Zoomeron equations

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Abstract

In this paper, we are going to seek the new exact solutions of fractional Benjamin Bona Mahony equation and fractional Zoomeron equation which are presented with definition of the fractional derivative called "conformable fractional derivative " proposed by Khalil *et al*. By implementing the properties of conformable fractional derivative and travelling wave transform, the equations are converted into ordinary differential equations, then the procedure of Extended Modified Exp-$\left(-\Omega(\xi)\right)$ method and symbolic computation have allowed us to obtain trig, hyperbolic and rational solutions of those equations. As an outcome, we insure that Conformable derivative definition and Extended Modified Exp-$\left(-\Omega(\xi)\right)$ method are powerful tools for obtaining new exact solutions of fractional partial differential equations.

Keywords: Extended Modified Exp-$\left(-\Omega(\xi)\right)$ Method , Benjamin Bona Mahony equation, Zoomeron equation, exact solutions, Conformable derivative.

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Exact Solution of Nonlinear Evolution Equations Using the Extended Modified Exp-$\left(-\Omega(\xi)\right)$ Method

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Abstract

Obtaining exact solutions of the evolution equation is one of the very important subjects in mathematics, science and technology. For this purpose, many different methods have been constructed and developed. In this article, a new technique which is called extended modified exp-$\left(-\Omega(\xi)\right)$ method is going to be studied for seeking new exact solutions of Burger-Fisher equation and Phi Four equation. The method is capable of deriving many number of solutions. With the aid of the method, various exact solutions including trig, hyperbolic and rational solutions have been obtained and using a software the graphical representation of the solutions have been presented. In conclusion, we can say that the present method can also be used for the solutions of a wide range of problems.

Keywords: Extended Modified Exp-$\left(-\Omega(\xi)\right)$ Method, Burger-Fisher equation, Phi-four equation, exact solutions

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Exact and numerical solutions to the time-fractional combined KdV-mKdV equation

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Abstract

This study investigates the time-fractional combined Korteweg-de Vries and modified Korteweg-de Vries (KdV-mKdV) equation by utilizing the sine-Gordon expansion method, topological kink-type soliton is successfully constructed with the conformable fractional derivative under consideration. Furthermore, the obtained topological kink-type soliton is considered to examine the numerical behavior of the combined KdV-mKdV equation by using the finite difference scheme. We consider the conformable and Caputo fractional derivatives for the numerical investigation.

Keywords: Combined KdV-mKdV equation; fractional order; soliton.

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ENHANCE IMAGE FORGERY DETECTION WITH OPTIMIZATION ALGORITHMS

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Abstract

Image forgery detection is one of the most interesting research topic in information forensics and security area. Many algorithms have been suggested to improve the detection of image forgery, but many problem have not being solved yet.

Optimization is the process of exploration the best value, maximum or minimum, of a function for some constrait. While new image forgery detection algoritms have been suggested in the literature, some parameters must to be optimized.

Keywords: Image forgery detection; Copy-move forgery detection; optimization algorithms.

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A SURVEY ON IMAGE FORGERY DETECTION METHODS

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Abstract

In recent years, digital image forgery detection has become one of the hardest studying area for researchers investigations in the field of information security and image processing. Image forgery detection methods can be divided into two extensive groups such as Active methods and Passive (Blind) methods.

Active methods have been used data hiding techniques like watermarking and digital signatures. Passive forensic methods (or Blind) use image statistics or they investigate the attributes of the image to determine the forgeries. Passive detection techniques are also split into three branches; image splicing, image retouching, copy-move. Such image forgery detection methods are focus of this survey.

Keywords: Image forensics; Image forgery detection; Copy-move forgery detection; Blind detection.

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USE AND COMPARISON OF TOPSIS AND ELECTRE METHODS IN PERSONNEL SELECTION

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ABSTRACT

One of the most important factors in terms of efficiency and efficiency in today's enterprises is the human factor and the first and most important step of this factor is personnel selection process. In this study, a leading company operating in the automotive sector in Turkey, the staff will provide maximum benefit to the company, in the most efficient manner, and at minimal cost is selected as soon as possible. For this purpose, the criteria that are important in blue collar personnel selection are determined and these criteria are weighted. TOPSIS and ELECTRE methods have been used for the selection of the candidates most suitable for the job among the candidates in the application pool of the automotive firm. By comparing the results obtained from these last two methods, it has been tried to determine which method is best suited to the criteria of the employer and which will provide the maximum benefit to the operation with the minimum cost and which is selected as soon as possible.

Keywords: Personnel Selection, Multi-Decision Making, TOPSIS, ELECTRE

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INVESTIGATION OF MECHANICAL STRESSES ON SANDWICH COMPOSITE LAYERS ACCORDING TO THE PRESSURE BY MAKING USE OF ANSYS SOFTWARE

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Abstract

Sandwich materials are the most important applications of technological composites. A composite material is a structure formed by combining the macroscopic meaning of more than one base material for a specific purpose. The sandwich materials are combined without dissolving the different structures to provide the desired various mechanical properties. Ansys is simulation software that enables a test in virtual environment between materials. In Ansys package program, 2 different models of 3 intermediate layers, with a straight and 7° orientation angle, are designed as 3 dimensional according to x, y, z coordinate measurements. Sandwich plates with smooth and radial geometries were fixed in two different tests from their right and left supports, linearly and mechanical stresses were analyzed according to axes under 4 MPa pressure. Here, we mainly analysed two different structures by comparing features according to the cases that having same shape-different supports and different shapes-same support. It has been investigated that the compression ratios of straight anchorage support increase linearly as a function of linear meshes in the same geometry but different support stresses. The radial anchorage support draw ratio decreases with linear supports while the compression ratios increase with x axis and decrease with y and z axes. On the other hand, it is concluded that radial anchorage ratio for the structures having different shapes and same type supports increases in x axis and decreases in both y and z. Moreover, one can see that radial linear support has lower draw and compression ratios on the x axis, and also the quantity increases on the y axis while the compression ratio decreases on the z axis.

Keywords: Sandwich composite, Ansys, Mechanical tension, Flat and radial layer.

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ELASTIC STRESS ANALYSIS OF ST 37 AND ST 70 STEELS BY USING FINITE COMPONENTS TECHNIQUE

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Abstract

St 37 and St 70 steels are used in general building materials and these structures are constructed by making use of the cold drawing process for the steel produced as a result of hot production. With the help of the Ansys package software, St 37 and St 70 steels having 3 mm thickness were modelled as a 3 dimensional I profile by using the finite element method. The finite element technique is a method providing a solution which can be controlled with simple pieces of complex engineering problems. Applying the fixing process to the steel section from its right and left bearings we give 100 MPa pressure to upper profile of the model and then we analyse the elastic stress analysis occurred on the X, Y, Z directions. Considering the analysis simulation data, we conclude that the St 37 steel has bigger elastic stress effect than the St 70 one.

Keywords: St 37-ST70, Ansys, Elastic stress, Finite element method.

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STEAM Education for the Next Generation

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Abstract

There are 6 defined generations living now in the modern World. Each generation is intensively different, growing up amongst different political and social environments and various technological advancements. In this study we analyzed some studies about the iPad generation and the reports of the World Economic Forum. It is seen that STEAM education for the next generation needs some complement courses to reach to the desired equipments in the 4th Industrial Revolution.

Keywords: **STEAM education, Gen-Z, Gen-Alpha, 4th Industrial Revolution**.

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Neimark-Sacker Bifurcation Analysis of a Monoclonal Tumor Growth

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Abstract

This study is concerned on a brain tumor growth with piecewise constant arguments, where we embed $[\![t]\!]$ and $[\![t-1]\!]$ as coefficients to the equation to emphasize the treatment therapy for specific times such as

$$\frac{dx(t)}{dt} = x(t)r\big(1 - \alpha x(t) - \beta_0[\![t]\!]x([\![t]\!]) - \beta_1[\![t-1]\!]x([\![t-1]\!])\big) - \gamma_1[\![t]\!]x(t)x([\![t]\!]) - \gamma_2[\![t-1]\!]x(t)x([\![t-1]\!]), \qquad \text{(A)}$$

where the parameters $\alpha, \beta_0, \beta_1, \gamma_1, \gamma_2$ and r belongs to R^+ and $[\![t]\!]$ is the integer part of $t \in [0,\infty)$. γ_1 represents the effect of the treatment on the tumor, while γ_2 is embedded to show the rate that causes a negative effect from the immune system to the tumor population. In this work, we analyzed the local and global asymptotic stability of the positive equilibrium in equation (A). Furthermore, we consider the conditions for a saddle point case and unstable behavior. The work focus also on the semi-cycle and periodic (or non-periodic) cases of the difference equation solutions in (A). Additionally, studies have shown that the equations goes on a Neickman-Sacker bifurcation, where we investigated the direction of equation (A).

Keywords: logistic differential equations; local stability; global stability; semi-cycle solutions; Neickman-Sacker bifurcation

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SOME BOUNDS FOR LAPLACIAN-LIKE ENERGY

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Abstract

Let G be a connectedgraphwith n verticesand m edges.TheLaplacian-energy-like of a graph G , denotedby $LEL(G)$,is defined as

$$LEL = LEL(G) = \sum_{i=1}^{n-1} \sqrt{\mu_i}$$

where μ_i 's areeigenvalues of theLaplacianmatrix of G .

Inthisarticle, weobtainsomenewlowerandupperboundsforLaplacian-energy-like of G .

Keywords:Energy of graph,Laplacian-like-energy,Laplacianmatrix,thenumber of spanningtree, The first Zagreb index

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POWER SIDE CHANNEL ANALYSIS AND ANOMALY DETECTİON OF MODULAR EXPONENTION METHOD IN DIGITAL SIGNATURE ALGORITHM BASED FPGA

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Abstract

In this study, digital signature application was performed on FPGA with classical RSA and Chinese Remainder Theorem (CRT). The power consumption of the system was observed when the digital signature process was performed on the FPGA. In order to distinguish the modular exponentiation methods as the classical RSA and the Chinese Remainder Theorem (CRT), the anomaly detection method was applied to the digital signature application using the power side channel analysis of the system. According to the obtained result, it is proved that information about the structure of the algorithm running in the system can be obtained by using machine learning techniques by using the power information consumed by a cryptographic device.

Keywords: Digital Signatures; RSA; Chinese Remainder Theorem; CRT; FPGA; Anomaly Detection; Power Side Channel Analysis.

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BOUNDED NELDER-MEAD ALGORITM AS A LOCAL OPTIMIZER FOR PORTFOLIO OPTIMIZATION

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Abstract

Portfolio optimization, from the perspective of the modern portfolio theory proposed by Markowitz, is a quantitative approach to make investment decisions across a collection of financial instruments. Often, a trade-off is sought between two conflicting objectives that an investor greatly desires: minimizing risk and maximizing profit. Real-life constraints such as boundary and cardinality transform the original convex quadratic programming problem into a mixed integer quadratic programming problem which is proven to be NP-Complete. This optimization problem can be effectively solved in two phases; asset selection and proper weight assignment. In this paper, attention is given to the proper weight assignment using the nelder-mead simplex algorithm. Initial simplex parameters for various risk levels are investigated. Lower and upper limits for each asset proportion, namely boundary constraints, are dealt within the algorithm to keep any solution within the feasible region. Results confirm the effectiveness of the solution methodology. This research is funded by the Scientific and Technological Research Council of Turkey (TUBITAK) with the grant number 214M224 and Scientific Research Project Coordination Unit of Pamukkale University with the grant number 2018KRM002-128.

Keywords: Nelder-Mead, boundary constraints, local optimizer, portfolio optimization.

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On the wave solutions to the TRLW equation

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Abstract

In this study, a nonlinear model are investigated, namely; the time regularized long wave equation. Various solitary wave solutions are constructed such as the topological, non-topological, topological and non-topological kink-type, compound topological bell-type and singular soliton solutions. Under the choice of suitable parameters values, the 2D, 3D and the contour graphs to some of the obtained solutions are plotted. We feel that the reported results in this study may be helpful in explaining the physical meanings of some important nonlinear models arising in the field of nonlinear science.

Keywords: The extended ShGEEM; TRLW equation; soliton.

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INSPECTION OF ARTIFICIALLY BUILT MECHANICAL FAILURES THROUGH INNOVATIVE CONDITION MONITORING TECHNIQUES

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Abstract

The aim of this research study is to investigate the problems of unbalance, axial misalignment, mechanical looseness and bearing fatigue which are frequently encountered in the industry in comparison with the ideal vibration method and electrical consumption technique which is the latest condition monitoring technique in the laboratory environment.

Artificial damages were created with the help of technological infrastructure and it was possible to investigate the activities of two different state monitoring techniques based on vibration and electrical consumption (current, voltage) signals and to obtain detailed information on this issue. In the study, it was tried to emphasize the application of condition-based estimator maintenance and the importance of relavant technologies.

Considering the importance of this in the study, the data on the types of defects planned for the tests have been examined in a wide spectrum. The results will contribute to the correct determination of the defects that occur under different conditions. The effects of imperfections were investigated by both waveform and spectrum imaging techniques. It is aimed for contributing to scientists working in this field and to their practice studies by examining oil starvation, unbalances, misalignment and mechanical looseness defects in case based estimator maintenance through untreated precision and sharing the obtained findings with scientific world.

Keywords: Condition monitoring; Spectrum; Diagnostic; Prognostic; Vibration.

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SOME OPERATIONAL FORMULAS FOR THE MULTIVARIATE MITTAG-LEFFLER FUNCTIONS

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Abstract

In this article, with the help of the inverse operator $\widehat{D}_x^{-1}$, we rewrite multivariate Mittag-Leffler functions $E_{\rho_1,\ldots,\rho_{j,\lambda}}^{(\gamma_1,\ldots,\gamma_j)}(x_1,\ldots,x_j)$ [3] in the series representation which further yields the Rodrigues-type relation. Also, as a special case of the main results, we rewrite a class of polynomials $Z_{n_1,\ldots,n_j}^{(\alpha)}(x_1,\ldots,x_j;\rho_1,\ldots,\rho_j)$ [2] which contains the multivariate Laguerre polynomials $L_{n_1,\ldots,n_j}^{(\alpha)}(x_1,\ldots,x_j)$ [1]. Finally, we constract an integral operator involving $Z_{n_1,n_2}^{(\alpha)}(x_1,x_2;\rho_1,\rho_2)$ in the kernel and then we propose fractional integro-differential equation contains $\varepsilon_{n_1,n_2,\lambda,\omega_1,\omega_2;0^+}^{\alpha}$.

Keywords: Laguerre and Konhauser polynomials; Mittag-Leffler function; Laplace transform.

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RISK ASSESSMENT WITH FAILURE MODE AND EFFECT ANALYSIS AND GREY RELATIONAL ANALYSIS METHOD IN PLASTIC INJECTION PROCESS

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Abstract

This study aims to evaluate the risks that may arise during the production process in a plastic injection manufacturing enterprise with traditional Failure Mode and Effect Analysis (FMEA) and Grey Relational Analysis (GRA). Although it is a widely used analytical technique that helps to identify and reduce the risks of failure in a process, the failure mode and effects analysis (FMEA) has some drawbacks that the different risk can have the same risk priority values and the weight of risk factors is not take into consideration. This situation has been tried to be eliminated by integrating the FMEA with the GRA. As a result, it is seen that the order of risk priority values of the identified failure change according to both methods.

Keywords: Risk Assessment; Failure Mode and Effect Analysis (FMEA); Grey Relational Analysis (GRA).

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TAYLOR'S FORMULA AND RELATED INEQUALITIES FOR A DERIVATIVE WITH A NEW PARAMETER

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Abstract

In this paper, we derive Taylor's theorem and some properties for beta fractional derivatives. We extend some classical integral inequalities to the β-fractional calculus. We also establish some refinements of Steffensen, Hermite-Hadamard and some related inequalities for the new parameter.

Keywords: Taylor's formula, β-fractional integral, Steffensen inequality, Hermite-Hadamard inequality.

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AN EXTENSION OF DARBO'S FIXED POINT THEOREM DEFINED BY THE SEQUENCES OF FUNCTIONS

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Abstract

In this work, we aim to contribute to functional analysis and operator theory by making a generalization of Darbo's fixed point theorem with the help of sequences of functions. Recently, Darbo's fixed point theorem associated with measure of noncompactness have been generalized by using the notion of shifting distance functions. We will define a pair of shifting distance sequences of functions. Besides, we will generalize Darbo's fixed point theorem by using sequences of functions and investigate the its fixed points. Also we will give interesting an example.

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Keywords: Fixed point; Measure of noncompactness, Shifting distance sequences of functions

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ON NUMERICAL SOLUTIONS FOR TIME FRACTIONAL PARTIAL DIFFERENTIAL EQUATION

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Abstract

In this work 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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A NUMERICAL METHOD FOR SOLVING TIME FRACTIONAL DIFFUSION EQUATION

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Abstract

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

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

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SOME NEW DIRECTIONS WITHIN FRACTIONAL CALCULUS

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Abstract

In my talk I will present some new trends within the fractional calculus and some of its applications. Several examples of complex models equipped with real data will be analyzed.

Keywords: Fractional differentiation; Mittag-Leffler kernels; Discrete fractional calculus.

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STEREODYNAMICS CALCULATIONS FOR O^++HD COLLISIONS

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Abstract

In space, deuterated species are surprisingly highly abundant. Following the recent discovery of OH^+, we are studying the possible formation of the OD^+ molecule in the interstellar medium. New quantum reactive scattering calculations for the O^+ + HD collisions have been carried out to obtain state-to-state cross sections for the title system by using an accurate wave packet approach [1-3] using the doublet and quartet ground H_2O^+ electronic potential energy surfaces correlating to the open shell reactants. Calculations were performed for collision energies in the range of 1 meV to 0.7 eV and for different initial rotational excitation of the reagent molecules to investigate the stereodynamics effect. This kind of calculations can provide us a detailed information about atom diatomic molecular collisions.

Keywords: Stereodynamics; reaction cross-section; wave packet method.

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PERTURBED TRAPEZOID INEQUALITIES FOR n. ORDER DIFFERENTIABLE CONVEX FUNCTIONS AND THEIR APPLICATIONS

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Abstract

In this study, we introduce a new general identity for n times differentiable functions. Then, some new inequalities are presented related to general perturbed trapezoid inequality for the classes of functions whose n. derivatives of absolute values are convex. Finally, some applications are given to prove the proposed inequalities.

Keywords: Convex function; perturbed trapezoid inequality.

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PRE-SERVICE MATHEMATICS TEACHERS' ABILITY OF DRAWING THE REFLECTION OF A FIGURE WITH RESPECT TO A SYMMETRY LINE

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Abstract

Since the concept of symmetry is interwoven with real life, it is one of the fundamental issues for preparing students to life. The related literature on symmetry mostly focuses on students and aims to identify students' current knowledge and conceptual misconceptions. However, there is a limited number of research studies on pre-service mathematics teachers' existing misconceptions and what they pay attention to while taking the symmetry of an objects with respect to a line. The aim of the present study is to investigate pre-service lower secondary school mathematics teachers' ability of drawing a given figure's reflection according to the symmetry lines in various positions. The sample of the study comprised eight pre-service mathematics teachers who were attending a mathematics education department and willing to participate in the study. Criterion sampling of purposive sampling methods was used. The underlying reason of choosing fourth grade teacher candidates is to assume that they acquired the concepts of symmetry and reflection symmetry in geometry courses. Six open-ended questions were asked to determine the ability of the prospective teachers to take the symmetry of a given figure respect to the lines in different situations. Furthermore, interviews were conducted with the participants on their definitions of symmetry and symmetry according to a line. In this way, it was tried to elaborate on the meanings that prospective teachers' understanding of the drawing reflection with respect to a symmetry line. The data of the study were the drawing papers of the questions that the prospective teachers have answered and the video recordings of the interviews including the definitions of the concepts of symmetry and symmetry respect to a line. Content analysis was used for data analysis. The findings indicated that the prospective teachers were successful in drawing the reflection of a given figure according to the vertical, horizontal and inclined symmetry lines, and they used an informal language to define the concepts of symmetry and symmetry according to a line. In this respect, it is thought that mathematical skills of pre-service mathematics teachers are to be supported through activities including verbal skills.

Key Words: Symmetry, Symmetry with respect to a Line, Pre-Service Mathematics Teachers

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Exact Solutions with Lie Symmetry Analysis for Nano-Ionic Currents along Microtubules

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Abstract

In this article, we apply Lie symmetry analaysis to nano-ionic currents of MTs which play an important role in biology. Then, the new classes of symmetry reductions of nano-ionic currents of MTs are designated and exact solutions are investigated.

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Optical Soliton Solutions of Nonlinear Schrödinger Equation with Jacobi Elliptic Functions

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Abstract

In this article, we obtain optical soliton solutions of the nonlinear Schrödinger equation (NLSE) by the Jacobi elliptic functions. Here, two laws of cubic-quartic nonlinearity are considered as Kerr and Power laws. Also, figures for the obtained solutions are drawn.

Keywords: Nonlinear Schrödinger Equation; Jacobi elliptic function.

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SUSTAINABLE DECISIONS AND APPROACHES IN TEXTILE PRODUCTION

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Abstract

The production of textile materials increases day by day due to the population growth, increasing consumption and fashion trends. This rapid increase in production triggers the demand of raw materials and causes the consumption of valuable clean water and energy resources. Chemical waste and greenhouse gas that grows out of chemical reactions harm the environment in many different ways such as influencing climate change and global warming. This study focuses on sustainable decisions and approaches in textile production. The production of natural textile fibers which do not need irrigation and/or any protective chemicals contributes to sustainable cultivation and textile manufacturing. In addition to the use of natural and natural-based textile fibers, the recyclability and reusability of the fibers are mandatory for complete sustainable textile production. Environmental textile application methodologies requiring less water, less chemicals and less energy serves to create a more sustainable future for textile industry. Consequently, sustainable decisions and approaches in textile production are; firstly, renewable, reusable, recyclable and bio-degradable material selection, secondly, finishing techniques leading to the use of less water, less chemical and less energy and finally, using natural or natural-based auxiliary substances instead of chemicals for a more environmental, sustainable world. Furthermore, consumers' sensitivity and awareness to environment will encourage the manufacturers for sustainable production and thus, natural resources will be safely transferred to the future generations.

Keywords: sustainability, sustainable textiles, renewable textiles, bio-degradable textiles, reusable textiles

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Approximate solution of a class of fractional integro-differential equations

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Abstract

The spline collocation method is applied to approximate the solution of fractional integro-differential equations of the type

$$y'(t) = f(t) + \int_0^1 K(t,s) D_*^q y(s) ds,$$

with the initial condition

$$y(0) = \beta \in \mathbb{R}.$$

A brief review to theory of fractional calculus is given. Numerical examples are also presented to test and illustrate the method.

Key words. Fractional derivative, fractional integro-differential equation, numerical solution, spline space.

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THE NUMERICAL SOLUTION OF A BOUNDARY VALUE CONTACT PROBLEM FOR HALF PLANE BY USING SIE

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Abstract: In this study, a contact problem between half-plane and a punch is investigated. The elastic parameters of the half-plane are not constant. A numerical solution method is developed to solve the cauchy type integral equation for determine the pressure distribution. The numerical method is based on the ideas of Lifanov [1] ve Erdoğan [2] studies. The numerical results are given.

Keywords: Cauchy Type Integral Equation, Plane Contact Problem.

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ON INTUITIONISTIC FUZZY 2-METRIC SPACES

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Abstract

The aim of this talk is to introduce some fixed point results for intuitionistic fuzzy 2-metric spaces. We first recall the definition of an intuitionistic fuzzy 2-metric space with several illustrative examples. Then we introduce the concepts of ε-chainable space and (ε, λ)-uniformly locally contarctive mapping between intuitionistic fuzzy 2-metric spaces. After that, by using the proposed concepts, we obtain a few fixed point theorems for a given complete intuitionistic fuzzy 2-metric space.

Keywords: Intuitionistic fuzzy 2-metric, contractive mapping, fixed point theorem

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The Near-Surface Stability Loss Problems for Layered Half-Plane and Half-Space

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This statement increases also the significance of the study for the influence of the curving of the reinforcing elements in the structure of the composite materials to the mechanical behavior of those. According to Refs. [1,2] and others, the curving of the reinforcing elements may be due to the design features (as in a woven composites), or to technological processes resulting from the action of various factors (as in a Polymer-Nanocomposites). Moreover the aforementioned curving can be taken [3] as a geometrical model for the structure of the composite materials for the investigation of the various type of fracture (internal or near-surface stability loss) problems for the unidirectional composites under compression along the reinforcing elements. Owing to such modeling employing ‘‘boundary form perturbation’’ technique in the papers [2] the Three-dimensional Linearized Theory of Stability (TLTS) [2, 3] was developed for the internal and near surface stability loss problems for viscoelastic composite materials by employing the initial imperfection criterion [2]. In this case the development of these imperfections with the time flow is investigated within the scope of the piecewise homogeneous body model by the use of the three-dimensional geometrically non-linear field equations of the theory of the viscoelasticity. Using the series representation of the sought values in small parameter characterizing the degree of the initial insignificant imperfections of the reinforcing elements the solution of the non-linear boundary value problems is reduced to the solution of the series linear boundary-value problems. By direct verification it is proven that the linear equations and relations which are attained in these linear boundary value problems coincide with the corresponding ones of the TLTS. Just aforementioned statements allows the authors of the papers [3] to take into account the initial imperfection in the relations of the TLTS and employ the TLTS to investigate the stability loss problems of the time dependent materials within the framework of the initial imperfection criterion. Moreover, in the paper [3] it was proved that for the investigation of the stability loss problems and the determination of the values of the critical forces or critical time results obtained within the framework of only the zeros and first approximations are enough.

Now we consider some details of the results obtained in the papers [3] and start with the paper [3] in which it was assumed that the mode of the initial imperfection of the reinforcing layers is the co-phase periodical plane curving (the plane-strain state was considered). In this case by employing the aforementioned approach the values of the critical forces for elastic composites and the values of the critical time for the viscoelastic composites were determined and it was established that in the particular cases the values of the critical forces coincide with the corresponding results listed in [3] which were attained by employing the Euler approach. In the paper [2] the approach [3] was developed for the unidirectional fibrous viscoelastic composite materials. The near-surface stability loss problems for layered half-plane and half-space are studied in the paper [1] and [2], respectively.

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Δ^m-STATISTICAL CONVERGENCE IN A PARANORMED SPACE

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Abstract

In this paper, we introduce the notion of Δ^m-statistical convergence, Δ^m-statistical Cauchy and Δ^m-strongly p-Cesàro summability in a paronormed space. We give some relations between them.

Keywords: Density, Statistical convergence, Paranormed space, Strongly p-Cesàro summability.

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Morphological disambiguation of Turkish with free-order co-occurrence statistics

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Abstract

In this article, we address a solution to the morphological ambiguity problem which generally occurs in morphologically complex languages like Turkish. Generally, statistical methods are applicable for this task which maximize the information, obtained for a probable word order sequence in a sentence. The decision in selection of the method to use for the calculation of the probabilities and the sequence selection method depends on the nature of the language. By using the co-occurrence statistics obtained from a semantic graph network which represents the lemmas of the sentences, we select the best word order sequence from the alternatives. The non-ambiguous and free-word-order character of this network is helpful in determining the statistics independently. We have obtained the probability values by using the Naive Bayes (NB) method and the selection of each sequence is maximized in inspiration of the Viterbi algorithm.

Keywords: Morhological ambiguity; Naive Bayes; Viterbi algorithm.

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Analysis of logistic equation with Atangana-Balenau derivative with fractional order

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Abstract

This paper seeks to analyse fractional logistic equation via the Atangana-Baleanu fractional derivative. First of all, the logistic equation is integrated a new fractional operatör. Then, the existence of the equation a has been examined. Afterwards, we also analysed uniqueness of the solutions using the fixed-point theorem. Finally, the equation was solved with numerical methods and results were obtained.

Keywords: Fractional derivative, logistic equation, fixed-point theory.

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Analysis of Cancer Treatment model with a fractional derivative without singular kernel

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Abstract

In this work, we analysed the cancer treatment model with the new fractional derivative. Then using the fixed-point theorem, we try to find the existence of the coupled solutions. We also analysed uniqueness of the solutions. Finally, the model will solve with numerical methods and results will be obtained.

Keywords: Fractional derivative, Modelling, fixed-point theory.

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ON THE SECOND-ORDER DIFFERENCE EIGENVALUE PROBLEMS

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Abstract

In this study, Sturm-Liouville difference equation is considered. The sum representations of solutions are found. Asymptotic formulas for eigenfunctions are found and behaviors of eigenfunctions are analyzed and illustrated by figures and tables. Also, we find the eigenvalues corresponding some eigenfunctions. We observe the number of eigenvalues of the problem.

Keywords: Sturm-Liouville, Difference Equation, Asymptotic Formula.

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GENERAL DISCUSSION ON FRACTIONAL SPECTRAL PROBLEMS

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Abstract

In this study, generally fundamental spectral theory of fractional Sturm-Liouville problems is given under different potentials. Also, similar results are given for discrete fractional Sturm-Liouville problems and obtained results are compared.

Keywords: Sturm-Liouville, fractional, discrete fractional, spectral theory.

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ALGORITHM DESIGN FOR IMPROVING PERFORMANCE OF MICROPROCESSOR-CONTROLLED SONAR BUOY PERFORMING SURVEILLANCE OF UNDERWATER OBJECTS

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Abstract

Design approach for improved system performance of a microprocessor-controlled sonar buoys performing surveillance of underwater objects is proposed. When launched under sea or ocean the microprocessor-controlled buoy sets into action for automatic scanning of the underwater as to extract the object information and transmit the same by wireless to a remote ground station for further processing and taking final control action. System design outline for sonar buoy incorporating 7-31 cells replica correlation resulting in improved system performance is presented in this paper. Although the complexity of the hardware replica correlator is minimized using the recent digital delay lines the proposed microprocessor-controlled buoy performs replica correlation through software and extracts object information conceding improved system performance.

Keywords: Buoy, replica correlation, underwater surveillance, microprocessor control, sonar.

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A Tabu Search Approach for a Vehicle Routing Problem Arising in a Logistics Company

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Abstract

Fleet management is a very important issue for logistics companies. Since their main aim is to transport the goods with minimum costs, they often make use of the scientific approaches for their vehicle routing problems. In this paper, a real life problem of a logistics company is taken into the account. The firm has 59 customers and one warehouse on their transportation network and they need to facilitate a single route while minimizing their total costs, satisfying customer demands and visiting each customer exactly once. As the size of the network is a large one, a solution approach based on tabu search algorithm is used for the problem. The metaheuristic model is solved by using C# software program, and the computational experiments show that the tabu search algorithm produces high quality solutions within an acceptable computation time.

Keywords: Case study; Vehicle routing problem; Tabu search algorithm.

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Determination of Semantic Relations Weight's on WordNet

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Abstract

In this study, we propose a new approach to determine the weight of semantic relation types on a graph based WordNet. Semantic relations are important part of the WordNet, each concept in the WordNet is connected to the graph through this relations. Assigning a numerical value to this relation types might bring new opportunitiy for the measurement of semantic relatedness of the two concept defined in the WordNet. Proposed method uses Men's 3000 semantic relatedness dataset as a human judged and trusted real world dataset and also use publicly available WordNet 3.0 lexical dictionary data. WordNet dictionary data is transformed into graph db. Semantic paths for each word pairs in the Men's 3000 dataset are extracted from graph, these paths are encoded and consolidated with statistical methods. After filtering the paths with lenght=1, we get the semantic weights of relations defined in WordNet.

Using these found relation weights we can determined the semantic relatedness value for any given word pairs that is defined in the WordNet. Just by collecting all the paths between two words, calculating the path weights by multiplying each relations weights. Finally all the found path values are consolidated by taking mean or median of the path value list, then we get the relatedness score. We might compare the found relatedness values with other real life semantic relatedness datasets in order to evaluate success and reliability of the proposed method.

Keywords: Natural Language Processing, WordNet, Semantic Similarity, Semantic Relations

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Using Graph Connectivity Measures for Distance in Semantic Networks

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Abstract

Semantic networks are datasets based on graph structure for natural language processing and distance mesurement for semantic networks is a vital requirement for semantic analysis on concepts that connected with relations between each other. Connectivity measures can be used for calculating semantic distance between concepts in a semantic network.

In this paper we evaluated graph connectivity algorithms including PageRank, HITS and Betweenness Centrality on a semantic network which was created from a Turkish dictionary. Connectivity measures based on these algorithms used to calculate semantic distance between synonym pairs in the semantic network. And we used a simple connectivity method beside other three popular connectivity algorithms to find most accurate and cost-effective method on our semantic network. Working on bipartite model of the network which increases the complexity of implementation for connectivity algorithms and also calculating on a semantic network that can be expanded with new nodes and edges in periods of time are two major difficulty for connectivity algorithms. Considering all these conditions, results from each algorithm, compared to pick out an optimal method for the semantic network we created.

***Keywords*:** Semantic Networks;PageRank;HITS;Betweenness Centrality;Semantic Distance

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THE PHASE PLANE ANALYSIS OF NONLINEAR EQUATION

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Abstract

I examine the main results concerning the existence and structure of permanent form travelling waves (PTWs) which may occur in the large-time solution to the following initial-boundary value problem

$$u_t + kuu_x = cu_{xx} + u(1-u),$$

where $k \neq 0$ is a parameter. To show any solution to above equation with $c > 0$ provides a permanent form travelling wave solution which could develop as the primary large-time structure in the solution of the initial-value problem of the equation.

Keywords: Burgers Fisher equation, PTW, manifolds.

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An inverse Sturm-Liouville problem with a generalized symmetric potential

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Abstract:

We consider the normal form of Sturm-Liouville differential equations with separable boundary conditions. For this problem we know that the potential function is determined uniquely by two spectra and that if the potential is symmetric, then it is determined uniquely by just one spectrum.Here firstly we generalize symmetric potential and then investigate change of needed data to determine potential function uniquely.

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DETERMINING OPTIMAL ROUTING SOLUTION OF A PATROL CAR

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Abstract

Chinese Postman Problem which is dealt with in the context of the arc routing problem is one of the routing problem in 1962 in order to get the shortest turn by passing at least once on every arc on the chart. It can be used in many stations such as determining vehicle routing, tours of police patrols and determining the routes of snow removal vehicles. In this study, after explaining the basic concepts related to Chinese Postman Problem, the analysis is done through the model to find the best route over the routes that police patrol cars in a certain area have to travel.

Keywords: *Chinese Postman Problem, Optimization, Routing Problem*

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A novel method for coefficient inverse problem for the kinetic equation

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Abstract

We obtain reproducing kernel functions to investigate the coefficient inverse problem for the kinetic equation. We get approximate solutions by reproducing kernel functions. We present our results by a table. We verify the accuracy of the technique for solutions of a coefficient inverse problem for the kinetic equation.

Keywords: Reproducing kernel method; inverse problem for the kinetic equation; reproducing kernel functions.

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On Solutions of Nonlinear Boundary-Value Problems

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Abstract

Reproducing kernel method has been applied to nonlinear boundary-value problems. Implementing this method, we construct a new algorithm to approximate the solution of such nonlinear boundary-value problems. The solution is obtained in the form of a series with this method. The convergence of the reproducing kernel method is shown.

Keywords: Nonlinear boundary-value problems, reproducing kernel method, series solutions.

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INVESTIGATIONS ON THE INITIAL COEFFICIENT ESTIMATES FOR NEW SUBCLASSES OF BI-UNİVALENT FUNCTIONS

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Abstract

In the present paper, the our main object is to introduce new subclasses of bi-univalent functions in the open unit disk by using Salagean operator and find upper bounds on the initial coefficients $|a_2|$ and $|a_3|$ for functions in these new subclasses. Also, we give some interesting results by using the relationship between Salagean differential operator and generalized Salagean differential operator.

Keywords: Univalent function; bi-univalent function; Coefficient bounds; Salagean differential operator.

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STUDIES ON THE RADII OF UNIFORM CONVEXITY OF SOME SPECIAL FUNCTIONS

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Abstract

In this investigation, our main object is to find the radii of uniform convexity of the some normalized q-Bessel and Wright functions. In making this investigation we deal with the normalized Wright functions for three different kind of normalization and six different normalized forms of q-Bessel functions. The key tools in the proof of our main results are the Mittag-Leffler expansion for Wright and q-Bessel functions and properties of real zeros of these functions and their derivatives. Also, we have shown that the obtained radii are the smallest positive roots of some functional equations.

Keywords: Radius of uniform convexity; Mittag-Leffler expansions; q-Bessel functions; Wright function.

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A HYBRID DE - HS ALGORITHM WITH RANDOMIZED PARAMETERS

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Abstract

The evolutionary algorithms and their hybrid methods are quite efficient and accurate in terms of solution quality of optimization. In this study, a new hybrid algorithm is generated by merging Differential Evolution (DE) and Harmony Search Optimization (HS) algorithms which is called DES. The core steps of the algorithms are used without any alterations, but the main control parameters which have direct effect on the performance are randomized in predefined intervals. Experimental study is done by comparing algorithms; DE, HS and their hybrid method DES. According to the results, it is found that DES algorithm has improved the performances of original algorithms in terms of efficiency for the selected test problems.

Keywords: Evolutionary algorithms, hybridization, differential evolution, harmony search, random parameters.

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A Multi Choice Conic Goal Programming Approach for the Optimization of Cuscrore Control Chart Parameters for the IMA (1,1) Time Series Data

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Abstract

In this study, the process for some particular signal type (spike) is modeled for IMA (1,1) Viscosity Data to find the optimum values of CuScore Control Chart parameters. Then the probabilities of identifying (detection rate) and misidentifying the signals (false alarm) were calculated by simulation codes in SAS. By using DOE and Response Surface Methodology, two different non linear regression equations were obtained for detection rate and false alarm. In this study, these regression models were considered as the conflicting objectives. Then, Multi Choice Conic Goal Programming (MCCGP) was used to minimise unwanted deviation variables of goals which contains conflicting objectives namely detection rate and false alarm. The results of the MCCGP provide parameter settings of Cuscore Control Chart for IMA (1,1) Time Series. MCCGP has been proposed by Ustun based on Conic Scalarizing Function alternatively. This alternative formulation allows the decision maker to set multi-choice aspiration levels for each goal to obtain an efficient solution in the global region and guarentees to obtain a properly efficient (in the sense of Benson) point.

Keywords: Cuscore Control Chart; Design of Experiment; Multi Choice Conic Goal Programming

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ON COMPUTING RELIABILITY OF GENERALIZED SYSTEM

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Abstract

A generalized k-out-of-n: F system consists of a sequence of N ordered modules in a line or circle. The jth module is composed of n_j components in parallel ($n_j > 1$, $j = 1, 2, \ldots, N$). The system, modules and components are assumed to have binary states which either fail or operate. In the system, lifetimes of components are assumed to be independent and identical distributions random variables. The generalized k-out-of-n: F system fails if and only if there exist at least f failed components or if there exist at least k consecutive failed modules. In the literature, recurrence formula for computing reliability of generalized k-out-of-n: F system was given under different approaches [1 - 4]. In this presentation, an exact formula using mathematical operator for computing reliability of generalized *2*-out-of-n: F system will be given.

Keywords: Reliability; Generalized k-out-of-n: F system; Consecutive k-out-of-n: F system.

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CHARACTERIZATION OF COHEN-MACAULAY LOCAL RINGS

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Abstract

In this article, we will use complete intersection homological dimensions to characterize Cohen-Macaulay local rings. Also, we will find some equivalent conditions for local rings which are either regular, complete intersection or Gorenstein.

Keywords: Complete intersection homological dimensions, complete intersection ring, Cohen-Macaulay ring, Gorenstein ring, regular ring.

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Δ^m-STATISTICAL BOUNDEDNESS

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Abstract

The concept of statistical boundedness of sequences was firstly introduced by Fridy and Orhan in [1]. Bhardwaj and Gupta made some generalizations of statistical boundedness in [2]. On the other hand Et and Çolak and Et and Nuray studied generalized difference sequence spaces with usual and statistical sense in [3] and [4] respectively. In this work we introduce the concept of Δ^m-statistical boundedness by using Δ^m difference operator and examine the relationship amongst Δ^m-statistical convergence, Δ^m-statistical Cauchiness and it. In addition to that we compute the Köthe-Toeplitz and generalized Köthe-Toeplitz duals of the set of all Δ^m-statistical bounded sequences. Moreover we come up with the idea of statistical α and β dual of the sets of sequence which makes us capable of creating statistical equivalents of the notions of normality and perfectness of sequence spaces.

Keywords: Δ^m-statistical boundedness, statistical Köthe-Toeplitz duals, statistical normality and perfectness

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COMPARISON OF COAP AND COCOA CONGESTION CONTROL MECHANISMS IN GRID NETWORK TOPOLOGIES

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Abstract

The Internet of Things (IoT) is a vision of the future Internet. Due to limited resources of IoT devices, a new generation of protocols and algorithms are being developed and standardized. The Constrained Application Protocol (CoAP) has been designed by the Internet Engineering Task Force (IETF) for application layer communication. CoAP is based on UDP, a simple transport layer protocol that does not handle congestion within the network. However, the phenomenon of congestion in IoT networks is also a major problem. Thus, the core CoAP specification offers a basic CoAP congestion control (CC) mechanism based on retransmission timeout (RTO) with binary exponential backoff (BEB). Default CoAP CC is insensitive to network conditions. Therefore, CoAP specification encourages further CC mechanisms that leverage network status information actually available to CoAP [1]. To improve the default CoAP CC, CoAP Simple Congestion Control/Advanced (CoCoA), defined in a draft specification, is being standardized by the IETF CoRE working group. Nevertheless, comparison of default CoAP CC and CoCoA has not been sufficiently investigated in the literature. In this paper, we investigate and present comparison of default CoAP CC and CoCoA in terms of throughput (i.e. number of requests/second) by varying number of concurrent clients where each client continuously sends back-to-back traffic to servers residing in 1x6, 3x6 and 5x6 grid network topologies. On the client side, we set up a PC to run concurrent clients that use Californium implementation of default CoAP CC and CoCoA. On the server side, we also use the same PC to run varying number of servers that use Erbium implementation of CoAP in Cooja simulator of ContikiOS. The CoAP servers are programmed with ContikiOS network stack. For our evaluations, we compare the performance of default CoAP CC and CoCoA. Our results show that CoCoA is not always better than default CoAP CC due to improper selection of the RTO in such scenarios. As a result, design and development of new CoAP CC mechanisms are open to research.

Keywords: Internet of Things; Congestion control; CoAP; CoCOA; Cooja; ContikiOS.

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AN EXPERIMANTAL STUDY FOR ESTIMATING END-TO-END AVAILABLE BANDWIDTH IN A CONTROLLED TESTBED ENVIRONMENT

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Abstract

Available bandwidth has been a critical and precious resource in various kinds of networks. Knowledge of available bandwidth is of great interest for both network operators and end-users as it plays a significant role in efficient network management and operation. The purpose of this study is to extend our previous work in [1] by classifying and experimentally evaluating three further end-to-end available bandwidth estimation tools including assolo, yaz and pathchirp. Differently from the rest of studies in literature, this study classifies and evaluates the tools by using two sophisticated classification and evaluation schemes that incorporate a rich set of objective accuracy and performance assessment criteria. The controlled testbed used to evaluate the tools consists of a source, a transit and a destination subnetwork, whereas the end-to-end available bandwidth of the entire network to be estimated was gradually varied from 10 to 90 Mb/s with a step of 10 Mb/s by using a cross-traffic (ct) generator. The results show that in light or medium ct scenarios (i.e. ct rate <= 50 Mb/s) assolo on the average yields acceptable estimates and performs better than the other two estimation tools, yielding for our testbed scenario an average estimation error of 4.67%. The average estimation errors of yaz and pathchirp are 8.43% and 15.71%, respectively. However, it has been observed that a major challenge applying for all three tools is that they produce very inaccurate estimates when the ct rate generated on the measurement path is too high. The experimental results clearly show that designing and developing new estimation tools that can properly measure heavily-used paths deserve further investigation.

Keywords: Available bandwidth; Quality of Service; Testbed; Experimental evaluation.

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THE REVERSE OPERATION OF KNOT DIGRAPH NOTATION

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Abstract

It is well known that bitopologies associated with these knot digraphs is finded by using knot digraph notation. In this work, we have developed a method that we called reverse of knot digraph notation to find out which knot belongs to when a bitopology associated with the knot is given.

Keywords: Knot, knot graph, knot digraph, bitopology,quasi-pseudo metric

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Boundary Integral Equation Methods for Plates and Shells

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Abstract

Plate and shell type structures are widely used in engineering, for example aircraft wings and fuselage panels, etc. In this paper, the derivation and implementation of boundary integral equations for the analysis of plates and shells involving shear deformation is initially presented. Next, the formulation is extended to shear deformable shallow shells. The shell formulation is shown to be formed by coupling boundary element formulations of shear deformable plate bending and 2D plane stress elasticity. The domain integrals which appear in this formulation are treated in two different ways: first, the integrals are evaluated numerically using constant cell discretization, and secondly, they are transformed into boundary integrals using the dual reciprocity technique. Furthermore, the Boundary Element Method (BEM) for large deflection of shear deformable plates is reformulated to the case of multi-section assembled plate structures. Each plate section is modelled as a BEM region under membrane and bending loads, with force, moments, displacements and rotations represented by generalized traction and displacement nodal variables on the boundary. Non-linear terms in the boundary integral formulation for each section that arise due to large deflection are treated as e¤ective body forces, and the associate domain integrals are transformed into boundary integrals using the Dual Reciprocity Method. Derivatives of stresses and deflection on the boundary arise in the non-linear terms, and are evaluated by exploring their values at interior domain points using Radial Basis Functions. Plate sections are joined along their edges using compatibility and equilibrium conditions involving the generalized traction and displacement nodal variables. The resulting non-linear equation system is solved numerically using an incremental load approach. An illustrative example of the method is presented for transversely loaded plate reinforced with Z-stringers.
Keywords: *Plates and Shells, Boundary Element Method, Multi-region, Crack Problems.*

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ADVANCED SECRETS OF SUMUDU TRANSFORM APPLICATIONS

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Abstract:
In this presentation, we investigateessential properties of the Sumudu transform, from theoretical and applicative stances, that render it the tool of choice.

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UNIFORM DIFFERENCE SCHEMES FOR SINGULARLY PERTURBED INTEGRO DIFFERENTIAL EQUATIONS WITH DELAY

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Abstract

This study deals with the singularly perturbed initial value problems for Volterra integro-differential equations with delay. A difference scheme is constructed in a uniform mesh on each time subinterval which gives first order uniform convergence in the discrete maximum norm. We have shown that the method displays uniform convergence with respect to the perturbation parameter for numerical approximation of the solution. The parameter uniform convergence is confirmed by numerical computations.

Keywords: Singular perturbation; Volterra integro-differential equations; Delay differential equations; Difference scheme.

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AN ALTERNATIVE APPROACH FOR NONLINEAR OPTIMIZATION PROBLEM WITH CAPUTO-FABRIZIO DERIVATIVE

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Abstract

In this study, a dynamic system is constructed by using Caputo-Fabrizio derivative to find the optimal solution of some class of nonlinear optimization problem. For this purpose, quadratic penalty function is adapted to the dynamic system. Variational Iteration Method (VIM) with multistage technique is used to evaluate the optimal solution. Numerical simulations on the test problems show that the purposed dynamic system with Caputo-Fabrizio fractional derivative is good agreement with the theoretical solution.

Keywords: Caputo-Fabrizio derivative; Optimization problem; Penalty function; Dynamic system.

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ON IMAGES OF CYCLIC CODES

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Abstract

In this paper cyclic codes written on a new ring. Gray images of these codes on the known rings are obtained. Then relations between these codes and their Gray images are given.

Keywords: Cyclic Codes; Gray map; Weight function.

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DISCRETE HOMOTOPY PERTURBATION SUMUDU TRANSFORM METHOD FRACTIONAL DIFFERENCE EQUATIONS

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Abstract

In this article, we apply the discrete homotopy perturbation Sumudu transform method(DHPSTM) to solve fractional partial difference equations. DHPSTM is a combined form of the discrete Sumudu transform method and the discrete homotopy perturbation method. The results show that this method is very accurate, efficient and can be applied to fractional partial difference equations.

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

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STABILITY ANALYSIS AND A DISCRETE-TIME POPULATION MODEL WITH PREDATION

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Abstract

In this article, we analyzed the local stability of the equilibrium point of the a general discrete time population model including predation with and without Allee effect. Then, we investigated the effect of the Allee function on the presented model. Obtained theorical results are supported by numerical simulations.

Keywords: Stability Analysis; Predation; Equilibrium Point; Allee Effect.

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ALLEE EFFECT AND STABILITY ANALYSIS OF A DELAYED DISCRETE-TIME POPULATION MODEL

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Abstract

In this work, stability conditions of nonlinear delayed general difference equation have been presented for T=1 and T=2 where T is delay term. By adding Allee effect to presented model, local stability analysis has been investigated at different times. Also, obtained results for T=1 and T=2 have been compared . This obtained results for T=1 case are different from results of T=2 case. Obtained all theoretical results are supported by numerical simulations.

Keywords: Stability Analysis; Equilibrium Point; Allee Effect; Delay Term

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Existence, Uniqueness, and Stability of Solutions to the Telegraph Equation in Reproducing Kernel Hilbert Spaces

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Abstract

We announce new theorems on the existence, uniqueness, and stability of solutions to the nonhomogeneous telegraph equation in two reproducing kernel Hilbert spaces. We review relevant details of absolutely continuous functions and reproducing kernel Hilbert spaces. We sketch proofs of the existence and stability theorems. We present several numerical examples to illustrate the power and numerical effectiveness of the theory.

Keywords: Reproducing kernel Hilbert space; existence, uniqueness and stability; reproducing kernel functions.

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COMPARISON THEOREMS TO FRACTIONAL PROBLEM

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Abstract

In this study, we consider the zeros of eigenfunctions of fractional Sturm-Liouville problem. We give 1st and 2nd comparison theorems for fractional Sturm-Liouville equation with boundary condition and we prove this theorems.

Keywords:; Fractional, Sturm-Liouville, Comparison.

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EXISTENCE RESULTS FOR IMPULSIVE FRACTIONAL QUADRATIC SPECTRAL PROBLEM

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Abstract

In this study, by using Schaefer fixed point theorem, we prove existence of solution of fractional Stum-Liouville problem for diffusion operator via impulsive conditions. The derivatives are described in Riemann-Liouville and Caputo sense. We show integral representation of solution this problem. Therefore, we use Riemann-Liouville integral operator.

Keywords: Sturm-Liouville problem; Fractional; Impulsive; Caputo.

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SOME LIFT PROBLEMS IN THE (2,0)-TENSOR BUNDLE

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Abstract

The aim of this study is to determine complete and horizontal lift of vector fields for a special class of semi-tensor (pull-back) bundle tM of the type (2,0).

Keywords: Vector field, complete lift, cross-section, horizontal lift, pull-back bundle, tangent bundle, semi-tensor bundle.

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ON THE EXISTENCE AND UNIQUENESS OF THE SOLUTIONS OF SPACE and TIME FRACTIONAL TELEGRAPH EQUATIONS

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Abtract

The aim of this study is to give a theorem about the existence and uniqueness on the solutions of space and time fractional telegraph equations. By using the new iterative method proposed by Daftardar-Gejji and Jafari and Sumudu transform, existence and uniqueness of the solutions of the mentioned equations are proven according to Banach's fixed point theorem. Then solutions of space and time fractional telegraph equations are obtained.

Keywords Space and time fractional telegraph equations, Caputo derivative, Sumudu transform, Iterative method

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Dynamic Reliability Evaluation of Linear Consecutive *k*-out-of-*n*: F System with Multi-State Components

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Abstract

In engineering applications, analyzing a technical system vary according to the operating principles of the system. In some situations, the status of the system is a function of stresses which act on the system and cause degradation. In order to efficiently analysis the reliability of a system which operates under stress, assigning the various states to the components depending on their operating performance is very important. In this paper, we have investigated the linear consecutive k-out-of-n: F system (A linear consecutive k-out-of-n: F system consists of n linearly arranged components such that the system fails if and only if at least k consecutive components fail) and assigned multiple states to its components. Due to the reason, the operating performance of the components can easily be controlled. Apart from that the reliability of the system depending on the states of its components can be calculated at any time interval. In the numerical examples, the states of the components and the reliability calculation of the system at specific time intervals are shown clearly.

Keywords: Dynamic system reliability; Multi-State components; Stress-Strength model; Consecutive k-out-of-n: F system.

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Estimating of Reliability in Multicomponent Stress-strength based on von Mises-Truncated Exponential distribution

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Abstract

A multicomponent s-out-of-k: G system consists of k linearly arranged components. The system has strengths following k-independently and identically distributed random variables $X_1, X_2, \dots, X_k$ and each component experiences a random stress Y. The system is regarded as working only if at least s out of k $(s < k)$ strengths exceed the stress. Let the random samples $Y, X_1, X_2, \dots, X_k$ be independent, $G(y)$ be the continuous distribution function of Y and $F(x)$ be the common continuous distribution function of $X_1, X_2, \dots, X_k$. Then, the reliability in a multicomponent stress-strength model developed by [1] is given by

$$R_{s,k} = P(\text{at least } s \text{ out of the } (X_1, X_2, \dots, X_k) \text{ exceed } Y)$$
$$= \sum_{i=s}^{k} \binom{k}{i} \int_{-\infty}^{\infty} [1 - F(y)]^i [F(y)]^{k-i} dG(y)$$

A multicomponent stress-strength model has been extensively studied under different distribution assumptions in reliability analysis [2]. In these models, the stress-strength variates are drawn from probability distributions on the real line. In the present paper, the stress-strength variates are drawn from a von Mises distribution on the unit circle, and a truncated exponential distribution on the real line, respectively. The multicomponent stress-strength reliability of such a system is obtained by maximum likelihood estimation.

Keywords: Reliability estimation; Stress-Strength model; von Mises distribution, Truncated Exponential distribution.

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From Discrete to Continuous Regime Switching Models

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Abstract

In the Black-Schoels mnodel, there is an aboundant litterature aiming at describing, quantifying, and improving the convergence speed of lattice-based methods towards their limitting time conitnuous model. However, most of these results remain to be established in the case of regime switching models. Ma and Zhu (2015) established a speed of convergence of 1/n for such models. However, the result is valid only for smooth payoff functions, thus excluding most options which are typically only piecewise smooth and may not even be continuous. We explain here how results in the Black-Scholes model can be extended to the regime switching case in order to establish the correct speed of convergence for a broad class of European options.

Keywords: Regime switching models, convergence rate, lattice methods, security derivatives.

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The Equivalence of Soft Group-Groupoids and Soft Crossed Modules

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Abstract

This paper is devoted to the investigation of relationship between the soft group-groupoids and the soft crossed modules. It is shown that, under some suitable conditions, the category $SG\mathcal{PGD}$ of the soft group-groupoids is equivalent to the category $SX\mathcal{M}\mathcal{OD}$ of the soft crossed modules over soft groups.

Keywords: Group-groupoid; crossed module; soft group-groupoid; soft crossed module.

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Notes on the Structure of Soft Crossed Module

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Abstract

The main aim in this paper is to introduce the category of soft crossed modules. It is presented the concept of soft crossed module over soft groups. Examples are provided to illustrate this concept. Also, it is shown that the semi-direct product of two soft groups is again a soft group.

Keywords: Crossed module; Soft group; Semi-direct product; Soft crossed module.

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On the Construction of a Novel Categorical Structure

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Abstract

The main purpose of this study is to introduce a new concept named soft group-groupoid. Several important aspects and results related to this concept are obtained. The category of soft group-groupoids is established by using the definition of homomorphism between the soft group-groupoids. Further, the concept of soft subgroup-groupoid is defined.

Keywords: Groupoid; group-groupoid; soft set; soft group; soft group-groupoid.

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A Soft Approach to Ring-Groupoids

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Abstract

This study introduces a soft approach to the concept of ring-groupoid which is the one of structured groupoids. Some properties and characterizations of soft ring-groupoids are established. Also, the category of soft ring-groupoids constructed by the homomorphism between two soft ring-groupoids is presented.

Keywords: Groupoid; ring-groupoid; soft set; soft ring; soft ring-groupoid.

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ON A NEW SEQUENCE SPACE IN 2-NORMED SPACES DEFINED BY A SEQUENCE OF ORLICZ FUNCTIONS

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Abstract

In this article, we obtain $F(\|.,.\|,\mathcal{M},p,s)$ sequence space over 2-normed spaces defined by a sequence of Orlicz functions. We give varios properties and some inclusions on this space.

Keywords: Orlicz function; Sequence Spaces; 2-norm; Paranormed spaces.

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THE SEQUENCE SPACE IN 2-NORMED SPACES DEFINED BY ORLICZ FUNCTIONS

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Abstract

In this article, we obtain $F(\|.,.\|, M, p, u)$ sequence space over 2-normed spaces defined by Orlicz functions. We study some topological properties of this space.

Keywords: Orlicz function; Sequence Spaces; 2-norm; Paranormed spaces.

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SOME NEW CHARACTERIZATIONS OF PARALLEL TRANSLATION SURFACE ACCORDING TO BISHOP FRAME WITH TIMELIKE M_1 IN MINKOWSKI 3-SPACE

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Abstract

In this paper we study parallel translation surfaces, which are generated by spacelike curves, according to Bishop frame with timelike M_1 in Minkowski 3- space. Then, we obtain some characterizations of these surface.

Keywords: Minkowski space, translation surface, parallel surface, Bishop frame.

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SOME NEW CHARACTERIZATIONS OF PARALLEL FACTORABLE SURFACE IN RIEMANNIAN THREE DIMENSIONAL HEISENBERG GROUP

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Abstract

In this paper, we give some properties of parallel factorable surface which is obtained by group operations in Riemannian three dimensional Heisenberg Group H_3. Then, we obtain some characterizetions of parallel factorable surface according to Levi- Civita connections of H_3.

K***eywords:*** Heisenberg group, Riemannian metric, factorable surface, parallel surface.

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Concerning On The New Exponential Travelling Wave Solutions of The (2+1)-dimensional Heisenberg Ferromagnetic Spin Chain Equation

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Abstract

In this manuscript, we investigate new travelling wave solutions of nonlinear Schrödinger –types equation which describes(2+1)-dimensional Heisenberg ferromagnetic spin chain equation by the Improved Bernoulli Sub-Equation Function Method (IBSEFM). We plot 2D and 3D surfaces which are obtained as exponential function solutions. These solutions should be able to benefit especially physical phenomena.

Keywords: Improved Bernoulli Sub-Equation Function Method (IBSEFM), (2+1)-dimensional Heisenberg Ferromagnetic

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SIMULATION OF STOCHASTIC DIFFERENTIAL EQUATIONS

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Abstract

In this study stochastic differential equations (SDEs) and some numerical methods are considered. Using Ito calculus the exact solution of SDE is obtained. Also numerical solutions are approximated. For efficiency the results are compared with help of graphs and error table.

Keywords: Stochastic differential equations; Ito calculus; numerical methods.

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A fast and accurate skew detection algorithm

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Abstract

A novel iterative approach to find the skew angle of an inclined document is proposed. In the proposed method, the document is divided into rectangular clusters of fixed size and the centroid of each cluster is found. The incline angle of each centroid with its right hand side neighbor is calculated and accumulated in a vector to construct the histogram. The peak point of the histogram is taken to be the first guess of the algorithm. After a correction due to the first guess, detection-correction process is repeated iteratively until a certain difference between successive guesses is reached. The final angle reached is set to be result of the proposed detection algorithm. The proposed method approximates the skew angle fast and accurately. Moreover, it can detect skew angles for different linguistic scripts. Furthermore, the detection range can extent from -45^{o} to +45^{o}. The results obtained from the proposed method are compared with three main methods used to detect the skew angle namely: (i) Projection Profile, (ii) Hough Transform and (iii) Nearest Neighborhood Clustering.

Keywords: Skew detection; Incline angle of a digital document; Hough Transform; Projection Profile; Nearest Neighbourhood Clustering.

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ON APPROXIMATION PROPERTIES OF q- SZÁSZ OPERATORS INCLUDING DUNKL EXPONENTIAL FUNCTIONS

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Abstract

In this article, we construct a new Szász operators with the help of the q-Dunkl generalization of the exponential function. The approximation properties of the operators are given with Korovkin-type theorem and a weighted Korovkin-type theorem. The rate of convergence by means of the Lipschitz class, the classical, second order, and weighted modulus of continuity are derived.

Keywords: Dunkl analog; generating functions; Szász operator; generalization of exponential function.

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NONLINEAR DYNAMICAL MODEL FOR DNA

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Abstract

This chapter deals with a nonlinear dynamical system arising in the analysis of the Double-Chain model in deoxyribonucleic acid. Bernoulli-Sub equation function method and Modified $\exp(-\Omega(\xi))$-expansion function method to obtain some novel dynamical structures to the nonlinear dynamical system are used. We construct some new exponential, hyperbolic and complex periodic wave solutions to this model. Under some suitable values of parameters, we plot the 2D and 3D graphics of the solutions obtained in this study. All the solutions found in this study satisfy the nonlinear dynamical system. Moreover, these solutions can be used to explain some new significant physical meanings of the nonlinear dynamical model for DNA.

Keywords: The new Double-Chain model, Bernoulli-Sub equation function method, Exponential, Rational, Complex function solutions.

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LANGUAGE PRACTICE WITH FILMS, DISCUSSIONS ON ITS EFFECT IN ENGINEERING CLASSES

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Abstract

Films are widely used in the teaching of foreign languages, and researchers argued that they are also useful in testing. Yet in this study we aimed to investigate what the students' views towards viewing films in English were, what difficulties they faced and how non-verbal information provided by films affected their learning English as a foreign language. In this study, Turkish university students were asked to watch a feature film and afterwards data were collected via a questionnaire which was composed of a five point Likert-scale and open ended questions sections. The descriptive statistical analysis of the data reflected positive views of the students toward viewing films in English.

Keywords: foreign language teaching/learning; feature films; subtitle, language skills

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INVERSE PROBLEM OF TENSION DETERMINATION IN A WAVE EQUATION

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Abstract

In this article, we consider the problem of determination of an end point tension in a wave equation. Since these types of problems are ill-posed, the regularization process is needed. We use the adjoint method to obtain the gradient of the regularized cost functional. By gradient method we constitute a minimizing sequence which converges to a tension function of the wave equation.

Keywords: Inverse Problem; Adjoint Method; Wave Equation.

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Solving Simplified Modified Form of Camassa-Holm Equation by The sn-ns Method

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Abstract

In this study, the simplified modified form of Camassa-Holm equation is considered. The sn-ns method is applied to this equation. Then, it introduces new solutions to this equation in the form of jacobi elliptic functions in addition to hyperbolic and trigonometric solutions.

Keywords: Camassa-Holm equation (C-H), the sn-ns method, elliptic function solution, hyperbolic solutions, trigonometric solution.

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MATHEMATICS EDUCATION THROUGH SYSTEMS THINKING IN PRESCHOOL EDUCATION

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Abstract

System is a concept that sustains its existence and functions as a whole through the interrelationships of its parts. Systems thinking can be described as a viewpoint that allows to see the whole and the network of the relationships rather than focusing on the details of any emerging parts of the events in a defined order. For this reason, it can be stated that systems thinking enables to see the system as a whole instead of the sum of the parts forming the system. As can be understood from its the conceptual definition, systems thinking can be used in a great number of areas. The field of education is one of the areas systems thinking is used theoretically and practically. While systems thinking is employed as a way of thinking or a teaching method in education, it is also a widely used approach in the field of education management. Systems thinking approach can be applied at all the educational levels starting from the pre-school period which is the first stage of education. The aim of the current study is to examine the applications of mathematics teaching through the systems thinking approach in a pre-school institution, and to find out the opinions of teachers and children on these applications. The sampling of the study consisted of 18 pre-school students and their teacher affiliated to a private primary school in Pamukkale District of Denizli province. The data of the study were collected through observations, interviews and the products that the children performed. It is thought that the findings of the present study will contribute to pre-school teachers and researchers who want to work in this area as it will provide examples of mathematics teaching applied through systems thinking approach in pre-school education, and the teacher opinions and students' achievements regarding the approach will be expressed.

Keywords: Pre-school Education; Systems Thinking in Education; Mathematics Education

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A NEW GENERALIZATION OF THE WREATH PRODUCT OF POLYGROUPS

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Abstract

Let L and H be two polygroups. In this paper, we construct a new generalization of both the direct product H×L and the wreath product H[L]. we investigate many properties of the new product and introduce several examples.

Keywords: wreath product of polygroups, polygroup extensions, normal subpolygroups

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On the exact solitary wave solutions to the long-short wave interaction system

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Abstract

In this paper, the application of the simplified the extended sinh-Gordon equation expansion method to the long-short-wave interaction system. We successfully construct various solitary wave solutions to this nonlinear complex model. The long-short-wave interaction system describes the interaction between one long longitudinal wave and one short transverse wave propagating in a generalized elastic medium. The 2D and 3D surfaces to some of the obtained solutions are plotted.

Keywords: Simplified extended ShGEEM; LSWIS; Soliton solutions.

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Mathematical Model for Advanced Sterilization Device Design

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In this study, it is aimed to design a prototype by integrating ultraviolet radiation technology with ceramic ultrasonic transducer. Ultrasonic wave intensity of 0.6w / cm²-6.2w / cm² is expected with the targeted device, and 30% more efficient sterilization is expected in UV sterilization processes compared to existing UV sterilization technology. Ultrasonic generator design, UV drive design and PID controlled resistance technologies will be designed. During the ultrasonic generator design, a mathematical model will be established that will provide the resonance frequency so as to reduce the heat of the transducer material to a minimum.

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Image Compressing With Curve Fitting

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Various data compression and data transfer methods have been developed with the aim of solving problems such as rapidly increasing data traffic and moving data in communication technologies. In this study, a linear curve fitting method is proposed for compressing photo data. In the proposed algorithm, by transforming the matrix values generated by the RGB values of the photograph into polynomial functions, the average reduction of 35% is achieved. In the compression method, the average loss in the photograph is around 5% compared to the original.

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Image Compressing With Curve Fitting

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Various data compression and data transfer methods have been developed with the aim of solving problems such as rapidly increasing data traffic and moving data in communication technologies. In this study, a linear curve fitting method is proposed for compressing photo data. In the proposed algorithm, by transforming the matrix values generated by the RGB values of the photograph into polynomial functions, the average reduction of 35% is achieved. In the compression method, the average loss in the photograph is around 5% compared to the original.

THE SHEAF OF THE GROUPS FORMED BY TOPOLOGICAL GENERALIZED GROUP OVER TOPOLOGICAL SPACES

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Abstract

In the present paper, we consider both homotopy and sheaf theory and construct an algebraic sheaf by means of the topological generalized group defined by Molei in [3].

Keywords: Generalized groups, sheaves, Whitney sum.

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ON APPROXIMATION OF HEXAGONAL FOURIER SERIES IN GENERALIZED HÖLDER METRIC

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Abstract

Let the function f belongs to the generalized Hölder classes of H-periodic continuous functions. Also, let $p = (p_n)$ and $q = (q_n)$ be two sequences of nonnegative real numbers such that $p_n < q_n$ and $q_n \to \infty$ as $n \to \infty$. The order of approximation of f by deferred Cesáro means $D_n\,(p;\ q;\ f)$ of its hexagonal Fourier series is estimated in the uniform and generalized Hölder norms.

Keywords: Deferred Cesáro means, Hexagonal Fourier series, Generalized Hölder class.

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LN TYPE ESTIMATOR ON ESTIMATING THE FINITE POPULATION VARIANCE IN THE SIMPLE RANDOM SAMPLING

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Abstract

The different types of estimators for the population variance have been used by many authors in the simple random sampling up to now. In this paper, we introduce using the ln function to estimate the population variance for the first time in Literature of the Sampling Theory. We propose an ln type estimator to improve the efficiency of the variance estimator. It is found that the ln type estimator is more efficient than the ratio, regression, and exponential type estimators under the obtained conditions. Finally, theoretical results derived in the article have been verified by considering a numerical illustration.

Keywords: Simple random sampling, ln type estimator, efficiency, mean square error, variance estimator.

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NUMERICAL STUDY OF NEWTONIAN FLUID IN THE PRESENCE OF HEAT AND MASS TRANSFER IN A CAVITY FILLED WITH A POROUS MEDIUM

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Abstract

In this problem, Newtonian fluid flow equations for 2-D unsteady incompressible natural convective heat and mass transfer are solved numerically using Finite Difference Method. We investigate the effects of heater location and heater size together for natural convection heated from below in a uniform porous medium. Stability properties are studied, in particular, for Rayleigh number from 10^4 to 10^6 in an enclosed cavity region.

Keywords: Natural convection, Finite-Element Method, Heat and Mass Transform.

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A NOTE ON A BINARY RELATION CORRESPONDING TO A BIPARTITE GRAPH

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Abstract

In this article, we define a serial nontransitive relation corresponding to a bipartite graph. We also obtain that graph of serial nontransitive relation R is bipartite. Therefore we conclude that bipartite graphs and serial-nontransitive relations are corresponding each other.

Keywords: Rough Set; Graph Theory; Bipartite Graph; Independent Set.

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A highly accurate difference method for approximating of the first derivatives of the mixed boundary value problem for Laplace's equation on a rectangle

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Abstract

In a rectangular domain, we discuss about an approximation of the first order derivatives for the solution of the mixed boundaryvalue problem. The boundary values on the sides of the rectangle are supposed to have the sixth derivatives satisfying the Hölder condition. On the vertices, besides the continuity condition, the compatibility conditions, which result from the Laplace equation for the second and fourth derivatives of the boundary values, given on the adjacent sides, are also satisfied. Under these conditions for the approximate values of the first derivatives of thesolution of mixed boundary problem on a square grid, as the solution of the constructed difference scheme a uniform error estimationof order $O(h^5)$ (h is the grid size) is obtained. Some results for the Dirichlet problem were given in $[1]-[2]$.

Numerical experiments are illustrated to support the analysis made.

Keywords: Finite difference method; Laplace equation; Error Estimations; Mixed boundary condition; Approximation of derivatives.

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A highly accurate difference method for approximating of the first derivatives of the mixed boundary value problem for Laplace's equation on a rectangle

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Abstract

In a rectangular domain, we discuss about an approximation of the first order derivatives for the solution of the mixed boundary value problem. The boundary values on the sides of the rectangle are supposed to have the sixth derivatives satisfying the Hölder condition. On the vertices, besides the continuity condition, the compatibility conditions, which result from the Laplace equation for the second and fourth derivatives of the boundary values, given on the adjacent sides, are also satisfied. Under these conditions for the approximate values of the first derivatives of the solution of mixed boundary problem on a square grid, as the solution of the constructed difference scheme a uniform error estimation of order $O(h^5)$ (h is the grid size) is obtained.

Numerical experiments are illustrated to support the analysis made.

Keywords: Finite difference method; Laplace equation; Error Estimations; Mixed boundary condition; Approximation of derivatives.

(Δ,f)-STATISTICAL CONVERGENCE DEFINED BY A MODULUS FUNCTION

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Abstract

In this article, we define the concepts of (Δ,f)-statistical convergence and strongly (Δ,f)-Cesaro summability of order β for $\beta \in (0,1]$ using an unbounded modulus function f in sequences of fuzzy numbers and examine some inclusion relations between them.

Keywords: Fuzzy sequence; Statistical convergence; Modulus function; Difference sequence.

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A NOTE ON MATRIX TRANSFORMATION

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Abstract

In this article, a general theorem concerned with $\varphi-\left|A,\delta\right|_k$ summability of an infinite series has been proved by virtue of the definition of quasi $\beta-$power increasing sequences and matrix transformations. This theorem includes some new and known results.

Keywords: Riesz mean; Almost increasing sequences; Quasi power increasing sequences; Hölder inequality; Minkowski inequality; Matrix transformation.

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OPERATOR (α, m)-PREINVEX FUNCTIONS

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Abstract

In this article, we define a new class of operator preinvex function in Hilbert space, namely operator (α, m)- preinvex. And then we obtain some new inequalities of Hermite-Hadamard in terms of this class.

Keywords: Hilbert space; Bounded self-adjoint operator; Operator preinvex functions; Operator (α, m)- preinvex.

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IGNITION LASER SYSTEMS, EVALUATION OF UTILIZATION

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Abstract

Classical methods are not enough for the solution of technical and economic problems encountered in today's ignition systems such as spark plugs and Pyrotechnic application. In search of an alternative solution, the firing Lasers were developed. In parallel with the advances in laser technology, the ignition lasers are used instead of conventional ignition systems in internal combustion engines. The principle structure of the ignition laser is investigated in this study. Compared to conventional spark ignition and pyro-ignition systems, positive and negative features are presented and discussed. And the common areas of use today and in the future have been analyzed. The ignition has the capability of increasing efficiency in the laser, internal combustion liquid, gas-fired power engines and solid, liquid gas fired rocket, missile propulsion engines, especially natural gas power generation production plants. It contributes to reduce harmful gases from internal combustion vehicles, automobiles and natural gas power plants. Future use of ignition lasers is expected to become more widespread. The firing lasers in Turkey, our universities, TUBITAK, R & D-activities does not have any remarkable studies abroad as Germany, Austria, R & D-intensive activities are underway in countries such as The structure of the laser ignition is simple in principle, it can be easily developed and produced in Turkey. Another purpose of the broadcast work is to draw attention to the firing lasers in Turkey.

Keywords: Ignition Laser, Principle Structure, Research, Uses, Automobile, Rocket, Power Plants

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COMPUTER AIDED TOPOLOGY OPTIMIZATION APPLICATIONS IN MACHINE DESIGN

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Abstract

Computer aided topology optimization applications in designs are made for various purposes such as reducing the weight of the machine designs, decreasing the form resistance and changing the frequency, under working conditions without compromising strength and reliability. The necessary information about the application of computer aided dimension-, form-, topology- and topography-optimization methods in the activities of machine designs is given in working with practical examples. The results are compared with different packet programs and iteration counts. In optimization, three-dimensional industrial design is defined by complex mathematical equations. According to the maximum or minimum target values, three dimensional shape solutions are obtained according to the iterative number of this equation. As a result: - As shown in the computer-aided design examples, machine designs and optimizations are easily realized with today's possibilities in the terms of time and cost. - Optimization programs facilitate the designer's work in many ways while contributing to the emergence of inventions with the new ideas as much as designs are improved. - There is no general use of a large number of packaged programs which are ready for the optimization. While some optimization programs give satisfactory, usable results for certain industrial designs, they can give results that are not used for other designs. - As expected, the number of iterations does not show any significant difference in the design after a certain value. Compared to the past, today's optimization programs give more reliable values and usable design drawings.

Keywords: Topology Optimization, Machin Design, Computer Aided, Packet Programs, Applications,

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A SERIES METHOD FOR THE SOLUTION OF FRICTIONAL CONTACT PROBLEM BETWEEN PUNCH SYSTEM AND ELASTIC LAYER

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Abstract: In this study, a series method for the solution of frictional contact problem between punch system and elastic layer was developed.

The proposed algorithm is applied to a multi contact problem in order to show the effectiveness of the algorithm.

Keywords: Singular Integral Equation, Plane Contact Problem, Cauchy kernel, Gauss–Jacobi quadrature, A system of linear algebraic equation.

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ON MAJORIZATION PROBLEMS ASSOCIATED WITH THE SUBCLASS $Q(j, \lambda, \alpha, n)$ OF STARLIKE FUNCTIONS WITH POSITIVE COEFFICIENTS

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Abstract

We consider the subclass $Q(j, \lambda, \alpha, n)$ of starlike functions by using the diferential D^n operator and functions of the form $f(z) = z - \sum_{k=j+1}^{\infty} a_k z^k$ which are analytic in the open unit disk.In this paper is to investigate an majorization problem for the class $Q(j, \lambda, \alpha, n)$. Relevant connections of the main result obtained in this paper with those given by earlier workers on the subject are also pointed out.

Keywords: Univalent function; Starlike; Convex.

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ON PROPERTIES OF THE SUBCLASS $P(j,\lambda,\alpha,n,z_0)$ OF STARLIKE FUNCTIONS INVOLVING ANY FIXED POINT

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Abstract

In this paper, we study the subclass $P(j,\lambda,\alpha,n,z_0)$ of starlike functions involving any fixed point and with negative coefficients by using the differential D^n operator and functions of the form $f(z) = z - \sum_{k=j+1}^{\infty} a_k z^k$ which are analytic in the open unit disk. We consider the class $P(j,\lambda,\alpha,n,z_0)$ for which $f(z_0) = z_0$, z_0 real where $a_k \geq 0$. Some properties belonging to the class $P(j,\lambda,\alpha,n,z_0)$ are obtained. We also determine the radii of close-to-convexity, starlikeness and convexity for the class $P(j,\lambda,\alpha,n,z_0)$.

Keywords: Univalent function; Starlike; Convex; Fixed point.

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PERTURBED TRAPEZOID INEQUALITIES FOR n. ORDER DIFFERENTIABLE CONVEX FUNCTIONS AND THEIR APPLICATIONS

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Abstract

In this study, we introduce a new general identity for n times differentiable functions. Then, some new inequalities are presented related to general perturbed trapezoid inequality for the classes of functions whose n. derivatives of absolute values are convex. Finally, some applications are given to prove the proposed inequalities.

Keywords: Convex function; perturbed trapezoid inequality.

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Existence and Uniqueness Results for a Complex Chaotic Fractional Order System

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Abstract

In this work, we obtain some new results for a complex chaotic system of fractional order. We present the results via Picard's theorem that is very easy to understand and has same idea with classical theorems known in the case of ordinary differential equations. We prove the theorems by successive approximation.

Keywords: Fractional order complex system, existence and uniqueness, Picard's theorem

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Investigation of Human Development Index of EU and OECD Countries Between 2000-2015: Panel Data Analysis

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Abstract

The aim of this study is to propose an alternative application approach by using panel data analysis method for economical, demographical and socio-cultural variables which are thought to be effective on the human development index (HDI). European Union and OECD members(41 countries) are evaluated from 2000 to 2015. By this purpose,before analysis, Significant variables were obtained by running step-wise regression at 5-year intervals. As a result of step-wise regressions , the mortality rate under the age of 5 year, merchandise trade, export rates and GDP per capita and life expectancy variables are found as significant for HDI. After then, panel data analysis are performed on these variables from 2000 to 2015.

According to analysis, from the perspective of human development level, the most successful countries have been Northern European and Western European countries. In addition, as the time progressed, the effects of years on human development index are also increasing. Both technological advances and developments in economic indicators have been shown to have an impact on human development.

Keywords: Human Development Index, Panel Data Analysis, Step-wise Regression

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CONCIRCULAR CURVATURE TENSOR ON GENERALIZED KENMOTSU MANIFOLDS

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Abstract

The aim of the present paper is to study on concircular curvature tensor on generalized Kenmotsu manifolds. Concircular flat and φ-concircular flat generalized Kenmotsu manifolds are examined. Also some results are given about φ-semi symmetric and φ-concircular semi symmetric generalized Kenmotsu manifolds.

Keywords: generalized Kenmotsu manifold, concircular curvature tensor, φ-concircular flat, φ-concircular semi symmetric

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Almost Semi Invariant Submanifolds of Para Kenmotsu Manifold

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Abstract

The purpose of this paper is to study almost semi invariant submanifolds of para Kenmotsu manifold. We studied integrabilities and parallel conditions of the distributions on almost semi invariant submanifold. Also we investigate some properties of almost semi invariant submanifolds of a para Kenmotsu space form whose sectional curvature is constant. We consider bisectional curvature of almost semi invariant product of a para Kenmotsu space form.

Keywords: Almost semi invariant submanifolds, para Kenmotsu manifold, sectional curvature

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GENERALIZED M-SERIES AND ITS CERTAIN PROPERTIES*

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Abstract

M-series and its modification is defined by Sharma in [6,7]. In this study, by using generalized beta function which defined by Chaudry et al. [1], generelization of M-series is introduced. Then, its certain properties such as integral representations, fractional integral and derivative formulas are investigated. Laplace, Mellin and Beta transforms of generalized M-series are also obtained.

Keywords: Generalized beta function; M-series; Integral transforms; Fractional integral formulas; Fractional derivative formulas.

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A CRYPTOGRAPHICAL METHOD VIA TOPOLOGICAL CONCEPTS

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Abstract

In this study, we investigate a cryptographical method by using topological concepts and obtain some interesting and useful results.

Keywords: topology; cryptography;topological concept.

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PARACOMPACTNESS ON MULTISET TOPOLOGICAL SPACES

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Abstract

In this work, we study the concept of paracompactness on multiset topological spaces and obtain some interesting and useful results.

Keywords: Multiset; mutiset topology; paracompactness.

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P-Expandable Spaces

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Abstract

We introduce the concept of P-expandable spaces as a variation of expandable spaces. A space (X, T) is said to be P-expandable if every locally finite collection $F = \{F_\alpha : \alpha \in \Delta\}$ of subsets of X, there exists a p-locally finite collection $G = \{G_\alpha : \alpha \in \Delta\}$ of preopen subsets of X such that $F_\alpha \subseteq G_\alpha$ for each $\alpha \in \Delta$. We characterize P-expandable spaces and study their basic properties. We show that if a space (X,T) is a quasi submaximal space, then (X,T) is P-expandable if and only if it is expandable.

Keywords: preopen set, p-locally finite collection, expandable space, P-expandable space.

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P-Expandable **Spaces**

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Abstract

We introduce the concept of P-expandable spaces as a variation of expandable spaces. A space (X, T) is said to be P-expandable if every locally finite collection F = {F_α : α ε Δ} of subsets of X, there exists a p-locally finite collection G = {G_α : α ε Δ} of preopen subsets of X such that $F_\propto \subseteq G_\propto$ for each α ε Δ. We characterize P-expandable spaces and study their basic properties. We show that if a space (X,T) is a quasi submaximal space, then (X,T) is P-expandable if and only if it is expandable.

Keywords: preopen set, p-locally finite collection, expandable space, P-expandable space.

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THE EFFECT OF MECHANICAL PROPERTIES OF CONCRETE ON IMPACT STRENGTH

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Abstract

In this study, impact stregth of concrete is investigated with the effect of mechanical properties such as compressive strength, flexural tensile strength and splitting tensile strength. For this purpose, six serial specimens with three different maximum aggregate diameter (4, 8, and 16 mm) and whose water/cement (w/c) ratio of 0.50 to 0.55 were prepared. The compressive, bending, splitting and impact strength of the prepared specimens were determined.

As a result of study; The mechanical properties of the concrete were positively effected by the increase in the aggregate size, while the icrease in the W/C ratio adversely effected. The change in the impact strength of concrete has also been the same. But the impact strength is less effected than the increase in W/C ratio.

Keywords: Concrete, Compressive Strength, Tensile Strength, Impact Strength, Charpy Experiment

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Four Point Implicit Methods for the Second Derivatives of the Solution of First Type Boundary Value Problem for One Dimensional Heat Equation

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Abstract

We construct four point implicit difference boundary value problem for the first derivative of the solution $u(x,t)$ of the first type boundary value problem for one dimensional heat equation with respect to the time variable t. Also, for the second derivatives of $u(x,t)$ special four point implicit difference boundary value problems are proposed. It is assumed that the initial function belongs to the Hölder space $C^{8+\alpha}$ $0<\alpha<1$, the heat source function given in the heat equation is from the Hölder space $C^{6+\alpha,3+\frac{\alpha}{2}}$, the boundary functions are from $C^{4+\frac{\alpha}{2}}$, and between the initial and the boundary functions the conjugation conditions of orders $q=0,1,2,3,4$ are satisfied. We prove that the solution of the proposed difference schemes converge uniformly on the grids of the order $O\left(h^2+\tau\right)$ (second order accurate in the spatial variable x and first order accurate in time t) where h is the step size in x and τ is the step size in t. Theoretical results are justified by numerical examples.

Keywords: Finite difference method, Approximation of derivatives, Uniform error, Heat conduction equation

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HYDROGEN ENERGY POTENTIAL DETERMINATION WITH COMPUTATIONAL MATHEMATICS

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Abstract

Hydrogen is the simplest element. An atom of hydrogen consists of only one proton and one electron. It's also the most plentiful element in the universe. Despite its simplicity and abundance, hydrogen doesn't occur naturally as a gas on the Earth - it's always combined with other elements. Water, for example, is a combination of hydrogen and oxygen (H2O).

Hydrogen is also found in many organic compounds, notably the hydrocarbons that make up many of our fuels, such as gasoline, natural gas, methanol, and propane. Hydrogen can be separated from hydrocarbons through the application of heat - a process known as reforming. Currently, most hydrogen is made this way from natural gas. An electrical current can also be used to separate water into its components of oxygen and hydrogen. This process is known as electrolysis. Some algae and bacteria, using sunlight as their energy source, even give off hydrogen under certain conditions.

NASA uses hydrogen fuel to launch the space shuttles. Credit: NASA

Hydrogen is high in energy, yet an engine that burns pure hydrogen produces almost no pollution. NASA has used liquid hydrogen since the 1970s to propel the space shuttle and other rockets into orbit. Hydrogen fuel cells power the shuttle's electrical systems, producing a clean byproduct - pure water, which the crew drinks.

A fuel cell combines hydrogen and oxygen to produce electricity, heat, and water. Fuel cells are often compared to batteries. Both convert the energy produced by a chemical reaction into usable electric power. However, the fuel cell will produce electricity as long as fuel (hydrogen) is supplied, never losing its charge.

Fuel cells are a promising technology for use as a source of heat and electricity for buildings, and as an electrical power source for electric motors propelling vehicles. Fuel cells operate best on pure hydrogen. But fuels like natural gas, methanol, or even gasoline can be reformed to produce the hydrogen required for fuel cells. Some fuel cells even can be fueled directly with methanol, without using a reformer.

In the future, hydrogen could also join electricity as an important energy carrier. An energy carrier moves and delivers energy in a usable form to consumers. Renewable energy sources,

HYDROGEN ENERGY POTENTIAL DETERMINATION WITH COMPUTATIONAL MATHEMATICS

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Abstract

Hydrogen is the simplest element. An atom of hydrogen consists of only one proton and one electron. It's also the most plentiful element in the universe. Despite its simplicity and abundance, hydrogen doesn't occur naturally as a gas on the Earth - it's always combined with other elements. Water, for example, is a combination of hydrogen and oxygen (H_2O).

Hydrogen is also found in many organic compounds, notably the *hydrocarbons* that make up many of our fuels, such as gasoline, natural gas, methanol, and propane. Hydrogen can be separated from hydrocarbons through the application of heat - a process known as *reforming*. Currently, most hydrogen is made this way from natural gas. An electrical current can also be used to separate water into its components of oxygen and hydrogen. This process is known as *electrolysis*. Some algae and bacteria, using sunlight as their energy source, even give off hydrogen under certain conditions.

NASA uses hydrogen fuel to launch the space shuttles. Credit: NASA

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In the future, hydrogen could also join electricity as an important energy carrier. An energy carrier moves and delivers energy in a usable form to consumers. Renewable energy sources, like the sun and wind, can't produce energy all the time. But they could, for example, produce electric energy and hydrogen, which can be stored until it's needed. Hydrogen can also be transported (like electricity) to locations where it is needed.

REVERSE SUPPLY CHAIN NETWORK DESIGN FOR E-WASTE INCLUDING ENVIRONMENTAL IMPACTS

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Abstract

Many electronic products become electronic waste (e-waste) without completing their economic lives due to rapid changes in technology and fashion. The resulting electronic waste cause environmental pollution and depletion of natural resources in the environment. In recent years, there has been a growing interest in the process of collecting, dismantling and processing of e-waste, as well as the necessity of the regulations and economic and environmental benefits. Significant responsibilities have been imposed on producers by the "Regulation on the Control of E-waste". For this reason, redesigning e-waste reverse supply chain networks for producers brings additional competitive advantages. In this study, a reverse supply chain network design model was implemented to represent a real system for producers aiming to meet the regulatory and environmental targets. The proposed mixed integer linear programming model has been solved with a theoretical case study by using the CPLEX 12.7.1 solver.

Keywords: Reverse supply chain, network design, e-waste, environmental impacts

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INVESTIGATION OF A CORRELATION BETWEEN AIR EXCESS COEFFICIENT (λ) AND THE FLAME IMAGE IN COAL COMBUSTORS

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Abstract

The online accusation of instantaneous images of flame in the burning chamber lets one to real time analyze the flame images and accordingly design the controllers for coal burning systems. In this particular work the association of air excess coefficient (λ) to the characteristic properties of flame image was investigated. Characteristic properties of flame images were obtained from the linear regression conducted on the images. Then the flue gas temperature and derived properties such as the norm, second norm, infinity norm, Frobenius norm, normalised sum of pixel values, matrix trace, matrix rank, sum of the pixel threshold value greater than 30, smallest eigen value, sum of the smallest 10 eigen values and sum of all eigen values of source (image) matrix were together appraised.

In accordance with the results obtained from the regression analysis carried out on eleven different flame's characteristic properties, it was found that the matrix trace of the image showed the most precious and dynamic correlation with the air excess coefficient.

Keywords: Coal burning system; Flame image features; Image processing; Air excessive coefficient, Coal burning control.

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MODEL OF DETERMINING THE OPTIMAL SUPPLY TIME OF PRODUCTS

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Abstract

Considerable amounts of money are spent on maintaining inventory at enterprises, so it is strategically important to manage them effectively. One of the methods lies in defining the optimal moment of supplying new shipments. Optimizing the new shipment supply moment is a problem that was considered under deterministic conditions. However, in reality a set of random factors have a significant influence, so it is necessary to take them into account.

The main goal is to present a new probabilistic model of supplying goods and to optimize the moment of the new shipment under conditions of stochastic demand.

We minimize the loss function which takes into account both cases: when the new shipment was delivered both before and after the actual running out of products (i.e. the storage expenses and deficit losses). Under conditions of normality of the actual moment of running out of goods we obtain the explicit form for the optimal supply moment.

The stochastic model for the new shipment supply moment was presented. The optimal moment of supply was found under the condition of normality of the moment of running out of goods.

Keywords: Stochastic models; demand; inventory control; profit; optimization.

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Some New Characterizations of Symplectic Curve in 4-Dimensional Symplectic Space

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Abstract: It is well known that there exist characterizations for curve in Euclidean space. Also, a lot of authors extended this characterizations for Minkowski space and obtained very different results.

In this paper, we introduce the geometric properties of Symplectic Curve in 4-Dimensional Symplectic Space which given by [12,15]. Later we obtained the conditions for Symplectic Curve to lie on some subspaces of 4-Dimensional Symplectic Space and we give some characterizations and theorems for these curves.

Keywords and phrases: symplectic curve, .Symplectic Space

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SOME SPECIAL CURVES IN E_2^4

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Abstract

The Euclidean 4-Space E_2^4 is the Euclidean 4-space E^4 provided with an indefinite at metric given by $g = -dx_1^2 - dx_2^2 + dx_3^2 + dx_4^2$,where (x_1, x_2, x_3, x_3) is a rectangular coordinate system of E_2^4. Let $\{T, N, B_1, B_2\}$ be the non-null moving Frenet frame along a unit speed non-null curve x in E_2^4, consisting of the tangent, principal normal, first binormal and second binormal vector field, respectively. If x is a non-null curve with non-null vector fields, then $\{T, N, B_1, B_2\}$ is a orthonormal frame and the Frenet equations gives

$$T' = k_1 N;\ N' = -\epsilon_0\epsilon_1 k_1 T + k_2 B_1;\ B_1' = -\epsilon_1 k_2 N + k_3 B_2;\ B_2' = -\epsilon_2\epsilon_3 k_3 B_1 \quad (*)$$

where the following conditions are satisfied

$$g(T,N) = g(T,B_1) = g(T,B_2) = g(N,B_1) = g(B_1,B_2) = 0, g(T,T) = \epsilon_0, g(N,N) = \epsilon_1,$$
$$g(B_1,B_1) = \epsilon_2\,, g(B_2,B_2) = \epsilon_{3,}\epsilon_i \in \{-1,1\}, i \in I = \{0,1,2,3\}, [5].$$

Let x be a non-null curve in E_2^4. We define that x is the normal curve in E_2^4, if its position vector with respect to some chosen origin always lies in the orthogonal complement $T^{\perp}$. The orthogonal complement $T^{\perp}$ is non-degenerate hyperplanes of E_2^4, spanned by $\{T, N, B_1, B_2\}$ definition, for a normal curve in E_2^4, the position vector x satisfies

$$x(s) = \mu(s)N(s) + \gamma(s)B_1(s) + \theta(s)B_2(s) or\ g(x,T) = 0$$

for some diferentiable functions μ, γ, θ of $s \in I \subset IR.$ In this paper, we examine the notion of the normal curves for the curves in E_2^4. We call these new associated curves as normal and by using the (*) frame of the curves. We give the representation formulae for normal curves in E_2^4 and using this formulae, we give some characterizations of these curves.

Keywords: Semi-Euclidean Space E_2^4, Normal curve.

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BEHAIVOURS OF RANDOM EFFECTED FREDHOLM INTEGRAL EQUATION

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Abstract

In this study, the probability characteristics of random fredholm integral equation obtained when fredholm integral equations are taken as a random variable with coefficient beta distribution are calculated. Also, the approximate analytical solutions are obtained by applying random differential transformation method to random fredholm integral equation. Solutions for the expected value and variance were found using these solutions. Also obtained the approximate expected value and variance formulas converging to a wider region by applying the modified DTM. Finally, these solutions are compared.

Keywords:Fredholm Integral Equation, Expected Value, Variance, Differential Transformation Method, Modified DTM.

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MODELLING AND SIMULATION OF A CELL OF A FLEXIBLE MANUFACTURING SYSTEM AS A SET OF 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. It is assumed that the cell consists of two machines, one industrial robot, a buffer of slots between two machines and input and output conveyors. The main goals of this paper are to develop a model of a cell of a flexible manufacturing system (FMS) as a set of distributed flow processes, to represent the developed model in terms of extended Petri nets, to investigate the developed model in a series of simulation experiments in the simulation system Winsim, and to analyse the results of simulation along with comparing them with the results of analytical modeling.

Keywords: Flexible manufacturing systems;Workflow processes; extended Petri nets; simulation, discrete event.

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ON THE SOLUTIONS OF FRACTIONAL CAUCHY PROBLEM FEATURING CONFORMABLE DERIVATIVE

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Abstract

In this research, we have obtained analytical solutions of fractional Cauchy problem by using q-Homotopy Analysis Method (q-HAM) featuring conformable fractional derivative. We have considered different situations according to the homogeneity and linearity of the fractional Cauchy differential equation. A detailed analysis of the results obtained in the study has been reported. According to the results, we have found out that our obtained solutions converge very speedily to the exact solutions.

Keywords: q-homotopy analysis method; Fractional Cauchy problem, Conformable derivative.

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NOVEL RECURSIVE APPROXIMATION FOR FRACTIONAL NONLINEAR EQUATIONS WITHIN CAPUTO-FABRIZIO DERIVATIVE

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Abstract

This study displays a novel method for solving time-fractional nonlinear partial differential equations. The suggested method namely variational homotopy perturbation iteration method (VHPIM) is considered with Caputo-Fabrizio fractional derivative operator. In order to show the efficiency and accuracy of the mentioned method, we have applied it to some special time-fractional nonlinear partial differential equations. Comparisons between obtained solutions and the exact solutions have been made and the analysis shows that recommended solution method presents a rapid convergence to the exact solutions of the problems.

Keywords: Variational homotopy perturbation iteration method; Caputo-Fabrizio fractional derivative; Nonlinear partial differential equation.

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Molecular simulation of PcCel45A protein expressed from Aspergillus Nidulans to understand its structure, dynamics and thermostability

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Abstract

Molecular Dynamic Simulation is very usable tool to understand various factors, including structure, dynamics and stability. Cellulose is the major component of plant cell walls and is the most abundant organic compound on the earth. Somewhat organisms can use cellulose as a food source, possessing cellulases (cellobiohydrolases and endoglucanases) that can catalyze the hydrolysis of the β-(1,4) glycosidic bonds. In this work, we investigated the relationship between changes in protein stability caused by temperature changes and changes in conformational properties of amino acid residues. We found that the ASN92 residue was the major contributor to the stability of structure; some other residues correlated significantly with stability. We also compared the theoretical results of the current study with the experimental ones published in previous studies.

Keywords: PcCel45A; Molecular Modelling; Cellulases.

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PREDICTION OF HAMSTRING AND QUADRICEPS MUSCLE STRENGTH USING MULTIPLE LINEAR REGRESSION

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Abstract

The strength of hamstring and quadriceps muscles plays an important role for athletes and sportspeople in determining their performance. The purpose of this study is to predict the hamstring and quadriceps muscle strength using Multiple Linear Regression (MLR). The data set used for this study includes the data of 70 athletes from the College of Physical Education and Sport at Gazi University, consisting of the features gender, sports branch, height, weight and age, as well as the hamstring and quadriceps muscle strength values measured with two types of activities (static training and classic training) used as the target variables. MLR has been used for the development of prediction models using different types of validation options including cross validation and random percentage data split. The Root Mean Square Error (*RMSE*) has been utilized as the main error metric for evaluating the performance of the prediction models. The *RMSE* values of the prediction models range between 14.91 and 32.41 Nm, showing that in addition to machine learning methods, MLR can also be used for predicting the hamstring and quadriceps muscle strength with acceptable error rates.

Keywords: Multiple linear regression, Hamstring; Quadriceps; Prediction

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DEVELOPMENT OF PHYSICAL FITNESS PREDICTION MODELS FOR TURKISH SECONDARY SCHOOL STUDENTS USING MACHINE LEARNING METHODS

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Abstract

Physical fitness is a set of attributes that are either health or skill-related which can be measured with specific tests. Maintaining physical fitness is essential for health and wellbeing. However, since measurement of physical fitness requires improved professional equipment, experienced staff and lots of time, researchers need different ways to determine physical fitness. The aim of this study is to develop new prediction models for predicting the physical fitness of Turkish secondary school students by using machine learning methods including Support Vector Machines (SVM), Radial Basis Function Neural Network (RBFNN) and Tree Boost (TB). The dataset comprises data of various number of subjects according to the target variables such as the test scores of the 30m speed, 20m stage run, balance and agility. The predictor variables used to develop the prediction models are gender, age, height, weight, body fat, number of curl-up and push-ups in 30 seconds. Eight physical fitness prediction models have been created with the variables listed above. The performance of the prediction models has been calculated by using standard error of estimate (SEE). The results show that SVM based prediction models outperform other models based on RBFNN and TB. Also, this study shows that the predictor variables body fat, push-up and curl-up play a significant role when used all together for physical fitness prediction.

Keywords: Physical fitness; Machine learning; Prediction.

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DEVELOPMENT OF INTERNET TRAFFIC PREDICTION SOFTWARE USING TIME-SERIES MULTILAYER PERCEPTRON

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Abstract

Internet traffic prediction plays a fundamental role in network design, management, control and optimization. Although there exist several studies in litereture that focus on predicting Internet traffic using statistical and machine learning methods, to the best of our knowledge, a fully functional off-the-shelf software with different optimization capabilities has not been developed. The purpose of this study is to develop a new software for prediction of Internet traffic data based on time-series Multilayer Perceptron (MLP). The software includes features such as the optimization of the number of hidden layers and neurons in each layer and feedback delay optimization with respect to autocorrelations. The Internet traffic data from two different Internet Service Providers, varying by 1-hour and 5-minute time frequencies, have been used for testing the software. The datasets have been split into training and testing sets via 70-30% and 80-20% split ratios. The Mean Absolute Percentage Error (MAPE) has been utilized as the main error rate metric in order to evaluate the accuracy of the prediction models. It has been observed that the MAPE's of the Internet traffic prediction models change between 3.25 and 9.09. One can conclude that the developed software can be used for Internet traffic prediction within acceptable error rates.

Keywords: Time-Series; Multilayer perceptron; Internet traffic; Prediction

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REPRODUCING KERNEL METHOD FOR TIME FRACTIONAL ADVECTION EQUATION

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Abstract

In this study, we give an iterative reproducing kernel method for numerical solution of Advection equation with time fractional Caputo derivative. Convergence analysis is constructed theoretically. The results show that the given method very efficient for time fractional Advection equation.

Keywords: Iterative reproducing kernel method; Advection equation; Caputo derivative.

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STRENGTENING THE ENCODING ALGORITHMS IN EMBEDDED SYSTEMS TO SIDE CHANNEL ATTACKS

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Abstract

In order to be able to create strong encoding systems, they have to be resistant to the decoding methods of encryption algorithms. In addition, the algorithms should be attempted with tests that will be resistant to decoding. Otherwise, encryption algorithms that are thought to be very powerful can be cracked in a short time. The cryptographic algorithm can be viewed from two perspectives. First perspective; is a black box that generates output information by receiving an abstract mathematical object or hidden key and input information, second perspective is to look at as a program implemented on a known processor. The first is the subject of classical cryptanalysis. The second is a subject that bases on physical attacks. Encryption algorithms are usually strong in terms of algorithmic structure, and they protect against attacks with their large key space. However, even if the algorithm key spaces are wide in the side channel attacks from physical attacks, they may be inadequate against this method. This attack is particularly effective in cryptographic embedded devices. The cryptographic system can be cracked with interpretations to be made from the electromagnetic fields, sound, heat levels, power consumption, and running time of the algorithms during the workings of the side channel attacks and cryptographic devices[1]. In order not to be able to understand the power consumption values obtained by side channel attacks, it is ensured that the measured power consumption values do not allow correlation. On the other hand, it is tried to ensure that safe hardware implementation with working on the matching of the processed data in the algorithm with the masking method in the same way as not to adversely affect the performance very much[2].

Keywords: Embedded Systems; Side Channel Attacks; Hiding; Masking.

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STABILITY ANALYSIS, NUMERICAL AND EXACT SOLUTIONS OF THE (1+1)-DIMENSIONAL NDMBBM EQUATION

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Abstract

A newly propose mathematical approach is presented in this study. We utilize the new approach in investigating the solutions of the (1+1)-dimensional nonlinear dispersive modi_ed Benjamin-Bona-Mahony. The new analytical technique is based on the popularly known sinh-Gordon equation and a wave transformation. In developing this new technique at each every steps involving integration, the integration constants are considered to not be zero which gives rise to new form of travelling wave solutions. The (1+1)-dimensional nonlinear dispersive modified Benjamin-Bona-Mahony is used in modelling an approximation for surface long waves in nonlinear dispersive media. We construct some new trigonometric function solution to this equation. Moreover, the finite forward difference method is utilized in investigating the numerical behavior of this equation by taking one of the analytical solutions obtained by using the new approach into consideration. We finally, give a comprehensive conclusions.

Keywords: (1+1)-dimensional nonlinear dispersive modified Benjamin-Bona-Mahony equation, Sinh-Gordon function method.

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TAUTOMERISM AND SPECTROSCOPIC PROPERTIES OF TRITHIOCYANURIC ACID

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Abstract

The molecular structure and the relative stabilities of the possible tautomers of the Trithiocyanuric acid are calculated by DFT/B3LYP method using 6-311G(d,p) basis sets [1-3]. The results of the energy analysis and thermodynamic treatment of the obtained data are used to predict the relative stabilities of the tautomers. The vibrational spectra of Trithiocyanuric acid are calculated using the same level of theory and the results are compared with the experimentally measured FTIR spectra. Good correlation is obtained between the experimental and calculated vibrational frequencies. The electronic spectra of Trithiocyanuric acid in gas phase are calculated using the TD-DFT method. The calculations predicted bathochromic shift in all the spectral bands in presence of solvent compared to the gas phase. Also the NMR spectra of all tautomers are calculated and the results are correlated with the experimental NMR chemical shifts where the most stable tautomer gives the best correlation coefficient.

Keywords: Tautomers, FT-IR, FT-Raman, NMR, DFT, Trithiocyanuric acid

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FT-IR, FT-RAMAN, NMR AND DFT STUDIES OF 4-AMINO-8-TRIFLUOROMETHOXYQUINOLINE

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Abstract

In the present work, the quantum chemical calculations were performed by means of the Gaussian09 software package, using hybrid density functional theory at the B3LYP level and with 6-311G(d, p) basis set [1-3]. All the computations have been carried out in gas phase. In order to establish the stable possible conformations, the conformational space of 4-amino-8-trifluoromethoxyquinoline molecule was scanned with theoretical methods. The harmonic vibrational frequencies have been calculated at the same level of theory. The vibrational frequencies were calculated and scaled, and subsequently values have been compared with the experimental Infrared and Raman spectra. The vibrational modes were assigned on the basis of TED analysis for 6-311G(d,p) basis set, using SQM program. The observed and calculated frequencies are found to be in good agreement.

Keywords: FT-IR, FT-Raman, NMR, DFT, 4-Amino-8-TrifluoroMethoxyQuinoline

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SOLVABILITY OF A SYSTEM OF HIGHER ORDER NONLINEAR DIFFERENCE EQUATIONS

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Abstract

In this paper, we show that the system of difference equations

$$x_n = ay_{n-k} + \frac{dy_{n-k}x_{n-(k+l)}}{bx_{n-(k+l)} + cy_{n-l}},\ y_n = \alpha x_{n-k} + \frac{\delta x_{n-k}y_{n-(k+l)}}{\beta y_{n-(k+l)} + \gamma x_{n-l}},\ n \in \mathbb{N}_0,$$

where k and l are fixed naturel numbers, the parameters $a, b, c, d, \alpha, \beta, \gamma, \delta$ are real numbers and the initial values x_{-j}, y_{-j}, $j = \overline{1, k+l}$, are real numbers, can be solved in the closed form. Also, we investigate some particular cases of aforementioned system and give a study of the long-term behavior of its solutions for the case $l = 1$.

Keywords: Asymptotic behavior; Forbidden set; Higher order difference equation; System of difference equations.

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ON A SOLVABLE THREE-DIMENSIONAL SYSTEM OF DIFFERENCE EQUATIONS

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Abstract

In this paper, we show that the following three-dimensional system of difference equations

$$x_n = \frac{z_{n-2}x_{n-3}}{ax_{n-3}+by_{n-1}},\ y_n = \frac{x_{n-2}y_{n-3}}{cy_{n-3}+dz_{n-1}},\ z_n = \frac{y_{n-2}z_{n-3}}{ez_{n-3}+fx_{n-1}},\ n \in \mathbb{N}_0,$$

where the parameters a,b,c,d,e,f and the initial values x_{-i}, y_{-i}, z_{-i}, $i \in \{1,2,3\}$, are real numbers, can be solved, extending further some results in literature. Also, we determine the asymptotic behavior of solutions and the forbidden set of the initial values by using the obtained formulae.

Keywords: Difference equation system; Solution in closed-form; Forbidden set; Asymptotic behavior.

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OTONOMOUS VEHICLE CAPABLE OF FOLLOWING TRAFFIC SIGN AND LINE

Automobiles, which are the most intensive and preferred means of transportation in all time, have many innovations and features based on the comfort, security and satisfaction of the users. These features are improved every day and even with added new programs and systems, they provide extra security, extra comfort by pre-user or simultaneous intervention.

Considering all the problems mentioned, it would be an ideal solution to develop a system that can alert drivers and intervene if necessary. With the object recognition method, traffic signs which are warning flashers and gates on the route are detected and the backplane is processed in milliseconds to warn the driver. This system, which is created according to the demand, will be supported by the driver by intervening if the automatized system is activated.

By applying the image processing methods in sequence, a system that can be active or passive by creating a quick and stable decision making mechanism will be introduced. The basic steps of image processing methods to be applied; the classification of objects to be detected, their identification and recognition. Later, according to the concept carried by the recognized object, movement will be provided.

Abstract
by Assane Lo

Stabilization of a laminated beam with interfacial slip by a parallel compensator

We consider a structure consisting of a two-layered beam with an adhesive layer bonding the two adjoining surfaces. This model for a two- layered plate in which slip may occur along the interface was derived in by Hansen and Spies. The adhesive layer creates a restoring force which is assumed proportional to the amount of slip. Therefore, we are in the presence of a structural damping due to interfacial slip. It has been shown by Wang, Xu and Yung; that the frictional damping created by the interfacial slip alone is not enough to stabilize the system exponentially to its equilibrium state. Therefore, a natural question that can be asked is: what are the possible additional damping that can ensure the exponential stability and other kinds of stability of the system? In a previous publication (Electronic Journal of Differential Equations, Vol. 2015 (2015), No. 129, pp. 1{14.), we improved the result of Wang, Xu and Yung by investigating the case of an additional viscoelastic damping that acts on the effective rotation angle without resorting to any boundary control.

In this paper, we propose an asymptotic stabilization of the undamped system with boundary displacement feedback.

RISK ANALYSIS OF PORTS IN MARITIME INDUSTRY IN TURKEY USING FUZZY FAILURE MODE AND EFFECT ANALYSIS

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Abstract

In this study, risk analysis of international trade ports is performed with maritime industry perspective. Main dimensions and their sub-criteria are collected via experts' opinions and literature survey to construct a structure. Due to fuzziness of evaluations via experts from maritime industry in Turkey, this structure is analyzed by using fuzzy failure mode and effect analysis (F-FMEA) approach. Remarks and proposals are given according to results of the study.

Keywords: Failure mode and effect analysis (FMEA), fuzzy sets, maritime industry, Turkey analysis, risk analysis.

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ON NUMERICAL SOLUTION OF BURGERS' EQUATION BY USING HOMOTOPY ANALYSIS METHOD

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Abstract

The pesent work examines the well-known partial differential equation that arises in nonlinear science, namely; the Burgers' Equation. Then, Homotopy Analysis Method (HAM) has been applied to Burgers' equation with initial conditions. Some problems are investigated to illustrate the effiency of the method. Approximate solutions obtained by HAM are compared with exact solution. The comparison shows that the achieved solutions are in excellent agreement. We also plot the two-three dimensional graphics and tables of obtained results with the help of the computer program in the Wolfram Mathematica. Convergence analysis is also provided by using some related theorems. The newly acquired results show that HAM is highly effective technique for solving nonlinear partial differential equations.

Keywords: Homotopy Analysis Method; Burgers' Equation; Approximate solution; Auxiliary parameter.

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THE NUMERICAL SOLUTION OF KDV EQUATIONS

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Abstract

The aim of this study is to analyse the numerical behaviour of the Korteweg-de Vries (KdV) Equation using analytic technique, namely the Homotopy Analysis Method (HAM). Two illustrative examples have also been presented. Solutions two-three dimensional graphics and tables are performed and necessary comparisons are obtained. Note that the analytic technique has also been compared with the exact solutions. The computed results are seen to be highly accurate and very good agreement with the literature. Convergence analysis is also provided. The proposed method has been shown to be unconditionally stable. Moreover, they indicate that only a few terms are sufficient to obtain accurate solutions.

Keywords: Homotopy Analysis Method; Korteweg-de Vries (KdV) Equation; Approximate solution; Auxiliary parameter.

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ON SOFT VECTOR SPACES

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Abstract

In this article, we introduce the concepts of soft vector space and soft subvector space over a vector space and some related properties are investigated. Also we give the notions of soft linear transformation and soft vector homomorphism, and then give theorems about homomorfic image and homomorfic pre-image of soft vector spaces under a soft linear transformation.

Keywords: Soft set; Vector space; Soft vector space.

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On the soliton solutions to some complex nonlinear Schrödinger equations

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Abstract

In this study, singular soliton solutions are extracted from the five complex nonlinear Schrödinger equations describing various complex phenomena in nonlinear science by using the improved Bernoulli sub-equation function method. Under suitable values of the parameters involved, the 2D, 3D and contour plots of all the acquired solutions are presented.

Keywords: The IBSEFM; the NLSEs; singular solitons

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Best Uniform Approximation of Offset Curves

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The offset curves play important task in Computer Aided Geometric Design (CAGD). In the recent years, researchers illustrated some methods to approximate offset curves. In 1996, Lee, Kim, and Elber approximated the offset curve using the convolution curve between the approximation B'ezier curve and the curve itself.In this talk, approximation of offset curve is considered that is based on the best uniform approximation of circular arc.In 2015, Rababah presented the best uniform approximation of the circular arc of degree 2 and order 4.The error function is the Chebyshev polynomial of degree 4.

In this talk, the best uniform approximation of the circular arc is used to construct a new method for approximation offset curve by a polynomial parametric defined curve of degree 2 and order 4.

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AN AUTOMATED DRONE NAVIGATION SYSTEM

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Abstract

In modern warfare, swarms of unmanned aircrafts and drones are used to preform various task ranging from taking surveillance data to sensing enemy's targets to enhance monitoring in disputed territories. In hostile zones, flying drones from one point to another in straight lines are vulnerable to anti-air defense systems and therefore are easy targets. The generation of random paths between two points in real time, which cannot be predicted in advance, can be of great value to flying drones. In previous work, a novel computer algorithm has been proposed to generate a random path between two points in space. A random path consists of finite number of randomly generated adjacent points that satisfy the condition: $L(p_1p_n) < L(p_{i-1}p_n)$. Where $L(p_1p_n)$ is the length of the path between the two adjacent pointsp$_1$ and p$_n$. Our algorithm has been coded and evaluated. Experiments showed that the randomly generated points were converged to the target point. The main importance of this method is the ability to generate paths between two points in real time, which cannot be predicted in advance. In this research work, we applied our method to the problem of drone navigation system. An ontology has been developed that describes the domain of automated navigation system. The ontology is designed to guide the process of generating acceptable vertices based on some criteria described in the ontology. Adding intelligence to the navigation system has provided us with a better solution. Initial findings are leading to the applicability of the randomly generated paths to the drone navigation system.

Keywords: Random Paths, Mobile Robots, Intelligence Computing, Military Applications.

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ON IDEAL FLUID FLOW IN COMPLEX PLANE

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Abstract

In this article, we associated to every analytic function f(z) defined on an open domain Ω or on the entire complex plane a vector field $\vec{F}$ (x y) =[u(x y) v(x y)], where u(x y) and v(x y) are the real and imaginary components of the analytic function f(z). Following the fact that the velocity vector V(z) =(u(x y), v(x y))^T induced an ideal fluid flow iff f(z) =u(x y) -iv(x y) is a complex analytic function of complex variable z, where z ϵ Ω, we considered a steady state fluid flow with velocity vector field V(z) =(u(x y), v(x y)) at the point z =(x, y) ϵ Ω. Thus Ω is assume the domain occupied by the fluid in the complex plane, while the vector V(z) represents the instantaneous velocity of the fluid at the point z ϵ Ω usually term as the complex potential of the fluid flow. The potential function and the stream function were obtained, from which we generate the level curves and used it to described the flow and the direction velocities of the flow.

Keywords: Complex Potential, Potential function, Stream function, Level curves.

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ON IDEAL FLUID FLOW IN COMPLEX PLANE

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Abstract

In this article, we associated to every analytic function f(z) defined on an open domain Ω or on the entire complex plane a vector field $\vec{F}$ (x y) =[u(x y) v(x y)], where u(x y) and v(x y) are the real and imaginary components of the analytic function f(z). Following the fact that the velocity vector V(z) $=(u(x\ y), v(x\ y))^T$ induced an ideal fluid flow iff f(z) =u(x y) -iv(x y) is a complex analytic function of complex variable z, where z ϵ Ω, we considered a steady state fluid flow with velocity vector field V(z) =(u(x y), v(x y)) at the point z =(x, y) ϵ Ω. Thus Ω is assume the domain occupied by the fluid in the complex plane, while the vector V(z) represents the instantaneous velocity of the fluid at the point z ϵ Ω usually term as the complex potential of the fluid flow. The potential function and the stream function were obtained, from which we generate the level curves and used it to described the flow and the direction velocities of the flow.

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   Application *International Journal of Scientific Research and Engineering Studies,* 23, 31-45,*2011.*

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A COMPUTATIONAL METHOD FOR SOLVING A CLASS OF FRACTIONAL NON-LINEAR SINGULARLY PERTURBED VOLTERRA INTEGRO-DIFFERENTIAL BOUNDARY-VALUE PROBLEMS

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Abstract

In this thesis, we present a computational method for solving a class of fractional singularly perturbed Volterra integro-differential boundary-value problems with a boundary layer at one end. The implemented technique consists of solving two problems which are a reduced problem and a boundary layer correction problem. The reproducing kernel method is used to the second problems. The Pade' approximation technique is used to satisfy the conditions at infinity. Existence and uniformly convergence for the approximate solution will be investigated. Numerical results will be presented to show the efficiency of the proposed method.

Keywords: Singularly perturbed Volterra integro-differential, Caputo fractional derivative, nonlinear initial value problem.

I. Chapter 1: Introduction

A. 1.1 Fractional Derivative

In 1695, a French mathematician called L'hopital stopped in an important question and decided to send a message to asked a German mathematician named Leibnitz to find the solution of the following question, if the order $\mathrm{n} = \frac{1}{2}$, how I can find the derivative for this function;

$$f(x) = x.$$

Leibnitz's answer was "This is an apparent paradox from which, one day, useful consequences will be drawn" [1]. As a result of this, the fractional calculus started to appear in the world by

q-SERIES A BRIDGE BETWEEN ANALYSIS AND DISCRETE MATHEMATICS

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Abstract

We discuss the connection between partitions and allied areas of combinatorics and the q-series identities. We shall illustrate this interaction by several examples.

Keywords: q-series identities ; Partitions; Discrete Mathematics

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Effects of chemical reaction and radiation on MHD free convection flow of generalized Walters'-B fluid with heat and mass transfer analysis over an exponential isothermal vertical plate

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Abstract

The present article reports the applications of Caputo-Fabrizio time-fractional derivatives. This article generalizes the idea of unsteady MHD free convection flow in a Walters.-B fluid with heat transfer analysis over an exponential isothermal vertical plate embedded in a porous medium. The classical model for Walters.-B fluid is written in dimensionless form with the help of non-dimensional variables. Furthermore, the dimensionless model is converted into a fractional model called as a generalized Walters.-B fluid model. The governing equations of generalized Walters-B fluid model have been solved analytically using the Laplace transform technique. They satisfy all imposed initial and boundary conditions and for $\Gamma \rightarrow 0$ can be reduce to the similar solutions for Newtonian fluids. The corresponding expressions for skin friction and Nusselt number are also evaluated. Numerical results for velocity and temperature are displayed graphically for various parameters of interest and discussed. This study is of fundamental importance and frequently arises in many practical situations such as chemical engineering and polymer extrusion processes..

Keywords: Free convection; Heat and mass transfer; Chemical reaction; Caputo-Fabrizio time derivative; Radiation; MHD.

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Keywords: Free convection; Heat and mass transfer; Chemical reaction; Caputo-Fabrizio time derivative; Radiation; MHD.

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Keywords: Free convection; Heat and mass transfer; Chemical reaction; Caputo-Fabrizio time derivative; Radiation; MHD.

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ON λ-STATISTICAL CONVERGENCE OF DOUBLE SEQUENCE OF FUNCTIONS OF ORDER α

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Abstract

In this article, we introduce the concepts statistical convergence of order α for generalized difference double sequences of real valued functions. Furthermore we give the concept of α -statistically Cauchy sequence for Δ^m-double sequences of real valued functions and prove that it is equivalent to pointwise statistical convergence of order α for Δ^m--double sequences of real valued functions. Also some relations between $S^{\alpha}_{(\lambda,\mu)}(\Delta^m, f)$ -statistical convergence and strong $w^{\beta}_{(\lambda,\mu)}(\Delta^m, f)$-summability are given.

.

Keywords: Statistical Convergence, Function Sequences, Cesaro Summability

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IMAGE CODING USING LAPLACE TRANSFORM

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Abstract

In this paper a different cryptographic method is introduced by using Power series transform. A new algorithm for cryptography is produced. The extended Laplace transform of the exponential function is used to encode an explicit text. The key is generated by applying the modular arithmetic rules to the coefficients obtained in the transformation. Here, ASCII codes used to hide the mathematically generated keys strengthen the encryption. Text steganography is used to make it difficult to break the password. The made encryption is reinforced by image steganography. To hide the presence of the cipher text, it is embedded in another open text with a stenographic method. Later, this text is buried in an image. For decryption it is seen that the inverse of the Power series transform can be used for decryption easily.

Experimental results are obtained by making a simulation of the proposed method. As a result, it is stated that the proposed method can be used in crypto machines.

Keywords: Cryptography, Power Series Transform, Data Encryption, Embedded Image

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Moisture sorption isotherms and thermodynamic functions of chickpea (*Cicer arietinum* L.) stored in a chamber under controlled humidity

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Abstract

The moisture sorption isotherms and the thermodynamic functions of chickpea stored in a chamber the relative humidity of which is controlled by an atomizing humidifier were determined at relative humidity ranging from 10 % to 90 % and 25, 35, 45 ^{o}C. The sorption isotherms of chickpea were Type III isotherms according to the BET classification. Moisture content decreased with increase in temperature at a given water activity. The sorption isotherms exhibited hysteresis effect over entire water activities. The experimental sorption data were fitted to many well-known isotherm models. The goodness of fit was evaluated by using statistical tests such as r^2, P % and RMSE. Peleg model was found to be the best model for predicting the equilibrium moisture content-water activity relationship and the moisture sorption behaviour of chickpea. The thermodynamic functions such as isosteric heat of sorption and sorption entropy were determined using the sorption isotherms data. The isosteric heats of sorption were calculated using the Clausius-Clapeyron equation and the isosteric heats of sorption were found to decrease with increasing moisture content. Firstly, the desorption entropy remained constant, then it decreased with an increase in equilibrium moisture content while the adsorption entropy decreased with an increase in equilibrium moisture content.

Keywords: Chickpea; Moisture sorption isotherms; Thermodynamic; Atomizing humidifier.

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On The Solutions of Some Difference Equations Systems and Analytical Properties

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Absract

In this study, we have investigated the global asymptotic behavior of the solutions of the system of the difference equation

$$k_n \frac{d^2 y_n(t)}{dt^2} = h_n \frac{dy_n(t)}{dt} + a_{n-1} y_{n-1}(t) + b_n y_n(t) + q a_n y_{n+1}(t)$$

$$n \in \{0,1\ldots,N-1\}, \qquad t \geq 0$$

where N ≥ 2 is a fixed integer and q> 1 is a fixed real number, $k_n, h_n, a_{n,} b_n$ real parametres and $\{y_n(t)\}_{n=1}^{N}$ find the solution. We have examined the difference equation which examines the limitations, persistence, asymptotic behavior and global asymptotic behavior of positive equations according to given conditions. We have obtained some asymptotic results for the positive balance of this system.We have obtained some asymptotic results for the positive equilibrium of this system.

Keywords: Difference equations, Asymptotic behavior, Global attractivity, Monotone.

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An Interior Inverse Problem for The Sturm Liouville Operator With Discontinuous Conditions

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Abstract

In this paper the eigenvalue problem ,

$$-u'' + h(x)u = \lambda u$$

on the interval $0 \leq x \leq \pi$ with the boundary conditions;

$$\alpha u(0) - u'(0) = \alpha u(\pi) - u'(\pi) = 0$$

and symmetric discontinuities at $x = \mu$ and $x = (\pi - \mu)$ satisfying the symmetric jump condition

$$u(\mu +) = hu(\mu -), u'(\mu +) = h^{-1}u'(\mu -) + ku(\mu -)$$

where $|h - 1| + |k| > 0$ and $0 \leq \mu < \frac{\pi}{2}$. Here the Sturm Liouville problem meets different symmetric limits and splash conditions with different symmetrical potentials. What is achieved is that if a limited number of eigenvalues is different then it is a simple statement of the difference of the potentials.

Keywords: Inverse problem, discontinuities, symmetric potential, jump conditions, second-order differential equation.

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CONTROL OF THERMAL CONDUCTIVITY BY DESIRED FINAL TIME HEAT

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Abstract

In this article, we consider the problem of control of the thermal conductivity in a heat equation. Since these types of problems are ill-posed, the regularization process is needed. We use the adjoint method to obtain the gradient of the regularized cost functional. By gradient method we constitute a minimizing sequence which converges to a thermal conduvtivity function of the heat equation.

Keywords: Inverse Problem; Adjoint Method; Heat Equation.

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New Exponential and Complex Traveling Wave Solutions to the Konopelchenko-Dubrovsky Model

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Abstract

In this study, the application of the improved Bernoulli sub-equation function method to the Konopelchenko-Dubrovsky system is presented. Some new and important solitary wave solutions with complex and exponential function structures are successfully constructed. All the obtained solutions in this study satisfy the Konopelchenko-Dubrovsky model. The interesting three- and two- dimensional surfaces of the obtained solutions are plotted. We carried out all the computations and the graphics plot in this paper by using some software program.

Keyword; Improved Bernoulli sub-equation function method, Konopelchenko-Dubrovsky system, Complex and exponential solutions

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Complete Lifts of Projectable Vector Fields to Semi-tensor Bundles

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Abstract

Using the fiber bundle M over a manifold B, we define a semi-tensor (pull-back) bundle tB of type (p,q). We consider complete lifting problem of projectable vector fields on M to the semi-tensor (pull-back) bundle tB of type (p,q).

Keywords: Vector field, complete lift, pull-back bundle, semi-tensor bundle.

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COMPARISON OF ENCRYPTION ALGORITHMS IN WIRELESS SENSOR NETWORKS

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Abstract

In general, Wireless Sensor Networks occur when sensor nodes are randomly left in an unreliable environment. Sensor node has limited processor, limited memory, limited radio capacity and low cost. In sensor network applications, security mechanisms must be used, because of unsafe environments, excessive number of sensor nodes, and wireless communication environments. Ensuring confidentiality, the primary goal of security, is one of the most important problems to be solved in order to realize time and vital objectives. While ensuring security, it is also necessary to consider other important criteria such as memory usage, energy and latency of Sensor Networks. In this study, encryption is described in Wireless Sensor Networks and Skipjack, XXTEA and AES encryption algorithms are compared using TOSSIM simulation program in TinyOS operating system considering memory usage, energy and delay criteria. The study is considered to be useful academicians who study security in Wireless Sensor Networks.

Keywords: Wireless Sensor Networks; Encryption; XXTEA; AES; Skipjack; TinyOS; TOSSIM;

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INVERSE SPECTRAL PROBLEM FOR DIRAC OPERATORS WITH FROZEN ARGUMENT

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Abstract

In this article, we consider Dirac operators possessing a term depending on the unknown functions with a fixed argument and study the uniqueness of recovering the operators from the spectrum. We also obtain a constructive procedure for solving this inverse spectral problem along with necessary and sufficient conditions of its solvability [1-4].

Keywords: Frozen argument; Eigenvalue.

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THE CALCULATION OF THE REGULARIZATION TRACE OF THE SCHRODINGER EQUATION WITH ENERGY-DEPENDENT POTENTIAL

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Abstract

In this article, we consider the eigenvalue problem for Schrödinger equation with energy-dependent potential in the finite interval. The regularized trace formula of this operator is established with Levitan's method [1].

Keywords: Trace formula; Eigenvalue asymptotics; Eigenvalue.

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INVESTIGATION OF FINITE ELEMENT METHOD PARAMETERS AFFECTING THE DISPLACEMENT BEHAVIOUR OF HIGHWAY PAVEMENTS

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Abstract

Flexible pavements are a type of superstructure constructed using bitumen and granular materials. The methods used in the design of flexible pavements can be examined in five categories. Empirical methods, limiting shear failure methods, limiting deflection methods, regression methods and mechanistic-empirical methods. There has been a dramatic change in the design methods for flexible pavements from the early purely empirical methods to the modern mechanistic-empirical methods [1-4]. Due to the heterogeneous pavement layers and dynamic and cycling loading instead of static loading, researchers diverted their research to the finite element method [1,3]. However, in finite element method, parameters such as the definition of the model as 2D or 3D, the loading condition, the types and formulation of contact between layers, size of mesh, boundary conditions and dimensions of the model have a significant effect on the results. In this study, finite element model parameters affecting the pavement responses under static loading were investigated on a typical superstructure configuration consists pavement, base and subgrade layers.

Keywords: Pavement responses; Mechanistic-empirical design; Finite element model.

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INVESTIGATION OF EARTHQUAKE BEHAVIOR OF CONSTRUCTION SYSTEM AND MATERIALS IN TRADITIONAL TURKISH ARCHITECTURE

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Abstract

In this study, it is aimed to present a point of view regarding the behaviour of construction systems implemented in traditional Turkish architecture against earthquakes. In the scope of the study, examples of civil architecture were considered and their structures were evaluated as building elements such as foundation, wall and flooring.

Traditional Turkish architecture construction systems can be evaluated in two parts. One of them is the wooden carcass system and the other is the unreinforced masonry system. In the wooden carcass system, the carrier is the load bearing elements used in horizontal and vertical directions. Intermediate parts (strut, diagonal etc.) are placed between these elements to form triangles. The gaps between the elements forming the structure are filled with various materials such as wood, mud brick, brick and stone. The triangles (strut, diagonal) used in the wooden skeleton system comprise highly resistant forms against earthquakes. Moreover, due to the internal structure and physical properties of the wood, which is the skeleton material, the flexibility that it maintains can meet the lateral loads of earthquakes.

The second construction system which is the system addressed in this application, is the unreinforced masonry system. In this system, the loadbearing system itself is the walls, which are not resistant to lateral loads. Hence ensuring that the walls can act against lateral loads provides flexibility allowing the earthquake load to be absorbed.

In order to provide this flexibility beams (hatıllar) are installed at certain intervals. After the wall is built to a certain height, a different material is laid allowing a plane of movement on the wall. Thus, when the wall is exposed to a lateral load, it escapes from the planes where the beams (hatıllar) are present, and is protected against large damages by absorbing the earthquake load. The material for the beam (hatıl) can vary according to different wall types. It can be a layer of mortar, wood, concrete, or brickwork made of two or three rows.

In order to establish that the foundation of the structure can withstand earthquakes by movement, wood is placed at the lower part of the foundation above a layer of sand ensuring lateral movement and flexibility of the building.

De Moivre Formula for Hybrid Numbers and Some Applications

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Abstract

In this paper, we express de Moivre formula for hybrid numbers according to their characters and types and examine the roots of a hybrid number using de Moivre formula.

Keywords: *Dual Numbers, Hyperbolic Numbers, Hybrid Numbers, Quaternions*

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The Characterizations of Self-Similar Curve

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ABSTRACT

In this paper, we introduce the geometric properties of self-similar curve in the Euclidean space which given by[1]. Later, we obtained the conditions for self-similar curve to Euclidean space and we give some theorems, characterizations and results for these curves.

Key Words: Osculating Circles, Osculating sphere, Self-similar curve.

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Self-Similar Surfaces in four-Dimension Euclidean Space

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ABSTRACT

In this paper, we study some geometric properties of self-similar surfaces in 4-dimension Euclidean space. In addition, we investigate to be self-similar of generalized rotational surfaces and tensor product surfaces in 4-dimension Euclidean space. Also, we give some theorems and results of self-similar surfaces in 4-dimension Euclidean space.

Key Words: Self-similar surfaces, tensor product surfaces, generalized rotating surfaces.

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The Bertrand Curve for Couple of Similar Frenet Curve

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ABSTRACT

In this paper, we introduce the involute-evolute curve couple and Bertrand curve for similar frenet curve in the Euclidean space, which given by[1]. Besides, we give some theorem and results related to similar frenet curve. Also, we examined some new conditions of which similar frenet curve in the Euclidean space.

Key Words: Bertrand curve mate, Involute-Evolute curve couple, Similar frenet curve

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EXTENSION OF HADAMARD CODES DEFINED ON RINGS

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Abstract

In this study, some special matrices are constructed by choosing certain elements of a finite rings. Codes are written by using these matrices.

These codes are extended to a field. Moreover these codes are classified and more good new codes are written.

Keywords: Hadamard Codes; Recurrent Codes; Finite Rings and Fields.

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THE LOWER BOUNDS OF SOME SUMMABILITY METHODS

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Abstract

Bennet [1] gave a method of how to find the lower bounds of infinite matrices with positive entries: [Let (x_n) be a monotone decreasing nonnegative sequence, $A \in B(l^p)$ with nonnegatice entries, 1<p<∞ . Then

$$\|Ax\|_p \geq L\|x\|_p$$

where

$$L^p = \inf_r (r+1)^{-1} \sum_{j=0}^{\infty} \left(\sum_{k=0}^{r} a_{jk} \right)^p =: \inf_r f(r) .]$$

By applying this method, the lower bounds for some summability methods have been calculated more precisely. In this study, we will also determine the lower bounds of some summability methods.

Keywords: Lower bound; Cesaro operator; weighted mean operators.

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THE SPECTRUM OF DISCRETE GENERALIZED CESARO OPERATORS ON l^p (1<p<∞).

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Abstract

$A=(a_{nk})$ matrix defined as $a_{nk}=\frac{\alpha^{n-k}}{n+1}, 0<\alpha<1$ is called discrete generalized Cesàro operators. In [1], the spectrum of the discrete generalized Cesàro operator on l^2 was given by Rhaly. Rhoades [2] also specifies the lower bound on l^p (1<p<∞) of the discrete generalized Cesàro operator. In this study we will also determine the spectrum of the discrete generalized Cesàro operator on l^p (1<p<∞).

Keywords: spectrum, fine spectrum, discrete generalized Cesàro operatör, Cesàro operator.

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VECTORIAL MOMENTS OF RIBBON CURVES IN E^3

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Abstract

In this article, we study the vectorial moments based on dual curve which defined by the ribbon frame on the ribbon curves in E^3. We obtain the ribbon apparatus of dual curves.

Keywords: Vectorial moments, ribbon curves, ribbon frame,

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NEW FOCAL CURVE ACCORDING TO THE MODIFIED ORTHOGONAL FRAME

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Abstract

In this article, we study new focal curve according to the modified orthogonal frame in Euclidean 3-space E^3. We obtain some new characterizations for focal curvatures of this curve.

Keywords: Focal curve, focal curvature, modified orthogonal frame

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REPRESENTATION OF THE MATRIX FOR CONVERSION BETWEEN TRIANGULAR BEZIER PATCHES AND RECTANGULAR BEZIER PATCHES

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Abstract

In this paper we studied Bezier surfaces that are very famous techniques and widely used in Computer Aided Geometric Design. Mainly there are two types of Bezier surfaces which are rectangular and triangular Bezier patches. They have different geometric properties so it is not easy to use both of them in the same CAD. Here we will give a different represantation for the conversion matrix which converts one type to another.

Keywords: Bèzier curves; Bèzier rectangles; Bèzier triangles; Degree reduction; Degree elevation.

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On Rough Convergence Variables of Triple Sequences

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Abstract

Triple sequence convergence plays an extremely important role in the fundamental theory of mathematics. This paper contains four types of convergence concept of convergence almost surely, convergence incredibility, trust convergence in mean and convergence in distribution and discuss the relationship among them and some mathematical properties of those new convergence.

Keywords: Triple sequences, Rough convergence almost surely, Convergence in credibility, Trust convergence, Convergence distribution.

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Bernstein Operator of Rough I- core of Triple Sequences

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Abstract

We introduce and study some basic properties of Bernstein polynomials of rough I-convergent of triple sequence spaces and also study the set of all Bernstein polynomials of rough I-limits of a triple sequence spaces and relation between analytic ness and Bernstein polynomials of rough I-core of a triple sequence spaces.

Keywords: Ideal, Triple sequences, Rough convergence, Closed and convex, Cluster points and rough limit points, Bernstein operator.

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THE STABILIZED FEM SOLUTION OF THE MHD FLOW IN A RECTANGULAR DUCT WITH PERTURBED BOUNDARY

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Abstract

In this study, we investigate the effects of small boundary perturbation on the magnetohydrodynamic (MHD) duct flow when the Hartmann walls of which the upper one is perturbed, are perfectly conducting and the side walls are insulated. The numerical results are obtained by solving the MHD flow equations with the stabilized finite element method (FEM) for Hartmann number values $Ha \leq 50$ and for perturbation parameter $\varepsilon = 0.1, 0.2, 0.3$. The velocity and the induced magnetic field behaviors with respect to the perturbed upper wall are simulated in terms of equivelocity and current lines, and also in terms of velocity and induced magnetic field level curves.

It is deduced that, the flow and the induced current contain the influence of the boundary perturbation which is significant near the perturbed boundary (upper wall), and also it is present to some extent in the whole duct. As the perturbation parameter is increased, the flow tends to move through the perturbed boundary and the induced current increases taking its maximum value in a region around the maximum point of the perturbed curve. Further increase in Ha retards the effect of the boundary perturbation leaving its place to flattened flow with side layers and stagnant fluid at the central part of the duct. The stabilized FEM captures all the influences of the perturbed boundary on the MHD rectangular duct flow.

Keywords: *MHD duct flow, Boundary perturbation*

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Positive Solutions of a Singular Integro-differential Boundary Value Problem in Perspective of Caputo-Fabrizio Fractional Derivative

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Abstract

We formulate Green's function and present sufficient conditions for existence of positive solutions for a fractional order integro-differential boundary value problem containing some nonlinear singular terms. Moreover, fractional derivative in integro-differential equation is of Caputo-Fabrizio type. We use results from functional analysis and fixed point theory to establish existence of positive solution.

Keywords: Caputo-Fabrizio derivative; Fractional calculus; Integro-differential equations; Positive solutions; Singular boundary value problems.

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Asimptotic behavior of solutions of higher order "Emden-Fouler's" type Equations

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Abstract

This report deals with the study of oscillatory properties of solutions of nonlinear higher order difference equation with delayed argument. There are established sufficient conditions for the difference equation to have propertis A or B.

Keywords: Solution, Oscillation, Property A, Property B.

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ON THE SOLUTIONS OF FRACTIONAL CAUCHY PROBLEM FEATURING CONFORMABLE DERIVATIVE

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Abstract

In this research, we have obtained analytical solutions of fractional Cauchy problem by using q-Homotopy Analysis Method (q-HAM) featuring conformable fractional derivative. We have considered different situations according to the homogeneity and linearity of the fractional Cauchy differential equation. A detailed analysis of the results obtained in the study has been reported. According to the results, we have found out that our obtained solutions converge very speedily to the exact solutions.

Keywords: q-homotopy analysis method; Fractional Cauchy problem, Conformable derivative.

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POLYGONS FOR HEARING-IMPAIRED STUDENTS

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Abstract

To detect what students think about mathematical concepts, how information they have, and what misconceptions are, is crucial to organize the learning environments as desired. Indeed, these students have been proven to have serious problems in learning mathematics which is an abstract course. This study also aims to reveal the knowledge that hearing-impaired students have about polygons and their properties which are edge, angle, corner, rotation, modal features, regions separated in the plane, and combination of different geometric shapes. It was determined that the students said that geometric objects such as cone, cylinder, cube and circles, angles which are non-polygonal are polygons. Also, it was detected that the students used some mathematical concepts with meanings in daily speech language while explaining these features. The students stated that triangle, rectangle, and square converted into a different polygon when they were rotated. In the light of findings, it is suggested that teachers should pay attention to the words and explanations they use in expressing mathematical concepts in the classroom environment and to show shapes and representations in different positions.

Keywords: polygons, non-polygons, hearing-impaired students.

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REGARDING THE NUMERICAL AND STABILITY ANALYSIS OF THE SHARMA-TOSSO-OLVER EQUATION

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Abstract

With aid of the Wolfram Mathematica package, this study investigates the solutions of a nonlinear model with strong nonlinearity, namely; the Sharma-Tosso-Olver equation. We use the improved Bernoulli sub-equation function method in acquiring the analytical solution to this equation, we successfully obtain one-singular soliton solution with exponential function structure. Through the obtained analytical solution, the finite forward difference method is used in approximating the exact and numerical solutions to this equation. We check the stability of the finite forward difference method with this equation using the Fourier-Von Neumann stability analysis. We find the L_2 and L_∞ norm error to the numerical approximation. We present the interesting 3D and 2D figures of the obtained singular soliton solution. We also plot the graphics of the numerical error, exact and numerical approximations data obtained in this study by using the MATLAB package.

Keywords: Sharma-Tosso-Olver equation. Improved Bernoulli sub-equation function method, Finite forward difference method.

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Inverse problem for a Class of Dirac Operators with eigenvalue linearly dependent to boundary condition

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ABSTRACT

We consider the boundary value problem L for the equation:

$$\ell[y(x)] := A(\sigma y)'(x) + C(x)y(x) = \lambda y(x),\ x \in I = (0,\pi) \tag{1}$$

with the boundary conditions

$$(\sigma y_1)(0)\sin\alpha + (\sigma y_2)(0)\cos\alpha = 0,$$
$$(a_1\lambda + a_2)(\sigma y_1)(\pi) + (b_1\lambda + b_2)(\sigma y_2)(\pi) = 0$$

where $A = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$, $C(x) = \begin{pmatrix} p(x) & q(x) \\ q(x) & r(x) \end{pmatrix}$, $y(x) = \begin{pmatrix} y_1(x) \\ y_2(x) \end{pmatrix}$, $p(x), q(x), r(x), \sigma(x), \dfrac{1}{\sigma(x)}$, real valued bounded function in $\sigma(x) > 0$, $\gamma(x) = \int_0^x \dfrac{dt}{\sigma(t)}$, $\alpha \in [0,\pi), a_1 a_2, b_1 b_2$ are real numbers.

If , $\sigma(x) \equiv 1$ the function $y(x) = \begin{pmatrix} y_1(x) \\ y_2(x) \end{pmatrix}$ is differentiable and also $\ell[y(x)] \in L_2(0,\pi)$. However when $\sigma(x) \neq 1$, the function $(\sigma y)(x)$ must be differentiable and $\ell[y(x)] \in L_2(0,\pi)$. It is clear that in that case the function $y(x)$ may or may not be differentiable function. However the function $(\sigma y)(x)$ has to be differentiable. Therefore, in this study the solution set of given system consists of more general functions, which is different from the classic case. Hence, this problem has importance mathematical and also application sense.

In this study, we consider operator (1) in a finite interval. Properties of spectrum are investigated in the second part. The Prüfer's angle, the Weyl function for considering operator have been defined in the third part. In the fourth part, the inverse problem of the reconstruction of a boundary value problem L from the Prüfer's angle, the Weyl function and two different eigenvalues sequences are investigated. Then the uniqueness theorem of inverse problem according to these functions and two different eigenvalues sets has been proved.

Key words: Inverse problem; Dirac operator, Prüfer's angle

Acknowledgement : This work is supported by the Scientic Research Project Fund of Cumhuriyet University under the project number F-545.

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Inverse problem for singular Sturm-Liouville operator which has discontinuous coefficient

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ABSTRACT

We consider the boundary value problem L for the equation:

$$ly := -y'' + \left[\frac{A}{x} + q(x)\right]y = \lambda\rho(x)y\,,\ \lambda = k^2\,,\ x \in I = (0,d)\cup(d,\pi)$$

with the boundary conditions

$$U(y): y(0) = 0, V(y): y(\pi) = 0$$

and with the jump conditions

$$\rho(x) = \begin{cases} 1, & 0 \le x < d \\ \alpha^2, & d < x \le \pi \end{cases}$$

where λ is spectral parameter; $A, \alpha \in R, \alpha \ne 1, \alpha > 0$, $d \in \left(\frac{\pi}{2}, \pi\right)$, $q(x)$-is a real valued bounded function and $q(x) \in L_2(0,\pi)$.

Boundary value problems with discontinuous coefficient often appear in applied mathematics, geophysics, mechanics, electromagnetics, elasticity and other branches of engineering and physics. The inverse problem of reconstructing the material properties of a medium from data collected outside of the medium is of central importance in disciplines ranging from engineering to the geosciences. [1-3]

In this study, uniqueness theorem for solution of inverse problem according to GLM type main integral equation has been proved.

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Key words: Inverse problem; Coulomb singularity; GLM type main integral equation.
AMS (2000) classif: 34A55, 34B24, 34L05
Acknowledgement : This work is supported by the Scientic Research Project Fund of Cumhuriyet University under the project number F-562

Active Power Filter Based on PQ Current Detection For Compensation of Harmonics

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Abstract

These last years, the spectacular progress and the increasing use of the semiconductor components in the electric systems conduct to the appearance of the problems connected to the harmonious disturbances. These problems can affect branches of industry (speed variators, electronic starters etc.) either tertiary (computing, lighting of desks, trades) or domesticate (household electrical appliances such as television sets). The harmonious currents are mainly generated by the non-linear loads(responsibilities) connected to the electricity network, this type of loads(responsibilities) absorb non-sinusoidal currents when the voltage is sinusoidal. These harmonious of current are going to generate in their turn harmonious tensions in the various points of connection to the network. For other electric equipments connected in these points, this harmonious pollution has unwanted effects. Among these effects, we can distinguish the deformation of the tension of the network in the connecting point, This pollution can also cause the heating(warm-up) of cables and electric equipments either still sudden stop of the rotating machines, or destruction of all these equipments. To minimize these disturbances we propose an active filter of power which allows to eliminate the harmonious and reduces the total of harmonious distortion (THD).

Keywords: Active Filter of Power APF; The Total of Harmonious Distortion THD, Harmonic Current HC

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A Fresh Look To Exact Solutions of Some Coupled Equations

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Abstract

This manuscript is going to seek travelling wave solutions of some coupled partial differential equations with an expansion method known as Sine-Gordon expansion method. Primarly, we are going to employ a wave transformation to partial differential equation to reduce the equations into ordinary differential equations. Then, the solution form of the handled equations is constructed as polynomial of hyperbolic trig or trig functions. Finally, with the aid of symbolic computation, new exact solutions of the partial differentials equations will have been found.

Keywords: Sine-Gordon expansion method, variant Boussinesq equation; coupled Klein Gordon equation., exact solutions

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A New Approach To Exact Solutions of Some Partial Differential Equations Based on Sine-Gordon Expansion Method

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Abstract

This manuscript is going to focu on to obtain exact solutions of (2+1) dimensional Dispersive Long Wave equation and (2+1)-dimensional Painlevé integrable Burgers (PIB) equation via sine-Gordon expansion method (SGEM). Firstly, the partial differential equations are converted into ordinary differential equations using the travelling wave transformation. Then, with the aid of symbolic computation , their hyperbolic function solutions are constructed. The newly obtained results show that the SGEM is a powerful and effective method in seeking exact solutions of nonlinear differential equations.

Keywords: Dispersive Long Wave equation; Painlevé integrable Burgers equation; sine-Gordon expansion method; exact solution.

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VEHICLE ROUTING PROBLEM APPLICATIONS IN FOOD INDUSTRY

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Abstract

Optimization of logistic management system is also vital for quality in food industry including collection and distribution of raw milk, fresh vegetables, fruits, catering meals, beverages, meat, fish and dairy products etc. Efficient logistics systems should therefore provide not only fresh and safe food products, but also it should be delivered on the time. Delivery time is the one of the most important concern for customers along with price and taste of the meal. The food industry companies needs to find the best route plan to deliver the foods within predetermined time limits. The distance from the food production center to serving areas will affect transportation time. It is very important to plan optimum delivery routes to minimize the cost and to keep the temperature of meals within the acceptable level. It is very important that the food companies set up their distribution networks in the most optimal way. Route optimization is one of the leading problems targeting the vehicle routing problem. In this study, a literature review of vehicle routing problem applications is examined from the recent published literature and a new case study from food industry is solved with variable neighborhood search metaheuristic.

This research is funded by the Scientific and Technological Research Council of Turkey (TUBITAK) with the grant number 217M578.

Keywords: Vehicle routing problem; Food industry; Logistics, Optimization.

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REPRODUCING KERNEL METHOD FOR TIME FRACTIONAL ALLEN-CAHN EQUATION

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Abstract

In this study, we present an iterative reproducing kernel method for numerical solution of Allen-Cahn equation with time fractional Caputo derivative. Convergence analysis is constructed theoretically. Numerical experiments show that approximate solution uniformly converges to exact solution. The results show that the given method very efficient and convenient for time fractional Allen-Cahn equation.

Keywords: Iterative reproducing kernel method; Allen-Cahn equation; Caputo derivative.

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On the new wave behavior to the longitudinal wave equation in a magneto-electro-elastic circular rod

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Abstract

With the aid of the symbolic computations software; Wolfram Mathematica 9, the powerful sine-Gordon expansion method is used in examining the analytical solution of the longitudinal wave equation in a magneto-electro-elastic circular rod. Sine-Gordon expansion method is based on the well-known sine-Gordon equation and a wave transformation. The longitudinal wave equation is an equation that arises in mathematical physics with dispersion caused by the transverse Poisson's effect in a magneto-electro-elastic circular rod. We successfully get some solutions with the complex, trigonometric and hyperbolic function structure. We present the numerical simulations of all the obtained solutions by choosing appropriate values of the parameters. We give the physical meanings of some of the obtained analytical solutions which significantly explain some practical physical problems.

Keywords: The SGEM; longitudinal wave equation in a MEE circular rod; complex; hyperbolic; trigonometric function solutions.

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On a mixed problem for semilinear wave equations with nonlinear boundary conditions

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Abstract

In the plane of independent variables x and t, in the domain $D_T: 0 < x < l, \quad 0 < t < T$, consider a nonlinear mixed problem of finding a solution $u(x,t)$ for semilinear wave equation of the form

$$u_{tt} - u_{xx} + g(u) = f(x,t), \quad (x,t) \in D_T, \tag{1}$$

satisfying the following initial

$$u(x,0) = \varphi(x), \quad u_t(x,0) = \psi(x), \; 0 \le x \le l, \tag{2}$$

and boundary value conditions

$$u_x(0,t) = F[u_t(0,t)], \; u(l,t) = 0, \; 0 \le t \le T, \tag{3}$$

where f, φ, ψ, g and F are given, while u is unknown real functions. Let the following conditions of smoothness

$$f \in C^1(\overline{D}_T), \; g, F \in C^1(R), \; \varphi \in C^2([0,l]), \; \psi \in C^1([0,l]) \tag{4}$$

be fulfilled. We assume that at points $(0,0)$ and $(l,0)$ the following conditions of agreement

$$\varphi'(0) = F[\psi(0)], \psi'(0) = F'[\psi(0)][\varphi''(0) - g(0) + f(0,0)],$$
$$\varphi(0) = \varphi(l) = \psi(l) = 0, \; g(0) - \varphi''(l) = f(l,0), \tag{5}$$

are also fulfilled. Let

$$\int_0^s g(s_1)ds_1 \ge -M_1 s^2 - M_2, \; sF(s) \ge -M_3, \; F'(s) \ne -1, \forall s \in R, \tag{6}$$

Where $M_i := const \ge 0, \; 1 \le i \le 3$.

There are proved, if the conditions (4)-(6) are fulfilled, than the problem (1)-(3) has a unique classical solution.

Keywords: Semilinear wave equation, mixed problem, apriori estimate.

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New Aspects of Fractional Optimal Control Problems with Applications

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Abstract

In this talk, new trends in the formulation of fractional optimal control problems will be discussed under the consideration of some newly defined fractional derivatives with nonsingular kernel. The necessary optimality conditions will be presented both in the cases of fractional derivatives with singular kernel and nonsingular kernel. Some one dimensional and multi dimensional illustrative examples will be shown with their numerical solutions via appropriate explicit numerical schemes within a comparative study. Further improvements will be discussed for the performance of the numerical schemes.

Keywords: Fractional Calculus; Fractional Optimal Control; Numerical Analysis.

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UNITS IN INTEGRAL GROUP RING $\mathbb{Z}[S_3 \times C_3]$

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Abstract

In this article, we obtain a split extension form of unit group in integral group of the direct group $S_3 \times C_3 =< a, b, x: a^3 = b^2 = x^3 = 1, bab^{-1}, ax = xa, bx = xb >$. In this characterization, we extend some group homomorphisms to ideals of integral group rings $\mathbb{Z}[S_3 \times C_3]$ linearly and show that the torsion free normal complement of the unit group in $\mathbb{Z}S_3$ is a direct summand (as a $\mathbb{Z}$-module) of this extension. Notations mostly follow [8].

Keywords: Unit Group; Integral Group Ring; Group Ring; Direct Product.

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High Order Iterative Methods for Matrix Inversion and Regularized Solution to the Fredholm Integral Equation of the First Kind with Noisy Data

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Abstract

The motivation of the present work is to propose high order iterative methods with a recurrence formula for approximate matrix inversion and provide regularized solution of Fredholm integral equation of first kind with noisy data by an algorithm using the proposed methods. For constructing the methods, the matrix multiplications and additions in the calculation of matrix polynomials are reduced through factorizations and nested loops of which the iterations are defined using a recurrence formula. Therefore, the computational cost is lower than the hyperpower method of same orders. Analysis of convergence shows that these high order methods posses $p = 4k + 3$ orders of convergence where, $k \geq 1$ is integer requiring $\kappa = k + 4$ matrix multiplications per step. From the given family of methods of orders $p = 7,11,15,19$ are applied to solve problems of Fredholm integral equation of first kind of which includes the harmonic continuation problem. Numerical analysis for the regularized solution of the considered problems are given. From the literature, iterative methods of same orders are used to solve the considered problems and numerical comparisons are shown through tables and figures.

Keywords: Approximate inverse, Perturbation error analysis, Fredholm integral equation of the first kind, Harmonic continuation problem

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HOME HEALTH CARE ROUTING SCHEDULING PROBLEM WITH WORKLOAD CONSTRAINTS

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Abstract

Home health care (HHC) is a wide range of health care services given by healthcare professionals such as doctors, nurses and therapists in the patient's home for their illness or injury. Due to the ageing population, high hospitalization cost and new developments in medical technologies, HHC is a rapidly growing service industry especially in developed countries. In order to increase the efficiency of the HHC, several decisions problems such as assigning the healthcare personals to the patients, finding daily or weekly visit schedules and travel routes must be addressed. These problems are called HHC routing and scheduling problems.

In this study, we consider HHC routing and scheduling problem with workload constraints. Healthcare professionals perform tasks that are both physically and mentally demanding. Therefore, work related illnesses are very common among homecare personals. In order to reduce work related illnesses, total workload should be distributed among healthcare professionals. We develop a mathematical model formulation that considers workload constraints when assigning workers to the patients. The aim of the model is to find the patient and personal assignments in order to maximize the number of patients visited daily without exceeding workload limit.

Keywords: Home health care, scheduling, routing, workload constraints.

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A Multi Choice Conic Goal Programming Approach for the Optimization of Cuscrore Control Chart Parameters for the ARMA (1,1) Time Series Data

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Abstract

Cumulative Score (CuScore) control charts, which are generalized version of the Shewhart, CUSUM and EWMA control charts, were developed to detect specific signals such as spike, step, bump and rump earlier. In this study, a Cuscrore control chart was designed for a particular signal type (bump) for the ARMA (1,1) time series data. The simulation code of this chart has been in SAS environment. Then, Design of Experiment (DOE) and Response Surface Methodology (RSM) were used to find the optimum values of CuScore control chart parameters by the objectives of maximizing the detection rate and minimizing the probability of false signal. By using DOE and Response Surface Methodology, two different non-linear regression equations were obtained for detection rate and false alarm. These regression models were considered as the objectives that conflicting each other. Then, Multi-Choice Conic Goal Programming (MCCGP) was used to minimize unwanted deviation variables of goals which contains conflicting objectives namely detection rate and false alarm. The results of the MCCGP provide parameter setting of Cuscore Control Chart for IMA (1,1) Time Series. Then, MCCGP has been proposed by Ustun based on Conic Scalarizing Function alternatively. This alternative formulation allows the decision maker to set multi-choice aspiration levels for each goal to obtain an efficient solution in the global region and guarentees to obtain a properly efficient (in the sense of Benson) point.

Keywords: Cuscore Control Chart; Design of Experiment; Response Surface Methodology; Multi-Choice Conic Goal Pragramming

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DETERMINING OPTIMAL ROUTING SOLUTION OF A PATROL CAR

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Abstract

Chinese Postman Problem which is dealt with in the context of the arc routing problem is one of the routing problem in 1962 in order to get the shortest turn by passing at least once on every arc on the chart. It can be used in many stations such as determining vehicle routing, tours of police patrols and determining the routes of snow removal vehicles. In this study, after explaining the basic concepts related to Chinese Postman Problem, the analysis is done through the model to find the best route over the routes that police patrol cars in a certain area have to travel.

Keywords: *Chinese Postman Problem, Optimization, Routing Problem*

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ON PROPERTIES OF RP_I-SETS, RPC_I-SETS AND RC_I-SETS

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Abstract

Ekici and Elmalı introduced and studied the notions of RP_I-sets, RPC_I-sets and RC_I-sets for some decompositions via generalized closedness in ideal spaces [On decompositions via generalized closedness in ideal spaces, Filomat, 29 (4) (2015), 879-886]. Also, properties of RP_I-sets, RPC_I-sets and RC_I-sets were introduced. The aim of this paper is to study additional properties of RP_I-sets, RPC_I- sets and RC_I- sets.

Keywords: RP_I-set, RPC_I-set, RC_I-set.

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EXAMPLE OF A KINETIC MATHEMATICAL MODELING IN FOOD ENGINEERING

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Abstract

Mathematical modeling of biochemical, chemical reaction processes facilitates understanding. The kinetics of these reaction processes can be analyzed mathematically and kinetics are presented as systems of differential equations. Mathematical model of a reaction kinetic is studied in this study. Bernoulli-Sub equation function method is used in this study. This example can be new model for food engineering applications.

Keywords: Bernoulli-Sub equation function method, Kinetic of reaction, Mathematical modeling, Food engineering.

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CONSEQUENCES ON THE GLOBAL STABILITY OF THE DISCRETE-TIME POPULATION MODEL

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Abstract

In this article, the global dynamic behavior of a discrete-time population model with and without Allee effect are investigated . The results for both situations were obtained.

Keywords: Global stability, Discrete-time model, Allee effect

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THE STABILITY OF DELAYED POPULATION MODELS AND THE EFFECT OF THE ALLEE FACTOR ON STABILITY

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Abstract

In this paper, we studied on delay difference models under a competitive effect. Firstly, we obtained the stability conditions of the equilibrium points of some models; and then we investigated the stability of the equilibrium points of the models together with Allee effect. Thus, we observed the effect of Allee factor on different populations. The numerical simulations confirm the analytical results.

Keywords: Population dynamics, Allee effect, Stability, Equilibrium point

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REPRESENTATION OF THE MATRIX FOR CONVERSION BETWEEN TRIANGULAR BEZIER PATCHES AND RECTANGULAR BEZIER PATCHES

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Abstract

In this paper we studied Bezier surfaces that are very famous techniques and widely used in Computer Aided Geometric Design. Mainly there are two types of Bezier surfaces which are rectangular and triangular Bezier patches. They have different geometric properties so it is not easy to use both of them in the same CAD. Here we will give a different represantation for the conversion matrix which converts one type to another.

Keywords: Bèzier curves; Bèzier rectangles; Bèzier triangles; Degree reduction; Degree elevation.

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DEGENERATE POCHHAMMER SYMBOL AND DEGENERATE HYPERGEOMETRIC FUNCTION

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Abstract

Recently, T. Kim and D.S. Kim [2] have defined and introduced some properties of the degenerate gamma function. In this study, we constitute and investigate some properties of the degenerate Pochhammer symbol using degenerate gamma function. Then, using the degenerate Pochammer symbol, we obtain the degenerate hypergeometric function *pFq* with *p* numerator and *q* denominator parameters. Moreover, we define and present some properties of the degenerate Sumudu transform using the degenerate exponential function. Also, we give the certain integral representations.

Keywords: Gamma function, Degenerate Gamma function, Pochammer symbol, Degenerate Pochammer symbol, Degenerate Hypergeometric function, Degenerate Sumudu transform, İntegral transforms.

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DISCRETE FRACTIONAL SOLUTIONS OF A HERMITE EQUATION

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Abstract

In recent years, fractional differential equations have been of great interest. It is caused both by the intensive development of the theory of fractional calculus itself and by the applications of such constructions in various sciences such as physics, mechanics, chemistry and engineering.

In this work, we submit a method for solving the second-order linear ordinary differential equation. Unlike previous studies, we obtain some different new solutions of the equation. Therefore, we obtain new discrete fractional solutions of the homogeneous and non-homogeneous Hermite differential equation by using a discrete fractional Nabla calculus operator.

Keywords: Fractional Calculus; Discrete Fractional Calculus; Hermite Equation.

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APPLICATIONS OF FRACTIONAL CALCULUS FOR SECOND ORDER DIFFERENTIAL EQUATIONS

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Abstract

Fractional calculus is a very useful and simple means in obtaining particular solutions to certain non-homogeneous linear differential equations. Fractional calculus tecniques contribute to many fields of science and engineering such as applied mathematics, control theory, economy, nuclear magnetic resonance, optics, robot technology and so on [1-4].

Our aim in this work is to obtain fractional solutions of the second order non homogeneous differential equation with Nishimoto's operator.

Keywords: Fractional Calculus; Nishimoto's operator; Differential Equation.

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EXPLICIT SOLUTIONS OF THE LAGUERRE EQUATION VIA FRACTIONAL CALCULUS OPERATOR

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Abstract

In this work, we submit a method for solving the second-order linear ordinary differential equation. Unlike previous works, we obtain some different new solutions of the equation. By means of fractional calculus techniques, we find explicit solutions of the Laguerre differential equations. We use the *N*-fractional calculus operator to obtain the solutions of these equations.

Keywords: Fractional Calculus; Nishimoto's operator; Laguerre Differential Equation.

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ON SOME GENERALISATIONS OF STATISTICAL CONVERGENCE

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Abstract

In this study using a modulus function we introduce and study some new concepts related to statistical convergence, statistical boundedness and strong Cesàro summability of sequences in a metric space with a new version of density for sets of positive integers. The sequence sets produced with the help of given concepts are closely related to each other. We will also reveal the relationships between the concepts we present and the concepts already have been given. Furthermore, we also investigate the relations on the sets which are derived as special cases.

Keywords: density, modulus function, statistical convergence, Cesàro summability.

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ON A NEW DIFFERENCE SEQUENCE SET

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Abstract

The idea of difference sequences and the related sets was introduced by Kızmaz [8] in 1981 and then this subject has been studied and generalized by various mathematicians. In this study, we have defined the difference sequence set $m(\varphi,p,\alpha)(\Delta_v^r x) = \{x=(x_k): \Delta_v^r x \in m(\varphi,p)\}$ and showed that $m(\varphi,p,\alpha)(\Delta_v^r x)$ is a Banach space. Furthermore, we have noted some other topological properties and obtained some results with related to this set. The results obtained in this study generalize some known results.

Keywords: Difference sequence, Solid space, BK-space.

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An Approximate Grid Solution of a Nonlocal Boundary Value Problem with Integral Boundary Condition for Laplace's Equation

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Abstract

The new method for the solution of the multilevel nonlocal boundary value problem given [1]-[4] is generalized to the problem with integral boundary condition for Laplace's equation on a rectangular domain. The solution of the given problem is defined as a solution of the Dirichlet problem by constructing the aproximate value of the unknown boundary function on the side of the rectangle where the integral boundary condition was given. Further, the five point approximation of the Laplace operator is used on the way of finding the uniform estimation of the error of the solution which is order of $O(h^2)$, where h is the mesh size. Numerical experiments are given to support the theoretical analysis made.

Keywords: rectangular domain; nonlocal boundary value problem; elliptic equation; difference scheme; solvability of boundary value problem; integral condition.

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An Approximate Grid Solution of a Nonlocal Boundary Value Problem with Integral Boundary Condition for Laplace's Equation

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Abstract. A new method for the solution of a nonlocal boundary value problem with integral boundary condition for Laplace's equation on a rectangular domain is proposed and justified. The solution of the given problem is defined as a solution of the Dirichlet problem by constructing the aproximate value of the unknown boundary function on the side of the rectangle where the integral boundary condition was given. Further, the five point approximation of the Laplace operator is used on the way of finding the uniform estimation of the error of the solution which is order of $O(h^2)$, where h is the mesh size. Numerical experiments are given to support the theoretical analysis made.

Keywords. rectangular domain, nonlocal boundary value problem, elliptic equation, difference scheme, solvability of boundary value problem, integral condition.

Water driven CuO nanoparticles enclosed in a partially heated trapezoidal cavity with heated obstacle via FEM

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Abstract

This frame work is established to investigate the thermal management of free convection enclosed in trapezoidal cavity filled with the water based copper oxide (CuO) nanofluid. As nanoparticles volume fraction ($\phi\%$) play a significant role to handle the thermal conductivity of any working fluid, so we have addressed the complex nature real world model that widely used at the industrial level and many other mechanisms. An identical trapezoidal shape cavity is placed inside the big trapezoidal cavity that have three various constraints at the surface (cold, insulated and heated). Since bottom wall of the outer cavity is partially heated so various heated portion tests are applied to analyze the influence of heat transfer within the entire cavity. Aspect ratio that depends upon the size of the inner cavity is also determine. Complete and compatible mathematical model is constructed in the form of nonlinear coupled partial differential equation. These set of equations are characterized under the law of conservation of mass, momentum and energy equation along with the restricted domain of the cavity. Koo and Kleinstreuer-Li (KKL) model is used for effective thermal conductivity and viscosity of the nanofluid. A Galerkin based Finite Element method (FEM) is implemented to attain the suitable results in term of stream function and isotherms within the restricted domain of the cavity. Results are also obtained for velocity and temperature of the nanofluid at vertically mean position of the cavity. A Nusselt is also calculated to determine the heat transfer rate at the surface of the various heated portion of outer and inner cavity. The simulations are performed for nanoparticles volume fraction $0 \leq \phi \leq 0.2$ heated portion length $0 \leq L_T \leq 1$ aspect ratio $0.5 \leq AR \leq 3.0$, Rayleigh numbe $10^4 \leq Ra \leq 10\text{^}5.7$, and three heated conditions (cold, adiabatic and hot) for inner trapezium.

Keywords: Trapezoidal cavity; nanoparticles; inner heated obstacle; nanofluid; KKL model; Heat transfer.

Implementation of the vehicular occupancy-emission relation using a cubic B-spline collocation method

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Abstract

The complexity and non-linearity of flow phenomena are explained by numerous criteria, including the interactions of the large number of vehicles occupying the road, which influence the road density. This density under certain conditions, leads to traffic congestion which has dangerous effects on the environment such as; resources consumption; noise and the effect caused by greenhouse gas emissions of the CO2 and other pollutants. In this paper we consider working in an uniform, homogeneous road where the traffic is described by the Lighthill Whitham-Richard (LWR) model resolved using a cubic B-spline collocation scheme in space and an implicit Runge Kutta scheme in time. We also sheded light on the relation between vehicle occupancy and vehicle emissions. Inthisarticle,we obtains omenew complex analytical solutions to the nonlinear Kundu-Eckhaus equation which seems in the quantum field theory, weakly nonlinear dispersive water waves and nonlinear optics by using improved Bernoulli sub-equation function method.

Keywords: LWR model; Traffic congestion; Traffic pollution; Traffic vehicle emission, B-spline; Collocation method; Implicit Runge Kutta method.

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A new family of $k-$ Gaussian Fibonacci Numbers

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Abstract.

In this manuscript, we identified a new family of $k-$ Gaussian Fibonacci numbers and found some relationships between this family and known Gaussian Fibonacci numbers. Also, we have obtained the generating functions of this family for $k=2$.

1. Introduction

Horadam [2] in 1963 and Berzsenyi [1] in 1977 defined complex Fibonacci numbers. Horadam introduced the concept the complex Fibonacci numbers as the Gaussian Fibonacci numbers. Moawwad El-Mikkawy and Tomohiro Sogabe [12] in 2015 defined a new family of k-Fibonacci numbers and they gave $F_n^{(k)}$ and establish some properties of the relation to the F_n. There are many studies on Fibonacci and Gaussian Fibonacci numbers. See, e.g. [3–11,13-17].

The Binet's formula of the Fibonacci numbers are defined as follows:

$$F_n = \frac{1}{\sqrt{5}}(\alpha^{n+1} - \beta^{n+1}), \quad n = 0,1,2,\cdots$$

where $\alpha = \frac{1+\sqrt{5}}{2}$ and $\beta = \frac{1-\sqrt{5}}{2}$. The first few Fibonacci numbers are 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, $\cdots$. For more detailed information on these numbers see [18]. The numbers F_n with the initial conditions $F_0 = 0$ and $F_1 = 1$ satisfy

$$F_{n+2} = F_{n+1} + F_n, \quad n \geq 0.$$

The Gaussian Fibonacci numbers: GF_n for $n \geq 0$ are defined

$$GF_n = GF_{n-1} + GF_{n-2}$$

where $GF_0 = i, GF_1 = 1$. The first few Gaussian Fibonacci numbers are $i, 1, i+1, i+2, 2i+3, 3i+5, 5i+8, \cdots$.

SSLH TOPOLOGICAL SPACES

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Abstract

As a generalization of the concept strongly locally homogeneous topological space, we introduce and investigate the concept of slightly strongly locally homogeneous (SSLH) topological space. We give several implications regarding this concept. We show that a slightly homogeneous component of an SSLH topological space is clopen. We show that a clopen subspace of an SSLH topological space is SSLH. Also, we show that the disjoint sum of SSLH topological spaces is SSLH.

Keywords: Strongly locally homogeneous space; countable dense homogeneous space.

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SSLH TOPOLOGICAL SPACES

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Keywords: Strongly locally homogeneous space; countable dense homogeneous space.

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On Optimal Control of the Initial Status in a Hyperbolic System

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Abstract

In this paper, optimal control problem governed by hyperbolic system with Dirichlet conditions is considered. It is proved that the optimal solution is exist and unique and it is obtained an adjoint problem corresponding to hyperbolic problem. After Frechet derivative of the cost functional is calculated, necessary optimality conditions for hyperbolic problem with cost functional are derived.

Keywords: Optimal Control, Hyperbolic Equations, Frechet Differentiability.

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APPROXIMATE SOLUTIONS OF TWO-DIMENSIONAL BURGERS' AND COUPLED BURGERS' EQUATIONS BY RESIDUAL POWER SERIES METHOD

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Abstract

In this study, two-dimensional Burgers' and coupled Burgers' equations are examined by the residual power series method. This method provides the solutions in the form of rapidly convergent series with easily calculable components using Mathematica software package. When the solution is polynomial, the method gives the exact solution using Taylor series expansion. The results reveal that the method is more efficient applicable and accuracy and the graphical consequences clearly present the reliability of the method.

Keywords: Residual power series; Taylor expansion; Two-dimensional Burgers' and coupled Burgers' equations.

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A RISK ANALYSIS BASED MODEL FOR ENHANCING THE SUSTAINABILITY PERFORMANCE OF ENTERPRISES

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Abstract

The competition environment, influence of increasing customer awareness and technological evolution combine with many other external macro-effects make the future predictions of managers more difficult. The suppliers in the supply chains exist in the markets not only with the diversity and quality of products, but also with the environmental, social and economic influences as a whole. In the direction of these developments, sustainability has emerged as a field that needs systematical implementations beyond its conceptual view to businesses. Sustainability indices are used in the supply chains for evaluating and selecting suppliers nowadays. Standard makers in the area of management systems emphasizes that the risk and opportunity analysis are critical issues for sustainability. Risk analysis takes place in the requirements of the new management systems standards updates. There is not enough researches in the matter of adaptation of risk analysis to general sustainability pillars. In this study, quality that finds an important place under the framework of integrated management systems are evaluated. The criteria for quality management system sustainability and the analysis of the risks that may be faced have been evaluated in a textile company. The implementation of the model begins with the definition of the policies, objectives and goals of a textile company. After that, processes are defined and the risks and opportunities related with the objectives analyzed. According to the risk analysis results preventive actions planed. Actions are evaluated for the sustainability pillars; economic, social and environmental. At the end of the model sustainability scores are determined.

Keywords: Sustainability; Quality Management; Risk Analysis; Decision Making

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What is the relationship between music and mathematics?

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Abstract

In the historical development of music, it is thought that first rhythm then melody which is the second important element of music was discovered. Besides, there are three main components of music today. Rhythm, melody and harmony. The harmony that forms the basis of music has matured in the second half of the last millennium. For many years, music has been a prosperity door for some artists, troubles and struggles with misery for some artists; a research topic for some anthropologists, musicologists or a mysterious problem that has always made some curious physicists and mathematicians intrigued or led them to pursuit.

Interestingly enough, the historical development of music is parallel to the historical development of mathematics. Both first emerged with a concrete idea, then swung between abstract-concrete. For example, while the mathematical object started with counting, music became a rhythm played in religious rituals in primitive societies. Who knows, perhaps, the musicians of that time were first to discover counting numbers.

“The music is a hidden mathematical problem of the soul” said famous mathematician Leibniz. “We can express music as a collection of sentences formed by following a simple set of voices created according to certain rules.” Mathematics, because of the search for truth, has to be in every job that exists in life at certain rates. This bears a more important value for music. Because the rhythm, one of the three most important components of music, has to progress with certain order and accuracy. In this progress, the timing value and expression of each note are the points of question. Such as; a beat, two-beat, quadrature, octal note… Pythagoras is a Greek philosopher and mathematician who put out about 2600 years ago that music and mathematics are a great relationship.

In this study, the relationship between music and mathematics will be tried to be determined by a scientific method. A general evaluation will be made of the relationship between music, which is one of the most important branches of art, and mathematics, which is considered to be the most important branch of positive science, or even mother of science.

Al-Khwarizmi’s Contributions to Mathematics and Mathematics Education

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Abstract

In this study, we are going to introduce Muḥammad ibn Mûsâ al-Khwarizmi ,who is an Iraqi Muslim mathematician, and his major contributions to mathematics and mathematics education. Muḥammad ibn Musa Al-Khwarizmi is the first Muslim mathematician who produced works in mathematics, astronomy, and geography and mapping of the earth. In Mathematics, The concept of Algorithm is found by Al-Khwarizmi and he was called as the 'father of algebra'. In particular, he improved a new systematic formula for solving linear and quadratic equations, introduced “balance” and “reduction” concepts. Muḥammad ibn Mûsâ al-Khwarizmi is one of the greatest mathematicians ever. His original works and contributions to mathematics changed understanding knowledge and science.

Keywords: History of mathematics; Algebra; Mathematics education.

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A Study on Finding Exact Solutions for the System of Shallow Water Wave equation using Extended Bernoulli Sub-Equation method

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Abstract

The aim of this study is to construct new exact solutions for the system of Shallow water wave equation which is an important equation in Mathematical physics. For this purpose, an extended Bernoulli Sub-equation method, which is an interesting candidate ass an auxiliary equation for this type of approach, is applied to the equation. New and more general solutions including rational travelling wave solutions, rational solutions and rational triangular solutions of the considered equation are obtained using the method successfully. As a result, the extended Bernoulli Sub-equation method is an effective and efficient method for seeking the exact solutions of a wide range of partial differential equations.

Keywords: Extended Bernoulli Sub-equation method; the system of Shallow water wave equation; exact solutions.

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NOVEL EXACT SOLUTIONS OF THE EXTENDED SHALLOW WATER WAVE AND THE FOKAS EQUATIONS

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Abstract

In this study, a Sine-Gordon expansion method for obtaining novel exact solutions of Extended Shallow wave equation and Fokas equation is presented. All of the equations which are under consideration consist of three or four variable. In this method, first of all, partial differential equations are reduced to ordinary differential equations by the help of variable change called as travelling wave transformation, then Sine Gordon expansion method allows us to obtain new exact solutions defined as in terms of hyperbolic trig functions of considered equations. The newly obtained results showed that the method is successful and applicable and can be extended to a wide class of nonlinear partial differential equations.

Keywords: Sine-Gordon expansion method Extended Shallow Water Wave equation; Fokas equation., exact solutions

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New Wave Solutions for Nonlinear Differential Equations using an Extended Bernoulli Equation as a New Expansion Method

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Abstract

In this paper, we presented a new expansion method constructed by taking inspiration for the Kudryashov method [1]. Bernoulli equation is chosen in the form of $F' = BF^n - AF$ and some expansions are made on the auxiliary Bernoulli equation which is used in this method. In this auxiliary Bernoulli equation some wave solutions are obtained from the shallow water wave equation system in the general form of " n-order ". As a result, obtained new results are simulated by graphically in 3D and 2D. To sum up, it is considered that this method can be applied to the several of nonlinear evolution equations in mathematics physics [2-4].

Keywords: A new expansion method; Kudryashov Method; Wave solution; System of the shallow water wave equation.

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RENEWABLE ENERGY ECONOMY- FREIBURG EXPERIENCE

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Abstract

The developing world and consumption growth have brought along the need for energy. Energy demand is generally derived from non-renewable sources which have lower costs and greater availability.The scarce resources and negative externalities especially on the environment, led people to renewable energy sources, an important element of the green economy. Although the use of renewable energy sources is costly in the short term but in long run it has many benefits of economy and environment. Energy conversion will eliminate the economic shortage of energy, sustainable development will be provided in this way. The use of renewable energy in green economy applications in the world is increasing day by day. The city of Freiburg in Germany is an area where renewable energy is effectively used. The city has acquired a different identity through renewable energy, the economy has been shaped accordingly and green economy practices have become a life style.

Keywords: Renewable Energy; Green Economy; Energy Economy, Freiburg.

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Mechanical properties of fiber and fly ash reinforced composite hollow pile

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Abstract

Pile foundations is a deep foundation varieties used for many years. Deep foundations are affected by environmental conditions depending on production materials (concrete, wooden, etc). In present, glass reinforced plastics material as alternative material is desired to be used because it is economical and durable. Hollow piles are manufactured in hollow form with a certain wall thickness of circular produced piles together with the saving of material and are known in previous studies which resist to greater stresses.
In this study, fiber-reinforced polyester (FRP) piles are aimed to be produced. For this purpose, hollow piles with two different lengths (4 mm, 10 mm) and 4 different diameters (35 mm, 50 mm, 60 mm, 70 mm) have been manufactured by adding hemp, fly ash, rubber waste materials to polyester in different ratios . Nonconfined compression test, SEM (Scanning Electron Microscopy) experiments were carried out for these hollow piles manufactured in the effect reduced.

Keywords: Pile foundation, FRP, fly ash, fiber, polymer, hollow pile, nonconfined compression test, sem.

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ON SOME PARANORMED LUCAS SEQUENCE SPACES

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Abstract

The sequence spaces $c_0(E)$, $c(E)$, $\ell_\infty(E)$ and $\ell_p(E)$ have been recently introduced and studied by Karakaş and Karabudak. The main purpose of the present paper is to extend the results of Karakaş and Karabudak to the paranormed case and is to work the spaces $c_0(\hat{L},p)$, $c(\hat{L},p)$, $\ell_\infty(\hat{L},p)$ and $\ell_p(\hat{L},p)$. Let μ denote any of the spaces c_0, c, ℓ_∞ and ℓ_p. We prove that $\mu(\hat{L},p)$ is linearly paranorm isomorphic to $\mu(p)$ and determine the $\alpha-, \beta-$ and $\gamma-$duals of the $\mu(\hat{L},p)$. Furthermore, the basis of $c_0(\hat{L},p)$, $c(\hat{L},p)$ and $\ell_p(\hat{L},p)$ are constructed. Finally, we characterize the matrix transformations from the spaces $\mu(\hat{L},p)$ to the spaces $c_0(q), c(q), \ell(q)$ and $\ell_\infty(q)$.

Keywords: *Paranormed sequence spaces, Lucas numbers, Matrix domain*

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ELECTRICAL ANALOGUE OF ARTERIAL BLOOD PRESSURE SIGNALS

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Abstract

In this study, we describe an electrical circuit model that will be useful for understanding the mechanisms and dynamics of the human cardiovascular system, which is considered as a complex system in the field of physiology. The electrical circuit model, defined as the Windkessel model, plays an important role in the observation of the characteristic effect of the blood pressure on the arterial system. An electrical circuit model, which we have connected to the input terminals of the Windkessel model, ensures that the mean arterial blood pressure signals are observed within the expected range of values. The Windkessel circuit model that we have tried to develop in this study was constructed in a laboratory environment and the results were observed. It is thought that this study will contribute to the literature in terms of the development of the Windkessel model by increasing the number of parameters involved in heart and arterial system.

Keywords: Arterial system; Mean arterial blood pressure; Windkessel model.

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INVESTIGATION OF EARTHQUAKE BEHAVIOR OF CONSTRUCTION SYSTEM AND MATERIALS IN TRADITIONAL TURKISH ARCHITECTURE

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Abstract

In this study, it is aimed to present a point of view regarding the behaviour of construction systems implemented in traditional Turkish architecture against earthquakes. In the scope of the study, examples of civil architecture were considered and their structures were evaluated as building elements such as foundation, wall and flooring. Traditional Turkish architecture construction systems can be evaluated in two parts. One of them is the wooden carcass system and the other is the unreinforced masonry system. In the wooden carcass system, the carrier is the load bearing elements used in horizontal and vertical directions. Intermediate parts (strut, diagonal etc.) are placed between these elements to form triangles. The triangles (strut, diagonal) used in the wooden skeleton system comprise highly resistant forms against earthquakes. Moreover, due to the internal structure and physical properties of the wood, which is the skeleton material, the flexibility that it maintains can meet the lateral loads of earthquakes. The second construction system which is the system addressed in this application, is the unreinforced masonry system. In this system, the loadbearing system itself is the walls, which are not resistant to lateral loads. In order to provide ~~this~~ flexibility beams (hatıllar) are installed at certain intervals. After the wall is built to a certain height, a different material is laid allowing a plane of movement on the wall. Thus, when the wall is exposed to a lateral load, it escapes from the planes where the beams (hatıllar) are present, and is protected against large damages by absorbing the earthquake load. In order to establish that the foundation of the structure can withstand earthquakes by movement, wood is placed at the lower part of the foundation above a layer of sand ensuring lateral movement and flexibility of the building. In traditional buildings the slabs are connected to the building walls with beams (hatıllar). Through the agency of the beams (hatıllar) formed at the connection points, the slabs can act as a mass so that they can meet the earthquake load. Allowing the structure to move makes it resistant to earthquakes, seismic isolators are used for this purpose by absorbing the earthquake load and moving the foundation of the structure.

Keywords: Building material, Traditional architecture, Earthquake behavior in traditional structure.

A New Method for (4+1) Dimensional Fokas Equation

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Abstract

In this paper, modified $\exp(-\Omega(\xi))$-expansion function method has been tackled for procuring exact solutions of (4+1) dimensional Fokas equation. Hyperbolic function solutions and dark soliton solutions of (4+1) dimensional Fokas equation have been found by means of this method. Moreover, by the help of Mathematica 9, some graphical simulations were given to clarify the behavior of these solutions.

Keywords: (4+1) dimensional Fokas equation; modified $\exp(-\Omega(\xi))$-expansion function method; hyperbolic function solutions; dark soliton solutions.

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Investigation of Dark and Bright Soliton Solutions of Some Nonlinear Evolution Equations

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Abstract

In this paper, generalized Kudryashov method (GKM) is used to find exact solutions of (1+1) dimensional nonlinear Ostrovsky equation and (4+1) dimensional Fokas equation. Firstly, we get dark and bright soliton solutions of these equations by using GKM. Then, for proper parameters, we plot 2D and 3D surfaces of some soliton solutions that we obtained by using this method. Numerical results together with the graphical demonstrations clearly present the reliability of this method.

Keywords: (1+1) dimensional nonlinear Ostrovsky equation; (4+1) dimensional Fokas equation; generalized Kudryashov method; dark soliton solution; bright soliton solution.

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On the Travelling Wave Solutions of Ostrovsky Equation

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Abstract

In this paper, extended trial equation method (ETEM) is applied to find exact solutions of (1+1) dimensional nonlinear Ostrovsky equation. We constitute some exact solutions such as soliton solutions, rational, Jacobi elliptic and hyperbolic function solutions of this equation via ETEM. Then, we submit results that we obtained by using this method.

Keywords: (1+1) dimensional nonlinear Ostrovsky equation; extended trial equation method; soliton solutions; rational; Jacobi elliptic; hyperbolic function solutions.

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A NEW BLOCK SEQUENCE SPACE

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Abstract

The purpose of the this study is to introduce the sequence space

$$\ell_p\left(E,B(r,s)\right)=\left\{x=(x_n)\in\omega:\sum_{n=1}^{\infty}\left|\sum_{j\in E_n}rx_j+\sum_{j\in E_{n+1}}sx_j\right|^p<\infty\right\},$$

where $E=(E_n)$ is a partition of finite subsets of the positive integers, $r,s\in\mathbb{R}/\{0\}$ and $p\geq 1$. The topological and algebrical properties of this space are examined. Furthermore, some inclusion relations are given. Finally, we show that the operator A defined from ℓ_p into $\ell_p\left(E,B(r,s)\right)$ is bounded and also we compute the norm of the operator A.

Keywords: Block sequence spaces, Capson matrix, Hilbert Matrix.

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Rate of convergence of Hermit-Feje'r polynomials for functions with derivatives of bounded variation

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The Hermite-Feje'r interpolation problem is a classical subject that was widely studied last century. The Hermite-Feje'r interpolating polynomial , $H_n(f,x)$, to function $f(x)$ on the roots of the Chebyshev polynomials converges uniformly to $f(x)$ if $f(x)$ is a continuous function on [-1,1].

In 1982, Bojanic and Cheng, Estimate the rate for approximation of functions of bounded variation by Hermite-Fejer polynomials and Cheng proved that converges uniformly to $f(x)$ at points of continuity of $f(x)$. 1992, they also estimate the Rate of convergence of Hermite-Feje'r polynomials for functions with derivatives of bounded variation using the zeros of Chebyshev polynomial of the first kind.

In this talk, the behavior of Hermite-Fejér interpolation, $H_n(f,x)$, for function with derivatives of bounded variations on $[-1,1]$ by taking the interpolation over the zeros of Chebyshev polynomial of the second kind, $U_n(x)$, is considered we give an estimate for the rate of convergence of, $H_n(f,x)$, using the zeros of Chebyshev polynomial, $U_n(x)$.

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ON CHARACTERIZATIONS OF ALMOST p-REGULAR SPACES AND ALMOST REGULAR SPACES

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Abstract

In 1990, Malghan and Navalagi studied the concept of almost p-regular spaces [Almost p-regular, p-completely regular and almost p-completely regular spaces, Bull. Math. Soc. Sci. Math. R. S. Roumanie, 34 (82) (1990), 317-326]. In 1969, Singal and Arya studied the concept of almost regular spaces [On almost-regular spaces, Glasnik Mat., 4 (24) (1969), 89-99]. In this paper, some characterizations of the concept of almost p-regular spaces and the concept of almost regular spaces are studied.

Keywords: Almost regular, Almost p-regular, regular space.

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On Simultaneously Chebyshev Subspaces in Banach Spaces

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Abstract

In this paper we study the problem of simultaneously proximinal, simultaneously Chebyshev and simultaneously quasi-Chebyshev subspaces in general Banach spaces. Also we characterize points of simultaneous approximation in a Banach space X by the closed unit ball B_X Further, some results concerning simultaneously proximinal subspaces in the quotient space are presented.

Keywords: simultaneous approximation Chebyshev approximation.

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On Simultaneously Chebyshev Subspaces in Banach Spaces

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Abstract

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On Simultaneously Chebyshev Subspaces in Banach Spaces

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Abstract

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Keywords: simultaneous approximation Chebyshev approximation.

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ON THE NOVEL NUMERICAL PROPERTIES OF A NONLINEAR MODEL ARISING IN MATHEMATICAL BIOLOGY

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Abstract

This study acquires the exact and numerical approximations of a reaction-convection-diffusion equation arising in mathematical biology namely; Murry equation through its analytical solutions obtained by using a mathematical approach; the modified exp(-psi(eta))-expansion function method. We successfully obtained the kink-type and singular soliton solutions with the hyperbolic function structure to this equation. We performed the numerical simulations (3D and 2D) of the obtained analytical solutions under suitable values of parameters. We obtained the approximate numerical and exact solutions to this equation by utilizing the finite forward difference scheme by taking one of the obtained analytical solutions into consideration. We investigate the stability of the finite forward difference method with the equation through the Fourier-Von Neu-mann analysis. We present the L_2 and L_∞ error norms of the approximations. The numerical and exact approximations are compared and the comparison is supported by a graphic plot. All the computations and the graphics plots in this study are carried out with help of the Matlab and Wolfram Mathematica softwares. Finally, we submit a comprehensive conclusion to this study.

Keywords: MEFM, FDM, Murry equation, kink-type and singular soliton solutions, hyperbolic function structure, exact and numerical solutions

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Properties of anti-Kahler-Codazzi Manifolds

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ABSTRACT

In this paper, we give some results on anti-Kahler-Codazzi manifolds.

Key Words: Anti-Kahler-Codazzi manifolds.

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Optical solitons and other solutions to the (2+1)-dimensional cubic nonlinear Schrodinger equation with fractional temporal evolution

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Abstract

In this study, the (2+1)-dimensional cubic nonlinear Schrodinger equation with fractional temporal evolution is investigated. The idea of conformable fractional derivative is used in transforming the complex nonlinear partial differential equation to nonlinear ordinary differential equation. Dark, bright, combined dark-bright, singular, combined singular solitons and singular periodic wave solutions are successfully constructed. The parametric conditions for the existence of valid solitons are given. The 2D and 3D graphics to the obtained solutions are plotted.

Keywords: The sinh-Gordon equation; NLSE; optical soliton.

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SUPER HALF DERIVATIVE FORMULATION WITH SUPER GAMMA FUNCTION ON SUPER SPACE

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Abstract

Differentiation are usually regarded as discrete operations, in the sense that we differentiate a function once, twice, or any whole number of times. However, in some circumstances it's useful to evaluate a fractional derivative. On the other hand, super space is the coordinate space of theory having supersymmetry. There are also anticommuting ordinary space dimensions x, y, z,... and these coordinates are labeled in Grassmann numbers rather than real numbers. However, all elements on super space which are named supernumbers occur from body part and soul part or further characterized by even part and odd part. The aim of this paper is to improve the fractional derivative calculus on super space with Gamma function.

Keywords: Fractional derivative; Gamma function; Super structure.

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QUATERNIONS ON SUPER SPACE

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Abstract

In this article, the basic structure of the quaternions that can be thought of as points in a four dimensional system is discussed and süper quaternions are de.ned on super space which have a stronger place to solve the theoretical physics and mathematical problems.

Keywords: Superspace; Quaternions.

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SOFT SIMPLICIAL RELATIONS FOR SOME SOFT SIMPLICIAL STRUCTURES IN DIGITAL IMAGES

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Abstract

In this paper, we investigate some new properties of soft simplicial maps by using $\kappa-$ adjacency relation for digital images. We focuse on soft simplicial complexes and soft simplicial sets as soft simplicial structures in digital images and obtain some results dealing with face and degenerate maps for $\kappa-$ adjacent soft simplicial structures.

Keywords: Digital Image; Soft Simplicial Maps; Soft Simplicial Set.

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ON LACUNARY WEAK STATISTICAL CONVERGENCE OF ORDER α

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Abstract

In this paper, we introduce weakly lacunary statistical convergence of order α and weakly N_{θ}^{α} -convergence for $0 < \alpha \leq 1$. We give some properties of these modes of convergence and examine some inclusion relations.

Keywords: Lacunary sequence, weak convergence, statistical convergence.

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ON A NEW CONCEPT OF ALMOST CONVERGENCE

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Abstract

The aim of present work is to introduce a new concept of almost convergence of sequences. New normed spaces are defined and some inclusion relations are examined concerning those spaces with examples. Further, the β- and γ-duals of the these new spaces are computed. Consequently, some matrix classes on these spaces are characterized.

Keywords: Almost convergence, matrix domain, β-, γ-duals, matrix transformations.

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English as the Language of Instruction for Mathematics

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In the last few decades, language of instruction nearly all over the world has been turned into English (in some part of the world 100 %, and in some part between 30-70 % of the mathematic lessons have been instructed in English) [1] to make transformation simple, bilingual high-stakes tests are being conducted as an accommodation scale, with the target of finally having English-only exams. . Especially in the immersion programmes together with the popularity of content based teaching method, mathematic lessons were gradually started to be taught in English. Talented lecturers have been expected teach mathematic lessons in English, rather than in Turkish (mother tongue), [2] particularly to harvest recipients who are intellectual, self-confident and proffers definitely to the existence of a dynamic community. There has been many discuss on the subject of teaching maths in English and [3]whether it is a common linguistic ability or a kind of mathematical ability. The aim of this study is to search for the difficulties lecturers are facing within the higher education institution in terms of teaching maths lessons in English rather than in mother tongue. It is also important to examine the local variables while conducting the study.
Keywords: Immersion Programmes, Content based teaching, high-stakes test

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A hybrid simulation for a system of singularly perturbed two-point reaction-diffusion equations

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Abstract

This study is concerned with systems of singularly perturbed second order reaction-diffusion equations in ODE's. To handle this type of problems, a numerical-asymptotic hybrid method is employed. In this hybrid method, an efficient asymptotic method so-called Successive complementary expansion method (SCEM) is employed first and then, a numerical method based on finite differences is proposed to approximate to the solution of corresponding singularly perturbed reaction-diffusion systems. Numerical examples are provided to show the efficiency and easy-applicability of the present method with convergence properties.

Keywords: Asymptotic approximation, Boundary layer, Reaction-diffusion equations, SCEM, Singular perturbation problems.

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SOLUTION OF AN OPTIMAL CONTROL PROBLEM WITH MEASURED DATA AT THE FINAL TIME FOR A VIBRATING BEAM

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Abstract

In this article, we deals with solving an optimal control problem for a beam equation. We get the existence, uniqueness of the optimal solution of this problem. The gradient of the cost functional on the set of admissible controls is derived via the solution of the adjoint problem. We give an iteration algorithm for the numerical solution of the problem considered using the Gradient Method based on the gradient of the cost functional.

Keywords: Final overdetermination; Optimal control.

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GALERKIN METHOD FOR THE NUMERICAL SOLUTION OF THE BEAM EQUATION

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Abstract

In this article, we give the numerical solution of the boundary value problem for the Euler-Bernoulli equation. The Galerkin method have been used to obtain this solution. We solve the numerical examples and show the errors of the approximation solutions in the tables.

Keywords: Euler-Bernoulli theory; Numerical method.

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*-Balanced Fuzzy Graphs

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Abstract

In this article, we introduce the relatively new concept of *-density of a fuzzy graph and *-balanced fuzzy graph. Several examples and results are also provided. In addition, many operations on fuzzy graphs that preserves *-balanced are explored.

Keywords: Fuzzy graph. *-density , *-balanced.

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VARIATION FORMULAS OF SOLUTIONS FOR CONTROLLED DELAY DIFFERENTIAL EQUATIONS WITH THE CONTINUOUS AND DISCONTINUOUS INITIAL CONDITIONS

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Abstract

As is known, real controlled processes contain an information about their behavior in the past i.e., such processes contain effects with delayed action and are described by controlled differential equations with delays. Linear representation of the main part of the increment of a solution with respect to perturbations of the initial data is called the variation formula of solution (variation formula). The variation formula plays the basic role in proving the necessary conditions of optimality and sensitivity analysis of mathematical models. Moreover, the variation formula allows one to construct an approximate solution of the perturbed equation. The continuity (discontinuity) of the initial condition means that the values of the initial function and the trajectory always coincide (not coincide) at the initial moment.

In this article, for the nonlinear controlled differential equations with several constant delays the variation formulas of solutions are proved, in which the effects of the continuous and discontinuous initial conditions, perturbations of delays and the initial moment are detected. The variation formulas obtained here are proved by the scheme given in [1].

Keywords: Delay controlled differential equation, variation formula of solution, effects of the continuous and discontinuous initial conditions, effects of delays perturbations, effect of the initial moment perturbation.

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Investigation of the solution of nonlinear partial differential equations by MEFM

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Abstract

In this article, The travelling wave wave solutions of the Modified Camassa-Holm (MCH) equation were obtained by using the Modified Expansion Function Method (MEFM). According to the obtained solutions, trigonometric functions with hyperbolic properties are obtained in the complex structure. For this reason, the graphics of the solutions are found to be real and imaginary by selecting the appropriate parameters. All the obtained solutions provide the MCH equation. In this work, all mathematical calculations are done with Wolfram Mathematica software.
Keywords: Modified Expansion Function method, Modified Camasssa-Holm equation ,The solitary wave solution

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New Function Method for the Heat Equation

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Abstract

In this study, the wave solutions of the heat equation with exponential nonlinearity have been constructed by using the new function method. Thus, trigonometric wave solutions are obtained via this approach. Also, some graphical interpretations are given with aid of the Mathematica package program.

Keywords: New function method; Heat equation; Wave solutions.

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Complex Acoustic Gravity Wave Behaviors to a Mathematical Model Arising in Nonlinear Mathematical Physics

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Abstract

In this article, with the aid of the Wolfram Mathematica package, we utilize the powerful sine-Gordon expansion method in constructing some new solutions to the (2+1)-dimensional Boiti Leon-Pempinelli equation. We successfully obtain some new travelling solutions bearing some new structures such as trigonometric function, exponential function and hyperbolic function structures. We claim that some of our results are complex in structure. All the solutions obtained verified the (2+1)-dimensional Boiti-Leon-Pempinelli equation. To illustrate our results, present the numerical simulation of all the obtained solutions in this study by choosing suitable values of the parameters. Furthermore, we give the physical interpretation of all the graphics. We also give the physical meaning to some of the obtained results in this study.

Keywords: The SGEM; the (2+1)-dimensional BLP equation; trigonometric function; exponential function; hyperbolic function solution.

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New numerical approximation of Atangana-Baleanu fractional derivative

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Abstract

Recently a new concept of fractional differentiation with non-local and non-singular kernel was introduced in order to extend the limitations of the conventional Riemann-Liouville and Caputo fractional derivatives. A new numerical scheme has been developed, in this paper, for the newly established fractional differentiation. We present in general the error analysis. The new numerical scheme was applied to solve linear and non-linear fractional differential equations. We do not need a predictor-corrector to have an efficient algorithm, in this method. The comparison of approximate and exact solutions leaves no doubt believing that, the new numerical scheme is very efficient and converges toward exact solution very rapidly.

Keywords: Non-singular kernel; Predictor-corrector; Approximate solution; chaotic models.

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SOME SPECTRAL PROPERTIES OF P-LAPLACIAN DIFFUSION BOUNDARY VALUE PROBLEM ON TIME SCALES

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Abstract

In this study, we consider $p-$Laplacian type Diffusion boundary value problem on an arbitrary time scales. We generalize some spectral properties of $p-$Laplacian Diffusion problem to an arbitrary time scales.

Keywords: $p-$Laplacian Diffusion equation; Time Scales.

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P-LAPLACIAN DIRAC SYSTEM ON TIME SCALES

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Abstract

In this study, we consider $p-$Laplacian type Dirac boundary value problem on an arbitrary time scales. We examine some spectral properties of this problem.

Keywords: $p-$Laplacian Dirac system; Time Scales.

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Constant Angle Spacelike Surface in de Sitter 3-Space

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Abstract

In this paper; using the angle between unit normal vector field of surfaces and a fixed spacelike axis in Minkowski 4-space. We develop two class of spacelike surface which are called constant timelike angle surfaces with timelike and spacelike axis in de Sitter 3-space. Moreover we give constant timelike angle tangent surfaces which are examples constant angle surfaces in de Sitter 3-space.

Keywords: Constant angle surfaces, de Sitter space, Helix.

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DESIGN AND MANUFACTURE OF WEAR TEST MACHINE FOR MICRO MODULE GEARS

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Abstract

Gears are the most widely used machine elements to transmit movement and mechanical power between the shafts. Gear tooth failures caused by wear, fatigue or fracture results in technical, critical and economical problems. For investigating wear failures, the FZG gear test systems have widespread used and accepted as the standard test in the world. However, there is no FZG test system or other standardized test device that can be used to examine the wear behaviour of gear tooth with the micro-module. The positional accuracy of the gear pair for micro devices and the rotational accuracy of the shafts have a great influence on wear performance compared to normal size gears. Therefore, it has great significance that the wear behaviour of gears tooth with micro-module can be identified precisely. In this study, a gear tooth wear test device was designed and manufactured which can represent different real service conditions for small gears with micro-module. Using this device, wear behaviours and load transfer performance of small gears with micro-module can be measured. The test system is driven by an AC servo motor and transmitted torque instantaneously measured with a dynamic torque sensor regulated by a computer-controlled brake mechanism. The gears used as specimen during the test can be mounted up in a real gearbox, different lubrication and service conditions can be tested.

Keywords: Micro module, gear, wear, failure.

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ON A NEW KNOT TABLE

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Abstract

A knot in R^3 (respectively in the 3-sphere, S^3), can be projected onto a plane R^2 (resp. a sphere S^2). This projection is almost always regular, meaning that it is injective everywhere, except at a finite number of crossing points. In this work, the knot graph is get from this regular diagram. After that we give direction to graph and get digraph which we called knot digraph. Bitopologies associated with these knot digraphs is finded by using knot digraph notation. We get new knot tables by classifying these bitopologies.

Keywords:Knot, knot graph, knot digraph, bitopology,quasi-pseudo metric

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A STOCHASTIC MODEL FOR PARATHYROID TUMOURS

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Abstract

In this paper, we study on the behavior and growth of parathyroid cancer in the human body. The Gompertz model is considered for this. Firstly, we investigate the change of parathyroid cancer respect to time, which is obtained using the deterministic Gompertz model through 41 patients in the literature. Then we describe the nonlinear stochastic Gompertz model based on deterministic Gompertz's law and obtain the diffusion coefficient in our stochastic model, using the data taken from the patients. We construct stochastic growth model with its coefficients and compare the model with observed data for demonstrate the effectiveness of model. Finally, the model is solved also numerically and our aims are supported with graphs and error tables.

Keywords: Stochastic growth model; tumour growth; estimation of parameters.

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Construction of various soliton solutions via the simplified extended sinh-Gordon equation expansion method

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Abstract

In this paper, we present the simplified version of the extended sinh-Gordon equation expansion method. The newly proposed approach is based on the well-known sinh-Gordon equation and a travelling wave transformation. We successfully employed this approach to the (2+1)-dimensional nonlinear Chiral Schrodinger's and various solitary wave solutions to the studied nonlinear model are successfully constructed. The (2+1)-dimensional nonlinear Chiral Schrodinger's equation describes the edge states of the fractional quantum hall effect. The 2D and 3D surfaces of some of the obtained solutions are plotted.

Keywords: Simplified extended ShGEEM; Chiral NLSE; Soliton solutions.

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DESIGN OF DIGITAL FIR FILTERS USING GRAY WOLF COLONY OPTIMIZATION

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Abstract

In this paper aims to establish a solution methodology for the optimal design of digital finite impulse response (FIR) filter by integrating the features of gray wolf colony optimization (GWCO). GWCO is inspired by the hunting strategy of wolves. In this optimization method, when the searching artificial wolves in the searching space discover the quarry, the searching artificial wolves report the position of the quarry to other artificial wolves by howl and eventually result is obtained. The optimal design of alternative FIR filter is realized with the result obtained with GWCO

Keywords: Filter Design, FIR filter, wolf colony optimization, gray wolf colony optimization (GWCO).

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A NEW TYPE RSA ALGORITHM WITH FUZZY LOGIC FOR IMAGE ENCRYPTION

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Abstract

In this study, by integrating fuzzy logic to RSA encryption scheme the augmentation of the security of sending the encrypted image is aimed. In this method first, the image is taken to the fuzzification process by the sender and then is encrypted using public key encryption. The encrypted image sent via an unsecure channel is first taken to the defuzzification process and then the original image is received after decryption. As a result, because of having uncertainty of fuzzy logic, a more secure communication mode is purposed. Another new idea of this study offers a more resistant encryption scheme to the several attacks by increasing the amount of possible public keys.

Keywords: Fuzzy Logic; Encryption Scheme; Public Key Encryption; Image Processing.

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MULTI-PARTY KEY EXCHANGE PROTOCOL OVER UNITS OF GROUP RINGS

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Abstract

In recent years, both symmetric and asymmetric encryption systems over various type of algebraic materials have become importance since they are based on some mathematically hard problems such as integer factorization, discrete logarithm, conjugacy search problem in group theory, finding the inverse of a given unit in group rings.

Key exchange protocol is a way of exchanging a secret key between two or more parties who want to communicate each other securely over an insecure channel. In this note, we first propose a Diffie-Helman type multi-party key exchange protocol using units in a given group ring and introduce a symmetric key encryption which is different from the encryption scheme in [1] by illustrating a concrete example.

Keywords: Key Exchange; Cryptosystem; Symmetric Key; Units; Group Rings.

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HIERARCHICAL CLUSTERING METHOD FOR TRAVELLING SALESMAN PROBLEM

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Abstract

The Travelling Salesman Problem is the most famous optimization problem in the NP-hard class. Many problems having natural applications in computer science and engineering can be modelled using the TSP. This paper presents a new heuristic algorithm called hierarchical clustering based on the clustering of the vertices. Proposed algorithm works in a three stage. In the first stage, algorithm classifies vertices into sets based on a length between vertices. At the second stage, connection between all clusters is made. Entry vertces and exit vertices is determined for every cluster. At the third stage, the shortest path is found from entry vertex to exit vertex covering all vertices in every cluster. Many problem instances from TSPLIB (travelling salesman problem library) were solved with NN, Greedy and proposed method. The experimental results show that the proposed method is efficient.

Keywords: Travelling salesman problem; Heuristic algorithms; Clustering.

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A NEW CHARACTERIZATION ON INEXTENSIBLE FLOWS OF NORMAL SURFACES

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Abstract

In this paper, we obtain a new characterization on inextensible flows of normal surfaces in Euclidean 3-space E^3. Moreover, we obtain a new result for minimality for normal surfaces in Euclidean 3-space E^3.

Keywords: Normal ruled surface, Euclidean 3-space, Inextensible flows.

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ON FUZZY 2-METRIC SPACES

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Abstract

In the present talk, we aim to investigate some fundamental properties of fuzzy 2-metric spaces. We first recall the definition of a fuzzy 2-metric space and define some elementary notions for fuzzy 2-metric spaces. Then we study completion of fuzzy 2-metric spaces. At the end, we prove the Baire's and Cantor's Theorems for fuzzy 2-metric spaces which are convenient tools for investigating fixed point results in fuzzy 2-metric spaces.

Keywords: Fuzzy 2-metric, convergence, completion.

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Maximal Order Block Trigonometrically Fitted Scheme For The Integration Of Second Order Initial Value Problems

Abstract

A Maximal Order Block Trigonometrically Fitted Method (MBTFM) whose coefficients are functions of frequency and step size specially designed for the solution of second order Initial Value Problems (IVPs) with oscillatory solution is proposed in this paper. The MBTFM is obtained from one discrete formulae with two complementary formula which are provided by Continuous Trigonometrically Fitted Block Method (CTFBM). The convergence of the MBTFM is discussed and the performance of the method is demonstrated on some numerical examples to show accuracy and efficiency of the method.

Comparison of Chebyshev Wavelet Collocation Method and Legendre Wavelet Collocation Method for Ginzburg-Landau Equation

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Abstract

The main aim of this paper is to demonstrate differences between Chebyshev wavelet collocation method and Legendre wavelet collacation method when applying in non-linear partial differential equation. For this purpose, we apply these both methods to the Ginzburg equation, which is best known among nonlinear equations. We show that these methods are how to use for numerical solution of the Ginzburg-Landau equation with boundary initial conditions. Firstly, we have obtained operational matrix for Chebyshev wavelets and Legendre wavelets, respectively. Then, Ginzburg-Landau equation is converted into an algebraic system for each method by using obtained operator matrix. Finally, this system has been solved using Maple computer algebra system. We demonstrate the validity and applicability of these techniques which have clarified by using an example. Exact solution is compared with obtained approximate solutions for each method. Finally, both Chebyshev wavelet collocation method and Legendre wavelet collocation method are found to be acceptable, efficient, accurate and computationally for the non-linear partial differential equation. Approximation of numerical solutions of both methods are excellent and difference of between their errors amount is found so little. Both of the methods are found almost the same numerical solutions as shown in tables and figures. Therefore, Both Chebyshev wavelet collacation method and Legendre wavelet collacation method are applicable for non-linear partial differential equation.

Keywords: Chebyshev wavelet collocation method, Legendre wavelet collacation method, Ginzburg-Landau Equation, Operational matrices of integration.

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A BIASED ESTIMATION METHOD IN ZERO INFLATED COUNT MODELS

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Abstract

Count variables may be often faced with in real life applications. It is the realization of a nonnegative integer-valued random variable. Zero-inflated count models can be used when there is an excess amount of zeros in the dependent variable. In this study, we introduce an improved biased estimation technique in the zero-inflated count models when there is multicollinearity problem in the data. We also compare our method to the maximum likelihood estimation in terms of mean squared error and squared bias. According to the results, new method is a better alternative to the maximum likelihood estimation in the presence of near linear dependencies in the design matrix.

Keywords: Zero-inflated count regression; Count data models; Ridge estimator; Ill-conditioned design matrix.

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$\lambda-$ WIJSMAN STATISTICAL CONVERGENCE ON TIME SCALES

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Abstract

In this study, we define $\lambda-$Wijsman density, $\lambda-$Wijsman statistical convergence and $\lambda-$Wijsman strong $p-$Cesaro summability on time scales. Furthermore, some relations about the new obtained spaces are also examined.

Keywords: Time scales; Wijsman statistical convergence.

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STATISTICAL BOUNDEDNESS ON TIME SCALES

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Abstract

In this study, we examine the concept of statistical boundedness on time scales.

We introduce λ-statistical boundness of function on time scale. Moreover, some relations about these concepts are obtained.

Keywords: Time scales; Statistical convergence.

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ON A NECESSARY CONDITION FOR AN OPTIMAL CONTROL PROBLEM IN A BEAM EQUATION

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Abstract

In this work, an optimal control problem is investigated for a beam equation with homogeneous boundary conditions. Such problems have been examined in the studies [1-4]. Well-posedness of the problem considered is proved. We give a necessary condition for the optimal solution by obtaining differentiable of the cost function.

Keywords: Beam Equation; Optimization.

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SIMULATION OF THE FAKE COLOR SCANNED – THE REGRESSED MODEL ON MARBLE QUALITY DETERMINATION

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Abstract

Beneficiate from that processing marble surface and surface color and control during processing can efficiently be made. However, scanning of surface color by HP scanner was carried out over 100 plates at A4 size as paper scanning. In order to avoid this disturbing reflectance manner of that polished raw material, cream, red and black colored marble tiles were used in scanning evalution. The simulated reflectance on tiles and porous structure and shining acts from surface or roughness could be developed reflektance separation. In the study, used.Adobe CS4, dirt and color conversion regressed by hue may also be evaluated. The quality in pricing of marble tiles with cream and red color or marble material without polished material in industrial sectors. The quality analysis of colored material such as rubber, paper, vegetable, egg and even waste food quality determination and analysis could be succeded by this simulation at lower cost. The reliability at reflectance of color may be 40%,60% and 80% with roughness, fakeness, scratch red diagram simulation and scanned forms were used in analysis and calibrated models at A4 sized tiles. The simulated color simulation were provided a 28% polishing time and price reduction in packed tiles.

In this article, we obtain some regressive analytical solutions and the exponential binomial equation which seems in the regressed theory, weakly dispersive color change and exponential simulated color using gaussian Mat-lab function method.

Keywords: gaussian function, regressed method; color simulation; exponential.regression

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SIMULATION OF GAS SORBTION KINETICS ON ACTIVE CARBON - REGRESSED MODEL FOR CONTROL TOXIC EMISSIONS OF FLUE GAS

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Abstract

Beneficiate from that finer char waste in toxic gas emission control during combustion can efficiently be made. However, fluidized combustion are carried out over 100 microns solid fuel combustion. In order to avoid this disturbing flow manner of that waste material, clay pellets were used in combustion chamber. The simulated sorbtion on solid carbon porous structure and capturing for toxic emissions active carbon or char can develope mechanical separation used.Temperature, active carbon and activated by microwave may also be evaluated as lime raw material without calcining for filling material in industrial sectors such as rubber, paper, animal food production.40%,60% and 80% active carbon, temperature infra red diagram simulation and activated forms were used in our combustion experiments at 1-2mm sized pellets. The pellets size-sorbtion simulation were provided a 78% sulfur dioxide emission and also 45% soot emission reduction in fluidized bed combustion.

In this article, we obtain some new complex analytical solutions to the exponential binomial equation which seems in the fault tree theory, weakly dispersive temperature waves and exponential simulated color using gaussian Mat-lab function method.

Keywords: gaussian function, fault tree method; temperature simulation; exponential.regression

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A NEW MULTI-STEP APPROACH BASED ON TOP ORDER METHODS (TOMS) FOR THE NUMERICAL INTEGRATION OF STIFF ORDINARY DIFFERENTIAL EQUATIONS

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Abstract

This paper presents an entirely new approach to obtaining self-starting Top Order Methods (TOMs) which we shall called Extended Top Order Methods (ETOMs). ETOMs were obtained through hermite polynomial used as basis function. Stability analysis of the new approach shows a uniform order six method for $k = 3$, they also possess very good absolute stability regions which made them highly suitable for the numerical integration of stiff ordinary differential equations. Implementation of the method in block form eliminates the need for starters and hence, generating simultaneously approximate solutions $y_i, i = 1,2,...,6$ on the go. To further observe the effect of the new approach, it was implemented on four numerical initial value problems of stiff ordinary differential equations occurring in real life and was shown to compete favorably with the work of existing scientists.

Keywords: Trapezoidal Method; Hermite Polynomial; Top Order Methods; Stiff Equation; Block Method; Stiff ODEs

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Image Distortion of LSB

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Abstract

Several methods developed and applied for protecting the information. One of these is the stenography. Steganographic techniques are used to transmit the information in the image to the receiver in a secure manner. There are two main principles in the steganographic process. The first one is to hide the message in the image and the second one is to reduce the distortion on the image caused by information hiding. By making changes on digital images, a lot of information can be placed in the image. Nevertheless, changes in the image should not be noticed. In this paper, "image distortion of LSB" method is studied. The PSNR, SNR and MSE were used to assess the distortion rates of the images. Histograms were drawn to visualize the differences between original and encoded, "stego-images".

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Analysis of k-out-of-n Systems Using Inter-arrival Failure Times

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Abstract

An important application area of the reliability theory is the examination of the k-out-of-n systems which have an important place in the systems. In the literature, the reliability of technical system generally is based on the distribution of the lifetimes of the components in the system. The situation after the repair of the failed system has never been examined. However, it is not necessary to repair all failed components in order to work a repairable k-out-of-n system. It is enough to repair the components as much as needed to work the system. In this study, the time between failures are considered when examining the reliability of k-out-of-n systems. Furthermore, after the first failure, the system is examined considering other failure times.

Keywords: k-out-of-n system; Semi Markov process; Inter-arrival failure time.

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Evaluation of Car Performances Using Data Envelopment Analysis

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Abstract

Data Envelopment Analysis (DEA) is a nonparametric method used to examine the relative efficiencies of Decision Making Units (DMUs) on conditions where there are multiple inputs and multiple outputs. It was first introduced in 1957 by Farrell in the literature and in the following years different researchers tried to be developed. In 1978 Charnes, Cooper and Rhodes studied it in detail. As in all sectors, it is very important for the automotive sector to operate effectively. Therefore, it is also important to measure the efficiency and find the source of the inefficiency.

In this study, the performances of the DMU of the automobiles will examine using Data Envelopment Analysis. In this direction, it is aimed to assist consumers in purchasing to consumers by calculating the relative efficiencies of automobile models according to the wishes of the consumers by determining effective and ineffective DMUs. Sales price and fuel consumption are determined as input variables; maximum speed, cylinder volume, horsepower, maximum torque, luggage volume, acceleration time from 0 to 100 km are determined as output variables.

Keywords: Data Envelopment Analysis; Efficiency; Super-Efficiency; Automotive Industry.

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Galerkin Finite Element Method For Coupled Klein Gordon Equation In Two Component Systems

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Abstract

In this study, an accurate numerical scheme is proposed for the Coupled Klein Gordon equation modelling one dimensional nonlinear wave process in two component media such as long longitudinal waves in elastic bi-layers. The newly obtained numerical scheme is based on Galerkin finite element method, a powerful technique to obtain numerical solutions of partial differential equations (PDEs), and cubic B-spline basis functions. The newly obtained numerical results are compared with exact solutions using the error norms L_2 and L_∞. The error norms show that the convergence of the results obtained by the Galerkin Finite Element method is reasonable enough.

Keywords: Finite element method, Galerkin, Coupled Klein Gordon equation, cubic B-spline basis.

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A New Perspective for The Numerical Solution for Fractional Klein Gordon Equation

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Abstract

In the present manuscript, a new numerical scheme is going to be presented for solving the time fractional nonlinear Klein-Gordon equation. The approximate solutions of the fractional equation are based on cubic B-spline collocation finite element method and L2 algorithm. The fractional derivative in the given equation is handled in terms of Caputo sense. Using the above mentioned methods, first of all, fractional differential equation is converted into algebraic equation system that are appropriate for computer coding. Then, two model problems are taken into consideration, their error norms are calculated to demonstrate the reliability and efficiency of the proposed method. The newly calculated error norms show that numerical results are in a good agreement with the exact solutions.

Keywords: Finite element method, collocation, Fractional Klein Gordon equation, Caputo derivative

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COMPUTATIONAL INVESTIGATION OF NEW COMPOUNDS BASED ON (EDOT) AND (BT) FOR DYE SENSITIZED SOLAR CELLS

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Abstract

Dye-sensitized solar cells (DSSCs) have increasingly attracted research interest for their abilities to convert solar light to electricity at a low cost since the breakthrough in conversion efficiency that Grätzel and co-workers made with Ru-based photosensitizers [1, 2]. The electron-donating and accepting strengths have been proven to be major control variables for increasing the energy conversion efficiency [3]. In the present study, a series of novel metal-free organic dyes for DSSCs were designed and investigated. These molecules were designed with the D1-BT-EDOT-BT-D2-A structure bearing the central donor unit (3,4-Ethylenedioxythiophene) (EDOT), the same Benzothiadiazole (BT) as π-acceptor and a different donor unit constitued of Thiophene, Phenylene, Carbazole, Fluorene and Antrhacene. 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. In order to predict the band gaps for guiding the synthesis of novel materials with low band gaps, we applied quantum-chemical techniques to calculate the band gaps in several oligomers. The calculated HOMO-LUMO (E_{gap}) gaps and the wavelength of absorption spectrum (λ_{max}) were compared with the experimental data. The calculated results of these dyes demonstrate that these compounds can be used as potential sensitizers for TiO_2 nanocrystalline solar cells.

Keywords: Donor-Acceptor; Benzothiadiazole; Tiophene; TD/DFT calculations; solar cells.

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COMPUTATIONAL INVESTIGATION OF NEW COMPOUNDS BASED ON (EDOT) AND (BT) FOR DYE SENSITIZED SOLAR CELLS

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Abstract

Dye-sensitized solar cells (DSSCs) have increasingly attracted research interest for their abilities to convert solar light to electricity at a low cost since the breakthrough in conversion efficiency that Grätzel and co-workers made with Ru-based photosensitizers [1, 2]. The electron-donating and accepting strengths have been proven to be major control variables for increasing the energy conversion efficiency [3]. In the present study, a series of novel metal-free organic dyes for DSSCs were designed and investigated. These molecules were designed with the D1-BT-EDOT-BT-D2-A structure bearing the central donor unit (3,4-Ethylenedioxythiophene) (EDOT), the same Benzothiadiazole (BT) as π-acceptor and a different donor unit constitued of Thiophene, Phenylene, Carbazole, Fluorene and Antrhacene. 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. In order to predict the band gaps for guiding the synthesis of novel materials with low band gaps, we applied quantum-chemical techniques to calculate the band gaps in several oligomers. The calculated HOMO-LUMO (E_{gap}) gaps and the wavelength of absorption spectrum (λ_{max}) were compared with the experimental data. The calculated results of these dyes demonstrate that these compounds can be used as potential sensitizers for TiO_2 nanocrystalline solar cells.

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EIGENVALUE PROBLEMS FOR p(x)−KIRCHHOFF-TYPE EQUATIONS WITH NEUMANN BOUNDARY CONDITIONS

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Abstract

This work is concerned with the existence of nontrivial weak solutions for a p(x)−Kirchhoff-type equation with Neumann boundary conditions. By using the Mountain Pass Theorem of Ambrosetti and Rabinowitz, Ekelands variational principle and the theory of the variable exponent Sobolev spaces, we establish the conditions for the existence of weak solutions.

Keywords: p(x)−Kirchhoff type equation, variational method, Mountain Pass Theorem, Neumann boundary conditions.

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ON A NOVEL NUMERICAL METHOD FOR SOLVING FRACTIONAL-ORDER CAUCHY PROBLEMS

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Abstract

Using the exponential series, a new numerical method is suggested in this paper. In this method, a given Cauchy problem for linear or nonlinear ordinary differential equation with classical differentiation is solve in multistep. To check the efficiency of the new method, four examples including chaotic problems are solved and numerical simulations are presented. The numerical simulations let no doubt to believe that, the new method is highly accurate.

Keywords: Exponential series; ordinary differential equations; chaotic models.

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On The Exact Solutions of Two-Mode Equations

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Abstract

The two-mode Korteweg-de Vries (TKdV) equation, which describes the one dimensional propagation of shallow water waves with two modes in a weakly nonlinear and dispersive fluid system, and one of the Burgers hierarchies in (1+1)-dimensions, which is known as the two-mode Sharma-Tasso-Olver (TSTO) equation, are considered. Analytical solutions of proposed equations are obtained by using the well-known Bernoulli equation method through the symbolic computation.

Keywords: Two mode equations; Analytical solutions; Bernoulli equation method.

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Timelike Curve Flows and Integrable systems in Lorentzian Symmetric Space

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Abstract

The main goal of this study is to give how to derive group-invariant soliton equations and their integrability structure from studying non-stretching flows of timelike curves in Lorentzian symmetric spaces G/H = SO(n, 1) /SO (n -1,1) by using the Cartan structure equations.

Keywords: Timelike curve, Flow, Integrable system

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On Hypersurface Family with a Common Asymptotic Curve in the 4D Galilean Space G_4

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Abstract

In the present study, we derive the problem of constructing a hypersurface family from a given isoasymptotic curve in the 4D Galilean space G4. We obtain the hypersurface as a linear combination of the Frenet frame in G4 and examine the necessary and sufficient conditions for the curve as an asymptotic curve. Finally, some examples related to our method are given for the sake of clarity.

Keywords: Galilean space, Hypersurface, Asymptotic.

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Integrated Intelligent paradigm for nonlinear singular system of Lane-Emden Equation arising in Astrophysics

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In the present study, a novel application of computational intelligence technique is presented for solving nonlinear Lane-Emden [1-3] system arising in astrophysics models by exploiting the competency of radial base neural networks models (RNNMs) optimized with evolutionary computing approach of genetic algorithms supported with local search technique of sequential quadratic programming. The RNNMs is to provide convenient and reliable procedure for constructing a useful model based on error function to solve the equations. The applicability and reliability of the proposed scheme have been monitored thoroughly for various boundary value problems trough numerical experimentation to validate its accuracy, convergence, and robustness. Statistical analysis has been performed to authenticate the accuracy in terms of different performance measuring gages based on variance account for (VAF), mean absolute error (MAE) and root mean square error (RMSE).

Keywords: Neural Networks; Genetic Algorithms; Astrophysics; Lane-Emden Systems; Sequential Quadratic; Hybrid Computing.

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