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Welcome

Dear Participants,

Welcome to the International Conference on Pure and Applied Mathematics, ICPAM 2015, Van, Turkey. The conference is organized and is to be held at Yüzüncü Yıl University from August 25th to August 28th. We are happy to have you here in Van.

The main aim of the conference is to provide participants with an opportunity to exchange the latest information and ideas, and to encourage debate on many issues in international mathematical researches. During the conference you will certainly meet old and new colleagues, exchange ideas, develop new projects. You will also feel and enjoy the special atmosphere of Van and Turkey.

With 76 sessions and 230 presentations and more than 250 participants from 24 countries, Algeria, Armenia, Azerbaijan, Canada, Egypt, France, Georgia, India, Iran, Iraq, Isle of Man, Japan, Jordan, Kosovo, Kuwait, Macedonia, Mauritania, Nigeria, Pakistan, Russian Federation, Saudi Arabia, South Africa, Turkey, United Arab Emirates, USA, as well as people from 55 different university from Turkey, ICPAM 2015 will provide a stimulating opportunity for a global interchange of ideas on recent advances in mathematics.

I would like to express my deep gratitude to Prof. Dr. Peyami BATTAL, President of Yüzüncü Yıl University, for his encouragement and support in all stages of this conference.

I am grateful to all the participants in the International Conference on Pure and Applied Mathematics, particularly the members of the Scientific and Organizing Committees, the referees and the authors for producing such a high standard conference.

The conference is almost entirely from the registration support of participants. Behind this, we are grateful to Rectorate of YYU, Faculty of Sciences of YYU and Administrative Coordination Office of Research Project (BAP) for their financial support. We would also like to thank to the sponsor, Mayor of Tuşba Municipality for their generous support. Have a pleasant stay in Van.



Professor Cemil Tunç
Chair Organizer of ICPAM Organizing Committee



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Mohammad Sal Moslehian, Ferdowsi University of Mashhad, IRAN
Mouffak Benchohra, Université Djilali-Liabes Sidi Bel Abbes, ALGERIA
Muhammad Aslam Noor, COMSATS Institute of Information Technology, PAKISTAN
Musa Çakır, Yuzuncu Yil University, TURKEY
Mustafa Bayram, Yıldız Technical University, TURKEY
Münevver Tezer-Sezgin, Middle East Technical University, TURKEY
Naim L. Braha, University of Prishtina, REPUBLIC of KOSOVA
Nizameddin Isgenderov, Baku State University, AZERBAIJAN
Octavian G. Mustafa, University of Craiova, ROMANIA
Olufemi Adeyinka Adesina, Obafemi Awolowo University, NIGERIA
Ömer Akin, TOBB University of Economics and Technology, TURKEY
Reza Abazari, University of Tabriz, Tabriz, Iran
Richard M. Low, San Jose State University, California, USA
Salim A. Messaoudi, King Fahd University of Petroleum and Minerals, SAUDI ARABIA
Samir H. Saker, Mansoura University, EGYPT
Shair Ahmad, University of Texas, USA
Smail Djebali, Ecole Normale Supérieure, ALGERIA
Şenay Baydaş, Yuzuncu Yil University, TURKEY
Tunay Bilgin, Yuzuncu Yil University, TURKEY
Vatan Karakaya, Yıldız Technical University, TURKEY,
Zeraoulia Elhadj, University of Tébessa, ALGERIA

Scientific Programme in Details

Tuesday, August 25

Room Amphi Chair: Hakan TOR

10:30-11:00 Opening Ceremony

Room Amphi Chair: Hüseyin MERDAN

11:00-11:30 **Marat AKHMET**

Extension of chaos, control and applications

11:30-11:45 Coffee Break

Room Amphi Chair: Hüseyin MERDAN

11:45-12:15 **Mahmoud ABDEL-ATY**

Prospective of quantum information

12:15-13:45 Lunch Break

Room Amphi Chair: Bülent KARAKAŞ

14:00-14:30 **Hidenori OGATA**, Hiroshi Hirayama

Hyperfunction method for numerical integrations

14:30-15:00 **Feyzi BAŞAR**

Recent trends related to four dimensional matrix transformations

15:00-15:15 Coffee Break

Room 101 Chair: Ercan TUNÇ

15:15-15:35 **Nihal YOKUŞ**, Nimet Coskun

Jost solution and spectrum of the discrete Sturm-Liouville equations with hyperbolic eigenparameter

15:35-15:55 **Şerifenur CEBESÖY**, Elgiz Bairamov, Yelda Aygar

Matrix-valued difference operators with polynomial type Jost solutions on the whole axis

15:55-16:15 **Hilmi ERGÖREN**

Impulsive neutral fractional differential inclusions at variable times

16:15-16:30 Coffee Break

Room 101 Chair: Mehmet Gıyas SAKAR

16:30-16:50 **Serkan ASLIYÜCE**, Feza Güvenilir

Grüss inequality on discrete fractional calculus with delta operator

16:50-17:10 **Sibel DOĞRU AKGÖL**, Ağacık Zafer

A general result on asymptotic integration of impulsive differential equations

17:10-17:30 Cemil Tunç, **Yener ALTUN**

On the asymptotic behaviors of solutions certain non-linear neutral equations with multiple deviating arguments

Room 102 Chair: Semra SARAÇOĞLU ÇELİK

- 15:15-15:35 **Erhan GÜLER**, Yusuf Yaylı
Generalized Bour's theorem in Minkowski space form
- 15:35-15:55 Erhan Güler, **Vahit ZAMBAK**
Algebraic surfaces of Henneberg in Minkowski 3-space
- 15:55-16:15 **Muhammed Talat SARIAYDIN**, Vedat Asıl
Characterizations of quaternionic some surfaces in Minkowski
3-space
- 16:15-16:30 Coffee Break

Room 102 Chair: Zineb ARAB

- 16:30-16:50 **Semra SARAÇOĞLU ÇELİK**, Yusuf Yaylı, Erhan Güler
Euler spirals in space forms
- 16:50-17:10 **Muhammed Talat SARIAYDIN**, Vedat Asıl
New parametric representation of a surface family with common
smarandache asymptotic by using Bishop frame
- 17:10-17:30 **Sahar MOAYERI RAHNI**
When the universal inverse semigroup $Pr(s)$ of inverse semigroup S
is E^* -unitary

Room 103 Chair: Bülent KARAKAŞ

- 15:15-15:35 **Sahar MOAYERI RAHNI**
The skew inverse semigroup ring
- 15:35-15:55 **Okan ARSLAN**, Hatice Kandamar
 Γ -radicals of gamma rings
- 15:55-16:15 Alev Firat, **Şule AYAR ÖZBAL**
Symmetric bi-multipliers on incline algebras
- 16:15-16:30 Coffee Break

Room 103 Chair: Marat AKHMET

- 16:30-16:50 **Mehtap LAFCI**, Gizem S. Öztepe
Oscillation of mixed type third order nonlinear differential equation
with piecewise constant arguments
- 16:50-17:10 Allaberen Ashyralyev, **Sema AKTÜRK**
Fractional spaces generated by the positive differential operator in
the half-space

Room 104 Chair: Musa ÇAKIR

- 15:15-15:35 **Hatice KARABENLİ**, Alaattin Esen, E. Nesligül Aksan
Collocation finite element solutions for Stefan problem with
Neumann boundary condition
- 15:35-15:55 Musa Cakir, **Derya ARSLAN**
A numerical method for nonlinear singularly perturbed multi-point
boundary value problem
- 15:55-16:15 **Hakki Duru**, Akbar BARATI CHIYANEH
Difference schemes on adapted mesh for the initial boundary value
Sobolev problems with boundary layers
- 16:15-16:30 Coffee Break

Room 104 Chair: Remziye Arzu ZABUN

- 16:30-16:50 **Alper KORKMAZ**, Hakan Kasım Akmaz
Exponential cubic B-spline based solutions of advection-diffusion equation
- 16:50-17:10 **Samet ERDEN**, Mehmet Zeki Sarıkaya
Generalized Bullen type inequalities for local fractional integrals and its applications
- 17:10-17:30 **Dashti AHMED ALI**
A comparison of methods for computing the matrix exponential appears in systems of differential equations

Room 105 Chair: Cesim TEMEL

- 15:15-15:35 Ümit Totur, **İbrahim ÇANAK**
Tauberian conditions for the (C, α) integrability of functions
- 15:35-15:55 **Mehmet Ali AKTÜRK**, Alexey Lukashov
Sharp rusak-type inequalities for rational functions on several intervals
- 15:55-16:15 **Abdallah BENAİSSA**
Asymptotic expansion of double oscillatory integrals: Contribution of non stationary critical points of the second kind
- 16:15-16:30 Coffee Break

Room 105 Chair: Esra DALAN YILDIRIM

- 16:30-16:50 **Ayşegül ÇAKSU GÜLER**, Esra Dalan Yıldırım
Some fixed point theorems on soft G-metric spaces
- 16:50-17:10 **Yağmur KARAKOÇ**
Cone metric spaces and cone two metric spaces
- 17:10-17:30 **Süleyman GÜLER**, Yücel Özdaş
On weak continuity of soft topological spaces

Room 106 Chair: Feyzi BAŞAR

- 15:15-15:35 Uğur Ulusu, **Ömer KİŞİ**
I-Cesro summability of sequences of sets
- 15:35-15:55 **Medine YEŞİLKAYAGİL**, Feyzi Başar
Some topological properties of the spaces of almost null and almost convergent double sequences
- 15:55-16:15 **Alireza KHALILI GOLMANKHANEH**
Fractal calculus and application
- 16:15-16:30 Coffee Break

Room 106 Chair: Hakan TOR

- 16:30-16:50 **Abdurrahman BÜYÜKKAYA**, Mahpeyker Öztürk
Some fixed point theorems satisfying Meir-Keeler type contractions via rational expression in 2-metric spaces
- 16:50-17:10 **Seda İĞRET ARAZ**, Murat Subaşı, Hakkı Güngör, Hülya Durur
On obtaining stable solution for a hyperbolic coefficient control problem
- 17:10-17:30 **Shpetim REXHEPI**, Fevzi Berisha, Egzona Iseni
On existence of Weyl derivative of functions in Lorentz space with quasi-monotone Fourier coefficients

Wednesday, August 26

Room Amphi Chair: Murat SUBAŞI

- 09:00-09:30 **Ersan AKYILDIZ**
An overview of discrete Log and Trace based public key cryptography on finite fields
- 09:30-10:00 **Vatan KARAKAYA**
On new iteration for K-set contraction mappings
- 10:00-10:15 Coffee Break

Room Amphi Chair: Ersan AKYILDIZ

- 14:00-14:30 **Hüseyin Merdan**
Asset flow differential equations
- 14:30-15:00 *Poster Presentations*

Room 101 Chair: Hilmi ERGÖREN

- 10:15-10:35 Khanlar R. Mamedov, **F. Ayca CETINKAYA**, Ozge Akcay
Boundary value problem for a Sturm-Liouville operator with piecewise continuous coefficient
- 10:35-10:55 **Asghar AHMADKHANLU**
Existence and uniqueness results for a class of fractional boundary value problem
- 10:55-11:15 **Zeynep KAYAR**
Fractional boundary value problems (BVPs) and Lyapunov type inequality
- 11:15-11:30 Coffee Break

Room 101 Chair: Güzide ŞENEL

- 11:30-11:50 **Aysegul BAYRAM**, Vedat Siap
Graph-theoretic approach to the ideal structure of a family of non-chain rings
- 11:50-12:10 **Ömer KÜSMÜŞ**
Another description of units of integral group ring of dicyclic group of order 12
- 12:10-12:30 Nazmiye Alemdar, **Sedat TEMEL**
Group-2-groupoids and 2g-crossed modules
- 12:30-13:45 Lunch Break

Room 101 Chair: Erdal KORKMAZ

- 15:15-15:35 **Derya ALTINTAN**, Vilda Purutçuoğlu, Ömür Uğur
Functional impulses in exact stochastic simulation
- 15:35-15:55 **Sebaheddin ŞEVGİN**, Pınar Yurdakul
Ulam stability of some Volterra equations
- 15:55-16:15 Cemil Tunç, **Sizar Abid MOHAMMED**
On the stability and boundedness of differential equations of third order with retarded argument
- 16:15-16:30 Coffee Break

Room 101 Chair: Derya ALTINTAN

- 16:30-16:50 Ayşe Feza Güvenilir, Billur Kaymakçalan, **Neslihan Nesliye PELEN**
Some results on predator-prey dynamic systems with Beddington-Deangelis type functional response
- 16:50-17:10 **Erdal KORKMAZ**, Cemil Tunç
Inequalities and exponential decay of certain differential equations of first order in time varying delay
- 17:10-17:30 **Ahmad JAFARIAN**
Artificial neural network method for solving fractional Fredholm integral equations

Room 102 Chair: Sebaheddin ŞEVGİN

- 10:15-10:35 **Özgür AYDOĞMUŞ**
Extinction in a generalized chain binomial epidemic model
- 10:35-10:55 **Gamzegül AYDIN**, Hüseyin Merdan, Abdessamad Tridane
Stability analysis of HIV infection model with tumor
- 10:55-11:15 **Hakan TOR**
Hyperbolic smoothing method for sum-max problems
- 11:15-11:30 Coffee Break

Room 102 Chair: Mahmut KARAKUŞ

- 11:30-11:50 **Ismail Hakkı DENİZLER**
Nakayama's lemma for artinian modules and generalized matlis duality
- 11:50-12:10 **Mehmet Zeki SARIKAYA**, Samet Erden, Hüseyin Budak
Some generalized Ostrowski type inequalities involving local fractional integrals and applications
- 12:10-12:30 Mehmet Zeki Sarıkaya, **Tuba TUNÇ**, Samet Erden
Generalized Steffensen inequalities for local fractional integrals
- 12:30-13:45 Lunch Break

Room 102 Chair: Özgür AYDOĞMUŞ

- 15:15-15:35 **Hacı Mehmet BASKONUS**, Hasan Bulut, Mirac Kayhan
Regarding analytical prototype studies for the generalized nonlinear Pochhammer-Chree equation
- 15:35-15:55 **Marat U. AKHMET**, Duygu Aruğaslan, Nur Cengiz
Exponential stability of periodic solutions of recurrent neural networks with functional dependence on piecewise constant argument
- 15:55-16:15 Nesir Huseyin, Anar Huseyin, **Khalik GUSEINOV**, Vladimir Ushakov
Approximation of the set of trajectories of control system described by an affine Volterra type integral equation
- 16:15-16:30 Coffee Break

Room 102 Chair: Nagehan AKGÜN

- 16:30-16:50 **Emine Serap KARACAN**, Emel A.Ugurlu, Unsal Tekir
On almost prime ideals
- 16:50-17:10 Morteza FAGHFOURI, **Sahar MASHMOULI**
Anti-invariant semi-Riemannian submersions admitting vertical from
Lorentzian Sasakian and para Sasakian manifolds
- 17:10-17:30 **Mehmet KIR**, Hukmi Kızıltunç
The concept of weak (ψ, α, β) contractions in partially ordered metric
spaces

Room 103 Chair: H. KAVURMACI ÖNALAN

- 10:15-10:35 **Özge ÇOLAKOĞLU**, Hamza Menken
On the q-extension of the p-adic Beta function
- 10:35-10:55 **Mirac CETİN FİRENGİZ**, Naim Tuglu
Some incomplete q-polynomials
- 10:55-11:15 **Murat BEKAR**, Yusuf Yaylı
Involutions of dual split-quaternions
- 11:15-11:30 Coffee Break

Room 103 Chair: Hidenori OGATA

- 11:30-11:50 **Nazish SHAHID**
The influence of thermal radiation, mass diffusion and fractional
parameters on mhd flow over a vertical plate that applies time
dependent shear to the fluid
- 11:50-12:10 **Alex PIJYAN**
On estimation of unknown parameters of exponential-logarithmic
distribution by censored
- 12:10-12:30 **Seçil YALAZ TOPRAK**, Mujgan Tez, H.Ilhan Tutarlar
Asymptotic normality of parametric part in partially linear models
in the presence of measurement error
- 12:30-13:45 Lunch Break

Room 103 Chair: Turgut HANOYMAK

- 15:15-15:35 **Gülüstan Kaya GÖK**, Nursah Mutlu, Serife Büyükköse
Kirchoff index of weighted graphs
- 15:35-15:55 **Mehdi ELIASI**
On ordering of trees by multiplicative version of Zagreb indices
- 15:55-16:15 **Adnan MELEKOĞLU**
Mirrors on Hurwitz surfaces
- 16:15-16:30 Coffee Break

Room 103 Chair: Adnan MELEKOĞLU

- 16:30-16:50 **Gülüstan Kaya GÖK**, Nursah Mutlu, Serife Büyükköse
Wiener index of weighted graphs
- 16:50-17:10 **Murat CANSAN**, Süleyman Ediz
Inverted distance and inverted Wiener index
- 17:10-17:30 **Süleyman EDİZ**, Murat Cancan
Reverse Zagreb indices of cartesian product of graphs

Room 104 Chair: İbrahim ÇANAK

- 10:15-10:35 **Ümit Totur, Muhammet Ali OKUR**
On Tauberian remainder theorems for Cesàro summability method of noninteger order
- 10:35-10:55 **Ümit TOTUR**, İbrahim Çanak
The (C, α, β) integrability of functions and a Tauberian theorem
- 10:55-11:15 **Youssef S. HASSAN**, Amr Mamdouh, Kareemeldien Maklad, Ahmed A. Elghannam, Mahmoud Abdelaty
Adaptive step size numerical solution to first order ODEs, a refinement of Eulers and RK methods
- 11:15-11:30 Coffee Break

Room 104 Chair: Gopal DATT

- 11:30-11:50 **Rukiye ÖZTÜRK**, Ali Aydogdu, Engin Ozkan
An alternative proof for a lemma used in the trace formula for $GL(2)$ over a number field
- 11:50-12:10 **Tugba YAVUZ**
Coefficient estimates for a new subclass of close-to-convex functions
- 12:10-12:30 **Serhan ULUSAN**, Adnan Melekoğlu
Symmetry groups of petrie polygons
- 12:30-13:45 Lunch Break

Room 104 Chair: Mehmet Zeki SARIKAYA

- 15:15-15:35 **Mehmet Eyüp KİRİŞ**, Naki Çaltıner
On generalized some inequalities for s -convex functions
- 15:35-15:55 **Ali AL-KARALY**, Karim Kholy
Aspects of analitical solutions and simulation of high order ODE
- 15:55-16:15 **Enes Abdurrahman BİLGİN**, Sıddık Keskin
Regression analysis algorithm for circular data
- 16:15-16:30 Coffee Break

Room 104 Chair: İsmail KÜÇÜK

- 16:30-16:50 **Gopal DATT**
Operator equations generalizing the notions of Hankel and Toeplitz operators
- 16:50-17:10 **Abdulhamit KUCUKASLAN**
Generalized fractional maximal operator on generalized local Morrey spaces
- 17:10-17:30 **Alev MERAL**, Ömür Uğur
Optimal portfolio strategies under various risk measures

Room 105 Chair: Hamza MENKEN

- 10:15-10:35 **Hacer BOZKURT**, Yılmaz Yılmaz
Some new theorems in Hilbert quasilinear spaces
- 10:35-10:55 **Arife ATAY**, H. İlhan Tutalar
Regular local functions in ideal topological spaces
- 10:55-11:15 **İzzettin DEMİR**, Oya Bedre Özbakır, İsmet Yıldız
Some properties of soft proximity spaces
- 11:15-11:30 Coffee Break

Room 105 Chair: Ayşegül ÇAKSU GÜLER

- 11:30-11:50 **Hamza MENKEN**, Özge Çolakoğlu
On the p-adic log beta function
- 11:50-12:10 **Ramazan EKMEKÇİ**, Rıza Ertürk
Q-convergence of graded difilters
- 12:10-12:30 Engin Ozkan, **Aykut GÖÇER**, İpek Altun
The relationship between nth lucas number and a sequence defined
by m-sequences
- 12:30-13:45 Lunch Break

Room 105 Chair: Ümit TOTUR

- 15:15-15:35 M. Emin Özdemir, **Havva KAVURMACI ÖNALAN**
 $(g, (h - m))$ -convex dominated functions
- 15:35-15:55 **Hatice KUSAK SAMANCI**, Serpil Kaya
The dual-variable Bernstein polynomials
- 15:55-16:15 Mehmet Güngör, Ahmet Demiralp, Yunus Bulut, M.Şamil Şık, **Yusuf KIRAÇ**
On comparisons of coherent systems via dynamic system signature
- 16:15-16:30 Coffee Break

Room 105 Chair: Sebaheddin ŞEVGİN

- 16:30-16:50 **Qais Mustafa ABDULQADER**
Comparison between discriminant analysis and logistic regression
analysis: An application on caesarean births and natural births data
- 16:50-17:10 Musa Cakır, **Derya ARSLAN**
Reduced differential transform method for sixth-order singularly
perturbed Boussinesq equation
- 17:10-17:30 **Hakki Duru**, Akbar BARATI CHIYANEH
Finite difference schemes on Shishkin mesh for singularly perturbed
initial-boundary value Sobolev type problems

Thursday, August 27

Room Amphi Chair: H. MUSTAFAYEV

10:30-11:00 **Kenzu ABDELLA**

Solving boundary value problems using the sinc collocation method with derivative interpolation

11:00-11:15 Coffee Break

Room Amphi Chair: Şenay BAYDAŞ

14:00-14:30 **İsmail KÜÇÜK**

Some aspects of optimal control

14:30-15:00 **Heybetkulu MUSTAFAYEV**

Some ergodic properties of measures

Room 101 Chair: Ercan TUNÇ

11:15-11:35 **Cemil TUNÇ**

Stability and boundedness of solutions of volterra integro-differential equations

11:35-11:55 Cemil Tunç, **Melek GÖZEN**

On exponential stability of solutions of neutral differential system with multiple variable delays

11:55-12:15 **Timur AYHAN**, Cemil Tunç

Global existence and boundedness results for solutions of specific third order nonlinear vector differential equations

12:15-13:45 Lunch Break

Room 101 Chair: Zeynep KAYAR

15:15-15:35 **Ercan TUNÇ**, Osman Tunç

On the oscillation of a class of damped fractional differential equations

15:35-15:55 **Hilmi ERGÖREN**

Neutral fractional differential equations with impulses at variable times

15:55-16:15 Cemil Tunç, **Ramazan YAZGAN**

On the existence of pseudo almost periodic solutions to a class of Lasota-Ważewska model differential equation

16:15-16:30 Coffee Break

Room 101 Chair: Derya ALTINTAN

16:30-16:50 **Benseridi HAMID**

Asymptotic analysis of a dynamical problem of non-isothermal linear elasticity with friction

16:50-17:10 **Dilmi MOURAD**

Existence and regularity of the solution for nonlinear and oblique problems with friction

17:10-17:30 Latifa Debbi, **Zineb ARAB**

Numerical approximations for some fractional stochastic partial differential equations

Room 102 Chair: İ. Hakkı DENİZLER

- 11:15-11:35 **Gulsen ULUCAK**, Unsal Tekir, Kursat Hakan Oral
A note on lattice module
- 11:35-11:55 **Selçuk TOPAL**
Algorithms in minimal ferrer graph constructions
- 11:55-12:15 **Selçuk TOPAL**
A computational approach to syllogistic English sentences with
ditransitive verbs in formal semantics
- 12:15-13:45 Lunch Break

Room 102 Chair: Ali BAJRAVANI

- 15:15-15:35 **Hatice KUSAK SAMANCI**, Ali Caliskan
A new approach to one parameter motion
- 15:35-15:55 Bülent Karakaş, **Şenay BAYDAŞ**
Group structure of Markov polygons
- 15:55-16:15 Şenay Baydaş, **Bülent KARAKAŞ**
Lie group structure on $n \times n$ Markov matrix
- 16:15-16:30 Coffee Break

Room 102 Chair: Şenay BAYDAŞ

- 16:30-16:50 **Hatice KUSAK SAMANCI**, Ali Caliskan
The level curves and surfaces on time scales
- 16:50-17:10 **Ali BAJRAVANI**
Projective geometry related to the secant loci in symmetric product
of smooth algebraic curves
- 17:10-17:30 **Mustafa BUYUKARSLAN**, Oguzhan Bahadır
On statistical manifold with dual connection and its applications

Room 103 Chair: Kenzu ABDELLA

- 11:15-11:35 **Kamil ARI**
On the generalized k-Pell (p,i)-numbers
- 11:35-11:55 **Ali ZALNEZHAD**, Ghasem Shabani, Hossein Zalnezhad, Mehdi
Zalnezhad
Achieving the largest primes: Algorithm and relations in order
- 11:55-12:15 **Ayşın ERKAN GÜRSOY**, Kürşat Aker
Murnaghan-Nakayama rule for Jack polynomials
- 12:15-13:45 Lunch Break

Room 103 Chair: Mahmut KARAKUŞ

- 15:15-15:35 **Esra KARAOĞLU**, Hüseyin Merdan
Hopf bifurcations of a ratio-dependent predator-prey model involving
two discrete maturation time delays
- 15:35-15:55 Heybetkulu Mustafayev, **Cesim TEMEL**
Mixing type theorem for power bounded measures
- 15:55-16:15 **Nagehan AKGÜN**
DRBEM solution of natural convection flow of water-based
nanofluids in an inclined angle
- 16:15-16:30 Coffee Break

Room 103 Chair: Süleyman EDİZ

- 16:30-16:50 **Ayşın ERKAN GÜRSOY**, Kürşat Aker
A combinatorial approach to Catalan numbers
16:50-17:10 **Ömer Küsmüş, Turgut HANOYMAK**
A possible key exchange protocol over group rings

Room 104 Chair: Hakki DURU

- 11:15-11:35 **Fevzi ERDOGAN**, Kerem Yamac, Mehmet Giyas Sakar
An exponential fitted method for singularly perturbed reaction-diffusion equations
11:35-11:55 Fevzi Erdogan, **Kerem YAMAC**, Mehmet Giyas Sakar
A fitted Numerov method for singularly perturbed reaction-diffusion equations
11:55-12:15 **Onur SALDIR**, Mehmet Giyas Sakar
A combination of VIM and asymptotic expansion for singularly perturbed convection-diffusion problem
12:15-13:45 Lunch Break

Room 104 Chair: Fevzi ERDOGAN

- 15:15-15:35 **Nagehan AKGÜN**
DQM solution of natural convection flow of water-based nanofluid
15:35-15:55 **Ali SIRMA**
Approximating the Riemann-Stieltjes integral in terms of Simpson's rule
15:55-16:15 **Mehmet Giyas SAKAR**, Onur Saldır
A new numerical approach for solving time-fractional partial differential equations
16:15-16:30 Coffee Break

Room 104 Chair: Ali SIRMA

- 16:30-16:50 **Enes Abdurrahman BİLGİN**
Development of an educational software for basic statistics
16:50-17:10 **Mustafa GÖK**, Erdal Beyde
Analysis of the reasoning skills of students in solving a non-routine problem

Room 105 Chair: Cesim TEMEL

- 11:15-11:35 **Güzide ŞENEL**
Matrix representation of soft points and its application
11:35-11:55 **Mahmut KARAKUŞ**
On λ - semiconservative FK spaces
11:55-12:15 **Fatih KUTLU**, Tunay Bilgin
Distance measures for temporal intuitionistic fuzzy sets
12:15-13:45 Lunch Break

Room 105 Chair: Khalik GUSEINOV

- 15:15-15:35 **İclal GÖR**, Rifat Aşlıyan, Ömer Kalfa
Textile image classification using naive bayes and multi-layer perceptron
- 15:35-15:55 **G. Selin SAVAŞKAN**, Aykut Or, Yakup Hacı
Lemke-Howson algorithm for two-person non-zero games
- 15:55-16:15 **Mehmet Nuri ALMALI**, Zinnur Dikici, Özkan Atan
The simulation of sound signal masking with sprout chaotic oscillation
- 16:15-16:30 Coffee Break

Room 105 Chair: Özgür AYDOĞMUŞ

- 16:30-16:50 **İclal GÖR**, Korhan Günel
Solving systems of linear differential equations by using artificial neural networks
- 16:50-17:10 **Ghanbary FATEMEH**, Ahmad Jafarian
Artificial intelligence based modeling for water treatment
- 17:10-17:30 **Hacer ŞENGÜL**, Mikail Et
On Wijsman I -lacunary statistical convergence of order α of sequences

August 27, 2015 Thursday				
Time	Room 101	Room 102	Room 103	Room 104
8:00-10:00	Amphi	Room 102	Room 103	Room 104
Breakfast (Social Program)				
Chair	H. MUSTAFAYEV			
10:30-11:00	Kenzu ABDELLA			
11:00-11:15	Invited Speaker			
Coffee Break				
Chair	E. TUNÇ	İ. H. DENİZLER	K. ABDELLA	H. DURU
11:15-11:35	C. TUNÇ	G. ULUCAK	K. ARI	F. ERDOGAN
11:35-11:55	M. GÖZEN	S. TOPAL	A. ZALNEZHAD	K. YAMAC
11:55-12:15	T. AYHAN	S. TOPAL	A. ERKAN GÜRSOY	O. SALDIR
12:15-13:45	Lunch Break			
Chair	Ş. BAYDAŞ			
14:00-14:30	İsmail KÜÇÜK			
14:30-15:00	Heybetkulu MUSTAFAYEV			
15:00-15:15	Coffee Break			
Chair	Z. KAYAR	A. BAJRAVANI	M. KARAKUŞ	F. ERDOGAN
15:15-15:35	E. TUNÇ	H. KUSAK SAMANCI	E. KARAOĞLU	N. AKGÜN
15:35-15:55	H. ERGÖREN	Ş. BAYDAŞ	C. TEMEL	A. SIRMA
15:55-16:15	R. YAZGAN	B. KARAKAŞ	N. AKGÜN	M. G. SAKAR
16:15-16:30	Coffee Break			
Chair	D. ALTINTAN	Ş. BAYDAŞ	S. EDİZ	A. SIRMA
16:30-16:50	B. HAMİD	H. KUSAK SAMANCI	A. ERKAN GÜRSOY	E. A. BÜLGİN
16:50-17:10	D. MOURAD	A. BAJRAVANI	T. HANOYMAK	M. GÖK
17:10-17:30	Z. ARAB	M. BUYUKARSLAN		H. ŞENGÜL
				Ö. AYDOĞMUŞ
				İ. GÖR
				G. S. SAVAŞKAN
				M. N. ALMALI

Social Programme

Wednesday, August 26

17:30-18:30 Visit to the Van cat House

19:00-21:00 Conference Dinner

Thursday, August 27

8:00-10:00 Van Breakfast

Friday, August 28

All day excursion: Visit to Van Fortress and Akdamar Island and Church

Abstracts of Invited Speakers

PROSPECTIVE OF QUANTUM INFORMATION

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Abstract

In this communication we discuss different aspects of Bioinformatics models and its application quantum information and quantum computer. We focus on the dynamics of charge qubits coupled to a nanomechanical resonator under influence of both a phonon bath in contact with the resonator and irreversible decay of the qubits. Even in the presence of environment, the inherent entanglement is found to be rather robust. Due to this fact, together with control of system parameters, the system may therefore be especially suited for quantum computer. Our findings also shed light on the evolution of open quantum many-body systems.

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SOLVING BOUNDARY VALUE PROBLEMS USING THE SINC
COLLOCATION METHOD WITH DERIVATIVE INTERPOLATION

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MSC 2000: 34B05, 34B15, 34B40, 34B60, 65L10, 65Z05

Abstract

We consider the application of a Sinc-Collocation approach based on first derivative to solve boundary value problems (BVPs) arising from fluid dynamics related models. Even in the presence of singularities that are often present in fluid dynamics problems involving boundary layers, the Sinc-collocation technique provides exponentially convergent approximations including those posed on unbounded domains. The typical Sinc strategy is to start with the Sinc interpolation of the unknown function and to obtain its first and higher derivatives through successive differentiation in order to transform the BVP into discrete system which has a basic drawback as it is well-known that numerical differentiation process is highly sensitive to numerical errors. However, the first derivative interpolation approach presented in this paper uses Sinc-based integration to approximate the unknown has advantages over the customary Sinc method since integration has the effect of damping out numerical errors that are inherently present in numerical approximations. Moreover, the approach presented in this paper preserves the appropriate endpoints behaviors of the Sinc bases, resulting in a highly accurate and computationally efficient method [1]. The accuracy and stability of the proposed method is demonstrated through several fluid dynamics model problems including a hydrodynamic model of wind-driven currents and the Blasius and nonlinear BVPs [2]. It is further shown that the proposed approach is more accurate and computationally efficient than those obtained by other approaches.

Keywords: Boundary value problems, sinc-collocation, fluid dynamics.

References

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- [2] Y. Mohseniahouei, K. Abdella, M. Pollanen, *J. of Comp. Sci.* **7** (2015) 13-26.

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EXTENSION OF CHAOS, CONTROL AND APPLICATIONS

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Abstract

A new method of chaos extension introduced and developed in several our papers and summarized in the book [1] will be discussed. We concern theoretical aspects of the method as well as application opportunities in physics, economics, robotics, neural networks and meteorology.

References

- [1] M. U. Akhmet, M. O. Fen, Replication of chaos in neural networks, Physics and Economy, Springer, 2015.

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AN OVERVIEW OF DISCRETE LOG AND TRACE BASED PUBLIC KEY
CRYPTOGRAPHY ON FINITE FIELDS

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Abstract

The Discrete Logarithm Problem (DLP), that is computing x , given $y = \alpha^x$ and $(\alpha) = G \subset \mathbb{F}_q^*$, based Public Key Cryptosystem (PKC) have been studied since the late 1970s. Such development of PKC was possible because of the trapdoor function $f : \mathbb{Z}_l \rightarrow G = (\alpha) \subset \mathbb{F}_q^*$, $f(m) = \alpha^m$ is a group homomorphism. Due to this fact we have: Diffie Hellman (DH) type key exchange, ElGamal type message encryption, and Nyberg-Rueppel type digital signature protocols. The cryptosystems based on the trapdoor $f(m) = \alpha^m$ are well understood and complete. However, there is another trapdoor function $f : \mathbb{Z}_l \rightarrow G$, $f(m) \rightarrow Tr(\alpha^m)$, where $G = (\alpha) \subset \mathbb{F}_{q^k}^*$, $k \geq 2$, which needs more attention from researchers from a cryptographic protocols point of view. In the above mentioned case, although f is computable, it is not clear how to produce protocols such as Diffie Hellman type key exchange, ElGamal type message encryption, and Nyberg-Rueppel type digital signature algorithm, in general. It would be better, of course if we can find a more efficient algorithm than repeated squaring and trace to compute $f(m) = Tr(\alpha^m)$ together with these protocols. In the literature we see some works for a more efficient algorithm to compute $f(m) = Tr(\alpha^m)$ and not wondering about the protocols. We also see some works dealing with an efficient algorithm to compute $Tr(\alpha^m)$ as well as discussing the cryptographic protocols. In this review paper, we are going to discuss the state of art on the subject.

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RECENT TRENDS RELATED TO FOUR DIMENSIONAL MATRIX
TRANSFORMATIONS

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MSC 2000: 46A45, 40C05

Abstract

Our main goal is to present a short survey on the spaces of double sequences and four dimensional matrix transformations. In Section 2, we give the corresponding results for four dimensional dual summability methods of the new sort to the results obtained by Altay and Başar in [*Some paranormed Riesz sequence spaces of non-absolute type*, Southeast Asian Bull. Math. **30** (5) (2006), 591–608] for two dimensional dual summability methods of the new sort. In Section 3, we present multidimensional analogues of Petersen’ theorem ”The necessary and sufficient conditions for the regular matrix $A = (a_{mn})$ to be stronger than the regular Riesz mean (R, p_n) , where $p_n > 0$ for all $n \in \mathbb{N}$ ” for double sequences. In Section 4, as the domain of four dimensional Riesz mean R^{qt} associated with the sequences $q = (q_k)$ and $t = (t_l)$ of non-negative real numbers in the spaces \mathcal{M}_u , \mathcal{C}_p , \mathcal{C}_{bp} and \mathcal{C}_r , we introduce the double sequence spaces $R^{qt}(\mathcal{M}_u)$, $R^{qt}(\mathcal{C}_p)$, $R^{qt}(\mathcal{C}_{bp})$ and $R^{qt}(\mathcal{C}_r)$, and also examine some properties of those sequence spaces. Furthermore, we show that these sequence spaces are Banach spaces. Let $\vartheta \in \{p, bp, r\}$. We determine the α -dual and $\beta(\vartheta)$ -dual of the space $R^{qt}(\mathcal{M}_u)$ and $\beta(\vartheta)$ -duals of the spaces $R^{qt}(\mathcal{C}_{bp})$ and $R^{qt}(\mathcal{C}_r)$ of double sequences. Finally, we characterize the classes $(R^{qt}(\mathcal{C}_r) : \mathcal{C}_\vartheta)$, $(\mu : (R^{qt}(\mathcal{C}_\vartheta)))$ and $(R^{qt}(\mathcal{C}_\vartheta) : \mathcal{C}_f)$ of four-dimensional matrix transformations, where μ and \mathcal{C}_f denote any given double sequence space and the space of almost convergent double sequences, respectively. Section 5 is devoted to Steinhaus type theorems together with the definitions of four dimensional conull and coregular matrices, and the characterizations of the classes $(\mathcal{M}_u : \mathcal{C}_\vartheta)$, where $\vartheta \in \{p, p0, f\}$. In Section 6, we state and prove the Mercerian theorem for a four dimensional matrix and the space of convergent double sequences in the Pringsheim’s sense.

Keywords: Double sequence space, paranormed sequence space, alpha-, beta-duals and matrix transformations.

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ON NEW ITERATION FOR K-SET CONTRACTION MAPPINGS

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SOME ASPECTS OF OPTIMAL CONTROL

Ismail KUCUK¹*Yildiz Technical University, Istanbul, Turkey***Abstract**

Applications of the optimal control problems arise in many fields of engineering and science. This talk presents a brief overview of the main ideas and concepts of optimal control problems. The discussion will take place in terms of the distributed parameter systems and on its applications to active control of smart mechanical systems and possible other applications will be introduced. The behavior of smart mechanical systems involving the control of vibrations are modeled through partial differential equations that involve unit step functions and their derivatives due to patches. Engineering applications of the patches can be seen in beams, plates, etc. The solution of the problem necessitates the implementation of numerical or approximate methods. The applications of these methods to piezolaminated smart beams using actuators will be discussed to illustrate the main ideas [1].

$$\mathcal{L}[w] = Kf(t) \left(\mathcal{H}''(x - x_1) - \mathcal{H}''(x - x_2) \right), \quad 0 < x < L, 0 < t < t_f, \quad (1)$$

Optimal control of nonlinear applications will also be presented briefly [2] along with possible future projects.

Keywords: Optimal control, maximum principle, variational methods.

References

- [1] I. Kucuk, I. S. Sadek, E. Zeini, S. Adali, Optimal vibration control of piezolaminated smart beams by the maximum principle, *Computers and Structures* **89** (2011) 744-749.
- [2] I. Kucuk, I. Sadek, A robust technique for solving optimal control of coupled Burgers equations, *IMA Journal of Mathematical Control and Information* **28** (2011) 239-250.

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ASSET FLOW DIFFERENTIAL EQUATIONS

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MSC 2010: 91B25, 91B50, 91G99

Abstract

In this talk, I will give an overview on deterministic asset pricing models. I will present asset flow differential equations used for modeling a single asset market involving a group of investors. Derivation of models are based on the assumption of the finiteness of assets (rather than assuming unbounded arbitrage) in addition to investment strategies that are based on either price momentum (trend) or valuation considerations.

Keywords: Ordinary differential equations for asset pricing, price dynamics, asset flow, dynamical system approach to mathematical finance.

References

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- [6] G. Caginalp, D. Balenovich, Asset flow and momentum: deterministic and stochastic equations, *Phil. Trans. R. Soc. Lond. A* **357** (1999) 2119-2133.

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SOME ERGODIC PROPERTIES OF MEASURES

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MSC 2000: 16S34, 16U60

Abstract

Let G be a locally compact abelian group with the dual group Γ and let $M(G)$ be the convolution measure algebra of G . By $\widehat{\mu}$ we denote the Fourier-Stieltjes transform of $\mu \in M(G)$:

$$\widehat{\mu}(\gamma) = \int_G \overline{\gamma}(g) d\mu(g), \quad \gamma \in \Gamma.$$

For $n \in \mathbb{N}$, by μ^n we denote n -times convolution power of $\mu \in M(G)$. A measure $\mu \in M(G)$ which satisfies $\sup_{n \in \mathbb{N}} \|\mu^n\| < \infty$ is called *power bounded*.

In the case when $1 < p \leq 2$, by \widehat{f} we will denote the Hausdorff-Young-Plancherel transform of $f \in L^p(G)$. For a closed subset F of Γ , by $L^p(F)$ we denote the set of all $f \in L^p(G)$ such that $\widehat{f} = 0$ almost everywhere on F (\widehat{f} is only defined up to sets of Haar measure zero).

We have the following.

Theorem. Let G be a locally compact abelian group and let μ be a power bounded measure on G . If $1 < p \leq 2$, then the following conditions are equivalent for a closed subset F of Γ :

- (a) $\lim_{n \rightarrow \infty} \left\| \frac{1}{n} \sum_{k=0}^{n-1} \mu^k * f \right\|_p = 0$, for all $f \in L^p(F)$.
 (b) $\widehat{\mu}(\gamma) \neq 1$, for all $\gamma \in \Gamma \setminus F$.

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HYPERFUNCTION METHOD FOR NUMERICAL INTEGRATIONS

Hidenori OGATA¹, Hiroshi HIRAYAMA²*¹The University of Electro-Communications, Chofu, Japan**²Kanagawa Institute of Technology, Atsugi, Japan***MSC 2000:** 65D30, 65D32**Abstract**

In this paper, we examine a numerical integration method proposed by Hirayama [1]. In his method, an integral $I = \int_a^b f(x)w(x)dx$ ($-\infty < a < b < +\infty$), where $f(x)$ is a given real analytic function and $w(x)$ is a weight function, is transformed into the complex integral on a closed contour

$$I = \frac{1}{2\pi i} \oint_C f(z)\Psi(z)dz \quad \text{with} \quad \Psi(z) = \int_a^b \frac{w(x)}{z-x} dx, \quad (1)$$

where C is a closed contour surrounding the interval $[a, b]$ and included in a complex domain D such that $f(z)$ is analytic in it, and is approximated by the trapezoidal rule. We here call this method the “hyperfunction method” since (1) is the definition of the integral I when the integrand $f(x)w(x)$ is regarded as a hyperfunction [2]. The hyperfunction method gives good approximations especially for integrals with so strong end-point singularities that the DE rule [3] does not work for them.

Keywords: Numerical integration, analytic function, hyperfunction.

References

- [1] H. Hirayama, A numerical integration rule by the contour integral transformation, Abstracts of the 44-th Numerical Analysis Symposium, 21–24 (in Japanese).
- [2] U. Graf, Introduction to Hyperfunctions and Their Integral Transforms, An Applied and Computational Approach, Birkhuser, 2010.
- [3] H. Takahasi, M. Mori, Double exponential formulas for numerical integrations, Publ. RIMS Kyoto Univ. **9** (1974) 721–741.

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Abstracts of Speakers

COMPARISON BETWEEN DISCRIMINANT ANALYSIS AND LOGISTIC
REGRESSION ANALYSIS:AN APPLICATION ON CAESAREAN BIRTHS AND
NATURAL BIRTHS DATA

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MSC 2000: 62-06

Abstract

The Discriminant Analysis (DA) and the Logistic Regression Analysis (LRA) are two statistical methods used for analyzing data and predicting group membership from a set of predictors. Many applications have been done in this area such as the recent works of [1,2]. In [3] Shaheen focused through application on Leukemia data for the comparison between three forms for classification data belongs two groups when the response variable has two categories only. In this paper we shall apply both (DA) and (LRA) for the caesarean births and natural births data using stepwise method. We also make a comparison between the two analysis and then we choose the best one for classifying the type of birth depending on the results of the analysis.

Keywords: Discriminant analysis, logistic regression analysis, caesarean births

References

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- [2] A. Elhabil, M. Eljazzar, A comparative study between linear discriminant analysis and multinomial logistic regression, *An-Najah university journal research* **28** (2014) 1528-1548.
- [3] H. I. Shaheen, Comparison between some of linear classification models with practical application, *Journal of economic and management* **20** (2014) 394-410.

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EXISTENCE AND UNIQUENESS RESULTS FOR A CLASS OF FRACTIONAL
BOUNDARY VALUE PROBLEMAsghar AHMADKHANLU¹¹*Azərbaycan Şahid Mədani Universiteti, Təbriz, İran*

MSC 2000: 34BXX

Abstract

In this work a class of boundary value problem including fractional differential equation is studied. The existence and uniqueness of solution for a nonlinear fractional boundary value problem are discussed. This problem includes a nonlinear fractional differential equation of order $\alpha \in (0, 1]$ and fractional integral boundary conditions. In fact we consider the following boundary value problem of fractional differential equation

$$\begin{aligned} {}^c\mathcal{D}^\alpha y(t) &= f(t, y(t)) & 0 < \alpha < 1, & \quad t \in J := [0, T] \\ y(0) + \mu \int_0^T y(s) ds &= y(T), \end{aligned} \tag{1}$$

where ${}^c\mathcal{D}^\alpha$ denotes the Caputo fractional derivative of order α , $f : J \times \mathbb{R} \rightarrow \mathbb{R}$ is given function will be specified later and $\mu \in \mathbb{R}$.

Banach contraction principle and Browder-Poter fixed point theorem will be used for proving existence and uniqueness of solution for that problem.

Keywords: Fractional differential equations, fractional integral condition, boundary value problem, fixed point.

References

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A COMPARISON OF METHODS FOR COMPUTING THE MATRIX
EXPONENTIAL APPEARS IN SYSTEMS OF DIFFERENTIAL EQUATIONS

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MSC 2000: 65F99, 15A15

Abstract

The matrix exponential commonly arises in the applications of various scientific fields due to the fact that it can provide the solution of the systems of linear differential equations arising in the mathematical modelling of scientific problems. There are a number of methods to compute the matrix exponential e^A for any given square matrix A . However, none of them are completely satisfactory. This paper aims to investigate and analyse a certain number of these methods, in terms of accuracy and efficiency, such as Taylor series method, Padé approximant, the scaling and squaring algorithm, and the spectral decomposition technique. All of the methods have been implemented in MATLAB environment, and then a number of experiments have been carried out on these methods. As a result of the accuracy and efficiency tests, we have found that the scaling and squaring algorithm, is the most accurate and cost-efficient method.

Keywords: Matrix exponential, Taylor series, Padé approximant, accuracy, efficiency.

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EXPONENTIAL STABILITY OF PERIODIC SOLUTIONS OF RECURRENT NEURAL NETWORKS WITH FUNCTIONAL DEPENDENCE ON PIECEWISE CONSTANT ARGUMENT

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Akhmet [1] generalized differential equations with piecewise constant argument by taking any piecewise constant functions as arguments, and recently he introduced functional dependence on piecewise constant argument [2]. These equations play an important role in applications such as neural networks [3]. In this study, we develop a model of recurrent neural network with functional dependence on piecewise constant argument of generalized type given by

$$x'(t) = -Ax(t) + Ex(\gamma(t)) + Bh(x_t) + Cg(x_{\gamma(t)}) + D. \quad (1)$$

Using the theoretical results obtained by Akhmet [2], we investigate conditions for exponential stability of periodic solutions for (1).

Keywords: Differential equations with functional dependence on piecewise constant argument, recurrent neural networks, stability, periodic solutions.

References

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SHARP RUSAK-TYPE INEQUALITIES FOR RATIONAL FUNCTIONS ON SEVERAL INTERVALS

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MSC 2000: 41A17, 41A20

Abstract

We consider sharp Rusak-type inequalities for rational functions on several intervals when the system of intervals is a “rational function inverse image” of an interval and those functions are large in gaps.

Let $\mathfrak{R}(\xi_1, \dots, \xi_{2n})$ be the set of all “rational functions” of the form

$$r(x) = \frac{b_0x^n + b_1x^{n-1} + \dots + b_n}{\sqrt{\rho_\nu(x)}}, \quad b_0, \dots, b_n \in \mathbb{C} \text{ and } \rho_\nu(x) = \prod_{j=1}^{2n} (x - \xi_j)$$

is a real polynomial of degree ν which is positive on $E = \bigcup_{j=1}^l [a_{2j-1}, a_{2j}]$, $-1 = a_1 < a_2 < \dots < a_{2l} = 1$. (ξ_j might be equal to ∞ , then $(x - \xi_j)$ should be omitted) Consider also the set $\mathfrak{R}^*(\xi_1, \dots, \xi_{2n})$ which consists of those functions $r \in \mathfrak{R}(\xi_1, \dots, \xi_{2n})$, which satisfy $|r(x)| > \|r\|_{C(E)}$ for all $x \in [-1, 1] \setminus E$. The last condition can not omit.

Theorem. Suppose that $\sum_{j=1}^{2n} \omega_k(\xi_j) = 2q_k$, $q_k \in \mathbb{N}$, $k = 1, \dots, l$, and $|\xi_j| > 1, j = 1, \dots, 2n$. Then for any $r \in \mathfrak{R}^*(\xi_1, \dots, \xi_{2n}), \|r\|_{C(E)} = 1$ the inequality

$$|r'(x)| \leq \begin{cases} \gamma'_n(x), & x \in \tilde{E}_n, \\ |m'_n(x)|, & x \in E \setminus \tilde{E}_n \end{cases} \quad (1)$$

is valid, where

$$m_n(x) = \cos(\gamma_n(x)), \quad \gamma_n(x) = \frac{\pi}{2} \int_{a_1}^x \sum_{j=1}^{2n} \varpi_E(x, \xi_j) dx,$$

$$\tilde{E}_n = [x_1, x_{q_1}] \cup [x_{q_1}, x_{q_1+q_2}] \cup \dots \cup [x_{q_1+\dots+q_{l-1}}, x_n],$$

and $x_1 < \dots < x_n$ are zeros of m_n (there are q_k zeros on $[a_{2k-1}, a_{2k}], k = 1, \dots, l$).

For $r(x) \equiv \varepsilon m_n(x)$, $|\varepsilon| = 1$, inequality in (1) is attained.

Research supported by RFBR-TUBITAK (14-01-91370/113F369).

Keywords: Inequalities in approximation, approximation by rational functions.

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ASPECTS OF ANALITICAL SOLUTIONS AND SIMULATION OF HIGH
ORDER ODE

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MSC 2000: 34C10

Abstract

This article will introduce the concept of Laplace transformation and how it improved the process of obtaining the exact solution of ODE and its application. This article will focus on the one and two degree of freedom systems, and how can the system be solved by even easier models such as state space modeling, and also how the system can be simulated by different methods. Finally there will be a comparative study to see which method is the least complex and more accurate to find the solution.

Keywords: Laplace transformation, ODE, state space, simulink

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GROUP-2-GROUPOIDS AND 2G-CROSSED MODULES

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MSC 2000: 18D05, 18D35, 20J15, 20L05

Abstract

The main idea of this paper is to construct the group structure on a 2-groupoid which we call *group-2-groupoid*. As an algebraic structure corresponding to a group-2-groupoid, a *2G-crossed module* is obtained on the structure of crossed modules. Then we prove the categorical equivalence between group-2-groupoids and 2G-crossed modules.

Keywords: 2-groupoid, group-2-groupoid, 2G-crossed module.

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THE SIMULATION OF SOUND SIGNAL MASKING WITH SPROUT
CHAOTIC OSCILLATION

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MSC 2000: 34C28

Abstract

Chaotic masking, which is one of the subjects aimed to supply the information security in communication medium, is addressed in this work. The system of Sprout used in chaotic masking and how to make chaotic masking in system are introduced. Then, PID control method providing synchronization in the system is defined. The masking process on sound signals using chaotic oscillation is simulated with Matlab/Simulink registered program.

Keywords: Chaos, chaotic masking, synchronization, PID, chaotic oscillator.

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DQM SOLUTION OF NATURAL CONVECTION FLOW OF WATER-BASED
NANOFLUIDS

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Abstract

In this study, unsteady natural convection heat transfer of water-based nanofluid in a square cavity with heat source at the left vertical wall is studied by solving the equation of conservation of mass, momentum and energy. Stream function-vorticity form of the governing equations are solved by using the differential quadrature method (DQM). Vorticity transport and energy equations are transformed to the form of modified Helmholtz equations by discretizing the time derivative terms first. This procedure eliminates the need of another time integration scheme in vorticity transport and energy equations, and has the advantage of using large time increments. The computational results are obtained for Rayleigh number values between 10^3 and 10^6 , volume fraction of nanoparticles changing from 0 to 0.2 and the length of the heater varying from 0.25 to 1.0. Also, two types of nanoparticles (Al_2O_3 and Cu) are tested. The results are show that the type of the nanoparticles and the length of the heat source affect the flow and temperature flow.

Keywords: DQM, natural convection, nanofluid

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DRBEM SOLUTION OF NATURAL CONVECTION FLOW OF
WATER-BASED NANOFLUIDS IN AN INCLINED ANGLE

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Abstract

In this study, heat transfer and fluid flow due to buoyancy forces in a partially heated and an inclined square enclosure is carried out using two types of nanoparticles (Al_2O_3 and Cu). Stream function-vorticity form of the governing equations are solved by using dual reciprocity boundary element method (DRBEM) with the fundamental solution of modified Helmholtz equation. By using the form of modified Helmholtz equation for the governing equations, the need of another time integration scheme is eliminated. Results are given in terms of streamlines, isotherms and vorticity contours for inclined angle from 0° to 90° , Rayleigh number values between 10^3 and 10^6 , and volume fraction of nanoparticles changing from 0 to 0.2. Also, the length of the heater is taken 0.25, 0.5 and 1.0 which is placed at the center of the left wall. The results are show that the type of the nanoparticles, the length of the heat source and the inclined angle affect the heat transfer of the fluid.

Keywords: DRBEM, natural convection, nanofluid, inclined angle.

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FUNCTIONAL IMPULSES IN EXACT STOCHASTIC SIMULATION

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Abstract

Jumps which are observed in many population models give rise to fluctuations in the dynamics of systems. Deterministic model which is based on the Impulsive Differential Equations (IDEs) considers these jumps as impulses and defines the dynamics of the system between successive jump times with the Ordinary Differential Equations (ODEs). From our previous studies, we have proposed a model which is the complement of IDEs in the sense that both studies consider the jumps as impulses. The main difference between these two approaches is that the former implements ODEs to model the dynamics of system between successive jump times while the latter applies the Chemical Master Equation (CME). From the analyses we have shown that such impulses can be added to the system under the two main scenarios, namely, impulses at fixed time and impulses at fixed states. Hereby as the novelty in this work, we extend our model in such a way that if the jump function and the realization of the model intersect, we update the time to the intersection time point and update the state vector according to the jump function. We insert this idea in the exact Gillespie algorithm and assess the performance of our extended model in different epidemic modellings.

Acknowledgement: This work is supported by the AGEF grant (No: BAP-08-11-2014-007) of the Middle East Technical University.

Keywords: Impulsive differential equations, ordinary differential equations, stochastic simulation, Gillespie algorithm, epidemic models.

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ON THE GENERALIZED K-PELL (P,I)-NUMBERS

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MSC 2010: 11B39; 65Q30; 05A15

Abstract

This study focus on the generalized k -Pell (p, i) -numbers for $k = 1, 2, \dots$ and $0 \leq i \leq p$. It introduces the generalized k -Pell (p, i) -numbers and their generating matrices and generating functions. Some interesting identities are established. The basic properties of Fibonacci and Fibonacci-like numbers are well known and are outlined, for example in [1] and generalizations of Pell numbers can be found in the literature. In [2] P. Catarino consider a generalization of Pell numbers, which the author calls the k -Pell numbers.

Keywords: Fibonacci numbers, Pell numbers, Binet's formula.

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γ -RADICALS OF GAMMA RINGS

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Abstract

Let M be a weak Nobusawa Γ -ring and γ be a nonzero element of Γ . The main focus of this work is to find out new properties for the structure of Γ -ring M . For this reason, we define γ -Lie ideals of Γ -ring M and investigate commutativity conditions for M with derivation. We also define some γ -radicals of the Γ -ring M and show these radicals are strictly weaker than the radicals of M in the literature.

Keywords: Gamma ring, prime Γ -ring, k -derivation, commutativity, γ -radical.

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FRACTIONAL SPACES GENERATED BY THE POSITIVE DIFFERENTIAL
OPERATOR IN THE HALF-SPACE

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Abstract

In the study, we consider the positivity of multi-dimensional differential operator in the half-space. We investigate the structure of fractional spaces generated by differential operators in the half-space. We establish the equivalence of the norms of these fractional spaces and Hölder spaces.

We also discuss its applications to theory of partial differential equations.

Keywords: Positive operator, fractional spaces, Green's function, Hölder spaces.

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GRÜSS INEQUALITY ON DISCRETE FRACTIONAL CALCULUS WITH
DELTA OPERATOR**Serkan ASLIYÜCE¹, A. Feza GÜVENİLİR²**^{1,2}Ankara University, Ankara, Turkey**MSC 2000:** 39A12, 34A25, 26A33**Abstract**

In this talk, firstly we will give basic definitions and theorems of discrete fractional calculus with delta operator. After that, using fractional delta operators we shall introduce the inequality given by G. Grüss in 1935:

If f and g are continuous functions on $[a, b]$ satisfying

$$\phi \leq f(t) \leq \Phi \text{ and } \gamma \leq g(t) \leq \Gamma \text{ for all } t \in [a, b],$$

then

$$\left| \frac{1}{b-a} \int_a^b f(x)g(x)dx - \frac{1}{(b-a)^2} \int_a^b f(x)dx \int_a^b g(x)dx \right| \leq \frac{1}{4}(\Phi - \phi)(\Gamma - \gamma).$$

Keywords: Discrete fractional calculus, Grüss type inequality.

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REGULAR LOCAL FUNCTIONS IN IDEAL TOPOLOGICAL SPACES

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Abstract

This paper deals with a space in which topology is replaced by its generalized open sets. We define an operator $A^{*r}(I, RO(X, \tau))$ called the regular local function of A with respect to I and $RO(X, \tau)$ as follows: $A^{*r}(I, RO(X, \tau)) = \{x \in X : A \cap U \notin I \text{ for every } U \in RO(X, x)\}$. We investigate properties of $A^{*r}(I, RO(X, \tau))$.

Keywords: Regular open set, regular closed set, ideal topological space, local function, regular local function.

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STABILITY ANALYSIS OF HIV INFECTION MODEL WITH TUMOR

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MSC 2010: 34D20, 37C75, 92B99

Abstract

In this study, we propose a mathematical model of HIV infection with tumor cells. We model the interaction between tumor cells, helper T cells, infected helper T cells and virus cells by using a nonlinear dynamical system approach which gives rates of change of the four cell populations in the body. First, we prove the positivity of the solution, as desired in any population dynamics. Then, we analyze the local asymptotic stability of equilibrium points of the HIV infection model. In the end, we support our theoretical results by some numerical simulations.

Keywords: HIV infection, nonlinear dynamical system, stability analysis.

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EXTINCTION IN A GENERALIZED CHAIN BINOMIAL EPIDEMIC MODEL

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Abstract

Here, our aim is to study extinction times in a stochastic epidemic model. First we consider the mean dynamics of the stochastic model. Since we are interested in a nonoverlapping population, our meanfield equations are difference equations. We give conditons for existence and global stability of endemic equilibrium. We show that the stochastic model stays close to the deterministic model for finite time. Using this approximation, we also give exponential lower bounds for mean time to extinction. In addition, we also calculate mean time to reach endemic equilibrium for large populations.

Keywords: Chain binomial epidemic model, difference equations, extinction time.

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GLOBAL EXISTENCE AND BOUNDEDNESS RESULTS FOR SOLUTIONS OF
SPECIFIC THIRD ORDER NONLINEAR VECTOR DIFFERENTIAL
EQUATIONS

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Abstract

We give criteria for the global existence and boundedness of all solutions of a kind of third order nonlinear ordinary vector differential equations of the form:

$$\left(q(t) \left(p(t) X' \right)' \right)' + F(X, X') X'' + G(X') X' + cX = P(t)$$

By means of the Lyapunov second (direct) method, we obtain a new result on the subject and give an example for the illustration of the topic. Our result includes and generalizes some earlier results in the literature.

Keywords: Global existence, Lyapunov function, boundedness, third order.

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PROJECTIVE GEOMETRY RELATED TO THE SECANT LOCI IN
SYMMETRIC PRODUCT OF SMOOTH ALGEBRAIC CURVES

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MSC 2000: 14H99; 14H51.

Abstract

We describe the tangent space of the secant loci associated to a line bundle on a projective smooth algebraic curve. Denoting by $V_d^r(L)$ the $(d-r)$ -th secant loci of C associated to the line bundle L on C , we obtain:

Theorem .1 (a) *If D belongs to $V_d^r(L) \setminus V_d^{r+1}(L)$, the tangent space to $V_d^r(L)$ at D is $T_D(V_d^r(L)) = (\text{Im}(\alpha_L \mu_0^L))^\perp$ where μ_0^L is the cup product map*

$$\mu_0^L : H^0(C, \mathcal{O}(D)) \otimes H^0(C, L(-D)) \rightarrow H^0(C, L).$$

(b) *If $D \in V_d^{r+1}(L)$ then $T_D(V_d^r(L)) = H^0(C, L \otimes \mathcal{O}_D)$. In particular, if $V_d^r(L)$ has the expected dimension and $d < s + 1 + r$, then $D \in \text{Sing}(V_d^r(L))$.*

Theorem .2 *The scheme $V_d^r(L)$ is smooth at $D \in V_d^r(L) \setminus V_d^{r+1}(L)$ and has the expected dimension $d - r \cdot (s + 1 - (d - r))$ if and only if μ_0^L is injective.*

Lemma .3 *For a very ample line bundle L on C and an integer d with $d \geq 4$, if $V_d^r(L) \neq \emptyset$, then no irreducible component of $V_d^r(L)$ is contained in $V_d^{r+1}(L)$.*

Theorem .4 *Let C be a hyper-elliptic curve and L a line bundle on C whose space of global sections has dimension $s + 1$. Assume moreover that $d \leq s + 1$. Then $V_d^r(L)$ is empty or irreducible of dimension $d - r$ according to whether $d < 2r$ or $2r \leq d$, respectively.*

Theorem .5 *If C is non hyper-elliptic and L a very ample line bundle on C with $d \leq h^0(L) - 1$, then every component of $V_d^r(L)$ has dimension at most equal to $d - r - 1$.*

Corollary .6 *Assume that L is a very ample line bundle on C with $h^0(L) = d + 1 \geq 4$. Then $V_d^1(L)$, if non empty, is of dimension $d - 2$.*

Keywords: Symmetric products, very ample line bundle.

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REGARDING ANALYTICAL PROTOTYPE STUDIES FOR THE
GENERALIZED NONLINEAR POCHHAMMER-CHREE EQUATION**Haci Mehmet BASKONUS¹, Hasan BULUT², Mirac KAYHAN³**¹ *Faculty of Engineering, Tunceli University, Tunceli, Turkey*² *Faculty of Science, Firat University, Elazig, Turkey*³ *Faculty of Science, Inonu University, Malatya, Turkey***Abstract**

In this study, we have applied the Bernoulli sub-equation function method to obtain some new analytical solutions for the generalized nonlinear Pochhammer-Chree equation. We have submitted the general structure of Bernoulli sub-equation function method in section 2. In Section 3, as an application, we have obtained some new analytical solutions of the generalized nonlinear Pochhammer-Chree equation defined by [1];

$$u_{tt} - u_{ttxx} + \gamma u_{xxt} - (\lambda_1 u + \lambda_2 u^p + \lambda_3 u^{2p-1})_{xx} = 0, \quad (1)$$

where $\gamma, \lambda_1, \lambda_2, \lambda_3$ are constants and they are not zero. Then, we have plotted two and three dimensional surfaces of analytical solutions by the help of wolfram Mathematica 9.

Keywords: The Bernoulli sub-equation function method, generalized nonlinear Pochhammer-Chree equation, exponential function solution, trigonometric function solutions, hyperbolic function solutions, complex function solution.

References

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LIE GROUP STRUCTURE ON $N \times N$ MARKOV MATRIX

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MSC 2000: 51B25

Abstract

This paper presents a Lie group structure on the set of all $n \times n$ Markov matrices.

Keywords: Lie groups, Markov matrices.

References

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GRAPH-THEORETIC APPROACH TO THE IDEAL STRUCTURE OF A
FAMILY OF NON-CHAIN RINGS

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MSC 2000: 05C99, 94B05

Abstract

For finite $k \geq 1$

$$R_k = F_2[u_1, u_2, \dots, u_k] / \langle u_i^2 = 0, u_i u_j = u_j u_i \rangle. \quad (1)$$

and $R_0 = F_2$ (finite field with two elements) are commutative rings with characteristic two. In [1], Yildiz *et.al* studied some special codes, called self-dual codes, over this ring. This family of rings has been studied as a new source for building linear codes. As pointed out in these studies, it is not easy to determine all ideals of R_k where $k > 1$, since it is not a principal ideal ring. In this study, we determine the ideal structure of R_3 by using the zero-divisor graph [2] of R_3 ($k = 3$).

Keywords: Zero-divisor graphs, non-chain rings.

References

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INVOLUTIONS OF DUAL SPLIT-QUATERNIONS

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MSC 2000: 11R52; 53A25; 53A35; 53B30; 70B10; 70E15

Abstract

Involutions and anti-involutions, which are self-inverse linear mappings, are useful tools to determine rigid-body (screw) motions. In 3-dimensional Euclidean space \mathbb{R}^3 , a reflection of a vector in a plane can be represented by an involution or anti-involution mapping obtained by using real-quaternions. Also, a reflection of a line about a line in \mathbb{R}^3 can be represented by an involution or anti-involution mapping obtained by using dual-quaternions. In this study, we will represent involution and anti-involution mappings obtained by using dual split-quaternions, and a geometric interpretation of each as rigid-body motions in 3-dimensional Minkowski space \mathbb{R}_1^3 .

Keywords: Dual split-quaternions, involutions, rigid-body (screw) motions.

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ASYMPTOTIC EXPANSION OF DOUBLE OSCILLATORY INTEGRALS:
CONTRIBUTION OF NON STATIONARY CRITICAL POINTS OF THE
SECOND KIND

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MSC 2000: 41A60

Abstract

In in this paper, we show that the contribution of a non-stationary critical point of the second kind to the asymptotic expansion of a double oscillatory integral is governed by “the order of contact” between the boundary of the domain of integration and the level curve of the phase through the critical point. Complete asymptotic expansions are derived and the coefficient of the leading term is computed in terms of the original data of the problem. This problem was previously studied by several authors, but only in the special case when the order of contact is minimal.

Keywords: Asymptotic expansion, oscillatory integral, critical point of the second kind.

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DEVELOPMENT OF AN EDUCATIONAL SOFTWARE FOR BASIC
STATISTICS

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Abstract

In this study we aim to develop a dynamic educational software. For this purpose we have developed a software that capable of both describing and analyzing issues of statistics. Programme can both produce random sample and solve statistics. The developed software has been created with the *c#* language with 2900 lines of code. General algorithm of the program, the calculated values compared with the actual values of these values will be presented in this study.

Keywords: Educationonal software, statistical software, *c#* programming language.

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REGRESSION ANALYSIS ALGORITHM FOR CIRCULAR DATA

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MSC 2000: 62J99,68N01

Abstract

In this study, we aimed to develop a software algorithm that can provide the opportunity to create the foundations of a regression of circular data without any additional information. For this purpose, we have developed special algorithms for circular regression and some basic circular statistics. Some of these are mode, mean, standard deviation and correlation. Algorithms have been developed with `c#` programming language. It was created for this purpose and approximately 3760 lines of code. We will give obtained results and error rates.

Keywords: circular regression, software algorithm, `c#` programming language.

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SOME NEW THEOREMS IN HILBERT QUASILINEAR SPACES

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MSC 2000: 34C10

Abstract

This study is concerned with the some new theorems and definitions in Hilbert quasilinear spaces. First, we introduce minimizing vector theorem and some results in Hilbert quasilinear spaces. Next, we provide two main examples: First example is a Hilbert quasilinear space, that does not satisfy the orthogonal decomposition and second example is subset of a Hilbert quasilinear space with the orthogonal decomposition properties. Then, we have from first example that any Hilbert quasilinear space may not satisfy the orthogonal decomposition theorem of Hilbert spaces. Finally, we give some results related to above theorems provide an important contributions to the improvement of the quasilinear functional analysis.

Key words: Quasilinear space, quasilinear inner prouct space, quasilinear Hilbert Space, orthogonality.

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ON STATISTICAL MANIFOLD WITH DUAL CONNECTION AND ITS
APPLICATIONS

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Abstract

Statistical manifolds was introduced by Amari in 1985. He has studied statistical manifolds in terms of information geometry. Since the geometry of such manifolds includes the notion of dual connection, also called conjugate connection in affine geometry, it is closely related to affine differential geometry. A statistical manifold is, in short, a Riemannian manifold (M, g) with one additional structure given by a torsion-free and symmetric affine connection ∇ and its dual connection ∇^* , which is also assumed to be torsion-free; we say ∇ and ∇^* are mutually dual whenever $Xg(Y, Z) = g(\nabla_X Y, Z) + g(Y, \nabla_X^* Z)$ holds for all vector fields X, Y, Z on M . In this paper, we gave some fundamental definitions and theorems, then we studied statistical manifolds with dual connection and its applications.

Keywords: Statistical manifold, statistical structure, dual connection.

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SOME FIXED POINT THEOREMS SATISFYING MEIR-KEELER TYPE
CONTRACTIONS VIA RATIONAL EXPRESSION IN 2-METRIC SPACES

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MSC 2000: 54H25, 47H10

Abstract

In this paper, we establish some fixed point theorems for Meir-Keeler type contractions via rational expressions and also we obtain some results for mappings satisfying integral type contractions in 2- metric spaces.

Keywords: Fixed point, Meir-Keeler type contraction, 2-metric spaces.

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A NUMERICAL METHOD FOR NONLINEAR SINGULARLY PERTURBED
MULTI-POINT BOUNDARY VALUE PROBLEM

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MSC 2000: 34B10, 65L05, 65L11, 65L12, 65L20

Abstract

We consider the following nonlinear singular perturbed multi-point problem:

$$\begin{aligned} -\varepsilon^2 u'' + f(x, u) &= 0, \quad 0 < x < 1, \\ u(0) &= 0, \\ k_0 u(1) &= \sum_{i=1}^m k_i u(s_i) + k_{m+1} \int_0^1 u(x) dx + d, \end{aligned}$$

where $0 < \varepsilon \ll 1$ is small perturbation parameter, the function $f(x, u)$ is sufficiently smooth on $[0, 1] \times \mathbb{R}$, $s_i \in (0, 1)$, $i = 1, 2, \dots, m$, $k_0 \geq 0$, and furthermore $\frac{\partial f}{\partial u}(x, u) \geq \alpha > 0$. The solution $u(x)$ has boundary layers at $x = 0$ and $x = 1$. This study is concerned with ε -uniform numerical method for the nonlinear singularly perturbed multi-point boundary value problem. We describe some properties of the solution of this problem. The numerical method is constructed on Shishkin mesh and the method is shown to be convergent of first order in the discrete maximum norm. Consequently, the numerical experiments which demonstrate the sharpness of our theoretical analysis are presented.

Keywords: Singular perturbation, fitted finite difference method, Shishkin mesh, nonlocal boundary condition, uniform convergence.

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REDUCED DIFFERENTIAL TRANSFORM METHOD FOR SIXTH-ORDER
SINGULARLY PERTURBED BOUSSINESQ EQUATIONMusa CAKIR¹, Derya ARSLAN²^{1, 2} *Yuzuncu Yil University, Van, Turkey*

MSC 2000: 34D15, 35B25, 65N20, 65N12, 65N15

Abstract

We consider the following the ill-posed Boussinesq equation and sixth-order singularly perturbed Boussinesq equation, respectively:

$$u_{tt} = u_{xx} + u_{xx}^2 + u_{xxxx}, \quad \text{and} \quad u_{tt} = u_{xx} + u_{xx}^2 + u_{xxxx} + \epsilon u_{xxxxxx}$$

The purpose of this paper is to obtain the approximate solution of sixth-order singularly perturbed Boussinesq equation and the ill-posed Boussinesq equation ($\epsilon = 0$) by the reduced differential transform method (RDTM). This numerical method for solving a wide variety of linear and nonlinear partial differential equations usually gets the solution in a series form. The suggested algorithm is quite efficient and is practically well suited for use in these problems. Several examples are presented to demonstrate the efficiency and reliability of the RDTM (Because this method yield the desired accuracy only in a few terms and in a series form of the exact solution), and numerical results are discussed, compared with exact solution. The numerical results show that this method is a powerful tool for solving nonlinear singular perturbed PDEs and the results show that the method reduces the numerical calculations.

Keywords: Singularly perturbed Boussinesq equation, ill-posed Boussinesq equation, reduced differential transform method.

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INVERTED DISTANCE AND INVERTED WIENER INDEX

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MSC 2000: 05C12

Abstract

The Wiener index is the sum of distances between all pairs of vertices of a (connected) graph. In this paper we defined two novel graph invariants; the inverted distance and the inverted Wiener index. The inverted distance of between any two different vertices u and v of a simple connected graph G defined as; $i(u, v) = D - d(u, v) + 1$ where D denotes the diameter of G and $d(u, v)$ denotes the distance of the vertices u and v . The inverted Wiener index of a simple connected graph G defined as; $IW(G) = \sum_{u \neq v} i(u, v)$ where the sum is taken over unordered pairs of vertices of G . We characterized maximum trees with respect to the inverted Wiener index.

Keywords: inverted distance, inverted Wiener index, Wiener index, average inverted distance.

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MATRIX-VALUED DIFFERENCE OPERATORS WITH POLYNOMIAL TYPE
JOST SOLUTIONS ON THE WHOLE AXIS

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MSC 2000: 39A05, 39A70, 39A10, 47A05.

Abstract

The main aim of this paper is to obtain the Jost solutions and some spectral properties of a second order matrix self-adjoint difference equation on the whole axis. In this paper, we investigate the analytical properties and asymptotic behaviors of these Jost solutions. Then, we find continuous spectrum of the operator L generated by matrix-valued difference expression of second order. At last, we get that the operator L has a finite number of real eigenvalues.

Keywords: Difference equations, discrete operator, Jost solution, eigenvalues, continuous spectrum.

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SOME INCOMPLETE Q -POLYNOMIALS

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MSC 2000: 11B39, 05A30

Abstract

The q -analogues of Fibonacci polynomials were studied by Carlitz [7] and Cigler [8, 7]. We use q -analogues of Fibonacci polynomials to define incomplete q -Fibonacci polynomials. We obtain some properties and relations between these polynomials.

Keywords: Incomplete Fibonacci numbers, incomplete q -Fibonacci polynomials, q -Fibonacci polynomials.

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SOME FIXED POINT THEOREMS ON SOFT G-METRIC SPACES

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MSC 2000: 54A05, 06D72, 47H10

Abstract

In this presentation, the notion of soft G-complete space is introduced and some properties of such spaces are investigated. Then, some fixed point theorems for mappings satisfying sufficient conditions are proved on soft G-metric spaces.

Keywords: soft set, soft G-metric space, fixed point.

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ON THE Q -EXTENSION OF THE P -ADIC BETA FUNCTION

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MSC 2000: 11S80, 33D05

Abstract

Let p be a fixed prime number. By $\mathbb{Z}_p, \mathbb{Q}_p$ and \mathbb{C}_p we denote the ring of p -adic integers, the field of p -adic numbers and the completion of the algebraic closure of \mathbb{Q}_p , respectively. Y. Morita (1975) defined the p -adic gamma function $\Gamma_p : \mathbb{Z}_p \rightarrow \mathbb{Q}_p$ by the formula

$$\Gamma_p(x) = \lim_{n \rightarrow x} (-1)^n \prod_{\substack{1 \leq j < n \\ (j,p)=1}} j$$

Let $q \in \mathbb{C}_p$ with $|q-1|_p < 1$ and $q \neq 1$, the q -extension of the p -adic gamma function is defined by

$$\Gamma_{p,q}(x) = \lim_{n \rightarrow x} (-1)^n \prod_{\substack{1 \leq j < n \\ (j,p)=1}} \frac{1-q^j}{1-q} \quad \text{for } x \in \mathbb{Z}_p,$$

where n runs over positive integers. We recall that $\lim_{q \rightarrow 1} \Gamma_{p,q} = \Gamma_p$.

In the present work we consider the q -extension of the p -adic beta function which is defined by

$$B_{p,q}(x, y) = \frac{\Gamma_{p,q}(x) \Gamma_{p,q}(y)}{\Gamma_{p,q}(x+y)}.$$

We obtain some properties of the q -extension of the p -adic beta function $B_{p,q}$.

Keywords: p -adic number, q -extension of the p -adic gamma function, q -extension of the p -adic beta function.

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OPERATOR EQUATIONS GENERALIZING THE NOTIONS OF HANKEL
AND TOEPLITZ OPERATORS

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Abstract

Hankel and Toeplitz operators came into existence with the work of H. Hankel in 1861 and O. Toeplitz in 1911 respectively. Although, the initial appearance of these operators was seen in matrix form, but various equivalent forms were obtained subsequently. In terms of matrices, a Hankel operator is an operator on a Hilbert space whose matrix with respect to an orthonormal basis is constant along each diagonal perpendicular to the main one and a Toeplitz operator is one whose matrix is constant along each diagonal parallel to the main one. In terms of operator equations, Hankel and Toeplitz operators on Hardy spaces are nothing but the solutions of operator equations $U^*X = XU$ and $U^*XU = X$ respectively, where U is the forward unilateral shift and U^* is its adjoint.

Barria and Halmos in 1982 focused the attention of mathematicians towards a new direction by proposing the operator equation $U^*XU = \lambda X$ for an arbitrary complex number λ . The study of Hankel and Toeplitz operators has gone a long way with the inception of various classes of operators like slant Hankel, slant Toeplitz, essentially slant Hankel, essentially slant Toeplitz, k^{th} -order slant Hankel, k^{th} -order slant Toeplitz operators, λ -Hankel operators. The present talk is a motivation of the work of Barria and Halmos that leads to some generalizations of the operator equations characterizing Hankel and Toeplitz operators and has come up as a recent development in this direction.

Keywords: Hankel operators, Toeplitz operators, operator equations.

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NUMERICAL APPROXIMATIONS FOR SOME FRACTIONAL STOCHASTIC
PARTIAL DIFFERENTIAL EQUATIONS

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Sciences, University Ferhat Abbas, El-Maabouda Setif 19000, Algeria.*

Abstract

In this work, we elaborate and calculate the rate of convergence of several numerical schemes to approximate the solution of some fractional stochastic partial differential equations (FSPDEs); fractional stochastic heat and Burgers equations with gaussian multiplicative noise. In particular, we use Galerkin spectral method in space, Euler method in time and we elaborate a complete scheme. We prove strong convergence and we calculate explicitly the rate of convergence and show its dependence on the fractional power of the Laplacian.

Keywords: Strong convergence, Galerkin spectral method, implicit Euler scheme, multiplicative noise, fractional laplacian, Burgers equation.

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SOME PROPERTIES OF SOFT PROXIMITY SPACES

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MSC 2000: 54A40, 06D72, 54E05.

Abstract

In this work, we continue investigating the properties of soft proximity spaces. Also, we give the notion of a soft δ -neighborhood in soft proximity spaces and obtain a few results analogous to the ones that hold for δ -neighborhood in proximity spaces. Moreover, we show that each soft uniform space on X induces a soft proximity space on the same set. Finally, we prove the existences of initial soft proximity spaces.

Keywords: soft set, soft proximity, soft δ -neighborhood, initial soft proximity.

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NAKAYAMA'S LEMMA FOR ARTINIAN MODULES AND GENERALIZED
MATLIS DUALITY

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MSC 2010: 13E10, 13E05

Abstract

The purpose of this study is to produce Nakayama's Lemma for Artinian modules. Note that Nakayama's Lemma is applicable for Noetherian modules. To prove the Artinian case, we develop a generalization of Matlis duality which applies to a complete semi-local Noetherian ring; This enables us to pass back and forth between the category of Noetherian modules and Artinian modules. This technique is used in conjunction with the completion of R (the ring we define modules over) related to R -module A , to show how several result about Artinian modules can be deduced from well-known classical Noetherian results. The classical duality of Matlis was originally developed for a complete local Noetherian ring. We use the fact that such a ring is isomorphic to a direct product of finitely many complete local rings and appeal to the standard version of Matlis' duality.

Keywords: Artinian rings and modules, finite dimensional algebras.

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A GENERAL RESULT ON ASYMPTOTIC INTEGRATION OF IMPULSIVE
DIFFERENTIAL EQUATIONS

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Abstract

There is hardly any work about asymptotic integration of differential equations under impulse effect. We consider second order nonlinear impulsive differential equations with fixed moments of impulses. By using principal and nonprincipal solutions we find an asymptotic representation of the solutions depending on a parameter.

Keywords: Fixed point theory, impulsive differential equations, principal and non-principal solutions, asymptotic integration.

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DIFFERENCE SCHEMES ON ADAPTED MESH FOR THE INITIAL
BOUNDARY VALUE SOBOLEV PROBLEMS WITH BOUNDARY LAYERS

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MSC 2000: 65M06, 34K26, 65M12, 34K28

Abstract

In this paper, a new adaptive mesh strategy has been developed for solving the linear singular initial-boundary value Sobolev type differential equation in the domain $D = (0, l) \times (0, T]$, form as follows:

$$Lu \equiv -\varepsilon \frac{\partial^4 u}{\partial t^2 \partial x^2} + a(x) \frac{\partial^2 u}{\partial t^2} - \varepsilon \frac{\partial^2 u}{\partial x^2} + b(x, t) u = f(x, t), \quad (x, t) \in D, \quad (1)$$

with the initial data

$$u(x, 0) = u(x), \quad \frac{\partial u}{\partial t}(x, 0) = \psi(x), \quad (2)$$

and boundary conditions

$$u(0, t) = u(l, t) = 0. \quad (3)$$

Here ε is a small positive parameter ($0 < \varepsilon \ll 1$), $a(x) \geq \alpha > 0$, $|b(x, t)| \leq b$, $u(x)$, $\psi(x)$ and $f(x, t)$ are sufficiently smooth functions. For the numerical solution of this problem, we use an finite difference schemes on B-mesh on a non-uniform mesh which is accomplished by the method of integral identities with the use of basis functions and interpolating quadrature rules with weight and remainder term in integral form. The error estimates for the numerical solution are obtained.

Keywords: Singular perturbation, Sobolev problem, uniform convergence, difference schemes, Bakhvalov mesh.

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FINITE DIFFERENCE SCHEMES ON SHISHKIN MESH FOR SINGULARLY
PERTURBED INITIAL-BOUNDARY VALUE SOBOLEV TYPE PROBLEMS

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MSC 2000: 65M06, 65M12, 34K28

Abstract

In this paper, we present a finite difference schemes on piece-wise uniform Shishkin mesh for solving singular perturbation Sobolev problem. We show that the constructed difference scheme is stable and first order uniform convergence. We give a numerical example which illustrate the theoretical results on the uniform accuracy of the discrete problem, as well as the robustness of the method.

Keywords: Singular perturbation, difference schemes, Shishkin mesh, Sobolev problem.

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REVERSE ZAGREB INDICES OF CARTESIAN PRODUCT OF GRAPHS

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MSC 2000: 05C07

Abstract

Recently the reverse vertex degree and the reverse Zagreb indices have been defined [1]. Let G be a simple connected graph and v be a vertex of G . Then, the reverse vertex degree of the vertex v , c_v defined as follows; $c_v = \Delta - d_v + 1$. The first reverse Zagreb alpha index of G defined as; $CM_1^\alpha(G) = \sum_{v \in V(G)} c_v^2$. The first reverse Zagreb beta index of G defined as; $CM_1^\beta(G) = \sum_{uv \in E(G)} (c_u + c_v)$. The second reverse Zagreb index of G defined as; $CM_2(G) = \sum_{uv \in E(G)} c_u c_v$. The chemical predictivity of these novel indices have been investigated in [2]. In this paper, some exact expressions for the reverse Zagreb indices of Cartesian product of two simple connected graphs were determined.

Keywords: Reverse vertex degree, reverse Zagreb indices, cartesian product of graphs.

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Q-CONVERGENCE OF GRADED DIFILTERS

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MSC 2000: 54A05, 54A20, 06D10

Abstract

Convergence of graded difilters have been presented and investigated by the authors in [3]. In this work, using graded Q-dinhd systems defined in [2] the authors define a different convergence type of graded difilters called Q-convergence which has some advantages and some disadvantages in comparison with the convergence defined in [3].

Keywords: Texture, q-convergence, graded ditopology, graded difilter, fuzzy topology.

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ON ORDERING OF TREES BY MULTIPLICATIVE VERSION OF ZAGREB
INDICES**Mehdi ELIASI¹***Department of Mathematics and Computer Science, Faculty of Khansar,
University of Isfahan, P.O.Box 87931133111, Khansar, Iran***MSC 2000:** 05C07**Abstract**

A topological index is a real number related to a molecular graph, which is a graph invariant and which has some chemical application. Let $G = (V, E)$ be a molecular graph representing of a chemical structures. The first and the second Zagreb indices of G are defined as:

$$M_1(G) = \sum_{uv \in E(G)} [d_G(u) + d_G(v)], \quad M_2(G) = \sum_{uv \in E(G)} [d_G(u)d_G(v)],$$

respectively, where d_u denotes the degree of vertex u . These indices have been used to study molecular complexity, chirality, ZE-isomerism and hetero-systems. Gutman et al. [1, 2] have recently proposed to consider the multiplicative variants of Zagreb indices as:

$$P_1^*(G) = \prod_{uv \in E(G)} [d_G(u) + d_G(v)], \quad P_2(G) = \prod_{uv \in E(G)} [d_G(u)d_G(v)],$$

In this paper for chemical trees, we introduce some graph transformations, which decrease Π_1^* and Π_2 . By using these operations, we identify classes of trees, which have smallest multiplicative version of Zagreb indices among all chemical trees of order $n \geq 16$.

Keywords: Zagreb indices, graph operation, chemical tree.

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GENERALIZED BULLEN TYPE INEQUALITIES FOR LOCAL FRACTIONAL
INTEGRALS AND ITS APPLICATIONS

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MSC 2000: 26D10, 26D15, 26A33, 52A41, 41A55.

Abstract

In this paper, we establish the generalized Bullen type inequalities involving local fractional integrals on fractal sets R^α ($0 < \alpha \leq 1$) of real line numbers. Some applications of these inequalities in numerical integration and for special means are given.

Keywords: Bullen's inequality, local fractional integral, fractal space, generalized convex function, numerical integration, special means.

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A FITTED NUMEROV METHOD FOR SINGULARLY PERTURBED
REACTION-DIFFUSION EQUATIONS

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MSC 2000: 34D15, 33F05

Abstract

In this paper we considered singularly perturbed reaction-diffusion problem whose solution exhibits boundary layers. We have introduced a simple and efficient computational technique based on Numerov's scheme which is composed of an exponentially fitted difference scheme on uniform mesh. A fitting factor is obtained from the theory of singular perturbations. The method is shown to uniformly convergent with respect to the perturbation parameter. A numerical experiment illustrate in practice the result of convergence proved theoretically.

Keywords: Singularly perturbation problems, reaction-diffusion problem, boundary layer, fitting factor, Numerov's method.

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AN EXPONENTIAL FITTED METHOD FOR SINGULARLY PERTURBED
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Abstract

In this study we consider a numerical method for a singularly perturbed one-dimensional reaction-diffusion problem whose solution exhibits boundary layers. A finite difference scheme is constructed in an equidistant mesh, which gives first and second order uniform convergence in the discrete maximum norm. A fitting factor is introduced in finite difference scheme and is obtained from the theory of singular perturbations. Thomas algorithm is used to solve the system. The method is shown to uniformly convergent with respect to the perturbation parameter. A numerical experiment illustrate in practice the result of convergence proved theoretically.

Keywords: Reaction-diffusion, singular perturbation, numerov method.

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IMPULSIVE NEUTRAL FRACTIONAL DIFFERENTIAL INCLUSIONS AT
VARIABLE TIMES

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MSC 2000: 26A33, 34A08, 34A37, 34A60, 34K37

Abstract

In this work, we establish some sufficient conditions for the existence of solutions for a class of initial value problems for impulsive fractional functional differential inclusions with neutral delay at variable moments.

Keywords: Caputo fractional derivative, existence and uniqueness, functional differential inclusions, Impulsive differential inclusions, variable times.

References

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NEUTRAL FRACTIONAL DIFFERENTIAL EQUATIONS WITH IMPULSES
AT VARIABLE TIMES

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Abstract

As known, impulsive functional differential equations of integer order with fixed and variable moments and the ones of fractional order with fixed moments take place in the related literature many times (see for instance [1, 2]). However, to the best of our knowledge, the ones of fractional order with variable moments have not been considered yet. In this study, we extend the results of Benchohra and Ouahab [3] having an integer-order impulsive neutral-delay differential equations with variable moments to the fractional order ones.

Keywords: Fractional differential equation, Caputo fractional derivative, impulses, variable times.

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ARTIFICIAL INTELLIGENCE BASED MODELING FOR WATER
TREATMENT

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MSC 2000: 92B20

Abstract

In this work, two computational methods are developed to predict the photocatalytic removal of AY23 in the presence of Ag-TiO₂ nanoparticles prepared under desired conditions. One is artificial neural network (ANN) approach, another is genetic algorithm (GA) modeling approach. To develop the models, a total of 100 data were used, wherein four parameters, such as initial concentration of dye, UV light intensity, initial dosage of nano Ag-TiO₂ and irradiation time were used as the input variables and removal of AY23 as output variable. The predictive and generalization abilities of the models were comprehensively evaluated using several statistical tests. The comparison between the predicted results by designed models and the experimental data prove that modeling of the removal process of AY23 by using ANN and GA are precise methods to predict the extent of AY23 removal under different conditions. ANN model performed relatively better than the GA model.

Keywords: Artificial neural network, genetic algorithm, modeling.

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SYMMETRIC BI-MULTIPLIERS ON INCLINE ALGEBRAS

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MSC 2000: 06B35, 06B99, 16B70, 16B99

Abstract

In this study, we introduce the notion of $*$ and $+$ -symmetric bi-multipliers in incline algebras and research some related properties. Also, we define kernel of $*$ and $+$ -symmetric bi-multipliers in incline algebras. Additionally, we state some properties of these $*$ and $+$ -symmetric bi-multipliers in integral incline algebras.

Keywords: Symmetric bi-derivations, incline algebras, multipliers, fixed set, kernel.

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KIRCHOFF INDEX OF WEIGTED GRAPHS

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Let G be a simple, connected graph. The Kirchoff index of G defined as

$$Kf(G) = \sum_{i < j} r_{ij}.$$

In this paper, we define Kirchoff index for the simple connected weighted graphs which edge weights are positive real numbers or positive definite matrices. Furthermore we will give some properties of Kirchoff index for weighted graphs.

Keywords: Weighted graphs, Laplacian matrices, Kirchoff index.

References

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WIENER INDEX OF WEIGTED GRAPHS

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MSC 2000: 05C50

Abstract

The Wiener index of simple connected G graph defined as

$$W(G) = \frac{1}{2} \sum_{i=1}^n \sum_{j=1}^n d(i, j).$$

In this paper, we will define of Wiener index of edge-weighted and vertex-weighted graphs, which weights are positive definite matrices. Moreover we will give some properties of Wiener index for this graphs.

Keywords: Weighted graphs, Laplacian matrices, Wiener index.

References

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ANALYSIS OF THE REASONING SKILLS OF STUDENTS IN SOLVING A
NON-ROUTINE PROBLEM

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MSC 2000: 97A90, 97C30

Abstract

Non-routine problems have a great significance in developing students reasoning skills. Because students attempt to overcome the situation they are in by associating their existing knowledge to arrive at a consistent objective while solving non-routine problems. Naturally these processes necessitate reasoning. This study aims to investigate the reasoning approaches students used in the solution process of a non-routine problem in a milieu designed in compliance with the Theory of Didactical Situations supporting the reasoning skills of seventh grade students. The study was conducted using the qualitative method. Participants of the study were 24 students attending the seventh grade in a middle school in Van province, Turkey. The implementation lasted for 45 minutes. The analysis of the findings of the study was based on the reasoning levels determined by Brousseau and Gibel[1]. As a result, students were able to solve the non-routine problem by establishing interaction with the designed milieu. It could be stated that the designed milieu supported the reasoning skills of the students.

Keywords: Theory of didactical situations, reasoning, non-routine problems, 7th grade.

References

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TEXTILE IMAGE CLASSIFICATION USING NAIVE BAYES AND
MULTI-LAYER PERCEPTRON

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MSC 68U10 68T10 62H30 62H35

Abstract

In this study, we have designed and implemented textile image classification systems using the methods as Multi-layer Perceptron and Naive Bayes. After the models of the systems are constructed for the classes as "Flowery", "Spotted", "Horizontal Striped", "Vertical Striped", "Plaided", "45 Degree Striped" and "135 Degrees Striped" in training phase, we have computed the success of systems in testing phase. The systems consist of four stages as preprocessing, feature extraction, training and testing [1]. In the preprocessing, first, all textile images are converted to the black-and-white images. Second, the thinning process of the images is performed by skeletonization operation. Third, the Sobel filter is applied to detect the edge of images [2]. In the feature extraction stage, the frequencies of 2x2, 3x3 and 4x4 kernel matrices in the images are calculated for each image. Information gain is also used for the dimension reduction of the images' attribute vectors. In the training stage, the models representing each class are composed by training all attribute vectors. In the testing stage, the systems are evaluated by accuracy and f-measure. As a result, Naive Bayes (The best accuracy and F-measure: 0.944) outperformed Multi-layer Perceptron (The best accuracy: 0.938, The best F-measure: 0.937) in classification accuracy and f-measure.

Keywords: Image classification, Naive Bayes, multi-layer perceptron.

References

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SOLVING SYSTEMS OF LINEAR DIFFERENTIAL EQUATIONS BY USING
ARTIFICIAL NEURAL NETWORKS

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MSC 2000: 68T01, 68T20, 34A30

Abstract

Artificial neural networks (ANNs) are well known computational methods which can solve different mathematical problems such as approximating the solution of differential equations. In this work, we solve systems of linear differential equations by using ANN called Multi Layer Perceptron (MLP). We present numerical solutions by MLP and compare them with the analytical solutions. The obtained results show that the artificial neural networks are able to solve systems of linear differential equations.

Keywords: Systems of linear differential equations, feedforward neural network, multi layer perceptron, backpropagation algorithm.

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GENERALIZED BOUR'S THEOREM IN MINKOWSKI SPACE FORM

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MSC 2010: 53A35; 53C42

Abstract

We obtain isometric minimal helicoidal and rotational surfaces using generalized Bour's theorem in three dimensional Minkowski space. In addition, we show that the surfaces preserve minimality when their Gauss maps identically equal, choosing any differentiable functions on the profile curve.

Keywords: Gauss map, Gaussian curvature, helicoidal surface, mean curvature, rotational surface.

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ALGEBRAIC SURFACES OF HENNEBERG IN MINKOWSKI 3-SPACE

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MSC 2010: 53A35; 53C42

Abstract

We consider the algebraic Henneberg zero mean curvature surfaces in three dimensional Minkowski space and compute their classes, degrees and integral free representations.

Keywords: Henneberg surfaces, Gauss map, mean curvature, class, degree.

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ON WEAK CONTINUITY OF SOFT TOPOLOGICAL SPACES

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MSC 2000: 54A05, 54C08, 06D72

Abstract

In this presentation, we introduce soft weak continuous function and soft almost continuous function on soft topological spaces. We show that the notion of soft weak continuous and soft almost continuous are independent. We also obtained soft weak continuity and soft almost continuity are strictly weaker than soft continuity. Then we give some basic theorems and results about these new notions.

Keywords: soft set, soft topological space, soft continuity.

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ON COMPARISON OF COHERENT SYSTEMS VIA DYNAMIC SYSTEM
SIGNATURE

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MSC 2010: 62N05, 62G30, 60E15

Abstract

System signature is extremely useful tool for comparing of coherent systems. Let X_i 's be independent and identically distributed n -components lifetimes of a system with T lifetime. The signature of the system is $\mathbf{s} = (s_1, s_2, \dots, s_n)$ where s_i is equal to probability of event $(T=X_{i:n})$ and $X_{i:n}$ is the i th order statistics of X_i 's. Also, dynamic system signature is the truncated form of system signature when exactly i components of the system have failed at time t . In this study, comparison of new better than used (NBU) and uniformly new better than used (UNBU) properties of aging systems with dynamic system signature by stochastic, hazard rate and likelihood ratio orderings are investigated.

Keywords: Coherent system, order statistics, signature, aging, NBU, UNBU, stochastic, Hazard rate and Likelihood ratio orderings.

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A COMBINATORIAL APPROACH TO CATALAN NUMBERS

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Abstract

In this paper, we form a bijection between two sets which their cardinalities are Catalan numbers. Also we prove a conjecture in [1] with regard to the equality of two generating functions are connected with these two sets whose cardinalities are Catalan numbers.

Keywords: Catalan numbers, generating functions, Dyck paths.

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MURNAGHAN-NAKAYAMA RULE FOR JACK POLYNOMIALS

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10, Turkey***Abstract**

For λ is a partition and n is a nonnegative integer, Murnaghan-Nakayama rule for Schur functions calculates the product of a Schur function s_λ and a power symmetric function p_n :

$$s_\lambda p_n = \sum_{\nu} (-1)^{ht(\nu/\lambda)} s_\nu,$$

where all partitions $\lambda \subseteq \nu$ for which ν/λ is a border strip with n boxes and the height $ht(\nu/\lambda)$ of the border strip is the number of rows, minus 1. This is the theorem in [3]. In this work, we investigate Murnaghan Nakayama rule for Jack polynomials. We obtain some combinatorial results and interpretations for some conditions.

Keywords: Jack polynomials, symmetric functions, young diagram.

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SOME RESULTS ON PREDATOR-PREY DYNAMIC SYSTEMS WITH
BEDDINGTON-DEANGELIS TYPE FUNCTIONAL RESPONSE

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Abstract

We consider two dimensional predator-prey system with Beddington-DeAngelis type functional response on Time Scales. For this special case we try to find under which conditions the system is permanent and globally attractive. This study will also give beneficial results for continuous and discrete case.

Keywords: Predator-prey dynamic system, permanence, global attractivity, Beddington DeAngelis type functional response.

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ASYMPTOTIC ANALYSIS OF A DYNAMICAL PROBLEM OF
NON-ISOTHERMAL LINEAR ELASTICITY WITH FRICTION

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MSC 2000: 35R35, 76F10, 78M35.

Abstract

In this paper, we are interested in the study of the asymptotic analysis of a dynamical problem in elasticity with non linear friction of Tresca type. The Lamé coefficients of thin layer are assumed to vary with respect to the thin layer parameter ε and depend of the temperature. We prove the existence and uniqueness of the weak solution for the limit problem. The proof is carried out by the use of the asymptotic behaviour when the dimension of the domain tends to zero.

Keywords: A priori inequalities, free boundary problems, elasticity system, asymptotic approach, Tresca law.

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ADAPTIVE STEP SIZE NUMERICAL SOLUTION TO FIRST ORDER ODES,
A REFINEMENT OF EULER'S AND RK METHODS

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Abstract

Solving differential equations numerically is a subject that employs a multitude of methods each suitable for certain class of equations. Herein we report a new approach for solving first order ODE numerically that can be considered to be a refinement to Euler and RK methods. Instead of using fixed step sizes as employed in these methods, our method estimates the suitable step size based on an evaluation of the second derivative of the solution curve at or in the vicinity of the iteration point.

Keywords: Differential equations, numerical, step size.

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APPROXIMATION OF THE SET OF TRAJECTORIES OF CONTROL
SYSTEM DESCRIBED BY AN AFFINE VOLTERRA TYPE INTEGRAL
EQUATION

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MSC 2000: 93C23

Abstract

The control system described by an affine Volterra type integral equation is considered. It is assumed that the system is nonlinear with respect to the phase vector and is affine with respect to the control vector. Admissible control functions are chosen from the closed ball of the space L_p , $p > 1$, with radius μ and centered at the origin. Approximation of the set of trajectories of the system generated by all admissible control functions is studied. The set of admissible control functions is replaced by the set which consists of a finite number of control functions and generates a finite number of trajectories. An evaluation of the Hausdorff distance between the set of trajectories of the system and the set consisting a finite number of trajectories is given. This paper extends the results obtained in [1] and [2].

Keywords: Integral equation, control system, approximation.

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ON OBTAINING STABLE SOLUTION FOR A HYPERBOLIC COEFFICIENT
CONTROL PROBLEM

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MSC 2000: 49J20, 35L20, 49J50

Abstract

This study deals with obtaining a solution for the hyperbolic coefficient control problem. The set of admissible controls has been taken as a subspace of the space whose elements and their first generalized derivatives are square integrable functions. Obtaining the gradient of the cost functional and proving the Lipschitz continuity on this set, the necessary condition for optimal solution has been given.

Keywords: Optimal control, second-order hyperbolic equations, Frechet differentiability.

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ARTIFICIAL NEURAL NETWORK METHOD FOR SOLVING FRACTIONAL
FREDHOLM INTEGRAL EQUATIONS

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MSC 2000: 45B05

Abstract

For the last decade, several authors demonstrated the performance of artificial neural network models over other traditional testing methods[1, 2]. The current research, aimed to present a global optimization technique based on combination of neural networks approach and power series method for the numerical solution of a fractional Fredholm type integro-differential equation involving the Caputo derivative. The mentioned problem to be solved approximately for the unknown series coefficient via a three-layer feed-forward neural architecture. In other words, an accurate truncated power series representation of the solution function is achieved when a suitable learning algorithm is used for the suggested neural architecture. As applications of the present iterative approach, some kinds of integral equations are investigated. The achieved simulations are compared with the results obtained by some existing algorithms.

Keywords: Fractional Fredholm equation, generalized power series expansion, ANNs approach, Caputo fractional derivative, approximate solution.

References

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COLLOCATION FINITE ELEMENT SOLUTIONS FOR STEFAN PROBLEM
WITH NEUMANN BOUNDARY CONDITION

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MSC 2000: 65D07, 65L60, 41A15, 35R37

Abstract

In this paper, we are going to consider one-dimensional Stefan problem with time-dependent Neumann boundary condition. For the problem, collocation finite element schemes constructed with variable space grid method and boundary immobilisation method are used. The newly obtained numerical results are represented for temperature distribution, the position of moving boundary and the velocity of moving boundary. The numerical results reached in this study have been compared with exact solutions and other numerical results obtained by finite difference method based on isotherm migration method. And they are found to be in good agreement with each other.

Keywords: Stefan problems, variable space grid method, boundary immobilisation method, collocation finite element method.

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ON ALMOST PRIME IDEALS

Emine Serap KARACAN¹, **Emel A. UGURLU**², **Unsal TEKIR**³^{1,2,3}Marmara University, Istanbul, Turkey**MSC 2000:** 13A15**Abstract**

This work consists only of a survey [1]. In this talk, we study almost prime ideals. Throughout this study, R denotes commutative ring with identity. We give some theorems about characterization of almost prime ideals.

Theorem : For a proper ideal I of R the following are equivalent:

1. I is almost prime.
2. For $x \in R - I$, $(I : x) = I \cup (I^2 : x)$.
3. For $x \in R - I$, $(I : x) = I$ or $(I : x) = (I^2 : x)$.
4. For ideals A and B of R with $AB \subseteq I$, but $AB \not\subseteq I^2$, then $A \subseteq I$ or $B \subseteq I$.

Theorem : For a proper ideal I of R the following are equivalent:

1. I is n -almost prime.
2. For $x \in R - I$, $(I : x) = I \cup (I^n : x)$.
3. For $x \in R - I$, $(I : x) = I$ or $(I : x) = (I^n : x)$.
4. For ideals A and B of R with $AB \subseteq I$, but $AB \not\subseteq I^n$, then $A \subseteq I$ or $B \subseteq I$.

Theorem : Let R and S be any two commutative rings. Then an ideal of $R \times S$ is almost prime if and only if it has one of the following three forms,

1. $I \times S$, where I is an almost prime ideal of R .
2. $R \times J$, where J is an almost prime ideal of S .
3. $I \times J$, where I is an idempotent ideal of R and J is an idempotent ideal of S .

Keywords: Almost prime ideals, n -almost prime, idempotent ideal.

References

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GROUP STRUCTURE OF MARKOV POLYGONS

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MSC 2000: 20F65

Abstract

This paper presents defining Markov n-polygons and shows group structures on these sets.

Keywords: Markov, group.

References

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CONE METRIC SPACES AND CONE TWO METRIC SPACES

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Abstract

There are many generalization forms of metric spaces. Some of them are; fuzzy metric space, cone metric space, K-metric space and K-normed space, etc.. In 2007, Chinese mathematicians Zang and Huang described the cone metric spaces as unaware of the existence of the K-metric and K-normed which was defined and used in the 20th century. At both of them, E Banach space was handled instead of reel number. Then, by making further, Huang and Zang gave the definition of convergence of series at cone metric spaces [1]. In this presentation, cone metric spaces which are a generalisation of metric spaces will be handled. Namely, cone two metric spaces will be examined by using two metric spaces instead of known d-metric space by looking at cone metric spaces. The knowledge about convergence of series will be given by using two metric at cone metric spaces. Some theorems and definitions related to cone two metric spaces will be examined and concluded with examples.

Keywords: Metric spaces, cone metric spaces, cone two metric spaces.

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ON Λ - SEMICONSERVATIVE FK SPACES

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MSC 2000 : 46A35, 46A45, 40C05

Abstract

An FK space $X \supset \phi$ is Λ - semiconservative FK space if $X^f \subset \lambda(S)$, where $\lambda(S)$ is the space of λ - convergent series and X^f is f - (or sequential) dual of X , that is

$$X^f = \{(f(\delta^k)) : f \in X'\}.$$

In this work, we give some definitions and theorems related with Λ - semiconservative FK spaces.

Keywords: FK spaces, β - dual, f - dual, semiconservative FK spaces.

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HOPF BIFURCATIONS OF A RATIO-DEPENDENT PREDATOR-PREY MODEL
INVOLVING TWO DISCRETE MATURATION TIME DELAYS

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MSC 2010: 34K13, 34K18, 34K20

Abstract

In this talk, we give a detailed Hopf bifurcation analysis of a ratio-dependent predator-prey system involving two different discrete delays. By analyzing the characteristic equation associated with the model, its linear stability is investigated. Choosing delay terms as bifurcation parameters the existence of Hopf bifurcations is demonstrated. Furthermore, some of the bifurcation properties including direction, stability and period are mentioned. Finally, theoretical results are supported by some numerical simulations.

Keywords: Hopf bifurcation, delay differential equation, time delay, stability, periodic solutions, population dynamics.

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FRACTIONAL BOUNDARY VALUE PROBLEMS (BVPS) AND LYAPUNOV TYPE
INEQUALITY

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MSC 2000: 34B05, 34A08

Abstract

In this talk we prove a sufficient condition for the existence and uniqueness of solutions of linear fractional differential equations involving sequential derivative with Riemann Liouville fractional derivative by using Lyapunov type inequality. As far as we know, this approach is quite new and the connection between BVPs and Lyapunov type inequality obtained for these kind of fractional differential equations is given for the first time.

Keywords: Boundary value problems, sequential fractional derivative, Lyapunov type inequalities.

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FRACTAL CALCULUS AND APPLICATIONS

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MSC 2000: 26A33, 28A80, 28A25, 37Fxx

Abstract

Fractals are the shape of many objects in the nature. Fractal geometry was studied by Benoit Mandelbrot. Fractals are often sets with fractional dimension. Mathematician and researchers have tried to establish analysis on fractals using measure theory but it is not algorithmic. Riemann method as algorithmic method has been generalized to define derivative and integral on fractal sets and curves. Recently, the researcher try to apply these equation in physics and engineering as a new mathematical models to have better approximation for the real problems.

Keywords: Fractal calculus, fractional local calculus, fractional dimension, local fractional derivatives.

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THE CONCEPT OF WEAK (ψ, α, β) CONTRACTIONS IN PARTIALLY ORDERED
METRIC SPACES

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MSC 2000: 41A65, 41A15, 47H09, 47H10, 54H25

Abstract

In this paper, we investigate generalized weak (ψ, α, β) contractions in partially ordered sets in order to establish extensions of Banach, Kannan and Chatterjea's fixed point theorems in this setting.

Keywords: Fixed point, weak contractions, Kannan fixed point theorem, Chatterjea fixed point theorem, partially ordered set.

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ON GENERALIZED SOME INEQUALITIES FOR S - CONVEX FUNCTIONS

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MSC 2000: 26D07, 26D15

Abstract

In this paper, a general integral identity for differentiable mapping is derived. Then, we extend some estimates of the right hand and left hand side of a Hermite- Hadamard-Fejér type inequality for functions whose first derivatives absolute values are s convex. Some applications for special means of real numbers are also provided. The results presented here would provide extensions of those given in earlier works.

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EXPONENTIAL CUBIC B-SPLINE BASED SOLUTIONS OF
ADVECTION-DIFFUSION EQUATION

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Abstract

Differential quadrature method (DQM), which was first proposed by Bellman et al. [1], based on exponential cubic B-spline functions [2] has been set up to simulate the solutions of the Advection-Diffusion equation numerically. The reduction of the equation to an ordinary differential equation system (ODS) has been performed by the use of differential quadrature method. Then, the resultant ODS has been integrated in time by using Fehlberg fourth-fifth order Runge-Kutta method with degree four interpolant.

Two initial boundary value problems modeling the transport of the initial concentration along a channel and fade out of an initial pulse have been studied. Existence of analytical solutions for both problems provides to measure the error between exact and numerical solutions. In order to check the efficiency and validity of the method, the discrete maximum error norm has been computed for various space step sizes and time step sizes.

Keywords: Differential quadrature method, Exponential cubic B-spline, Advection-Diffusion equation.

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INEQUALITIES AND EXPONENTIAL DECAY OF CERTAIN DIFFERENTIAL
EQUATIONS OF FIRST ORDER IN TIME VARYING DELAY

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MSC 2000: 34D20, 34C11

Abstract

In this paper, we give sufficient conditions to guarantee exponential decay of solutions to zero of the time varying delay differential equation of first order. By using the Lyapunov-Krasovskii functional approach, we establish new results on the exponential decay of solutions, which include and improve some related results in the literature.

Keywords: Exponential stability, instability, Lyapunov functional, time delay.

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GENERALIZED FRACTIONAL MAXIMAL OPERATOR ON GENERALIZED LOCAL
MORREY SPACES**Abdulhamit KUCUKASLAN**¹¹*Department of Mathematics, Ankara University, Ankara, Turkey***MSC 2000:** 42B20, 42B25, 42B35.**Abstract**

In this talk, we study the continuity properties of the generalized fractional maximal operator M_ρ on the generalized local Morrey spaces $LM_{p,\varphi}^{\{x_0\}}$ and generalized Morrey spaces $M_{p,\varphi}$. We find conditions on the triple $(\varphi_1, \varphi_2, \rho)$ which ensure the Spanne type boundedness of M_ρ from one generalized local Morrey space $LM_{p,\varphi_1}^{\{x_0\}}$ to another $LM_{q,\varphi_2}^{\{x_0\}}$, $1 < p < q < \infty$ and from $LM_{1,\varphi_1}^{\{x_0\}}$ to the weak space $WLM_{q,\varphi_2}^{\{x_0\}}$, $1 < q < \infty$. We also find conditions on the pair (φ, ρ) which ensure the Adams type boundedness of M_ρ from one generalized Morrey space $M_{p,\varphi^{\frac{1}{p}}}$ to another $M_{q,\varphi^{\frac{1}{q}}}$ for $1 < p < q < \infty$ and from $M_{1,\varphi}$ to $WM_{q,\varphi^{\frac{1}{q}}}$ for $1 < q < \infty$. In all cases the conditions for the boundedness of M_ρ are given in terms of supremal-type integral inequalities on $(\varphi_1, \varphi_2, \rho)$ and (φ, ρ) , which do not assume any assumption on monotonicity of $\varphi_1(x, r)$, $\varphi_2(x, r)$ and $\varphi(x, r)$ in r .

Keywords: Generalized fractional maximal operator, generalized local Morrey spaces.**References**

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A NEW APPROACH TO ONE PARAMETER MOTION

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MSC 2000: 51J15, 51P05

Abstract

In our study, we study a different approach to one parameter motion. We think that while one of the planes is fixed, the other is deformation on the plane with shear motion. By this way, we will calculate the velocity connection and pole curve that occurred by the movement.

Keywords: Planar motion, pole curve, shear mapping.

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THE LEVEL CURVES AND SURFACES ON TIME SCALES

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MSC 2000: 51P05, 26E70;

Abstract

The general idea of this paper is to study level curves and surfaces by considering delta gradient functions on time scales. Aided by the definition of the delta gradient function, some geometric structures of level curves and surfaces are investigated.

Keywords: Time scales, level curves and surface, delta calculus.

References

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THE DUAL-VARIABLE BERNSTEIN POLYNOMIALS

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MSC 2000: 33E99, 26B12

Abstract

In this paper we introduce the concept of dual Bernstein polynomials and give its some analysis properties. In particular, we investigate some the limit and derivation of dual-variable Bernstein polynomials.

Keywords: Dual-variable Bernstein polynomials, limit, derivations.

References

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DISTANCE MEASURES FOR TEMPORAL INTUITIONISTIC FUZZY SETS

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MSC 2000: 03E72, 46S40.

Abstract

In this study, we proposed distance measures for temporal intuitionistic fuzzy sets and investigated some properties of these distance measures. Also, we gave numerical examples for TIFS and its distance measures. We compared these distance measures defined with two and three parameters in terms of reliability and applicability.

Keywords: distance measure, temporal intuitionistic fuzzy set, intuitionistic fuzzy set.

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ANOTHER DESCRIPTION ON THE UNITS OF INTEGRAL GROUP RING OF
DICYCLIC GROUP OF ORDER 12

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MSC 2000: 16S34, 16U60

Abstract

There are many kind of open points with varying difficulty on characterization of unit group of the integral group ring of a given group. In this work, we explicitly give a description of unit group of integral group ring of the group $T_{12} = \langle a, b : a^6 = 1, b^2 = a^3, bab^3 = a^5 \rangle$.

Keywords: Unit problem, group ring, integral group ring, dicyclic group.

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A POSSIBLE KEY EXCHANGE PROTOCOL OVER GROUP RINGS

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MSC 2000: 94A60, 11T71, 14G50

Abstract

Key exchange protocols are such methods for parties who want to generate shared cryptographic keys that they can send secret messages to each other securely through an insecure channel. In this paper, we first construct a possible key exchange protocol over group rings by giving a concrete example and discuss the security of the system.

Keywords: group rings, units, cryptographic keys, security.

References

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OSCILLATION OF MIXED TYPE THIRD ORDER NONLINEAR DIFFERENTIAL
EQUATION WITH PIECEWISE CONSTANT ARGUMENTS

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MSC 2000: 34K11

Abstract

In this paper, we study the oscillatory and asymptotic behavior of all solutions of the mixed type third order nonlinear differential equation with piecewise constant arguments.

Keywords: Third order differential equation, piecewise constant arguments, oscillation

References

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BOUNDARY VALUE PROBLEM FOR A STURM-LIOUVILLE OPERATOR WITH
PIECEWISE CONTINUOUS COEFFICIENT

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MSC 2000: 34L10, 34L40

Abstract

In this paper, a self adjoint boundary value problem with a piecewise continuous coefficient on the positive half line $[0, \infty)$ is considered. The resolvent operator is constructed and the expansion formula with respect to eigenfunctions is obtained. The spectrum of the operator is discussed.

Keywords: Sturm-Liouville operator, resolvent operator, expansion formula.

References

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ANTI-INVARIANT SEMI-RIEMANNIAN SUBMERSIONS ADMITTING VERTICAL
FROM LORENTZIAN SASAKIAN AND PARA SASAKIAN MANIFOLDS

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MSC 2000: 53C25, 53C15, 53B30.

Abstract

In this paper we study anti-invariant semi-Riemannian submersions from Lorentzian Sasakian and Para Lorentzian Sasakian onto semi-Riemannian manifolds. We give examples of anti-invariant semi-Riemannian submersions. We survey main results of anti-invariant semi-Riemannian submersions defined on (para) Lorentzian Sasakian manifolds. We investigate necessary and sufficient condition for an anti-invariant semi-Riemannian submersion to be totally geodesic and harmonic.

Keywords: Semi-Riemannian submersion, (Para) Sasakian manifold, Anti-invariant submersion.

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MIRRORS ON HURWITZ SURFACES

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MSC 2000: 05C10, 30F10

Abstract

A compact Riemann surface X is called symmetric if it admits an anti-conformal involution $\sigma: X \rightarrow X$, which is called a symmetry of X . The fixed-point set of σ consists of disjoint simple closed geodesics on X , which are called the mirrors of σ . Let $g > 1$ be a positive integer and $\mu(g)$ be the maximum number of conformal automorphisms of all Riemann surfaces of genus g . Then it is known that $\mu(g) \leq 84(g - 1)$. A Riemann surface of genus g admitting $84(g - 1)$ conformal automorphisms is called a Hurwitz surface. In this study we find an upper bound for the number of mirrors on Hurwitz surfaces.

Keywords: Riemann surface, Hurwitz surface, symmetry, mirror.

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ON THE p -ADIC LOG BETA FUNCTION**Hamza MENKEN**¹, **Özge ÇOLAKOĞLU**²^{1,2}*Mersin University, Mersin, Turkey*

MSC 2000: 11S80, 33D05

Abstract

Let p be a fixed prime number. By \mathbb{Z}_p , \mathbb{Q}_p and \mathbb{C}_p we denote the ring of p -adic integers, the field of p -adic numbers and the completion of the algebraic closure of \mathbb{Q}_p , respectively.

J. Diamond (1977) gave a definition for the p -adic log gamma function $G_p : \mathbb{C}_p \setminus \mathbb{Z}_p \rightarrow \mathbb{C}_p$ by the Volkenborn integral

$$G_p(x) := \int_{\mathbb{Z}_p} ((x+u) \log_p(x+u) - (x+u)) du$$

where \log_p is the p -adic logarithm function.

In the present work we consider the p -adic log beta function and we obtain some its properties.

Keywords: p -adic number, p -adic logarithm function, p -adic log gamma function, p -adic log beta function.

References

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OPTIMAL PORTFOLIO STRATEGIES UNDER VARIOUS RISK MEASURES

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Abstract

In this research, we search for optimal portfolio strategies in the presence of various risk measures that are common in financial applications. Particularly, we deal with the static optimization problem with respect to Value at Risk, Expected Loss and Expected Utility Loss measures. To do so, under the Black-Scholes model for the financial market, Martingale method is applied to give closed-form solutions for the optimal terminal wealths, then via representation problem the optimal portfolio strategies are achieved. We compare the performances of these measures on the terminal wealths and optimal strategies of such constrained investors. Finally, we present some numerical results to compare them in several respects to give light to further studies.

Keywords: Portfolio optimization, value at risk, expected loss, expected utility loss, Black-Scholes model, Martingale method, risk constraints.

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THE SKEW INVERSE SEMIGROUP RING

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MSC 2000: 20M18, 16W22

Abstract

For a given partial action π of an inverse semigroup S on an associative algebra \mathcal{A} , we introduce the notation of *skew inverse semigroup ring* $\mathcal{A} \rtimes_{\pi} S$, and prove that this construction is associative algebra under some conditions on a partial action π . At the end we define the concept of *strongly associative algebra* and we show that a semiprime algebra A is strongly associative. We refer to the treatises [1, 2, 3] for a thorough treatment of the concepts of partial actions, actions, and crossed products. Let $\pi = (\{\pi_s\}_{s \in S}, \{X_s\}_{s \in S})$ be a partial action of S on A , and let $L = \{\sum_{s \in S} a_s \delta_s : a_s \in X_s\}$ the set of all formal finite sums, with the following multiplication:

$$(a_s \delta_s) \cdot (b_t \delta_t) = \pi_s(\pi_{s^*}(a_s) b_t) \delta_{st}.$$

With the aid of multiplier algebra, instead of using approximate identity of C^* -algebra as in [3], we will prove that if for each $s \in S$ the ideal X_s is (L, R) -associative then L is associative, so, it is an algebra. Let I be the ideal generated by the set $\{a \delta_r - a \delta_t : \text{where } r \leq t \text{ and } a \in X_r\}$, then $A \rtimes_{\pi} S$ is the quotient algebra $\frac{L}{I}$, hence, it is an associative algebra.

Keywords: Partial action, inverse semigroup, multiplier algebra.

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WHEN THE UNIVERSAL INVERSE SEMIGROUP $Pr(S)$ OF INVERSE SEMIGROUP
 S IS E^* -UNITARY

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MSC 2000: 20M18, 16W22

Abstract

In this work, we will consider the notion of *partial actions* of groups and *partial actions* of inverse semigroups on sets, for more details about these concepts the reader is referred to [1, 3]. At first, for a finite group G we will prove that if the order of G is greater than one then G admits a partial action which is not a homomorphism. We will prove our claim by using the *universal inverse semigroup* $S(G)$ associated to a group G , more information can be found in [3]. Also, we will consider the *universal inverse semigroup* $Pr(S)$ that A. Buss and R. Exel in [3] associated to an inverse semigroup S . Recall that an inverse semigroup S is E^* -unitary if for $s \in S$ and $e \in E(S)$, $e \leq s$ implies that $s \in E(S)$. We will show that an inverse semigroup S is E^* -unitary if and only if $E(S)$, the set of all idempotents, is a filter. Our main Theorem for an inverse semigroup S is that:

Theorem. An inverse semigroup S is E^* -unitary if and only if $Pr(S)$ is E^* -unitary inverse semigroup.

Keywords: Partial action, universal inverse semigroup, E^* -unitary inverse semigroup.

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EXISTENCE AND REGULARITY OF THE SOLUTION FOR NONLINEAR AND
OBLIQUE PROBLEMS WITH FRICTION

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MSC 2000: 35B40, 35C20

Abstract

In this paper we consider the nonlinear boundary value problem governed by a stationary perturbed elasticity system with mixed boundary conditions (Tresca-Dirichlet- maximal monotone graph), in a smooth domain. We first establish the existence result and some estimates for weak solutions of its approached problem. A specific regularity of the displacement field is obtained. The proof is based on the approach of maximal monotone graph by its Yosida regularization and the contraction method.

Keywords: Regularity, elasticity, maximal monotone graph.

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MIXING TYPE THEOREM FOR POWER BOUNDED MEASURES

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MSC 2000: 47B07; 30H05

Abstract

Let G be a locally compact abelian group with dual group Γ . By $M(G)$ and $L^1(G)$ respectively, we denote the convolution measure algebra and the group algebra of G . For $n \in \mathbb{N}$, by μ^n we denote n -times convolution power of $\mu \in M(G)$. A measure $\mu \in M(G)$ which satisfies $\sup_{n \in \mathbb{N}} \|\mu^n\| < \infty$ is called *power bounded*. For a power bounded measure $\mu \in M(G)$, we have $|\widehat{\mu}(\gamma)| \leq 1$ for all $\gamma \in \Gamma$, where $\widehat{\mu}$ is the Fourier-Stieltjes transform of μ . We put

$$\mathcal{E}_\mu := \{\mu \in \Gamma : |\widehat{\mu}(\gamma)| = 1\}.$$

The main result is as follows.

Theorem. *If $\mu \in M(G)$ is power bounded, then*

$$\lim_{n \rightarrow \infty} \|\mu^{n+1} * f - \mu^n * f\| = 0, \quad \forall f \in L^1(G),$$

if and only if $\widehat{\mu}(\mathcal{E}_\mu) = \{1\}$.

Keywords: Group algebra, measure algebra, weak mixing.

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(G,(H-M))-CONVEX DOMINATED FUNCTIONS

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MSC 2000: Primary 26D15, Secondary 26D10, 05C38

Abstract

In this paper, a new definition of $(g, (h - m))$ -convex dominated functions is introduced and then several integral inequality for this type functions are presented.

Keywords: Convex dominated function, Hermite-Hadamard inequality, $(h - m)$ -convex function.

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THE RELATIONSHIP BETWEEN n^{th} LUCAS NUMBER AND A SEQUENCE
DEFINED BY M-SEQUENCES

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Abstract

In this work, we consider the sequence whose n th term is the number of M-sequences of length n^{th} [6]. We define the set of integer vectors $E(n)$ on the sequence. We show that the cardinality of $E(n)$ is the n^{th} Lucas number L_n . We also give some theorem related to L_n and $E(n)$.

Keywords: n^{th} Lucas Number, M-Sequences, cardinality.

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AN ALTERNATIVE PROOF FOR A LEMMA USED IN THE TRACE FORMULA FOR
GL(2) OVER A NUMBER FIELD

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MSC 2000: 11F72

Abstract

In this note, we give an alternative proof for a particular part of the lemma given in [3] (p. 201, Lemma 9.9) and which is used in [4] (p. 234, Lemma 6.5).

Keywords: GL(2), symmetric square, trace formula, number field.

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ON ESTIMATION OF UNKNOWN PARAMETERS OF
EXPONENTIAL-LOGARITHMIC DISTRIBUTION BY CENSORED DATA

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MSC 2000: 62N02

Abstract

The problem of estimation of parameters of Exponential-Logarithmic distribution in the case of censored data is considered. We used pseudo maximum likelihood method and construct a procedure to solve this problem. Theorem of consistency is proved. Also, simulation is used to study the properties of estimators derived.

Keywords: Exponential-Logarithmic distribution, pseudo maximum likelihood estimators, consistent estimators, partly censored data.

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ON EXISTENCE OF WEYL DERIVATIVE OF FUNCTIONS IN LORENTZ SPACE
WITH QUASI-MONOTONE FOURIER COEFFICIENTS

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Abstract

General notations, definitions and results relating to Lorentz spaces, quasi-monotone sequences, best approximation, class of 2π -periodic functions which belong to Lorentz space having quasi-monotone Fourier coefficients and Weyl derivative. Finally the sufficient and necessary condition of existence of Weyl derivative of functions belonging to Lorentz space according to their quasi-monotone Fourier coefficients and properties of best approximation.

Keywords: Lorentz spaces, quasi-monotone sequences, best approximation, Weyl derivative.

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A NEW NUMERICAL APPROACH FOR SOLVING TIME-FRACTIONAL PARTIAL
DIFFERENTIAL EQUATIONS

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MSC 2000: 26A33

Abstract

In this research, we introduced a new method based on variational iteration method with an auxiliary parameter for solving time-fractional partial differential equations. The convergence of method is showed by using Banach fixed point theorem. Maximum error bound is given. The fractional derivatives are taken in the Caputo sense. Some nonlinear time-fractional partial differential equations are solved by proposed method. The numerical results show that a new method is very effective and convenient.

Keywords: Time-fractional partial differential equation, Caputo derivative, variational iteration method, auxiliary parameter.

References

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A COMBINATION OF VIM AND ASYMPTOTIC EXPANSION FOR SINGULARLY
PERTURBED CONVECTION-DIFFUSION PROBLEM

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MSC 2000: 65L10, 34D15, 41A60

Abstract

In this study, the alternative approach of variational iteration method (VIM) with an auxiliary parameter is introduced for solving singularly perturbed convection-diffusion problems. Asymptotic expansion performed on boundary layer region. The regular region is solved by the alternative approach of variational iteration method with an auxiliary parameter. Linear and nonlinear problems are solved by using the presented method. The numerical results show that the presented method is very effective for this type problems.

Keywords: Singularly perturbed, convection-diffusion, variational iteration method, asymptotic expansion.

References

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EULER SPIRALS IN SPACE FORMS

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MSC 2000: 53A04, 53A05.

Abstract

We consider Euler spirals in Euclidean 3-space and in three dimensional Minkowski space using some different characterizations. Additionally, we show that all Euler spirals are generalized Euler spirals and also all logarithmic spirals are generalized Euler spirals.

Keywords: Curvature, Cornu spiral, Bertrand curve pair.

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CHARACTERIZATIONS OF QUATERNIONIC SOME SURFACES IN MINKOWSKI
3-SPACE

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MSC 2000: 53B30

Abstract

In this paper, we study the bisector of split quaternionic curves in Minkowski 3-space. Moreover, given two rational split quaternionic curves, we show that the bisector surface is rational.

Keywords: Bisector surface, Split quaternion, Minkowski space.

References

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NEW PARAMETRIC REPRESENTATION OF A SURFACE FAMILY WITH COMMON
SMARANDACHE ASYMPTOTIC BY USING BISHOP FRAME

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MSC 2000: 53A35

Abstract

In this paper, we study common smarandache asymptotic curves on a surface in the Euclidean 3-space. By utilizing the Bishop frame, the surface family can be expressed as a linear combination of the components of the local frame in Euclidean 3-space. With this parametric representation, we derive the necessary and sufficient condition for the given smarandache curve to be the common asymptotic curve on the surface.

Keywords: Asymptotic curve, Bishop frame, Smarandache curve.

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SOME GENERALIZED OSTROWSKI TYPE INEQUALITIES INVOLVING LOCAL
FRACTIONAL INTEGRALS AND APPLICATIONS

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MSC 2000: 26D07, 26D10, 26D15, 26A33.

Abstract

In this study, we establish the generalized Ostrowski type inequality involving local fractional integrals on fractal sets R^α ($0 < \alpha \leq 1$) of real line numbers. Some applications for special means of fractal sets R^α are also given. The results presented here would provide extensions of those given in earlier works.

Keywords: Generalized Ostrowski inequality, generalized Hölder's inequality, generalized convex functions.

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GENERALIZED STEFFENSEN INEQUALITIES FOR LOCAL FRACTIONAL
INTEGRALS

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MSC 2000: 26D15, 26A33.

Abstract

Firstly we give a important integral inequality which is generalized Steffensen's inequality. Then, we establish weighted version of generalized Steffensen's inequality for local fractional integrals. Finally, we obtain several inequalities related these inequalities using the local fractional integral.

Keywords: Steffensen's inequality, local fractional integral, fractal space, generalized convex function.

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LEMKE-HOWSON ALGORITHM FOR TWO-PERSON NON-ZERO SUM GAMES

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MSC 2000: 91A05, 91A10

Abstract

Lemke-Howson Algorithm is effective method to find at least one Nash Equilibrium (N.E) in the pure strategies and mixed strategies for bimatrix (or two-person non-zero sum) games. The algorithm was first introduced in [1] and algebraic method specifying N.E points was generated for bimatrix games. In this work, bimatrix games are studied and Lemke-Howson Algorithm is investigated to find N.E.

Keywords: Bimatrix games, Nash equilibrium, Lemke-Howson algorithm.

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THE INFLUENCE OF THERMAL RADIATION, MASS DIFFUSION AND
FRACTIONAL PARAMETERS ON MHD FLOW OVER A VERTICAL PLATE THAT
APPLIES TIME DEPENDENT SHEAR TO THE FLUID

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MSC 2010: 35Q35, 62P30, 62P35, 65L10

Abstract

Exact expressions for velocity field, temperature and mass concentration corresponding to the radiative flow of an MHD viscous fluid over an infinite plate that applies time dependent shear to the fluid have been calculated. These expressions are obtained by using Laplace transform of corresponding fractional differential equations. The expression of temperature and mass concentration of fluid have been presented in series form. However, velocity field is presented in the form of integral solutions. All exact expressions satisfy initial and boundary conditions. Some significant limiting cases of fluid parameters and of fractional parameters have been discussed. The influence of fluid and fractional parameters on fluid motion have been analyzed through graphical illustrations. Two special cases of shear stress; shear stress in the form of Heaviside function and oscillating shear stress have also been taken into account to compare the behavior of fluid motion graphically.

Keywords: MHD viscous fluid, fractional derivatives, thermal radiation, exact solutions.

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APPROXIMATING THE RIEMANN-STIELTJES INTEGRAL IN TERMS OF
SIMPSON'S RULE

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Abstract

Error bounds in approximating the Riemann-Stieltjes integral in terms of Simpson's rule are given. Applications for approximating the Riemann integral of a two-function product are provided as well.

Keywords: The Riemann-Stieltjes integral, Simpson's rule, error bounds.

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MATRIX REPRESENTATION OF SOFT POINTS AND ITS APPLICATION

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MSC 2000: 03G25, 20D05

Abstract

The innovation about soft point in this study is, we define soft point's soft matrix form which was not described before for each set of parameters. The matrix representation of soft points is useful for storing all soft points that can be obtained in all different parameters. We then apply it to some important inequalities in classical set theory and observe them as soft equalities in soft set theory. Finally, we prove that our proposed soft matrix provides every soft point that changes with each parameter that takes place in a soft set and enables detailed examination in application of soft set theory.

Keywords: Soft set, soft point, soft matrix, soft matrix form of soft point.

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ON WIJSMAN I -LACUNARY STATISTICAL CONVERGENCE OF ORDER α OF
SEQUENCES

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Abstract

In this talk, we introduce the concepts of Wijsman I -lacunary statistical convergence of order α , Wijsman I -statistical convergence of order α and Wijsman strongly I -lacunary statistical convergence of order α of sequences of sets and investigated between their relationship.

Keywords: I -convergence, Wijsman convergence, lacunary sequence.

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ULAM STABILITY OF SOME VOLTERRA EQUATIONS

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MSC 2000: 45J05, 47H10, 45M10

Abstract

In 1940, Ulam posed the following problem: “Give conditions in order for a linear mapping near an approximately linear mapping to exist” [1]. In 1941, this problem was solved by Hyers [2] in the case of Banach space. In 1978, the result of Hyers was generalized by Rassias [3] for approximately linear mappings. The results obtained by Hyers and Rassias can be applied to the case various differential and integral equations [4, 5, 6].

In this talk, we analyse the Hyers-Ulam stability and Hyers-Ulam-Rassias stability of some Volterra equations.

Keywords: Hyers-Ulam stability, Hyers-Ulam-Rassias stability, Volterra equations.

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ALGORITHMS IN MINIMAL FERRER GRAPH CONSTRUCTIONS

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MSC 2000: 05C85, 05A18, 68R05

Abstract

In this paper, we give some algorithms and technical properties to construct minimal Ferrer graphs [3] coming from Ferrer relation [2] on P_n and C_n by using set cover method [1].

Keywords: Graph algorithms, partitions of sets, combinatorics

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A COMPUTATIONAL APPROACH TO SYLLOGISTIC ENGLISH SENTENCES WITH
DITRANSITIVE VERBS IN FORMAL SEMANTICS

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MSC 2000: 03B65, 68W01, 03C80

Abstract

In this paper, we give some computational aspects of entailment tools in natural English sentences with ditransitive verbs which taking a subject, a direct object and an indirect object in formal semantics of natural language as in [2]. We also present some algorithms and an implementation of reasoners for the sentences and generators for quantifiers [1].

Keywords: Logic of natural languages, algorithms (General), logic with extra quantifiers and operators

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HYPERBOLIC SMOOTHING METHOD FOR SUM-MAX PROBLEMS

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Abstract

In this study, an approach for solving nonsmooth optimization problem, which includes sum of finite maximums of smooth functions is proposed. Minimum l_1 -norm approximations is a particular case of this problem. In this approach, the problem is reformulated in order to use the hyperbolic smoothing function and the relationship between the original problem and reformulated problem are proved. This approach allows us to use conventional smooth optimization methods.

Keywords: Hyperbolic smoothing method, sum-max problem, nonsmooth optimization.

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TAUBERIAN CONDITIONS FOR THE (C, α) INTEGRABILITY OF FUNCTIONSÜmit TOTUR¹, İbrahim ÇANAK²¹*Adnan Menderes University, Department of Mathematics, Aydın, Turkey*²*Ege University, Department of Mathematics, Izmir Turkey***MSC 2000:** 40A10, 40C10, 40D05, 40G05**Abstract**

For a real-valued continuous function $f(x)$ on $[0, \infty)$, we define

$$s(x) = \int_0^x f(u)du \text{ and } \sigma_\alpha(x) = \int_0^x \left(1 - \frac{u}{x}\right)^\alpha f(u)du$$

for $x > 0$. We say that $\int_0^\infty f(u)du$ is (C, α) integrable to L for some $\alpha > -1$ if the limit $\lim_{x \rightarrow \infty} \sigma_\alpha(x) = L$ exists.

It is known that $\lim_{x \rightarrow \infty} s(x) = L$ implies $\lim_{x \rightarrow \infty} \sigma_\alpha(x) = L$ for all $\alpha > -1$. The aim of this paper is twofold. First, we introduce some new Tauberian conditions for (C, α) integrability method under which the converse implication is satisfied and improve classical Tauberian theorems for the (C, α) integrability method. Next, we give short proofs of some classical Tauberian theorems as special cases of some of our results.

Keywords: Divergent integrals, Cesàro integrability, (C, α) integrability, Tauberian theorems.

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THE (C, α, β) INTEGRABILITY OF FUNCTIONS AND A TAUBERIAN THEOREM

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MSC 2000: 40A10, 40C10, 40D05, 40E05

Abstract

For a continuous function $f(T, S)$ on $\mathbb{R}_+^2 = [0, \infty) \times [0, \infty)$, we define its integral on \mathbb{R}_+^2 by

$$F(T, S) = \int_0^T \int_0^S f(t, s) dt ds,$$

and its (C, α, β) mean by

$$\sigma_{\alpha, \beta}(T, S) = \int_0^T \int_0^S \left(1 - \frac{t}{T}\right)^\alpha \left(1 - \frac{s}{S}\right)^\beta f(t, s) dt ds,$$

where $\alpha > -1$, and $\beta > -1$. We say that $\int_0^\infty \int_0^\infty f(t, s) dt ds$ is (C, α, β) integrable to L if $\lim_{T, S \rightarrow \infty} \sigma_{\alpha, \beta}(T, S) = L$ exists.

We prove that if $\lim_{T, S \rightarrow \infty} \sigma_{\alpha, \beta}(T, S) = L$ exists for some $\alpha > -1$ and $\beta > -1$, then $\lim_{T, S \rightarrow \infty} \sigma_{\alpha+h, \beta+k}(T, S) = L$ exists for all $h > 0$ and $k > 0$.

Next, we prove that if $\int_0^\infty \int_0^\infty f(t, s) dt ds$ is $(C, 1, 1)$ integrable to L and

$$T \int_0^S f(T, s) ds = O(1)$$

and

$$S \int_0^T f(t, S) dt = O(1)$$

then $\lim_{T, S \rightarrow \infty} F(T, S) = L$ exists.

Keywords: The (C, α, β) integrability, improper double integral, convergence in Pringsheim's sense, Tauberian conditions and theorems.

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ON TAUBERIAN REMAINDER THEOREMS FOR CESÀRO SUMMABILITY
METHOD OF NONINTEGER ORDER

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MSC 2000: 40E05,40G05

Abstract

Let A_n^α be defined by the generating function $(1-x)^{-\alpha-1} = \sum_{n=0}^{\infty} A_n^\alpha x^n$, ($|x| < 1$), where $\alpha > -1$. For a real sequence $u = (u_n)$, Cesàro means of the sequence (u_n) of noninteger order α are defined by

$$\sigma_n^{(\alpha)}(u) = \frac{1}{A_n^\alpha} \sum_{j=0}^n A_{n-j}^{\alpha-1} s_j.$$

We say that a sequence (u_n) is (C, α) summable to a finite number s , where $\alpha > -1$ if

$$\lim_{n \rightarrow \infty} \sigma_n^{(\alpha)}(u) = s. \quad (1)$$

A sequence (u_n) is called λ -bounded by (C, α) method of summability if

$$\lambda_n(\sigma_n^{(\alpha)}(u) - s) = O(1), \quad (2)$$

with $\lim_{n \rightarrow \infty} \sigma_n^{(\alpha)}(u) = s$.

In this paper, we prove some Tauberian remainder theorems for Cesàro summability method of noninteger order $\alpha > -1$.

Keywords: Tauberian remainder theorem, λ -bounded series, (C, α) summability.

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STABILITY AND BOUNDEDNESS OF SOLUTIONS OF VOLTERRA
INTEGRO-DIFFERENTIAL EQUATIONS

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Abstract

In 2003, Vanualailai and Nakagiri [2] considered the nonlinear Volterra integro-differential equation without delay

$$\frac{d}{dt}[x(t)] = A(t)f(x(t)) + \int_0^t B(t,s)g(x(s))ds, \quad (1)$$

where $t \geq 0$, $x \in \mathfrak{R}$, $A(t) : [0, \infty) \rightarrow (-\infty, 0)$, $f, g : \mathfrak{R} \rightarrow \mathfrak{R}$ are continuous functions, and $B(t, s)$ is a continuous function for $0 \leq s \leq t < \infty$. Vanualailai and Nakagiri [2] studied the stability of solutions of equation (1) by defining a suitable Lyapunov functional.

In this paper, we consider the nonlinear Volterra integro-differential equation with delay

$$x'(t) = -a(t)f(x(t)) + \int_{t-\tau}^t B(t,s)g(x(s))ds + p(t), \quad (2)$$

where $t \geq 0$, τ is a positive constant, fixed delay, $x \in \mathfrak{R}$, $a(t) : [0, \infty) \rightarrow (0, \infty)$, $p : [0, \infty) \rightarrow \mathfrak{R}$, $f, g : \mathfrak{R} \rightarrow \mathfrak{R}$ are continuous functions with $f(0) = g(0) = 0$, $B(t, s)$ is a continuous function for $0 \leq s \leq t < \infty$. We investigate the stability of zero solution and boundedness of solutions of equation (2) by defining suitable Lyapunov functionals, when $p(t) \equiv 0$ and $p(t) \neq 0$, respectively.

Keywords: Stability and boundedness, Volterra integro-differential equations, Lyapunov functionals.

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ON THE ASYMPTOTIC BEHAVIORS OF SOLUTIONS CERTAIN NON-LINEAR
NEUTRAL EQUATIONS WITH MULTIPLE DEVIATING ARGUMENTSCemil TUNÇ¹, Yener ALTUN²^{1,2}Yüzüncü Yıl University, Van, Turkey**Abstract**

In this paper, we obtain sufficient conditions for all solutions of neutral equation of the form

$$\frac{d}{dt} \left[x(t) + \sum_{i=1}^2 c_i(t)x(t - \tau_i(t)) \right] + \sum_{i=1}^2 p_i(t)x(t) + \sum_{i=1}^2 q_i(t)h_i(x(t))x(t - \sigma_i(t)) \\ + r(t) \int_{t-\delta(t)}^t x(s) ds = 0$$

to approach zero as $t \rightarrow \infty$. The technique of proof involves defining an appropriate Lyapunov functional. The obtained result includes and improves some results in the literature.

Keywords: Non-linear neutral equations, deviating arguments, Lyapunov functional.

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ON EXPONENTIAL STABILITY OF SOLUTIONS OF NEUTRAL DIFFERENTIAL
SYSTEM WITH MULTIPLE VARIABLE DELAYSCemil TUNÇ¹, Melek GÖZEN²^{1,2}Yüzüncü Yıl University, Van, Turkey**Abstract**

In this work, we establish sufficient conditions which guarantee the solutions of neutral delay differential system of the form

$$\begin{cases} \dot{x}(t) = A(t)x(t) + \sum_{i=1}^n B_i(t)x(t - h_i(t)) + \sum_{i=1}^n C_i(t)\dot{x}(t - h_i(t)) + f_1(t, x(t)) \\ \quad + f_2(t, x(t - h_1(t)), \dots, x(t - h_n(t))) + f_3(t, \dot{x}(t - h_1(t)), \dots, \dot{x}(t - h_n(t))) \\ x(s) = \phi(s), \dot{x}(s) = \varphi(s), s \in [-h_i, 0], (i = 1, 2, \dots, n) \end{cases}$$

are globally exponentially stable. The obtained result includes and improves some results in the literature.

Keywords: Neutral delay differential system, Lyapunov functional, globally exponentially stable.

References

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ON THE STABILITY AND BOUNDEDNESS OF DIFFERENTIAL EQUATIONS OF
THIRD ORDER WITH RETARDED ARGUMENT

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Abstract

In this paper, we study the stability, boundedness and ultimately boundedness of solutions of the following t vector functional differential equations of third order with retarded argument, $\tau_1 > 0$:

$$X''' + \Psi(X')X'' + G(X') + cX(t - \tau_1) = P(t, X, X', X'').$$

By using the Liapunov-Krasovskii functional approach, new stability, boundedness and ultimately boundedness criteria are obtained for the considered functional differential equation. The obtained results extend and improve some recent results in the literature.

Keywords: Stability and boundedness, retarded argument, Liapunov-Krasovskii functional approach.

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ON THE EXISTENCE OF PSEUDO ALMOST PERIODIC SOLUTIONS TO A CLASS
OF LASOTA-WAZEWSKA MODEL DIFFERENTIAL EQUATION

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Abstract

In this work, we discussed a class of Lasota-Ważewska model differential equation. Using exponential dichotomy method, under suitable conditions, we give certain sufficient conditions which guarantee the existence of positive pseudo almost periodic solutions of this model. By this study we extend and improve some earlier result in the literature.

Keywords: Pseudo almost periodic solution, Lasota-Ważewska model differential equation, exponential dichotomy.

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ON THE OSCILLATION OF A CLASS OF DAMPED FRACTIONAL DIFFERENTIAL EQUATIONS

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MSC 2000: 34A08, 34C10

Abstract

Using Riccati type transformations, the authors establish some new oscillation criteria for the fractional differential equation

$$(D_{0+}^{1+\alpha}y)(t) + p(t)(D_{0+}^{\alpha}y)(t) + q(t)f(G(t)) = 0, \quad t > 0, \quad (1)$$

where $D_{0+}^{\alpha}y$ is the Riemann-Liouville fractional derivative of order α of y , $G(t) = \int_0^t (t-s)^{-\alpha} y(s) ds$ and $\alpha \in (0, 1)$. Examples are provided to illustrate the relevance of the results.

Keywords: Oscillatory solutions, fractional differential equation, integral averaging technique, Riccati transformation.

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A NOTE ON LATTICE MODULE

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Abstract

Let L be a multiplicative lattice and M be a lattice L -module. In this presentation, we acquaint a topology said to be the Zariski topology over $\sigma(M)$, the collection of all prime elements of an L -module M . We investigate some results on the Zariski topology over $\sigma(M)$. Our aim is to characterize the lattice modules whose prime spectrum satisfy some of the separation axioms between T_0 and T_1 which are $T(\beta)$, $T(\beta')$, $T(\varepsilon)$, T_{ES} , T_D , T_{DD} , T_Y and T_{YS} .

Keywords: Prime spectrum of lattice module, prime element, separation axiom.

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SYMMETRY GROUPS OF PETRIE POLYGONS

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MSC 2000: 30F10, 05C10, 05C25

Abstract

A regular map \mathcal{M} on a Riemann surface X is an embedding of a finite connected graph \mathcal{G} into X such that the components of $X - \mathcal{G}$ are identical regular, which are called the faces of \mathcal{M} . A Petrie polygon of \mathcal{M} is a polygon such that every two consecutive sides, but no three, belong to a face of \mathcal{M} . In this study we determine the symmetry group of a Petrie polygon of a regular map.

Keywords: Regular map, Petrie polygon, symmetry group.

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\mathcal{I} -CESARO SUMMABILITY OF SEQUENCES OF SETS

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MSC 2010: 40A05; 40A35

Abstract

In this paper, we defined concept of Wijsman \mathcal{I} -Cesàro summability for sequences of sets and investigate the relationship between the concepts of Wijsman strongly \mathcal{I} -Cesàro summability, Wijsman strongly \mathcal{I} -lacunary summability, Wijsman p -strongly \mathcal{I} -Cesàro summability and Wijsman \mathcal{I} -statistical convergence.

Keywords: Cesàro summability, statistical convergence, lacunary sequence, \mathcal{I} -convergence, sequence of sets, Wijsman convergence.

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ASYMPTOTIC NORMALITY OF PARAMETRIC PART IN PARTIALLY LINEAR
MODELS IN THE PRESENCE OF MEASUREMENT ERROR

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Abstract

The interest in study measurement error model is growing with the publication of series of papers on various topics. In literature semiparametric partially linear model relating a response Y to predictors (X, X^*) with function $X^T\beta + g(X^*)$ when the X^* s are unobserved and with additive error is mainly considered with the assumption that the measurement error has a known distribution. Our study gives more detailed answer to the question of "in situation of if independent variable has an unknown distribution in a semiparametric regression model how regression functions and densities predictions could be obtained?". We derived an estimator of β and demonstrated the resulting estimator $\hat{\beta}$ is asymptotically normal. In the application, the performances of $\hat{\beta}$ and $\hat{g}_n(x^*)$ are investigated through Monte Carlo experiments.

Keywords: Errors in variables, measurement error, partially linear model, semiparametric regression, unknown error density.

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COEFFICIENT ESTIMATES FOR A NEW SUBCLASS OF CLOSE-TO-CONVEX
FUNCTIONSTuğba YAVUZ¹

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Abstract

Let \mathbb{D} be the unit disk $\{z : |z| < 1\}$, A be the class of functions analytic in D , satisfying the conditions

$$f(0) = 0 \quad \text{and} \quad f'(0) = 1. \quad (1)$$

In this presentation, we will introduce a new subclass of close-to-convex functions denoted by $KQ_h(\gamma, \lambda)$ with $\gamma \in \mathbb{C} \setminus \{0\}$, $\lambda \in [0, 1]$. Here $h(z)$ is a convex function which satisfies the conditions $h(0) = 1$ and $Re(h(z)) > 0$ ($z \in \mathbb{D}$). We will give upper bounds for Taylor coefficients of functions which belong to $KQ_h(\gamma, \lambda)$. We will obtain some earlier results as special cases of our parameters.

Keywords: Analytic functions, close-to-convex functions, coefficients estimates.

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SOME TOPOLOGICAL PROPERTIES OF THE SPACES OF ALMOST NULL AND
ALMOST CONVERGENT DOUBLE SEQUENCES

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MSC 2010: 40C05, 40G10

Abstract

Let \mathcal{C}_{f_0} and \mathcal{C}_f denote the spaces of almost null and almost convergent double sequences, respectively. We show that \mathcal{C}_{f_0} and \mathcal{C}_f are BDK-spaces, barrelled and bornological but they are not monotone and so not solid. Additionally, we establish that both of the spaces \mathcal{C}_{f_0} and \mathcal{C}_f include the space \mathcal{BS} of bounded double series.

Keywords: Double sequence, Pringsheim convergence, almost convergence.

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JOST SOLUTION AND SPECTRUM OF THE DISCRETE STURM-LIOUVILLE
EQUATIONS WITH HYPERBOLIC EIGENPARAMETER**Nihal YOKUS¹, Nimet COSKUN²**^{1,2}*Karamanoğlu Mehmetbey University, Karaman, Turkey***MSC:** 39A70 47A10 47A75**Abstract**

In this paper, we consider the boundary value problem (BVP) for the discrete Sturm-Liouville equation

$$a_{n-1}y_{n-1} + b_n y_n + a_n y_{n+1} = \lambda y_n, n \in \mathbb{N} \quad (1)$$

$$(\gamma_0 + \gamma_1 \lambda)y_1 + (\beta_0 + \beta_1 \lambda)y_0 = 0 \quad (2)$$

where (a_n) and (b_n) , $n \in \mathbb{N}$ complex sequences, $\gamma_i, \beta_i \in \mathbb{C}$, $i = 0, 1$. By taking λ as a hyperbolic eigenparameter, we obtain exponential type Jost solution of this BVP (1)-(2). Discussing the analytical properties and asymptotic behaviour of Jost solution, we prove that this boundary value problem has a continuous spectrum filling the segment $[-2, 2]$. We also prove that BVP (1)-(2) has finite number of eigenvalues and spectral singularities.

Keywords: Difference equations, eigenparameter, spectral analysis, Jost solution, discrete equations

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ACHIEVING THE LARGEST PRIMES: ALGORITHM AND RELATIONS IN ORDER

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MSC 2000: 11N05, 11N32, 11N80

Abstract

Prime numbers are currently attained through an exceptional situation in the area of numbers theory and cryptography. The trend for accessing to the largest prime numbers due to using Mersenne theorem, although resulted in vast development of related numbers, it has reduced the speed of accessing to prime numbers from one to four years. Mersenne primes are prime numbers of the form $2^n - 1$, where n is necessarily a prime number. This paper focuses on attaining theorems that are more extended than Mersenne theorem with accelerating the speed of accessing to prime numbers. Since the reason for frequently using Mersenne theorem has found an efficient formula for accessing to the largest prime numbers, this paper provides some relations for prime numbers defined in several formulas for attaining prime numbers in any interval. Therefore, according to flexibility of these relations, it could be found a new branch in the field of accessing to great prime numbers through providing an algorithm at the end of this paper for finding the largest prime numbers.

Keywords: Generalization the Mersenne's theorem, relations of prime numbers, algorithm.

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Abstracts of Posters

AB INITIO INVESTIGATION OF THE PHYSICAL PROPERTIES OF PEROVSKITE
RbCdBr₃ STRUCTURE

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Abstract

We investigated the physical properties such as energy band structure, density of states for electrons and optical properties for RbCdBr₃ compound using the density functional theory under local density approximation and the generalized gradient approximation in Abinit and Wien2k package programs. The calculated results show that the energy band structure of this crystal has an indirect band gap of value 2.693 eV from high symmetry point G to a point between T-Z high symmetry points. Besides, the real and imaginary parts of complex dielectric function, refractive index, energy-loss functions for volume and surface, coefficients of extinction, reflectivity and absorption along the crystallographic axes are investigated. The obtained results are in agreement with the experimental ones.

Keywords: DFT, electronic properties, structural properties.

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ON THE NOTION OF θ -OPENNESS

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MSC 2000: 54D15, 54C08, 54C10

Abstract

θ - $g\delta p$ -continuity which are related to δp -normal spaces are presented. More properties of δp -normal spaces and almost δp -normal spaces are researched.

Keywords: θ - $g\delta p$ -continuity, δp -normal space, $g\delta p$ -closed set.

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AB INITIO CALCULATION OF PHYSICAL PROPERTIES OF RbGeCl₃

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Abstract

We have calculated the structural and electronic properties of RbGeCl₃ compound using the density functional theory within the generalized gradient approximation and the local density approximation. The calculated results for each physical property are presented and then compared with available experimental and previous theoretical data. To our knowledge, structural properties and energy band structure of RbGeCl₃ compound has not been investigated using DFT. Therefore, we investigated the physically properties such as structural and volume optimizations, electronic energy band structure and density of states of valance electrons of this crystal.

Keywords: DFT, electronic properties, structural properties.

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CONNECTEDNESS IN MONOTONE ORDERED SPACE

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MSC 2000: 34C10

Abstract

In this paper, we introduce and study the notion of connectedness in monotone ordered space which is a generalization of monotone spaces.

We study ordered semi-separated sets and ordered connected sets in monotone ordered space.

Keywords: Monotone ordered space, ordered semi-separated set, ordered connected sets.

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STRUCTURAL AND ELECTRONIC PROPERTIES OF $A_xD_{1-x}B_yC_{1-y}$ QUATERNARY
ALLOYS VIA FIRST PRINCIPLES

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Abstract

We have investigated the structural and electronic properties of cubic AB, AC, DB and DC compounds and their new $A_xD_{1-x}B_yC_{1-y}$ quaternary alloys, using the density functional theory. Structural properties of these quaternary alloys are calculated with the Perdew and Wang local-density approximation. The lattice constants of $A_xD_{1-x}B_yC_{1-y}$ quaternary alloys were computed by Vegards law. The band gap of $A_xD_{1-x}B_yC_{1-y}$ is related by the compositions x and y . There is no theoretical examining on $A_xD_{1-x}B_yC_{1-y}$ quaternary alloys and requires experimental confirmation.

Keywords: Structural properties, electronic properties, quaternary alloys.

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STRUCTURAL, DYNAMIC AND THERMODYNAMIC PROPERTIES OF $CsPbBr_3$
COMPOUND IN CUBIC PEROVSKITES VIA FIRST PRINCIPLES

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Abstract

The electronic, dynamic and thermodynamic properties of $CsPbBr_3$ compound in the cubic perovskite phase are systematically investigated using the first principles calculations. The generalized gradient approximation was used for exchanged and correlation interaction. The theoretically calculated lattice constant and band gap are found to be good in agreement with the other theoretical and experimental results. We studied dynamic and thermodynamic properties of $CsPbBr_3$ in cubic perovskite phase and have not encountered any available data for dynamic and thermodynamic properties of $CsPbBr_3$ in cubic perovskite phase. We calculated the entropy, constant-volume specific heat, Helmholtz free energy for $CsPbBr_3$.

Keywords: Electronic properties, dynamic properties, thermodynamic properties.

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FIRST PRINCIPLE CALCULATION OF ELECTROINIC BAND STRUCTURE OF
LuRhO₃ COMPOUND

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Abstract

The structural and volume optimization, electronic band structure density of states of valance electrons of crystal LuRhO₃ have been investigated using the density functional methods, local density approximation and generalized gradient approximation, in Abinit package program. The obtained band structure and calculated density of states of valance electrons for LuRhO₃ compound shows that the electronic structure of crystal has a semiconductor state. Besides, the structural and volume optimization has been performed. To our knowledge in literature, the structural and volume optimization, energy band structure and density of states of valance electrons LuRhO₃ crystal have not been investigated as either experimentally or theoretically. Therefore, in present work, using density functional theory, we investigated the physical properties such as the structural and volume optimization, energy band structure and density of states of valance of this compound.

Keywords: Structural properties, electronic band structure, density of states.

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ON THE OPTIMAL CONTROL PROBLEM IN A PARABOLIC SYSTEM

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MSC 2000: 35K20, 35D30, 49J20

Abstract

Optimal control problems in the parabolic problems for different types of cost functionals have been examined by several authors [1, 2, 3, 4]. In this study, we study the optimal control problem governed by on linear parabolic differential equation with Dirichlet boundary conditions. The control function is at the right hand side of the equation. The cost functional consist of deviation in the L_2 -norm of the solution of the system at the final time from a given target, plus L_2 -norm of the control. It is proved that the Frechet derivation of the cost functional can be found via the solution of the adjoint parabolic problem. The results are illustrated by an numerical example.

Keywords: Second-order parabolic equations, weak solutions, optimal control.

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STRUCTURAL, DYNAMIC AND OPTICAL PROPERTIES OF DOUBLE-LAYER
HEXAGONAL BiTeCl CRYSTAL

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Abstract

The geometric structural optimization, density of states for phonons, phonon band structure and optical features of double-layer hexagonal BiTeCl crystal have been investigated by linearized augmented plane wave method using the density functional theory under the generalized gradient and the local density approximations in this study. Ground state properties of new-type ferroelectric BiTeCl structure were studied. Calculated lattice parameters, ground state properties and experimental results are consistent. Linear dielectric functions and related properties were calculated. The frequency dependent phonon spectrum of hexagonal BiTeCl crystal was calculated using the harmonic approximation model.

Keywords: Structural properties, dynamic properties, optic properties.

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STRUCTURAL, ELASTIC AND THERMODYNAMIC PROPERTIES OF HEXAGONAL
BiTeBr CRYSTAL

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Abstract

The geometric structural optimization, elastic properties and thermodynamic functions of total energy (E) Helmholtz free energy (F), constant volume heat capacity (Cv) and entropy (S) have been investigated by linearized augmented plane wave method using the density functional theory under the generalized gradient and local density approximations for hexagonal BiTeBr crystal in this study. Ground state properties of topographic ferroelectric BiTeBr structure were studied. Calculated lattice parameters, ground state properties and experimental results are consistent with literature. We could not find any experimental data to compare our calculated results for thermodynamic and elastic properties.

Keywords: Structural properties, thermodynamic properties, elastic properties.

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STRUCTURAL, ELASTIC AND ELECTRONIC PROPERTIES OF BiTeI CRYSTAL

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Abstract

The geometric structural optimization, elastic constants and related properties, electronic density of states and energy band structure of hexagonal BiTeI crystal have been investigated by linearized augmented plane wave method using the density functional theory under the generalized gradient and local density approximations in this study. Calculated lattice parameters, ground state properties and experimental results are consistent. Elastic constants and related properties were calculated. No experimental data we could find in literature to be able to compare elastic properties.

Keywords: Structural properties, elastic properties, electronic properties.

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CONDITIONS FOR CONVERGENCE AND SUBSEQUENTIAL CONVERGENCE OF
REGULARLY GENERATED SEQUENCES**Sefa Anıl SEZER**¹, **İbrahim ÇANAK**²¹ *İstanbul Medeniyet University, İstanbul, Turkey*² *Ege University, İzmir, Turkey***MSC 2000:** 40A05, 40E05.**Abstract**

Regularly generated sequences were first introduced in [1]. It is said that (u_n) is regularly generated by a sequence $\alpha = (\alpha_n)$ in some sequence space \mathcal{A} and α is called a generator of (u_n) if

$$u_n = \alpha_n + \sum_{k=1}^n \frac{\alpha_k}{k}.$$

In this work we obtain necessary conditions under which the regularly generated sequence (u_n) converges or converges subsequentially.

Keywords: Subsequential convergence, regularly generated sequences, slowly oscillating sequences, summability by weighted means.

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