The Algerian-Turkish International days on Mathematics 2012

**TOPICS**

- Nonlinear Analysis
- Functional Analysis
- Differential Equations
- Applied Mathematics
- Sequence Spaces
- Summability Theory
- Algebraic Coding Theory and Cryptography
- Mathematical Chemistry and Environment

**ABSTRACTS BOOK**

9 - 11 October 2012, Annaba, Algeria
Welcome

The "Algerian-Turkish International days on Mathematics 2012 ATIM’2012" jointly organized by Laboratory of Advanced Materials, Badji Mokhtar Annaba University and Fatih University, Istanbul, Turkey, will be held on 9-11 October 2012 in Annaba, Algeria. The aim of this conference is to provide a platform for scientific expertise in mathematics to present their recent works, exchange ideas and new methods in this important area and to bring together mathematicians to improve collaboration between local and international participants. We are looking forward to meeting you in Annaba at ATIM’2012.

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- Mathematical Chemistry and Environment
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Survey on the domain of triangles in the sequence spaces

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Abstract

By \( \omega \), we denote the space of all real valued sequences. Any vector subspace of \( \omega \) is called a sequence space. The domain \( \lambda_A \) of an infinite matrix \( A \) in a sequence space \( \lambda \) is defined by

\[
\lambda_A = \left\{ x = (x_k) \in \omega : Ax \in \lambda \right\},
\]

which is a sequence space, where \( Ax = (Ax)_n \) with \( (Ax)_n = \sum_{k=0}^{\infty} a_{nk} x_k, n \in \mathbb{N} = \{0, 1, 2, \ldots\} \). If \( A \) is triangle, then one can easily observe that the sequence spaces \( \lambda_A \) and \( \lambda \) are linearly isomorphic, i.e., \( \lambda_A \cong \lambda \).

Although in most cases the new sequence space \( \lambda_A \) generated by the triangle matrix \( A \) from a sequence space \( \lambda \) is the expansion or the contraction of the original space \( \lambda \), it may be observed in some cases that those spaces overlap. Define the \( S- \) and \( \Delta- \) transform of \( x = (x_k) \in \omega \) by \( (Sx)_n = \sum_{k=0}^{\infty} x_k \) and \( (\Delta x)_n = x_n - x_{n-1}, (x_{-1} \equiv 0) \), for all \( n \in \mathbb{N} \). Then, one can easily see that the inclusion \( \lambda_S \subset \lambda \) strictly holds for \( \lambda \in \{\ell_\infty, c, c_0, \ell_p\} \). Further, one can deduce that the inclusion \( \lambda \subset \lambda_\Delta \) also strictly holds for \( \lambda \in \{\ell_\infty, c, c_0, \ell_p\} \), where \( 0 < p < \infty \). However, if we define \( \lambda = c_0 \oplus \text{span} \{z\} \) with \( z = \{-1\}^k \), i.e., \( x \in \lambda \) if and only if \( x = s + \alpha z \) for some \( s \in c_0 \) and some \( \alpha \in \mathbb{C} \), and consider the matrix \( A \) with the rows \( A_n \), defined by \( A_n = (-1)^n c^{(n)} \) for all \( n \in \mathbb{N} \), we have \( Ae = z \in \lambda \) but \( Az = e \notin \lambda \) which lead us to the consequences that \( z \in \lambda \setminus \lambda_A \) and \( e \notin \lambda_A \setminus \lambda \). That is to say that the sequence spaces \( \lambda_A \) and \( \lambda \) overlap but neither contains the other. The approach constructing a new sequence space by means of the matrix domain of a triangle matrix has recently been employed by number of researchers.

In this study, following Başar [Summability Theory and its Applications, Bentham Science Publishers, e-books, Monographs, pp. xi+405, İstanbul-2012, ISBN: 978-1-60805-252-3], we summarize the literature on the normed and paranormed sequence spaces derived by the domain of some triangle matrices.

2000 Mathematics Subject Classification: Primary 46A45; Secondary 40C05.
Keywords: Normed and paranormed sequence spaces, matrix domain, \( \alpha-, \beta- \) and \( \gamma- \) duals, triangle matrices, matrix transformations.
Stability to Vector Lienard Equation with Constant Deviating Argument

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ABSTRACT In applied sciences, some practical problems concerning mechanics, the engineering technique fields, economy, control theory, physics, chemistry, biology, medicine, atomic energy, information theory, etc. are associated with Liénard or modified Liénard equation. By this time, the qualitative properties of solutions of scalar Lienard or modified Lienard equation with and without a deviating argument have been intensively discussed and are still being investigated in the literature. We refer the reader to the papers or books of Ahmad and Rama Mohana Rao [1], Barnett [2], Burton ([3], [4]), Burton and Zhang [5], Caldeira-Saraiva [6], Cantarelli [7], El’sgol’ts [8], El’sgol’ts and. Norkin [9], Gao and Zhao [10], Hale [11], Hara and Yoneyama ([12], [13]), Heidel ([14], [15]), Huang and Yu [16], Jitsuro and Yusuke [17], Kato ([18], [19]), Kolmanovskii and Myshkis [20], Krasovskii [21], Li [22], Liu and Huang ([23], [24]), Liu and Xu [25], Liu [26], Long and Zhang [27], Luk [28], Malyseva [30], Muresan [31], Nápoles Valdés [32], Sugie [33], Sugie and Amano [34], Sugie et al. [35], Tunç [36-39, 40-42], C. Tunç and E. Tunç [43], Yang [44], Ye et al. [45], Yoshizawa [46], Zhang ([47], [48]), Zhang and Yan [49], Zhou and Jiang [50], Zhou and Liu [51], Zhou and Xiang [52], Wei and Huang [53], Wiandt [54] and the references thereof.

However, to the best of our knowledge from the literature, the stability and boundedness of solutions for vector Lienard equation with a deviating argument has not been discussed in the literature, yet. In this paper, we consider the vector Lienard equation with the multiple constant deviating arguments, \( \tau_i > 0 \):

\[
X''(t) + F(X(t), X'(t))X'(t) + G(X(t)) + \sum_{i=1}^{n} H_i(X(t - \tau_i)) = P(t).
\]

Some new results for the stability of solutions of this equation are obtained. By the work, we improve some results in the literature.

References


2000 Mathematics Subject Classification: Keywords:


[45] Ye, Guo-Rong; Ding, Hui-Sheng; Wu, Xi-Lang, Uniform boundedness of solutions for a class of Liénard equations. *Electron. J. Differential Equations* 2009, No. 97, 5 pp,


Statistical convergence and its some generalizations

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Abstract: A number sequence \((x_k)\) is said to be statistically convergent if there is a number \(L\) such that
\[
\lim_{n \to \infty} \frac{1}{n} \left| \{k \leq n : |x_k - L| \geq \varepsilon \} \right| = 0
\]
for every \(\varepsilon > 0\). We write \(S\) to denote the set of all statistically convergent sequences.

Let \(\lambda = (\lambda_n)\) be a non-decreasing sequence of positive real numbers tending to \(1\) such that 
\[
\lambda_{n+1} \leq \lambda_n + 1, \quad \lambda_1 = 1.
\]
The set of all such sequences will be denoted by \(\Lambda\). Let \(\lambda = (\lambda_n) \in \Lambda\). A sequence \(x = (x_k)\) is said to be \(\lambda\)-statistically convergent if for every \(\varepsilon > 0\)
\[
\lim_{n \to \infty} \frac{1}{\lambda_n} \left| \{k \in I_n : |x_k - L| \geq \varepsilon \} \right| = 0
\]
where \(I_n = [n - \lambda_n, n]\). \(S_\lambda\) will denote the set of all \(\lambda\)-statistically convergent sequences. In case 
\[
\lambda = (\lambda_n) = (n), \quad S_\lambda \text{ becomes } S.
\]
Let \(0 < \alpha \leq 1\) be a fixed number. The sequence \((x_k)\) is said to be statistically convergent of order \(\alpha\) if
\[
\lim_{n \to \infty} \frac{1}{n^\alpha} \left| \{k \leq n : |x_k - L| \geq \varepsilon \} \right| = 0
\]
for every \(\varepsilon > 0\). We use \(S_\alpha\) to denote the set of all statistically convergent sequences of order \(\alpha\). In case 
\(\alpha = 1\), \(S_\alpha\) becomes \(S\). We also define the sets \(S_\lambda^\alpha\) and \(S_\lambda^{\alpha, p}\) in the similar manner.

The set of all strongly \(p\)-Cesàro summable sequences of order \(\alpha\) will be denoted by \(w_p^\alpha\), i.e. \(x \in w_p^\alpha\) iff
\[
\lim_{n \to \infty} \frac{1}{n^\alpha} \sum_{k=1}^{n} |x_k - \ell|^p = 0
\]
for some \(\ell\) \((p > 0)\).

We write \([C, 1]\) and \([V, \lambda]\) for the sets of sequences \(x = (x_k)\) which are strongly Cesàro summable and strongly \((V, \lambda)\)-summable.

We discuss the relations between the sequence sets \(S\), \(S_\alpha\), \(S_\lambda\), \(S_\lambda^\alpha\), \(w_p^\alpha\), \([V, \lambda]\), \([V, \lambda, p]\) and so on for different \(\alpha\)'s and \(\lambda\)'s. Furthermore the similar definitions and discussions will be given for the double sequences.

2000 Mathematics Subject Classification:

Keywords:
References


Characterisation of compact operators between certain BK spaces

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Abstract
The sets \( c_0(\Lambda) \), \( c(\Lambda) \) and \( c_1(\Lambda) \) of sequences that are \( \Lambda \)-strongly convergent to 0, \( \Lambda \)-strongly convergent and \( \Lambda \)-strongly bounded were first introduced and studied by Moricz [3]; the set \( c(\Lambda) \) generalises the concept of strong convergence of Hyslop [1], and Kuttner and Thorpe [2]. We study some important topological and geometric properties of the spaces \( c_0(\Lambda) \), \( c(\Lambda) \) and \( c_1(\Lambda) \) and their dual spaces.

Furthermore, we present the complete lists of characterisations of the classes of matrix transformations from those spaces into the spaces of bounded, convergent and null sequences, and of their subclasses of compact matrix operators. These results are mainly achieved by the theory of BK spaces, and by the means of the Hausdorff measure of noncompactness. Finally, we apply our own software to the graphical representations of neighbourhoods and weak neighbourhoods in the topologies of our spaces.

References


2000 Mathematics Subject Classification: Primary: 46H05; Secondary: 40H05.

Keywords: FK and BK spaces, dual spaces, matrix transformations, measure of noncompactness, compact operators.
Abstract In this paper, we intend to introduce the concept of $I$- double statistical convergence and $I$- double lacunary statistical convergence which naturally extends the notions of double statistical convergence and double lacunary statistical convergence. We mainly try to establish the relation between these two summability notions.

The double sequence $\theta_{r,s} = \{(k_r, l_s)\}$ is called double lacunary if there exist two increasing of integers such that

$$k_0 = 0, h_r = k_r - k_{r-1} \to \infty \text{ as } r \to \infty$$

and

$$l_0 = 0, h_s = l_s - l_{s-1} \to \infty \text{ as } s \to \infty.$$  

Notations: $k_{r,s} = k_r l_s$, $h_{r,s} = h_r h_s$, $\theta_{r,s}$ is determine by $I_{r,s} = \{(k, l) : k_{r-1} < k \leq k_r \& l_{s-1} < l \leq l_s\}$, $q_r = \frac{k_r}{k_{r-1}}$, $q_s = \frac{l_s}{l_{s-1}}$, and $q_{r,s} = q_r q_s$. We will denote the set of all double lacunary sequences by $\mathbb{N}_{\theta_{r,s}}$.

We now have the following definitions.

Definition 1. A sequence $x = \{x_{k,l}\}$ is said to be $I$-lacunary statistically convergent to $L$ or $S^I_{\theta_2}$-convergent to $L$ if for any $\epsilon > 0$ and $\delta > 0$

$$\{(r, s) \in \mathbb{N} : \frac{1}{h_{r,s}} |\{(k, l) \in I_{r,s} : |x_{k,l} - L| \geq \epsilon\}| \geq \delta\} \in I.$$  

In this case we write $x_{k,l} \to L(S^I_{\theta_2})$. The class of all $I$- double lacunary statistically convergent sequences will be denoted by $S^I_{\theta_2}$.

For $I = I_{fin}, S^I_{\theta_2}$-convergence again coincides with $S_{\theta_2}$ statistical convergence.

References


2000 Mathematics Subject Classification:

Keywords:

Elements of fixed point theory: Old and New

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Abstract
In this talk, we review some classical results and present recent development of fixed point theory. In particular, we put the stress on the fundamental properties of the sets, the topology of the spaces and some boundary conditions satisfied by maps involved in the theorems. Both metric and topological fixed point theory will be surveyed though the stress will be put on the three celebrated fixed point theorems: The Banach, Brouwer and Schauder theorems. Examples and counter examples illustrate the results presented in this survey. The main references for this talk are [1, 19, 22, 26, 30, 34, 35].

References


2000 Mathematics Subject Classification: 47H10, 54C15, 54C20, 54C55, 55M15.
Keywords: Fixed point theorem; convex set; retract; homeomorphism; contraction; compact map; boundary condition.


[31] W.A. Kirk, A fixed point theorem for mappings which do not increase distance, Amer. Math Month. 72 (1965) 1002-1004.


[34] D.R. Smart, Fixed Point Theorems, Cambridge University Press, 1974

Extrapolation method and some Nondensely defined impulsive semilinear neutral partial functional differential inclusions

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Abstract In this paper, we use the extrapolation method combined with a fixed point theorem for the sum of completely continuous and contraction operators, to establish sufficient conditions for the existence of mild solutions and extremal mild solutions for some classes of non-densely defined impulsive semilinear neutral functional differential inclusions in separable Banach with infinite delay.

References


Computing Index Of Graded Filiform and Quasi Filiform Lie Algebras

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Abstract

The filiform and the quasi-filiform Lie algebras form a special class of nilpotent Lie algebras. The aim of this paper is to compute the index and provide regular vectors of this two class of nilpotent Lie algebras. we consider the graded filiform Lie algebras $L_n$, $Q_n$, the $n$ dimensional filiform Lie algebras for $n \leq 8$, also the graded quasi-filiform Lie algebras and finally a Lie algebras whose nilradical is $Q_{2n}$.

1 Introduction

The filiform Lie algebras were introduced by M. Vergne (see [?]), she classified them up to dimension 6 and also characterized the graded filiform Lie algebras. The classification of naturally graded quasi-filiform Lie algebras is known; they have the characteristic sequence $(n - 2, 1, 1)$ where $n$ is the dimension of the algebra. The aim of this work is to give an extended version of our paper [?] and to focus on filiform Lie algebras. We compute the index and provide the regular vectors of $n$-dimensional filiform Lie algebras for $n < 8$ and quasi-filiform Lie algebras. In the first, we summarize the index theory of Lie algebras. It is known that any $n$-dimensional filiform Lie algebra may be obtained by deformation of the one of the filiform Lie algebras $L_n$, so we consider the classification up to dimension 8 and compute for each Filiform Lie algebra its index and the set of all regular vectors. We compute also the index of graded quasi-filiform Lie algebras, and give regular vectors corresponding. In the last we compute the index of Lie algebras whose nilradical is $Q_{2n}$.

2 Lie Algebras Index

Definition 2.1. A Lie algebras $G$ over $\mathbb{K}$ is a pair consisting of a vector space $V = G$ and a skew-symmetric bilinear map $[,] : G \times G \to G$ $(x, y) \to [x, y]$ satisfying the Jacobi identity

$[x, [y, z]] + [y, [z, x]] + [z, [x, y]] = 0 \quad \forall x, y, z \in G.$

Let $V$ be a finite-dimensional vector space over $\mathbb{K}$ provided with the Zariski topology, $G$ be a Lie algebra and $G^*$ its dual. Then $G$ acts on $G^*$ as follows:

$G \times G^* \to G^*$

$(X, f) \mapsto X.f$

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Keywords:
where $\forall \in G : (X, f)(Y) = f([X, Y])$.

Let $f \in \mathcal{G}^*$ and $\Phi_f$ be a skew-symmetric bilinear form defined by

$$\Phi_f : \mathcal{G} \times \mathcal{G} \rightarrow \mathbb{K}$$

$$(X, Y) \mapsto \Phi_f(X, Y) = f([X, Y])$$

We denote the kernel of the map $\Phi_f$ by $\mathcal{G}^f$,

$$\mathcal{G}^f = \{ x \in \mathcal{G} : f([x, y]) = 0 \ \forall y \in \mathcal{G} \}. \quad (2.1)$$

**Definition 2.2.** The index of a Lie algebra $\mathcal{G}$ is the integer

$$\chi_{\mathcal{G}} = \inf \left\{ \dim \mathcal{G}^f : f \in \mathcal{G}^* \right\}.$$ 

A linear functional $f \in \mathcal{G}^*$ is called regular if $\dim \mathcal{G}^f = \chi_{\mathcal{G}}$. The set of all regular linear functionals is denoted by $\mathcal{G}^*_r$.

**Remark 2.1.** The set $\mathcal{G}^*_r$ of all regular linear functionals is a nonempty Zariski open set.

**Remark 2.2.** In practice we search the minors of ordre $n - \chi(\mathcal{G})$ of non-zero determinant of the matrix $M$ such that $M$ is the matrix corresponding of the multiplication table.
New Čebyšev type inequalities for fractional integrals

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ABSTRACT The aim of this paper is to establish new Čebyšev type inequalities, for fractional integrals.

References


2000 Mathematics Subject Classification:
Keywords:
STABILITY IN NONLINEAR NEUTRAL INTEGRO-DIFFERENTIAL EQUATIONS WITH VARIABLE DELAY

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Abstract In this paper we use the contraction mapping theorem to obtain asymptotic stability results of a nonlinear neutral integro-differential equation with variable delay. An asymptotic stability theorem with a necessary and sufficient condition is proved, which improves and generalizes some previous results due to Burton [3], Becker and Burton [2] and Jin and Luo [4]. In the end we provide an example to illustrate our claim.

References


2000 Mathematics Subject Classification: 34K20, 34K30, 34K40.
Keywords: Fixed points, Stability, Integro-differential equation, Variable delay.
Solving the traffic assignment problem using a new version of the Frank-Wolfe algorithm

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Abstract The Frank-Wolfe method was first introduced in quadratic programming at once it proved very effective for the resolution of large scale flood problems, the Frank-Wolfe method, is famous for its advantages: it is easy to implement and it performs well far from the optimal solution. However, it has a property that makes it less favourable to use without modifications, namely that it shows very slow asymptotic convergence due to that the feasible solutions tend to zig-zag towards the optimal solution. To improve its performance, different modifications of the Frank-Wolfe method have been suggested, starting with the first I. J. Leblanc works until recent works of Ziyou Gao & Al.

On our behalf, in this paper we propose a new improvement of the FW method (FWF) for solving the traffic assignment problem, this modification consist to combine Fukushima direction (FWF), with a widened line search technique (FWL). we choose the best possible combination which can join together the maximum effectiveness to FW algorithm and preserve its convergence.

The main proponent of this attempt is to avoid the zig-zagging in the path described by the solution points of the pure FW method.

We also present preliminary computational studies in a C++ Builder5, in these we apply (FW), (FWL), (FWF), and (FWFL) methods to some Traffic assignment problems. The computational results indicate that the proposed algorithm yield satisfactory results within reasonable computational time comparing to the other methods.

2000 Mathematics Subject Classification:

Keywords: Algorithms, Convergence, Descent direction, Frank-Wolfe method, Line search, Traffic assignment.
Abstract Concepts of fractional analysis like differentiation and integration can be considered as a generalization of ordinary ones with integer order. However, much remains to be done before assuming that this generalization is really established. Fractional differential equations have been extensively applied in many fields, for example in probability, viscoelasticity and electrical circuits. Different theoretical studies about the subject were done by many mathematicians. For more details, we refer to the book of K.S. Miller and B. Ross [2].

On the other side impulsive effects that appear in the modeling of phenomena subject to considerable short-term changes may be part of studies of fractional differential problems. This topic was awake the curiosity of many researchers in recent years to include [1]. In this presentation we study existence of local and extremal solutions for some integrodifferential fractional equation with impulses by using fixed-point theory and fractional analysis under suitable assumptions.

References


2000 Mathematics Subject Classification: 26A33, 34A12, 34A37.
Keywords: local existence, extremal solution, integrodifferential equation, Caputo fractional derivative, impulsive conditions, fixed point theory.
A Neighbourhood System of Fuzzy Numbers and its Topology

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Abstract It is shown that the neighbourhood system obtained by the neighbourhoods (whose radii are positive fuzzy numbers) in a fuzzy number-valued metric space is a basis of a bona fide topology for the set of all fuzzy numbers, and then the convergence with respect to this topology is introduced and its basic properties are studied.

2000 Mathematics Subject Classification: Primary 40A05, Secondary 03E72; 26E50
Keywords:
Construction of Self-Dual and Isodual Cyclic Codes over Finite Chain Rings

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ABSTRACT Codes over finite chain rings are a generalization of codes over fields. They have attracted significant attention from the scientific community because of their connection to non-linear codes over fields. Lattices can also be constructed from self-dual codes over rings. This work first considers the construction of cyclic isodual codes over finite fields. Then the construction is generalized to finite chain rings. The codes are derived from duadic codes over finite fields. In particular, we prove the following result.

Theorem 1 Let $f_i, 1 \leq i \leq 2$ be two monic polynomials which generate a pair of odd duadic codes of length $m$ over $F_q$. Let $g(x) = (x-1)f_i(x)f_j(-x)$. Then the cyclic code of length $2m$ over $F_q$ generated by $g(x)$ is:

i) a self-dual code if $q$ is even;

ii) an isodual code if $q$ is odd.

Let $g_i$ be the Hensel lift of the polynomial $f_i$ over a finite chain ring $R$ with residual field $F_q$. Then the cyclic code of length $2m$ generated by $G(x) = (x-1)g_i(x)g_j(-x)$, is an isodual code over $R$.

Let $g_i$ be the polynomial defined above. The free duadic codes $F_i$ are defined as the cyclic codes generated by $g_i$. When the nilpotency index $e$ is even we define the following pair of non free duadic codes

$E_1 = \langle (x-1)g_1(x), \gamma^2g_1(x)g_2(x) \rangle$ and $E_2 = \langle (x-1)g_2(x), \gamma^2g_1(x)g_2(x) \rangle$

Let $\mu_{-1}$ be the permutation of $S_m$ defined by $i \mapsto -i \mod m$. Then we have the following result.

Theorem Let $E_i$ and $F_i$ be the codes given above. If the splitting is given by $\mu_{-1}$ then $E_i$ are self-dual codes and $F_i$ are isodual. If the cyclotomic classes modulo $m$ are left invariant by $\mu_{-1}$, then the $F_i$ are isodual and the $E_i$ are duals of each other.

2000 Mathematics Subject Classification:
Keywords:
Asymptotic analysis of linearly elastostatic Signorini problem with Coulomb friction of shallow shell

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ABSTRACT In a recent work, Paumier [1, 2], studied the Signorini problem with friction in the linear Kirchhoff-Love theory plates using the convergence method, then Léger and Miara [3] generalized this study to the case of linearized shallow shell but without friction. The purpose of this paper is to extend these results to the case of linearized shallow shell with a local Coulomb friction law.

References


Positive solutions for a fractional boundary value problem with fractional derivative condition

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Abstract In this paper, we consider the nonlinear fractional differential equation boundary-value problem with fractional derivative condition:

\[ cD_0^q u(t) = f(t, u(t), cD_0^q u(t)), \quad 0 < t < 1 \]
\[ u(0) = u'(0) = 0, \quad u''(1) = cD_0^\sigma u(1), \]

where \( f : [0, 1] \times R \times R \to R \) is given function, \( 2 < q < 3 \) and \( 0 < \sigma < 1 \). By means of a fixed-point theorem on cones, existence, uniqueness and positivity results of solutions are established.

References


2000 Mathematics Subject Classification:
Keywords: Positive solution, Fractional Caputo derivative, Banach Contraction principle, Leray Schauder non-linear alternative, Guo-Krasnoselskii Theorem.
Impulsive differential equations with variable times

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Abstract
In this paper, Schauder-Tychonoff’s fixed point theorem and the notion of upper and lower solutions are used to investigate the existence of solutions for first order impulsive equations.

References


2000 Mathematics Subject Classification:
Keywords: Impulsive equations; upper and lower solutions; fixed point
The solutions of the octonionic equations in the form
\[ \alpha (x \beta) = \rho, \quad (ax) \beta = \rho \quad \text{and} \quad \alpha x \alpha = \rho \]

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ABSTRACT We in this study give the methods to find the solutions of the octonionic equations with one unknown such that \( \alpha (x \beta) = \rho \), \( (ax) \beta = \rho \) and \( \alpha x \alpha = \rho \). Two-sided equations like these equations cannot be solved by any elementary methods, because the non-commutativity and non-associative of octonion multiplication makes it difficult to simplify the equations any further. The methods given in this note allow to reduce simply the equations in these forms to a real system of eight equations. Furthermore, we present examples to illustrate our results in this study.

References

2000 Mathematics Subject Classification:
Keywords: The systems of real equations; The octonionic equations.
STABILITY OF NONLINEAR DIFFERENTIAL EQUATION WITH DELAY VIA SCAUDER’S AND KRASNOSELSKII’S THEOREMS

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

\[ x'(t) = -\alpha(t)x^3(t) + b(t)x^3(t - r(t)). \]

by using Schauder’s and Krasnosel’ski’s theorems.

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

References


2000 Mathematics Subject Classification: 34K20, 47H10.
Keywords: Nonlinear neutral differential equation, Contraction mapping, Stability, Krasnoselskis theorem
Multivalued mixed variational inequalities with locally cocoercive multivalued mappings

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Abstract

Let $C$ be a nonempty closed convex subset of $\mathbb{R}^n$ and let $F : \mathbb{R}^n \to 2^{\mathbb{R}^n}$ be a multivalued mapping such that $F(x)$ is nonempty closed subset, for every $x \in C$. Suppose further that $\varphi : C \to \mathbb{R}$ is a convex subdifferentiable function. We consider the following multivalued mixed variational inequality:

$$\exists w^* \in F(x^*), \quad \langle w^*, y - x^* \rangle + \varphi(y) - \varphi(x^*) \geq 0 \quad \forall y \in C.$$ 

A large variety of problems arising in elasticity, fluid flow, economics, oceanography, transportation, optimization, pure and applied sciences can be seen as special cases of this problem. One usually calls $F$ the cost operator and $C$ the set of constraints. Recall that a multivalued mapping $F$ is said to be cocoercive with a constant $\gamma$ or briefly ($\gamma$-cocoercive) on $M$ if

$$\forall x, x' \in M, \forall w \in F(x), \forall w' \in F(x')$$

$$\gamma d_H^2 (F(x), F(x')) \leq \langle w - w', x - x' \rangle.$$ 

We make use of a retraction mapping and some sequential approximation techniques of fixed point theory to solve the multivalued mixed variational inequalities involving locally cocoercive multivalued mappings. We construct by using the Banach contraction principle converging sequences to the solutions and show how to choose regularization parameters to compute these solutions.

2000 Mathematics Subject Classification: 65K10; 90C25; 47H10
Keywords: Multivalued mixed variational inequality; cocoerciveness; fixed point; multivalued mapping; Hausdorff metric.
Periodic solutions for neutral nonlinear system of differential equations with two functionals delays

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Abstract
In this paper, we use Krasnoselski’s fixed point theorem to show that neutral nonlinear system of differential equations with two functionals delays
\[
\frac{d}{dt}x(t) = A(t)x(t) + \frac{d}{dt}Q(t, x(t-g_1(t)), x(t-g_2(t))) + f(t, x(t-g_1(t)), x(t-g_2(t)))
\]
has a periodic solution, in the process we use the fundamental matrix solution of 
\[
y' = A(t)y.
\]
We also use the contraction mapping principle to show the existence of unique periodic solution of the equation.

References
Some peculiar dynamical properties of Three Dimensional Maps

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Abstract
In this work we seek to characterize the recurrent dynamics of the three map having the following structure

\[ T(x, y, z) : \begin{cases} 
    x_{n+1} = f(y_n) \\
    y_{n+1} = g(z_n) \\
    z_{n+1} = h(x_n)
\end{cases} \]

Where \( f : Y \to X \), \( g : Z \to Y \) and \( h : X \to Z \) are endomorphism maps. We present our results of \( T \) system on basis of the classical oligopoly model [3] and of the two-dimensional case \((x_{n+1} = f(y_n), y_{n+1} = g(x_n))\), see in [2], we give some properties and characteristics, since this class of three-dimensional dynamics is associated with the properties of one-dimensional maps. There is an interesting passage from the one-dimensional endomorphisms to the three-dimensional endomorphisms.

References


2000 Mathematics Subject Classification:
Keywords: three-dimensional maps; Bifurcations; Fixed point, Cycles.


On the Fine Spectrum of the Upper Triangle Double Band Matrix $\Delta^+$ on the Sequence Space $c_0$

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**Abstract** Define the upper triangle double band matrix $\Delta^+ = (d_{nk})_{n,k=0}^\infty$ by  

$$d_{nk} = \begin{cases} 1 & n = k, \\ -1 & n + 1 = k, \\ 0 & k > n + 1 \text{ or } 0 \leq k < n \end{cases}$$

for all $n, k \in \mathbb{N}$.

In this study, after summarizing the related literature on the spectrum and fine spectrum of certain matrix operators on some sequence spaces, we determine the fine spectrum of the matrix operator $\Delta^+$ defined by an upper triangle double band matrix acting on the sequence space $c_0$ with respect to the Goldberg’s classification. As a new development, we give the approximate point spectrum, defect spectrum and compression spectrum of the matrix operator $\Delta^+$ on the space $c_0$. Although the corresponding results of the present work coincides with those results derived by Başar et al. in *Subdivisions of the spectra for difference operator over certain sequence spaces*, under communication, the adjoint operators are different.

2000 Mathematics Subject Classification: Primary 47A10, Secondary: 47B37.  
Keywords: Spectrum, fine spectrum, Goldberg’s classification, approximate point spectrum, defect spectrum, compression spectrum, upper triangle double band matrix.
TRIPLE POSITIVE SOLUTIONS FOR SYSTEM OF NONLINEAR SECOND-ORDER DIFFERENTIAL EQUATIONS THREE POINT BOUNDARY VALUE

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Abstract In this work, we apply the Legget-Williams fixed point theorems to obtain sufficient condition for existence at least three positive solutions of boundary value problems for systems of second-order ordinary differential equations of the form

\[
\begin{align*}
-u''(t) + k^2 u(t) &= f(t, u(t), v(t)), \quad 0 < t < 1 \\
-v''(t) + \omega^2 v(t) &= g(t, u(t), v(t)), \quad 0 < t < 1 \\
u(0) &= v(0) = 0 \\
u(1) &= \alpha u(\eta), \quad v(1) = \lambda v(\beta)
\end{align*}
\]

where \( f : (0,1) \times [0, +\infty) \times [0, +\infty) \rightarrow [0, +\infty); g : [0,1] \times [0, +\infty) \times [0, +\infty) \rightarrow [0, +\infty) \) and \( k, \omega \) are positives constants. 0 < \eta < 1, 0 < \beta < 1, 0 < \alpha < \alpha_0, 0 < \lambda < \lambda_0 .

2000 Mathematics Subject Classification: 34B10, 34B15, 34B14
Keywords: Nonlinear second-order differential systems, Positive solutions, Legget-Williams fixed point theorems, boundary condition.

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Reversible codes over $GF(16)$ and DNA codes

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Abstract The error correction capability of DNA strands which is similar to the goal of error correction in coding theory has attracted researchers from coding theory recently. A main goal has been studying the structure of error correcting codes by imposing some restrictions so that they resemble DNA structure. In this study, 16 element field ($GF(16)$) is used to code DNA as pairs. Reversible DNA codes of even and odd length are built in the field $GF(16)$ by a special family of polynomials. Further, Hamming minimum distances are also studied.
Constraint Coefficient Problems for Subclasses of Univalent Functions

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Abstract In the present paper, we introduce generalized differential operator of functions which are analytic in the unit disk. Also we use this operator to introduce new classes $C_\gamma$ and $S^*_\gamma$ of suitably normalized close-to-convex and starlike univalent functions with positive coefficients, respectively. These are two subclasses of the class $S_R$ of equally normalized univalent functions with real coefficients, the class of positive real part functions with real coefficients. Using some lemmas on the extreme points of closed convex classes, we solve the constraint problems of the first coefficients of $C_\gamma$ and $S^*_\gamma$ for a fixed second coefficient that is close to two. For these classes we also derive the radii of close-to-convexity, starlikeness and convexity. Further, an application involving fractional calculus for functions in $C_\gamma$ and $S^*_\gamma$ are given. All of our results are sharp.

2000 Mathematics Subject Classification:
Keywords: differential operator, real coefficients, starlikeness, convexity, close-to-convexity
The Algerian-Turkish International days on Mathematics

Local solution of the system of equations describing the motion of water in the desert areas

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Abstract

Today the issue of water resource and desertification has become very important. In this work, we propose a mathematical model of the flow of water in the desert regions expressed by a system of equations describing the change in the amount of the steam in the atmosphere and that of the quantity of water. Then we prove the existence and uniqueness of the local solution of this system.

References


2000 Mathematics Subject Classification:

Keywords: desertification, evaporation, condensation, saturated steam.
Optimal control of BCG immunotherapy in a mathematical model of superficial bladder cancer

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Abstract
In this talk, we aim to discuss the application of the Pontryagin’s maximum principle after introducing an optimal control in a mathematical model of BCG immunotherapy in superficial bladder cancer. Interactions between tumor cells and immune responses represented by effector cells; describe a nonlinear system of four ordinary differential equations. Several studies have shown that we still don’t know what is the optimal dose of BCG, main- tenance schedule, duration of treatment or is the optimal treatment different for every patient. For this reason, our first goal is to find treatment regimens that minimize the cancer cell count. We include numerical simulations based on a fourth-order iterative Runge-Kutta scheme which is used to solve the optimality system of a boundary two-point value problem.

References


2000 Mathematics Subject Classification:
Keywords: Superficial bladder cancer; BCG immunotherapy; Pontryagin’s maximum principle; Optimal control.
Computational flow analysis on a two phase model with an unknown pressure function

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ABSTRACT Blood flow inside capillary can be modeled as a two-phase model which is a right hand side identification problem with an unknown pressure function $p(x)$ (see [1]-[5]). In this presentation, the stability analysis of the problem is obtained. For obtaining approximate results, first and second orders of accuracy difference schemes are presented. The Matlab implementation of these differences schemes are generated.

References


Systèmes Dynamiques Discrets Bidimensionnels. Relation entre Point Fixe et Point Focal

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ABSTRACT Il existe des singularités spécifiques aux systèmes dynamiques discrets définis par des applications bidimensionnelles ayant au moins une composante fractionnelle; ce sont les points focaux et les courbes préfocales [1]. Dans cette étude on s’intéresse aux relations qui peuvent exister entre un point fixe de T (application définissant le système dynamique) et un point focal d’une détermination inverse $T^{-1}$, si elle existe, de T [2].

1 - La première relation est une localisation, dans le plan de phases, du point focal de $T^{-1}$ quand celui-ci est un point fixe de T.

2 - La deuxième relation est une équivalence entre le fait que le point focal Q soit un point fixe de T et que l’intersection des courbes préfocales de $T^{-1}$ et de $T^{-2}$ associées à Q soit non vide.

3 - La troisième relation est une condition nécessaire "une valeur propre nulle de la matrice Jacobienne de T au point Q" pour qu’un point focal de $T^{-1}$ soit un point fixe de T.

Cette étude sera complétée par deux exemples. Le premier est une application polynomiale ayant une détermination inverse fractionnelle admettant un seul point focal; le second est aussi une application polynomiale ayant une détermination inverse fractionnelle mais admettant deux points focaux.

References


Solvability of a third order boundary value problem at resonance

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ABSTRACT This paper deals with a class of third order boundary value problem at resonance case. Some existence results are obtained by using the coincidence degree theory of Mawhin.

References


Abstract In this paper, a numerical algorithm, based on the homotopy perturbation method, is applied for solving heat equation with an initial condition and non local boundary conditions. The analytic solution of the linear heat equation is calculated in the form of a series with easily computable components. We use three examples where the numerical application shows that the obtained solution coincides with the exact one.

References

Lacunary Statistical Limit Points in Random 2-Normed Spaces

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Abstract In this article we introduce the notion $\theta$-cluster points, and investigate the relation between $\theta$-cluster points and limit points of sequences in the topology induced by random 2-normed spaces and prove some important results.

2000 Mathematics Subject Classification: 40A35, 46A70, 47B35.
Keywords: $t$-norm, random 2-normed space, Lacunary statistical convergence.
On $I$-convergence of Double Sequences in the Topology Induced by Random 2-Norms

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ABSTRACT In this article we introduce the notion $I$-convergence and $I$-Cauchy of double sequences in the topology induced by random 2-normed spaces and prove some important results.
Some topological and geometric properties of the domain of the triple band matrix \( B(r, s, t) \) in the sequence space \( \ell(p) \)

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Abstract The sequence space \( \ell(p) \) was introduced by Maddox [Spaces of strongly summable sequences, Quart. J. Math. Oxford (2)18(1967), 345–355]. In the present paper, the sequence space \( \ell(B, p) \) of non-absolute type has been studied which is the domain of the triple band matrix \( B(r, s, t) \) in the sequence space \( \ell(p) \). Furthermore, the \( \alpha-\), \( \beta-\) and \( \gamma-\)duals of the space \( \ell(B, p) \) have been determined, and the Schauder basis has been given. The classes of matrix transformations from the space \( \ell(B, p) \) to the \( \ell_\infty, c \) and \( c_0 \) have been characterized. Additionally, the characterizations of some other matrix transformations from the space \( \ell(B, p) \) to the Euler, Riesz, difference, etc., sequence spaces have been obtained by means of a given lemma. The last two sections of the paper have been devoted to some results about the rotundity of the space \( \ell(B, p) \) and conclusion.

2000 Mathematics Subject Classification: Primary 46A45; Secondary 46B45, 46A35.
Keywords: Paranormed sequence space, matrix domain of a sequence space, \( \alpha-\), \( \beta-\) and \( \gamma-\)duals, triple band matrix and matrix transformations.
Existence and uniqueness of solution for a second order boundary value problem

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Abstract Our work deals with a second order boundary value problem. Our aim is to give new conditions on the nonlinear term, then, using Banach contraction principale and Leray Schauder nonlinear alternative, we establish the existence and uniqueness of nontrivial solutions of the considered problem.

2000 Mathematics Subject Classification: 34K20, 34K30, 34K40.
Keywords: Fixed point theorems, Second order boundary value problem, Integrals conditions, Banach contraction principle, Leray Schauder nonlinear alternative.
SOLUTION DE MEILLEUR COMPROMIS POUR LE PROBLEME DU PLUS COURT CHEMIN MULTICRITERE

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ABSTRACT Dans ce papier nous étudions le problème du plus court chemin entre deux sommets, source et puits dans un réseau multicritère. L’objectif de ce travail est de caractériser l’existence des solutions admissibles et des solutions efficaces. Nous étudions les conditions nécessaires et suffisantes d’existence de solutions admissibles et efficaces pour le problème de la recherche d’un plus court chemin d’un sommet source à un sommet puits dans un réseau bicritère, puis dans le cas général du réseau multicritère.

Les problèmes de cheminement constituent un thème classique en recherche opérationnelle dont les applications sont très nombreuses, notamment en transport et en télécommunication. Parmi les problèmes de cheminement les plus anciens et les plus traités on trouve le problème du plus court chemin. Il consiste chercher le meilleur chemin entre deux points, source et puits, afin de minimiser un critère précis, généralement, le temps, la distance ou le coût. Avec le développement fulgurant de l’aide multicritère à la décision, et, en particulier, suite la nouvelle démarche dans la formulation des problèmes concrets de décision qui tient compte de tous les points de vue, le problème de cheminement classique monocritère [1] ne caractérise pas complètement les problèmes pratiques de cheminement. En effet, dans un réseau de transport ou de télécommunication, plusieurs paramètres peuvent être associés chaque arc comme le temps, la distance, le coût, etc. Il est donc clair qu’on est amené à un problème de décision multicritère particulier, celui de la recherche d’un plus court chemin dans un réseau multicritère [2, 3, 4, 5].

References


2000 Mathematics Subject Classification:
Keywords: Plus court chemin, plus court chemin multicritère, réseau, chemin efficace.


THE PROPERTIES OF SOME SEQUENCE SPACES ON SEMINORMED SPACES

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Abstract In this paper we introduce the sequence spaces $c_0(p, f, \phi, q, s)$, $c(p, f, \phi, q, s)$, $\mu(p, f, \phi, q, s)$ using a modulus function $f$. We give various properties and some inclusion relations on these spaces.

References


2000 Mathematics Subject Classification: 40A05, 40C05, 40D05
Keywords: Modulus function, invariant mean, seminorm, sequence space


Identification of the Diffusion in a Semi-Linear Problem

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Abstract

We give in this paper a variational method to identify the diffusion in a semilinear parabolic problem. We show that the identification of the diffusion amounts to solving a problem of optimal control. Under assumptions on the given nonlinearity we construct a sequence of linear problems whose solutions converge to the solution of original one, and we use finite-elements to compute the cost functional. In the end we use the sensibility method [4] to approximate the gradient of the cost functional.

References


2000 Mathematics Subject Classification:
Keywords: Parabolic Equation, Diffusion, Finite-elements, Optimization
Adomian Decomposition Method for solving nonlinear diffusion equation with convection term

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ABSTRACT In this paper, the Adomian decomposition method is applied to solve the nonlinear diffusion equation with convection term. This method yields an analytical solution in terms of a rapidly convergent series with easily computable terms. The numerical results obtained by this method have been compared with the exact solution to show that the Adomian decomposition method is a powerful method and easy to use.

References


2000 Mathematics Subject Classification: 35J05-35Q68-35J25-41A58-14F35
Keywords: Adomian Decomposition Method, Nonlinear diffusion equation with convection term

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ON THE FINE SPECTRUM OF THE GENERALIZED DIFFERENCE OPERATOR DEFINED BY A DOUBLE SEQUENTIAL BAND MATRIX OVER THE SEQUENCE SPACE $\ell_1$

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Abstract

Let $\lambda = (\lambda_k)$ be a strictly increasing sequence of positive reals tending to infinity, that is

$$0 < \lambda_0 < \lambda_1 < \lambda_2 < \cdots$$

and

$$\lim_{k \to \infty} \lambda_k = \infty.$$

Define the infinite matrix $\Lambda = (\lambda_{nk})_{n,k=0}^{\infty}$ by

$$\lambda_{nk} = \begin{cases} \frac{\lambda_k - \lambda_{k-1}}{\lambda_k}, & 0 \leq k \leq n \\ 0, & k > n \end{cases}$$

for all $n, k \in \mathbb{N}$. Following Furkan, Bilgiç and Kayaduman [Hokkaido Math. J., On the fine spectrum of the generalized difference operator $B(r, s)$ over the sequence spaces $\ell_1$ and $bv$, 35(2006), 897-908], we determine the fine spectrum with respect to the Goldberg’s classification of the operator defined by the triangle matrix $\Lambda$ over the sequence space $\ell_1$. Additionally, we give the approximate point spectrum, defect spectrum and compression spectrum of the matrix operator $\Lambda$ over the space $\ell_1$.

2000 Mathematics Subject Classification: Primary 47A10, Secondary 47B37.

Keywords: Spectrum of an operator, Lambda matrix, spectral mapping theorem, the sequence space $\ell_p$, Goldberg’s classification.
General approach of the root of a p-adic number

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Abstract
In this work, we applied the classical numerical method of the Newton in the p-adic case to calculate the cubic root of a p-adic number \( a \in \mathbb{Q}_p^* \), where \( p \) is a prime number, and through the calculation of the approximate solution of the equation \( x^3 - a = 0 \). We also determined the rate of convergence of this method and evaluated the number of iterations obtained in each step of the approximation.

Let \( p \) be a prime number. The field \( \mathbb{Q}_p \) of p-adic numbers is the completion of the field \( \mathbb{Q} \) of rational numbers with respect to the p-adic norm \( | \cdot |_p \) defined by

\[
\forall x \in \mathbb{Q}_p : |x|_p = \begin{cases} 
p^{-v_p(x)}, & \text{if } x \neq 0 \\
0, & \text{if } x = 0,
\end{cases}
\]

with \( v_p \) is the p-adic valuation defined by \( v_p(x) = \max \{ r \in \mathbb{Z} : p^r | x \} \).

The p-adic norm induces a metric \( d_p \) given by

\[
d_p : \mathbb{Q}_p \times \mathbb{Q}_p \longrightarrow \mathbb{R}^+ \\
(x, y) \longmapsto d_p(x, y) = |x - y|_p,
\]

this metric is called the p-adic metric. The iterative formula of the secant method is

\[
\forall n \in \mathbb{N} : x_{n+1} = \frac{1}{3x_n^2} \left( a + 2x_n^3 \right) \quad (0.1)
\]

if \( x_{n_0} \) is the cubic root of \( a \) of order \( r \). Then

1. If \( p \neq 3 \), then \( x_{n+n_0} \) is the cubic root of \( a \) of order \( 2^n r - 3m(2^n - 1) \) and

\[
\forall n \in \mathbb{N} : \begin{cases} 
x_{n+n_0+1} - x_{n+n_0} \equiv 0 \mod p^{\varphi_n} \\
\varphi_n = 2^n r - m(3 \cdot 2^n - 1)
\end{cases}
\]

2. If \( p = 3 \), then \( x_{n+n_0} \) is the cubic root of \( a \) of order \( 2^n r - 3(m+1)(2^n - 1) \) and

\[
\forall n \in \mathbb{N} : \begin{cases} 
x_{n+n_0+1} - x_{n+n_0} \equiv 0 \mod 3^{\varphi'_n} \\
\varphi'_n = 2^n r - (m(3 \cdot 2^n - 1) + (3 \cdot 2^n - 2))
\end{cases}
\]

2000 Mathematics Subject Classification: 11E95, 65H04
Keywords: Newton method, Hensel’s lemma, rate of convergence
References


Hypergeometric solutions of a forth order Fuchsian partial differential equation

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Abstract
We give an explicit representation of the solutions of the Cauchy problem, in terms of series of hypergeometric functions, for the following class of forth order fuchsian partial differential equations
\[
\begin{cases}
(t\partial_t^2 - \partial_x^2 + \alpha \partial_t) (t\partial_t^2 - \partial_x^2 + \beta \partial_t) u(t, x) = 0, & \alpha, \beta \in \mathbb{C}, \beta \neq \alpha - 1 \\
u(0, x) = x^p \sum_{n=0}^{\infty} a_n x^n, & p \in \mathbb{C} \\
u_t(0, x) = 0.
\end{cases}
\]

We show that the solutions are holomorphic, ramified around the characteristic surface \( K : 4t - x^2 = 0 \).

References


2000 Mathematics Subject Classification: 35A20, 35C10, 35C05, 33C05, 33L10.

Keywords: Fuchsian operator, Gauss hypergeometric function.
Some coupled fixed point theorems for mappings satisfying a rational expression

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Abstract. The purpose of this paper is to establish some coupled coincidence point theorems for a pair of mappings having a mixed g-monotone property satisfying a contractive condition of rational type in the framework of partially ordered metric spaces. Also, we present a result on the existence and uniqueness of coupled common fixed points. The results presented in the paper generalize and extend several well-known results in the literature. An example is also provided to support our claim.

2000 Mathematics Subject Classification: 47H10, 54H25
Keywords: Coupled fixed point, mixed g-monotone property, ordered metric spaces.
The Algerian-Turkish International days on Mathematics

General boundary stabilization of memory type in thermoelasticity

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Abstract

In this work we study a nonlinear system of thermoelasticity, where a viscoelastic damping acting on a part of the boundary. We establish a general decay result, from which the usual exponential and polynomial decay are only special cases.

We are concerned with the following system

\[
\begin{align*}
\frac{\partial u}{\partial t} - \alpha \nabla \theta + f(u) &= 0 \quad \text{in } \Omega \times \mathbb{R}^+ \\
\frac{\partial \theta}{\partial t} - k \nabla \theta + \text{div}u &= 0 \quad \text{in } \Omega \times \mathbb{R}^+ \\
u(u, 0) &= u_0, \quad \theta(u, 0) = \theta_0, \quad u_0, \theta_0 \in H^1(\Omega) \\
\end{align*}
\]

where a viscoelastic damping acting on a part of the boundary.

\(\alpha, k, \beta\) are positive constants, \(f(u)\) behaves like \(|u|^p u\), \(\Omega\) is a bounded domain of \(\mathbb{R}^n\), with a smooth boundary \(\partial\Omega\). \(\nu\) is the outward normal to \(\partial\Omega\). \(u = u(x, t) \in \mathbb{R}^n\) is the displacement vector, \(\theta = \theta(x, t)\) is the difference temperature, and the relaxation function is considered to be positive, non-increasing and belongs to \(W^{1,2}(0, +\infty)\).

The boundary condition on \(\Gamma_1\) is the nonlocal viscoelastic condition responsible for the memory effect.

2000 Mathematics Subject Classification:

Keywords:
On the spaces of Euler almost convergent and Euler almost null sequences

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Abstract Let $E^r$ denotes the Euler means of order $r$. The Euler sequence spaces $e^r_p$, $e^r_0$, $e^r_c$ and $e^r_\infty$ consisting of all sequences whose $E^r$-transforms are in the spaces $\ell_p$, $c_0$, $c$ and $\ell_\infty$ are introduced by Altay and Başar [1], Altay et al. [2], and Mursaleen et al. [5]. Recently, Polat and Başar have studied the Euler spaces of difference sequences of order $m$, in [6].

Let $\lambda$, $\mu$ be any two sequence spaces and $A = (a_{nk})$ be an infinite matrix of real numbers $a_{nk}$, where $n$, $k \in \mathbb{N}$. Then, we write $Ax = ((Ax)_n)$, the $A$-transform of $x$, if $(Ax)_n = \sum_k a_{nk}x_k$ converges for each $n \in \mathbb{N}$. If $x \in \lambda$ implies that $Ax \in \mu$ then we say that $A$ defines a matrix mapping from $\lambda$ into $\mu$ and denote it by $A : \lambda \rightarrow \mu$. By $(\lambda : \mu)$, we mean the class of all infinite matrices such that $A : \lambda \rightarrow \mu$. The domain $\lambda_A$ of an infinite matrix $A$ in a sequence space $\lambda$ is defined by $\lambda_A := \{x = (x_k) \in \omega : Ax \in \lambda\}$ which is a sequence space. If $A$ is triangle, then one can easily observe that the sequence spaces $\lambda_A$ and $\lambda$ are linearly isomorphic, i.e. $\lambda_A \cong \lambda$.

The concept almost convergence of a bounded sequence introduced by G.G. Lorentz [4]. Quite recently, Başar and Kirisci have worked the domain of the generalized difference matrix $B(r,s)$ in the sequence space $f$ of almost convergent sequences, in [3]. In this paper, following Başar and Kirisci [3], we essentially deal with the domains $f_{E^r}$ and $(f_0)_{E^r}$ of the Euler means of order $r$ in the spaces $f$ and $f_0$ of almost convergent and almost null sequences, respectively.

References


2000 Mathematics Subject Classification: Primary 46A45; Secondary 40C05.
Keywords: Almost convergence, matrix domain of a sequence space, $\beta$– and $\gamma$– duals and matrix transformations.


Homogeneous Spaces of Elliptic Curves and associated groups

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ABSTRACT We are interested in homogeneous spaces of elliptic curves, we begin by studying Weierstrass Cubic: algebraic structure of groups of Mordell-Weil invariants discriminating. We get the coordinates of points $P, P_1 + P_2$ and $mP, m \geq 2$, and the torsion groups $T(E)$. We describe the valuations and discounts. We study isomorphisms and isogenies of elliptic curves. We describe the cohomology of abelian groups. This allowed us to develop the theory of homogeneous spaces, groups of Châtelet-Weil groups and Selmer groups Chafarevich - Tate.

2000 Mathematics Subject Classification:

Keywords:
CONTRIBUTION A LA DEPOLLUTION DES EAUX COLOREEES PAR LES ARIGLES ANIONIQUES

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Abstract Le travail que nous avons réalisé s'inscrit dans une perspective de contribution dans le domaine de l'environnement. Outre le fait de traiter de la pollution des eaux, nous nous sommes familiarisé avec les techniques de synthèse, de caractérisation des matériaux solides cristallins de type "argiles anioniques" appelés souvent par le nom "d'Hydroxydes Doubles Lamellaires (HDL) " et particulièrement leur intérêt dans les applications de dépollution des rejets industriels provenant de l'industrie telle le textile... et autres. L'objectif que nous nous sommes fixé est l'élimination des colorants anioniques par adsorption sur ces hydroxydes doubles lamellaires carbonatés, leurs produits calcinés ainsi que la phase Zn-al-cl. En effet ces argiles anioniques sont caractérisées par un empilement de feuilles d’hydroxydes de métaux divalent et trivalement [MII1-x MIIIx(OH)2]x+[Ax/mm-, nH2O]x- (dans notre cas M+2=Zn+2 et M+3=Al+3) séparés par des domaines inter feuilles occupés par l’anion A échangeable . Notre matrice a été préparée par la méthode de coprécipitation en milieu basique (pH=9) et constant avec un rapport molaire (Zn/Al) ; R=2.

Le produit de synthèse obtenu de ce rapport a été caractérisé par plusieurs techniques comme la diffraction des rayons X (DRX) et spectroscopie infrarouge (IRTF), ce qui nous a permis de confirmer que le matériau obtenu correspond bien aux hydroxydes doubles lamellaires recherchés. De part leurs propriétés d’échange anionique très élevée, leur structure modulable et contrôlée et leur effet mémoire unique, les HDLs sont des matériaux potentiellement très intéressants pour l’adsorption, l’intercalation des molécules de colorants en vue d’une remédiation environnementale. Ces propriétés d’échange anionique nous ont permis d’évaluer leur efficacité dans l’élimination des colorants donnant des résultats très satisfaisants sur les phases calcinées.

L’aspect économique de l’utilisation des matériaux adsorbant, rend important la réutilisation des argiles anioniques vue leur pouvoir à se régénérer, la réutilisation de ces matériaux pour l’adsorption des colorants a été effectuée après 4 cycles de régénération.

2000 Mathematics Subject Classification:
Keywords: HDL, adsorption, modèle, A85.
A broadcast chromatic number of a tree

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Abstract
Let $G = (V, E)$ be a simple graph with no isolated vertices. For every vertex $u \in V$, the open neighborhood of a vertex $u$ is denoted by $N_G(u)$ and its degree $\deg_G(u)$ is the set $\{v \in V : uv \in E\}$. The closed neighborhood of $u$ is $N_G[u] = N_G(u) \cup \{u\}$. The distance $d(u, v)$ between two vertices $u$ and $v$ in $G$ is the number of edges on a shortest path between $u$ and $v$ in $G$. The eccentricity $e(v)$ of a vertex $v$ is the largest distance from $v$ to any vertex of $G$. The radius of $G(\text{rad}(G))$ is the smallest eccentricity in $G$. The diameter of $G(\text{diam}(G))$ is the largest eccentricity in $G$. The vertex cover number of $G$ and is denoted by $\alpha_0(G)$ is the cardinality of a minimum subset $S$ of the vertices in a graph such that every edge in the graph has at least one endpoint in $S$. A broadcast is a function $f : V \to \{0, 1, 2, \ldots, \text{diam}(G)\}$ that if every vertex $v \in V$, $f(v) \leq e(v)$. A broadcast coloring of order $k$ in $G$ is a function $\pi : V \to \{1, \ldots, k\}$ that if $\pi(u) = \pi(v)$ implies that the distance between $u$ and $v$ is more than $\pi(u)$. The minimum order of a broadcast coloring is called the broadcast chromatic number of $G$ and is denoted by $\chi_b(G)$. It was introduced by Wayne Goddard, Sandra M. Hedetniemi, Stephen T. Hedetniemi and John M. Harris, Douglas F. Rall in [1] and study its properties. They showed that it is NP-hard to determine if $\chi_b(G) \leq 4$ and they determine the maximum broadcast chromatic number of a tree. The case of a tree of diameter 4 is more complicated, but an explicit formula was given. The key to the formula is the numbers of large and small neighbors of the central vertex (note that the vertex is large if it has degree 4 or more, and small otherwise). We use these results and to prolong them on the tree of diameter 5 while taking the central vertex of large degree, if the two central vertices are the same degree, we take that who has the greatest sum of degree of all its neighbors (Note that the tree of diameter 5 has two central vertices).

References


2000 Mathematics Subject Classification:
Keywords: Graph theory, Broadcast coloring, Broadcast chromatic number.
Abstract

In this paper we investigate the existence and uniqueness of solutions on a compact interval for non-linear fractional integro-differential equations with state-dependent delay. Our results will be obtained using suitable fixed point theorems and the technique of measures of noncompactness. Some applications of the main result have been included.

References


2000 Mathematics Subject Classification: 26A33; 45J05; 45G05.

Keywords: Integral resolvent family, mild solution, fixed points, state-dependent delay, measure of noncompactness.
Mathematical Simulation of Cloaking Metamaterial Structures

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ABSTRACT There is currently a great deal of interest in the theoretical and practical possibility of cloaking objects from the observation by electromagnetic waves. In this paper we present a rigorous derivation of the material parameters for both the cylinder and rectangle cloaking structures. Numerical results using these material parameters are presented to demonstrate the cloaking effect.

References


2000 Mathematics Subject Classification:
Keywords: Maxwell’s equations, metamaterial, finite element method, invisible cloak
Lagrange interpolation arising from a steady fluid structure interaction problem

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ABSTRACT In this paper, we use Lagrange interpolation to solve fluid structure interaction problem. This study comes with a view to extend our previous approximation techniques in the resolution of coupled problems. A combination of Lagrange interpolation and BFGS method leads to computation of the structure displacement, the fluid velocity and the fluid pressure.
Numerical Modeling of swirling flow in cylindrical configuration under the constant magnetic field

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Abstract
A numerical modeling of the mixed convection in cylindrical configurations with a magnetic field was considered. The finite volumes method has been used to resolve the equations of continuity, momentum (Navier-Stokes), energy and electric potential. The equations of mathematical model are partial differential equations, nonlinear elliptic, complex and coupled. The SIMPLER and TDMA algorithms [1] are used to solve this system and obtain a solution. The computer code developed here is validated via comparisons with numerical and experimental data founded in the literature. Stability diagrams are established according to the numerical results of this investigation. These diagrams highlight the dependence of the critical Reynolds numbers ReCr with the values of the Richardson Ri and Hartmann Ha numbers. The effect of the rotating disk, magnetic field and the bottom wall conductivity on the flow is also studied [2-8]. The results obtained in this study will possibly allow the researchers and industrialists to know the oscillatory modes of a low Prandtl number fluid with magnetic field, in order to improve the quality of the semiconductors obtained during the crystal growth.

References


2000 Mathematics Subject Classification:
Keywords: Numerical Modeling, The finite volumes method, Rotating flow, Magnetic field, Liquid metal.


Sur les Problèmes aux Limites Elliptiques gouvernée par l’opérateur de
Laplace à poids dans un domaine plan polygone

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Abstract
L’étude de l’équation de Laplace dans un polygone ou un polyèdre, et généralement l’étude des problèmes elliptiques dans des domaines non réguliers n’est entamée que depuis une date relativement récente; d’une part Grisvard [3] montre que la formule de Green construite pour le Laplacien dans le cas classique c’est à dire dans des domaines réguliers est encore valable dans les domaines non réguliers tels que les polygones ou polyèdres, par exemple, et en utilisant l’alternative de Fredholm, il retrouve des résultats analogues à ceux du cas classique, ces résultats ne sont pas encore généralisés à des opérateurs elliptiques aux dérivées partielles d’ordre plus élevé dans des domaines de $\mathbb{R}^n$, et ceci à cause de la complexité des calculs.
Le but de notre travail est d’étudier le rôle que jouent les fonctions poids dans l’étude du problème générale suivant :

$$\triangle u = f \text{ dans } \Omega \quad B u = g \text{ sur } \Gamma$$

Où $\Omega$ est un ouvert plan de frontière polygonale notée $\Gamma^1$, et $B$ étant un opérateur différentiel aux dérivées partielles, d’ordre 0 ou 1 défini sur la frontière $\Gamma$, on ne considèrera ici que les deux cas: la condition de Dirichlet, et celle de Neumann. $f$ donnée dans $L^2(\Omega)$.
La transformation de Mellin, est bien adaptée à la géométrie du domaine, le noyau de Green aussi bien adaptée à la résolution de l’équation différentielle explicite, et de en évidence d’inégalité à priori. (Lemme de Peetre).[1, 2].

2000 Mathematics Subject Classification: 35A05, 45J05
Keywords: Problème de Poisson, transformation de Mellin, Espace à poids, Polygone, Régularité
References


Statistical Bayesian Analysis of Experimental Data

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ABSTRACT The Bayesian researcher should know the basic ideas underlying Bayesian methodology (i.e., Bayesian theory) and the computational tools used in modern Bayesian econometrics (i.e., Bayesian computation). Bayesian econometrics typically involves extensive use of posterior simulation. Some of the most important methods of posterior simulation are Monte Carlo integration, importance sampling, Gibbs sampling and the Metropolis–Hastings algorithm. The Bayesian should also be able to put the theory and computational tools together in the context of substantive empirical problems. We focus primarily on recent developments in Bayesian computation. Then we focus on particular models (usually regression based). Inevitably, we combine theory and computation in the context of particular models. Although we have tried to be reasonably complete in terms of covering the basic ideas of Bayesian theory and the computational tools most commonly used by the Bayesian, there is no way we can cover all the classes of models used in econometrics. We propose to the user of analysis of variance and linear regression model, which is the workhorse of econometrics, a practical, realistic and constructive statistical inference, which brings a fresh look at his data. We illustrate the desirability and feasibility of Bayesian methods by providing simple and direct answers. Accordingly, we have selected a few popular classes of models (e.g., regression models with extensions and panel data models) to illustrate how the Bayesian paradigm works in practice.

References


2000 Mathematics Subject Classification:
Keywords: Bayesian analysis, Markov Chain Monte Carlo Algorithms, Linear regression model.
On the asymptotic behavior of transmission thin shell problems

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ABSTRACT In this paper we study the asymptotic behavior of two-dimensional transmission problems for the linear Koiter’s model of an elastic multi-structure composed of two thin shells with the same thickness $\varepsilon << 1$. The membrane approximation, i.e., for $\varepsilon = 0$, fails to give a convenient approximate solution, as the limit problem is ill posed. An appropriate dilation leads to an equivalent problem, for which we prove strong convergence in some usual space.
A Computational Method for integrodifferential hyperbolic equation with integral conditions

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Abstract
In this work, we discuss the one dimensional integrodifferential hyperbolic equation subject to nonlocal conditions. We use the method of Laplace transforms. Finally, we obtain the solution by using a numerical technique for inverting the Laplace transforms.

1 Introduction
In the rectangle $Q = (0,1) \times (0,T)$, we consider the equation

$$\frac{\partial^2 u}{\partial t^2} - \frac{\partial^2 u}{\partial x^2} = f(x,t) + \int_0^t a(t-s)u(x,s)\,ds, \quad x \in (0,1), \quad t \in (0,T)$$

(1.1)

We adhere to equation (1.1) the initial conditions

$$u(x,0) = \varphi(x), \quad \frac{\partial u(x,0)}{\partial t} = \psi(x), \quad 0 \leq x \leq 1,$$

(1.2)

and the nonlocal conditions

$$\int_0^1 u(x,t)\,dx = 0, \quad \int_0^1 xu(x,t)\,dx = 0, \quad 0 \leq t \leq T.$$  

(1.3)

2000 Mathematics Subject Classification:
Keywords: Integrodifferential hyperbolic equation, Nonlocal condition, Laplace transform method.
References


Comparison between classes of Joel Anderson and finite operators

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Abstract
Let $\mathcal{H}$ be a separable infinite dimensional complex Hilbert space, and $\mathcal{L}(\mathcal{H})$ denote the algebra of all bounded linear operators on $\mathcal{H}$. The derivation of the operator $A$ is defined by:
\[ \delta_A : \mathcal{L}(\mathcal{H}) \to \mathcal{L}(\mathcal{H}) \]
\[ X \mapsto AX - XA \]
The main objective of this work is to compare the classes of operators for which the distance of the identity operator and the derivation range is minimal (class of Joel Anderson noted $\mathcal{J}A(\mathcal{H})$), or maximal (class of finite operator noted $\mathcal{F}(\mathcal{H})$).
And to prove that the class $\mathcal{J}A(\mathcal{H})$ has no algebraic structure and to give a necessary and sufficient condition for a bounded linear operator $A$ to be in $\mathcal{J}A(\mathcal{H})$ and to obtain some results concerning the form of operators in $\mathcal{J}A(\mathcal{H})$.
We proved that $\mathcal{F}(\mathcal{H})$ is a field and we present some properties of $\mathcal{F}(\mathcal{H})$ and give some classes of operators which are in $\mathcal{F}(\mathcal{H})$.  

2000 Mathematics Subject Classification:
Keywords:
On Statistical Convergence of Order $\alpha$ of Generalized Difference Sequences

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Abstract The idea of difference sequence spaces was introduced by Kızmaz and was generalized by Et and Çolak. Later on difference sequence spaces have been studied by Altay and Basar, Et and Başarır, Malkowsky and Parashar, Mursaleen and many others. In this study we introduce the concept $S_\alpha^\lambda (\Delta^m)$—statistical convergence of order $\alpha$. Also some relations between $S_\alpha^\lambda (\Delta^m)$—statistical convergence of order $\alpha$ and strong $S_\beta^\varphi (\Delta^m)$—summability of order $\beta$ are given. Furthermore some relations between the spaces $\omega^\alpha (\lambda, M)$ and $S_\lambda^\alpha (\Delta^m)$ are examined.
Modified Newton’s methods with fifth or sixth -order convergence and multiple roots

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ABSTRACT In paper [5] a modifications of the Newton’s method which produces iterative methods with the fifth or sixth of convergence have been proposed. Here we study the order of convergence of the methods when we have multiple roots. We prove that the order of convergence of the mNm go down to one but, when the multiplicity p is known, it may be raised up to two and six by using two different types of correction, when p is unknown we show that the mNm have converge faster than the classical Newton’s method.
ON THE NEW SEQUENCE SPACES INCLUDING THE SPACES OF ALL CONVERGENT AND NULL SEQUENCES

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Abstract

Let $-\infty < r < \infty$ and $\omega$ denotes the space of all complex valued sequences. Define the subsets $c^r$ and $c^r_0$ of the space $\omega$ by

$c^r := \{x = (x_k) \in \omega : \exists l \in \mathbb{C} \ni \lim_{k \to \infty} \frac{x_k}{k^r} = l\}$,

$c^r_0 := \{x = (x_k) \in \omega : \lim_{k \to \infty} \frac{x_k}{k^r} = 0\}$.

Let $\lambda \in \{c^r, c^r_0\}$. The main results of this study are, as follows:
1 ) The sets $c^r$ and $c^r_0$ are linear spaces with respect to the coordinate-wise addition and scalar multiplication of sequences.
2 ) $(\lambda, d^r_1)$ is a complete metric spaces, where

$d^r_1(x, y) = \sup_{k \in \mathbb{N}} |\frac{x_k}{k^r} - \frac{y_k}{k^r}|; x = (x_k), y = (y_k) \in \lambda$.

3 ) $(\lambda, \| \cdot \|_r^\lambda)$ is a Banach space, where

$\|x\|_r^\lambda = \sup_{k \in \mathbb{N}} |\frac{x_k}{k^r}|; x = (x_k) \in \lambda$.

4 ) The inclusion relation $\mu \subset \lambda$ with $r \geq 0$ strictly holds, where $\mu \in \{c, c_0\}$.
5 ) The $\alpha-$, $\beta-$ and $\gamma$-duals of the spaces $c^r$ and $c^r_0$ are determined.
6 ) The classes $(\lambda : \ell_\infty)$, $(\lambda : f)$, $(\lambda : c)$ and $(\mu : \lambda)$ of infinite matrices are characterized, where $f$ denotes the space of almost convergent sequences and $\mu \in \{\ell_\infty, c, c_0\}$.

2000 Mathematics Subject Classification: Primary 46A45; Secondary 40C05.
Keywords: Matrix domain of a sequence space, $\alpha-$, $\beta-$ and $\gamma$-duals and matrix transformations.
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STATISTICAL CONTINUITY AND STATISTICAL DERIVATIVE

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Abstract

A sequence \( x = (x_k) \) is said to be statistically convergent to the number \( u \) if for every \( \epsilon > 0 \),

\[
\lim_{n \to \infty} \frac{1}{n} | \{ k \leq n : |x_k - u| \geq \epsilon \} | = 0
\]

where the vertical bars indicate the number of elements in the enclosed set. In this case we write \( st \lim x_n = u \).

\( f : \mathbb{R} \to \mathbb{R} \) is said to be statistically continuous at \( u \in \mathbb{R} \) provided that whenever \( st \lim x_n = u \) then \( st \lim f(x_n) = f(u) \).

The purpose of this study is to give alternative definition of statistically continuous function and define notion of statistical derivative for real valued functions.

References


2000 Mathematics Subject Classification: Primary 40A05; Secondary 40C05, 40D05.
Keywords: statistical convergence, statistical continuity, statistical derivative.


Operating Conditions Optimization of Catalytic Fixed Bed Reactor

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Abstract
The importance of the production of ethylene oxide as intermediate product is indisputable in chemical industry, since the total request of ethylene oxide continues to increase because of its importance like intermediary to manufacture antifreeze, fibers of polyester and other petrochemical products.

The objective of this present work is the study of the catalytic fixed bed reactor used for this production by seeking the optimal operating conditions: it is a question of adapting the operating conditions by holding account physical limitations of the reactor and industrial constraints.

In this work we applied the pseudo-homogeneous model which already proved its effectiveness in this case, a code in Matlab was developed in order to solve the generated system of differential equations.

We studied the influence of certain operational parameters on the selectivity and the thermal stability of the reactor, which can depend on a great number of external parameters but without having analytical models of them.

In this context we used the method “experimental plan”, which is often used to minimize the number of measurement points of a process to obtain the maximum of information and the most influential factors, except that we have replaced measurements by numerical executions of the elaborate program.

Indeed, we made variations of certain operational parameters in precise intervals, for which we calculated the corresponding selectivity and temperature of the reactor. By applying a factorial experimental plan, we could quantify the influence of the parameters; we find a correlation connecting the parameters to the key factors, namely selectivity and temperature in order to facilitate optimization under constraints.

The results obtained are in agreements with those of the literature and make it possible to see that the selectivity without constraints would be higher but the optimal operating conditions must take into account the limits imposed by industrial constraints and process safety.

2000 Mathematics Subject Classification:
Keywords: ethylene oxide, fixed bed, catalytic reactor, pseudo-homogeneous model, optimization, experimental plan
AN INEQUALITY RELATED TO THE RIESZ CORE OF DOUBLE SEQUENCES

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ABSTRACT A double sequence \( x = \{x_{jk}\}_{j,k=0}^{\infty} \) is said to be convergent in the Pringsheim sense or \( P \)-convergent if for every \( \epsilon > 0 \) there exists an \( N \in \mathbb{N} \) such that \( |x_{jk} - \ell| < \epsilon \) whenever \( j, k > N \), [3]. In this case, we write \( P \lim_{j,k \to \infty} x_{jk} = \ell \). A double sequence \( x \) is bounded if

\[ \|x\| = \sup_{j,k \geq 0} |x_{jk}| < \infty. \]

By \( \ell^2_\infty \) we denote the space of all bounded double sequences.

Let \( A = [a_{mn}]_{j,k=0}^{\infty} \) be a four-dimensional infinite matrix of real numbers for all \( m, n = 0, 1, \ldots \). The sums

\[ y_{mn} = \sum_{j=0}^{\infty} \sum_{k=0}^{\infty} a_{mn}^{jk} x_{jk} \]

are called the \( A \)- transforms of the double sequence \( x = \{x_{jk}\} \). We say that a sequence \( x = \{x_{jk}\} \) is \( A \)-summable to the limit \( \ell \) if the \( A \)-transform of \( x = \{x_{jk}\} \) exists for all \( m, n = 0, 1, \ldots \) and is convergent to \( \ell \) in the Pringsheim sense, i.e.,

\[ \lim_{p,q \to \infty} \sum_{j=0}^{p} \sum_{k=0}^{q} a_{mn}^{jk} x_{jk} = y_{mn} \]

and \( \lim y_{mn} = \ell \).

Let \( (q_i), (p_j) \) be sequences of non-negative numbers which are not all zero and \( Q_m = q_1 + q_2 + \cdots + q_m, q_1 > 0, P_n = p_1 + p_2 + \cdots + p_n, p_1 > 0 \). The Riesz convergence of a double sequence \( x = \{x_{jk}\} \) has been defined in [1] by the \( P - \lim \) of \( r_{mn}^{pq}(x) \), where

\[ r_{mn}^{pq}(x) = \frac{1}{Q_m} \frac{1}{P_n} \sum_{i=1}^{m} \sum_{j=1}^{n} q_i p_j x_{ij}. \]

If \( x = \{x_{jk}\} \) is Riesz convergent to \( s \), then we write \( P_R - \lim x = s \). The set of all Riesz convergent double sequences is denoted by \( c_2^R \).

The aim of this study is to give the necessary and sufficient conditions for a four dimensional matrix \( A = [a_{mn}^{jk}] \) to satisfy \( P - \lim \sup r_{mn}^{pq}(Ax) \leq C_s(x) \) for all \( x \in \ell^2_{\infty} \), where

\[ C_s(x) = \lim_{m,n} \sup_{s,t} \frac{1}{mn} \sum_{j=0}^{m} \sum_{k=0}^{n} x_{jk} \]

which defined in [2].

2000 Mathematics Subject Classification: 40C05, 40J05, 46A45
Keywords: Double sequences, core of a sequence and Riesz convergence
References


SPACE OF CONTINUOUS FUNCTIONS OVER THE FIELD OF NON-NEWTONIAN REAL NUMBERS

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Abstract As an alternative to the classical calculus, Grossman and Katz introduced the non-
Newtonian calculus in [2] consisting of the branches of geometric, anageometric and bigeometric calculus. Recently, Bashirov et al. [1] have recently emphasized on the non-Newtonian calculus and gave the results with applications corresponding to the well-known properties of derivative and integral in the classical calculus. Quite recently, Uzer [3] has extended the multiplicative calculus to the complex valued functions and interested in the statements of some fundamental theorems and concepts of multiplicative complex calculus, and demonstrated some analogies between the multiplicative complex calculus and classical calculus by theoretical and numerical examples.

Following Grossman and Katz, we construct the field $\mathbb{R}(N)$ of non-Newtonian real numbers and the concept of non-Newtonian metric. Also we define and give the basic important properties of convergence and continuity. Later, we emphasize on the sets $C(N)[a, b]$, as the space of non-Newtonian continuous functions.

Our main results are:

Theorem 1. $(\mathbb{R}(N), \times, \times)$ is a complete field.

Theorem 2. An $N$-monotone sequence of $N$-real numbers converges if and only if it is $N$-bounded.

Theorem 3. Let $(a_n)$ and $(b_n)$ be $N$-convergent sequences of $N$-real numbers. Then for each pair of $N$-real numbers $\alpha$ and $\beta$, the sequence $\{\lambda \times a_n \times \mu \times b_n\}$ is $N$-convergent and

$$N - \lim_{n \to \infty} [\{\lambda \times a_n \times \mu \times b_n\}] = \lambda \times (N - \lim_{n \to \infty} a_n) \times \mu \times (N - \lim_{n \to \infty} b_n)$$

Moreover, if $a_n \leq b_n$ for all $n \in \mathbb{N}$, then $N - \lim_{n \to \infty} a_n \leq N - \lim_{n \to \infty} b_n$.

Theorem 4. $C_N[a, b]$ is a metric space with the metric $d_N$, where $d_N(x, y) = \max_{t \in [a, b]} |x(t) - y(t)|$ with $x, y \in C_N[a, b]$.

Theorem 5. $C_N[a, b]$ is a vector space with the algebraic operations defined in the usual way.

Theorem 6. $C_N[a, b]$ is a Banach space with norm given by $\|x\|_N = \max_{t \in [a, b]} |x(t)|$.

2000 Mathematics Subject Classification: Primary 26A06, 11U10; Secondary 08A05, 46A45

Keywords: Non-Newtonian calculus, algebraic structures with respect to non-Newtonian calculus, non-Newtonian function space.
References


On Generalized Gegenbauer Matrix Polynomials

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Abstract The purpose of this talk is to consider a new generalization of the Gegenbauer matrix polynomials in two variables. The hypergeometric matrix representation of the generalized Gegenbauer matrix polynomials is presented here. Moreover, matrix differential recurrence relations and partial differential equation concerning to these matrix polynomials are established.

2000 Mathematics Subject Classification:
Keywords: Gegenbauer matrix polynomials; Gamma matrix function; Hypergeometric matrix function; matrix differential equations.
**Abstract**  We extend Lupas inequality for 

\[ \begin{align*} 
T(f, g) &= \frac{1}{b-a} \int_a^b f(x)g(x)dx - \frac{1}{(b-a)^2} \int_a^b f(x)dx \int_a^b g(x)dx 
\end{align*} \]

where the integrals involved exist.

The problem of estimating the functional in (1) under convexity has been studied by several authors. In 1971, Atkinson [1] showed that if \( f, g \) are convex functions which are twice differentiable on \([a, b]\) and

\[ \int_a^b \left(x - \frac{a + b}{2}\right) g(x)dx = 0, \]

then \( T(f, g) \geq 0 \). In 1972, Lupas [3] proved the following inequality for convex functions

\[ \begin{align*} 
T(f, g) &\geq \frac{12}{(b-a)^3} \int_a^b \left(x - \frac{a + b}{2}\right) f(x)dx \int_a^b \left(x - \frac{a + b}{2}\right) g(x)dx, 
\end{align*} \]

with equality when at least one of the functions \( f, g \) is an affine function on \([a, b]\). We extend Lupas’s inequality for \( n \)-convex (\( n \)-concave) functions.

**References**


Exponential inequalities for the Robbins Monro’s algorithm with associated variables

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Abstract In this work, we establish exponential inequalities for the Robbins-Monro’s algorithm with associated variables, and to precise the almost complete convergence rate of this algorithm.

References


2000 Mathematics Subject Classification: 60E15, 60F15, 62L08, 62L20.
Keywords: Robbins-Monro’s algorithm, associated random variable, exponential inequality, rate of convergence.
Abstract The study of economic behavior of service providers in a competition environment is an important and interesting research issue. This paper deals with a game theory approach to the numerical analysis of the batch arrival queuing system. We consider a single server Markovian queue. We assume that arriving customers decide whether to enter the system or balk based on a natural reward-cost structure, which incorporates their desire for service as well as their unwillingness to wait. We examine customer behavior under various levels of information regarding the system state. Specifically, before making the decision, a customer may or may not know the state of the server and/or the number of present customers. We derive equilibrium strategies for the customers under the various levels of information and analyze the stationary behavior of the system under these strategies. We also illustrate further effects of the information level on the equilibrium behavior via numerical experiments.

2000 Mathematics Subject Classification:
Keywords: Markovian Queuing Systems - Game Theory - Equilibrium customer strategies- Nash Equilibrium-Competition, Nash Equilibrium.
Cone convergency for multiple sequences

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ABSTRACT The aim of this paper is to introduce a new type convergency which is useful when a $d$-multiple sequence is not convergent in some usual senses.

2000 Mathematics Subject Classification: Primary 40A05, 40B05; Secondary 26A03x
Keywords: Double sequence; multiple sequence; statistical convergence; multiple natural density; cone convergency.
Basisity problem and weighted shift operators

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Abstract

We investigate a basisity problem in the space $\ell^p_A(D)$ and in its invariant subspaces. Namely, let $W$ denote a unilateral weighted shift operator acting in the space $\ell^p_A(D)$, $1 \leq p < \infty$, by $Wz^n = \lambda_n z^{n+1}, n \geq 0$, with respect to the standard basis $\{z^n\}_{n \geq 0}$. Applying the so-called "discrete Duhamel product" technique, it is proven that for any integer $k \geq 1$ the sequence $\{(w_{i+nk})^{-1} \cdot (W | E_i)^{kn} f\}_{n \geq 0}$ is a basic sequence in $E_i := \text{span} \{z^{i+n}: n \geq 0\}$ equivalent to the basis $\{z^{i+n}\}_{n \geq 0}$ if and only if $f(i) \neq 0$. We also investigate a Banach algebra structure for the subspaces $E_i, i \geq 0$.

2000 Mathematics Subject Classification: 46B15; 47B37, 47B47

Keywords: Basis, Basic sequence, Discrete Duhamel Product, Banach algebra, Weighted Shift Operator.
About A New Class of Bifurcations Generated by Piecewise Linear Maps

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Abstract

The purpose of this paper is to study the occurrence of a new bifurcation phenomena for piecewise smooth maps. These phenomena are part of a rich new class of bifurcations which we call border-collision bifurcations. Border collision bifurcations have been defined for continuous piecewise smooth maps depending on parameters [14]. In the simplest case of one dimensional maps, border collision bifurcations occur, as a parameter is varied, when a fixed or periodic point of the map collides with the set of points (called border) where the map is not differentiable. We are interested in a family of two-dimensional piecewise map $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ depending on three parameters, given by two maps $T_1, T_2$ defined in the regions $R_1, R_2$, respectively:

$$T : (x, y) \mapsto \begin{cases} T_1(x, y), & \text{if } (x, y) \in R_1 \\ T_2(x, y), & \text{if } (x, y) \in R_2. \end{cases}$$

where

$$T_1 : \begin{pmatrix} x \\ y \end{pmatrix} \mapsto \begin{pmatrix} 1 - ax - by \\ x \end{pmatrix}, \quad R_1 = \{(x, y) \in \mathbb{R}^2 \mid x \geq 0\},$$

$$T_2 : \begin{pmatrix} x \\ y \end{pmatrix} \mapsto \begin{pmatrix} 1 + ax - by + c \\ x \end{pmatrix}, \quad R_2 = \{(x, y) \in \mathbb{R}^2 \mid x < 0\},$$

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

References


2000 Mathematics Subject Classification:

Keywords: Piecewise linear maps, attractor, border collision bifurcations, Chaos.

Nonlinear Fractional Differential Inclusions in Banach Spaces

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Abstract In recent years, fractional Calculus have been addressed by several researchers. Fractional derivatives provide an excellent tool for the description of memory and hereditary properties of various materials and processes. These characteristics of the fractional derivatives make the fractional order models more realistic and practical than the classical integer-order models. As a matter of fact, fractional Calculus arise in many engineering and scientific disciplines such as physics, chemistry, biology, economics, control theory, signal and image processing, biophysics, blood flow phenomena, aerodynamics, and fitting of experimental data.

In this work we investigate the existence of solutions for an initial value problem (IVP for short) for the nonlinear fractional differential inclusion of the form

\[ cD^r y(t) \in F(t, y(t), cD^{r-1} y(t)), \quad \text{for a.e. } t \in J := [0, T], \quad 1 < r < 2, \]

\[ y(0) = y_0, \quad y'(0) = y_1, \]

where \( cD^r \) is the Caputo fractional derivative, \( F : J \times E \times E \to \mathcal{P}(E) \) is a given multivalued map satisfying some assumptions that will be specified later, \( y_0, y_1 \in E \) and \( E \) is a Banach space with norm \( \| \cdot \| \).

We devote our attention here, to prove that the initial value problem for the nonlinear fractional differential inclusion (0.1)–(0.2) has at least one solution by applying a fixed point theorem due to Mönch for multivalued operators, combined with the concept of measures of noncompactness. This concept has proved to be a very useful tool for seeking solutions for fractional differential equations in Banach spaces.

2000 Mathematics Subject Classification:
Keywords:
Exact number of positive solutions for quasilinear boundary value problems with $p$–convex nonlinearities

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Abstract

By using the quadrature method, we study the exact number of positive solutions of the following quasilinear boundary value problem:

\[\begin{aligned}
   -(&\varphi_p(u'))' = \lambda f(u) & \quad \text{in } (0,1), \\
   u(0) = u(1) = 0,
\end{aligned}\]

where $p > 1$, $\varphi_p(y) = |y|^{p-2}y$, $(\varphi_p(u'))'$ is the one dimensional $p$–Laplacian and $f$ is a $p$–convex function and $\lambda$ is a positive real parameter.

2000 Mathematics Subject Classification: 34B15, 34C10
Keywords: $p$–Laplacian; positive solutions; quadrature method; $p$–convex function
MacWilliams Identity for Codes Over Forests

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Abstract In this work, the MacWilliams Identity is established for binary linear codes over forests which are a special family of posets. With this approach, this establishment avoids the use of the dual poset. Some examples are also provided.

2000 Mathematics Subject Classification:
Keywords: Poset, P-code, P-weight, Poset metric, dual poset, MacWilliams Identity, weight enumerator, trees, forests.
Convergence of Wavelet Expansions

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ABSTRACT Frame analysis has been a popular subject for over ten years. Frames were introduced by Duffin and Schaeffer in the context of non-harmonic Fourier series. A sequence \( \{x_n\} \) in a Hilbert space \( H \) is a frame if there exist two numbers \( A, B > 0 \) such that for all \( x \in H \) we have

\[
A \| x \|^2 \leq \sum_n | < x, x_n > |^2 \leq B \| x \|^2.
\]

The numbers \( A, B \) are called the frame bounds.

In recent years, frame theory attracted attention of many mathematicians to study theoretical and application aspects. Wavelets and frames in Sobolev spaces are motivated by applications of wavelets in numerical algorithms and image processing, since the solution spaces of many partial differential equations and the classes of images are now modelled by various Sobolev spaces. Quite often, wavelets are constructed in \( L^2(\mathbb{R}^d) \) and their norm equivalence is established for other Sobolev spaces. Expansions in a frame series have properties similar in many respects to those of expansions in orthogonal system, and they are used in both theoretical studies and applications for signal and image analysis, data compression and pattern recognition.

In this paper, we show convergence, pointwise convergence and uniform convergence of the wavelet series

\[
\sum_{l=1}^L \sum_{j \in \mathbb{Z}} \sum_{k \in \mathbb{Z}^d} < f, \psi_{j,k} > \hat{\psi}_{j,k} \quad \text{and} \quad \sum_{l=1}^L \sum_{j \in \mathbb{Z}} \sum_{k \in \mathbb{Z}^d} < f, \psi_{j,k}^* > \psi_{j,k}^* \quad \text{for any} \quad f \in L^2(\mathbb{R}^d)
\]

Further, the convergence investigation is also made using oblique extension principle on Sobolev spaces \( H^s(\mathbb{R}^d) \) and \( H^{-s}(\mathbb{R}^d) \). The Parseval frame is obtained for \( H^s(\mathbb{R}^d) \) and \( H^{-s}(\mathbb{R}^d) \). Here \( H^s(\mathbb{R}^d) \) is a Hilbert space under the inner product

\[
< f, g >_{H^s(\mathbb{R}^d)} = \frac{1}{(2\pi)^d} \int_{\mathbb{R}^d} \hat{f}(\psi) \overline{\hat{g}(\psi)} T (1+ \| \psi \|^2)^s d\psi, \quad f, g \in H^s(\mathbb{R}^d).
\]

Moreover, for each \( g \in H^{-s}(\mathbb{R}^d) \),

\[
< f, g > = \frac{1}{(2\pi)^d} \int_{\mathbb{R}^d} \hat{f}(\psi) \overline{\hat{g}(\psi)} T d\psi, \quad f \in H^s(\mathbb{R}^d)
\]

defines a functional value on \( H^s(\mathbb{R}^d) \).

2000 Mathematics Subject Classification: 42C15 42C40
Keywords: Sobolev spaces, Parseval frame, Oblique extension principle
On Scaling Ill Conditionned Matrices

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Abstract One challenge when we compute eigenvalues of a matrix or solve a linear system $A.x = b$ and so on, is when the matrix $A$ is ill conditioned (i.e., $\kappa_2(A) = \|A\|_2 \cdot \|A^{-1}\|_2$) is very big. Many technics to scale $A$ exist; one of the most popular is the method of W.H. Wilkinson which consist to render the entries of $A$ between $-1$ and $+1$. The idea which is presented here consist to bring the problem of scaling $A$ to a non linear programming problem and then use the tools of optimization to solve it.
On a Combinatorial Laplacian and Homology of Compact Manifolds

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Abstract
This article considers a fixed closed oriented smooth $2m$–manifold ($m$ odd) $M$, and dual cell-decompositions $K$, $K'$ of $M$. It proves that $C_\ast(K; \mathbb{R}) \oplus C_\ast(K'; \mathbb{R})$ is a symplectic chain complex, also presents the corresponding Laplacian and proves the properties.

References


2000 Mathematics Subject Classification: 57N99; 55U15; 18G35
Keywords: Symplectic chain complex, Combinatorial Laplacian, Homology, Compact manifold
SOME FURTHER REMARKS ON IDEAL SUMMABILITY IN 2-NORMED SPACES

PRATULANANDA DAS, SUDIP KUMAR PAL AND SANJOY KR GHOSHAL

Abstract

Very recently ideals were used to study summability of sequences in 2-normed spaces by Gurdal et al ([2], [3], [6]) who investigated the convergence and Cauchy condition (namely I and I*-convergence and Cauchy conditions). In this paper we make some further investigations in this line which provides answers to two important questions regarding I and I*-Cauchy sequences which were left unanswered. We then introduce new concepts of I and I*-divergence in 2-normed spaces and study their certain properties.

References


2000 Mathematics Subject Classification: 40A05, 46A70, 40A99, 46A99

Keywords: 2-normed spaces, I-Cauchy, I*-Cauchy, I-divergence, I*-divergence, condition (AP)
Existence of multiple positive solutions for a nonlocal boundary value problem with sign changing nonlinearities

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Abstract
In this paper, we study the existence of multiple positive solutions of a boundary value problem

\[ \ddot{x}(t) + q(t)f(x(t)) = 0 \quad 0 < t < 1, \]
\[ x(0) = 0, \quad x(1) = \int_{a}^{b} x(s) dg(s), \]

where the nonlinear term \( f \) is allowed to change sign. We impose growth conditions on \( f \) which yield the existence of at least two positive solutions by using a fixed point theorem in double cones.

References


2000 Mathematics Subject Classification:
Keywords: Nonlocal boundary value problems, multiple positive solutions, fixed point theorem in double cones.
The Algerian-Turkish International days on Mathematics

Necessary and sufficient Tauberian conditions for the $A^r$ method of summability

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Abstract

Let $0 < r < 1$. Then the class $A^r = (a^r_{nk})$ of Toeplitz matrices, introduced by Başar in [Fırat Üniv. Fen & Müh. Bil. Dergisi 5(1) (1993), 113–117], is given by

$$a^r_{nk} = \begin{cases} 1 + r^k & 0 \leq k \leq n, \\ 0 & k > n, \end{cases}$$

for all $k, n \in \mathbb{N}$. We should note here that a number of papers were published on the sequence spaces defined by the domain of the $A^r$ matrices in some normed and paranormed sequence spaces by the researchers.

Móricz and Rhoades determined the necessary and sufficient Tauberian conditions for certain weighted mean methods of summability in [Acta. Math. Hungar. 102(4) (2004), 279–285]. In the present paper, we deal with the necessary and sufficient Tauberian conditions for the $A^r$ method by the following theorems:

**Theorem 0.1.** Let $(x_k)$ be a sequence of real numbers which is summable $A^r$ to a finite limit $l$. Then

$$\lim_{n \to \infty} x_n = l$$

if and only if the following two conditions are satisfied:

$$\sup_{\lambda > 1} \liminf_{n \to \infty} \frac{1}{\lambda n - n} \sum_{k=n+1}^{\lambda n} [(1 + r^k)x_k - x_n] \geq 0$$

and

$$\sup_{0 < \lambda < 1} \liminf_{n \to \infty} \frac{1}{n - \lambda n} \sum_{k=\lambda n+1}^{n} [x_n - (1 + r^k)x_k] \geq 0.$$
Theorem 0.2. Let \((x_k) \in \omega\) be summable \(A^r\) to a finite limit. Then \((x_k)\) converges to the same limit if and only if one of the following two conditions is satisfied

\[
\inf_{\lambda > 1} \limsup_{n \to \infty} \left| \frac{1}{\lambda_n - n} \sum_{k=n+1}^{\lambda_n} [(1 + r^k)x_k - x_n] \right| = 0
\]

or

\[
\inf_{0 < \lambda < 1} \limsup_{n \to \infty} \left| \frac{1}{n - \lambda_n} \sum_{k=\lambda_n+1}^{n} [x_n - (1 + r^k)x_k] \right| = 0.
\]
On the new sequence spaces including the spaces of absolutely $p$–summable and bounded sequences

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Abstract

Let $0 \leq r < \infty$ and $\omega$ denotes the space of all complex valued sequences. Define the subsets $\ell^r_p$ and $\ell^r_\infty$ of the space $\omega$ by

$$
\ell^r_p := \left\{ x = (x_k) \in \omega : \sum_{k=1}^{\infty} \frac{|x_k|^p}{k^r} < \infty \right\}, \quad (0 < p < \infty),
$$

$$
\ell^r_\infty := \left\{ x = (x_k) \in \omega : \sup_{k \in \mathbb{N}} \frac{|x_k|}{k^r} < \infty \right\},
$$

where $\mathbb{N}$ denotes the set of positive integers.

The main results of this study are, as follows:

1) The sets $\ell^r_p$ and $\ell^r_\infty$ form a linear space with respect to the coordinate-wise addition and scalar multiplication of sequences.

2) $(\ell^r_p, d^r_p)$ and $(\ell^r_\infty, d^r_\infty)$ are the complete metric spaces, where

$$
d^r_p(x, y) = \left( \sum_{k=1}^{\infty} \frac{|x_k - y_k|^p}{k^r} \right)^{1/p}; \quad x = (x_k), y = (y_k) \in \ell^r_p, \quad (p \geq 1),
$$

$$
d^r_\infty(x, y) = \sup_{k \in \mathbb{N}} \frac{|x_k - y_k|}{k^r}; \quad x = (x_k), y = (y_k) \in \ell^r_\infty.
$$

3) (i) Let $p \geq 1$. Then, $(\ell^r_p, \| \cdot \|_p^r)$ is a Banach space, where

$$
\|x\|_p^r = \left( \sum_{k=1}^{\infty} \frac{|x_k|^p}{k^r} \right)^{1/p}; \quad x = (x_k) \in \ell^r_p.
$$

(ii) Let $0 < p < 1$. Then, $(\ell^r_p, \| \cdot \|_p^r)$ is a complete $p$–normed space, where

$$
\|x\|_p^r = \sum_{k=1}^{\infty} \frac{|x_k|^p}{k^r}; \quad x = (x_k) \in \ell^r_p.
$$

2000 Mathematics Subject Classification: Primary 46A45; Secondary 40C05.

Keywords: Matrix domain of a sequence space, $\alpha$–, $\beta$– and $\gamma$–duals and matrix transformations.
4) \((\ell_\infty^r, \| \cdot \|_\infty^r)\) is a Banach space, where
\[
\|x\|_\infty^r = \sup_{k \in \mathbb{N}} \frac{|x_k|}{k^r}; \quad x = (x_k) \in \ell_\infty^r.
\]

5) The inclusion relations \(\ell_p \subset \ell_p^r\) with \(r > 1\) and \(\ell_\infty \subset \ell_\infty^r\) and \(\ell_\infty \subset \ell_p^r\) strictly hold.

6) The \(\alpha-, \beta-\) and \(\gamma-\) duals of the spaces \(\ell_p^r\) and \(\ell_\infty^r\) are determined.

7) The classes \((\ell_p^r : \ell_\infty), (\ell_p^r : c), (\ell_\infty : \ell_\infty^r)\) and \((\ell_\infty : \ell_p^r)\) of infinite matrices are characterized.
On the solutions of some fractional systems of difference equations

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Abstract

Studying properties of systems of rational difference equations allow to understand the behavior of some real life phenomena in biology, control theory, economics, physics, sociology, etc, which are modelled by such systems. Although systems of difference equations are very simple in form, it is extremely difficult to understand thoroughly the behaviors of their solutions. Recently many papers are devoted to this subject, see for example [1-4] and references cited therein.

In this paper we deal with the solutions of some systems of difference equations on a rational forms. We get the form of the solutions and in order to illustrate our results and to support our theoretical discussions, we consider several interesting numerical examples which represent different types of qualitative behavior of the solutions.

References

[1] B. D. Iričanin, N. Touafek, On a second-order max-type system of difference equations, accepted.

2000 Mathematics Subject Classification: Primary 39A10, Secondary 40A05.
Keywords: Behavior of solutions, periodic solutions, system of difference equations.
A Theoretical and Numerical Performance of Central Trajectory Methods for Semidefinite Programming

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Abstract
In this work, we present a feasible primal algorithm for linear semidefinite programming definite by

$$\begin{cases}
\min \left[ (C, X) = \text{tr}(CX) = \sum_{i,j=1}^{n} C_{ij}X_{ij} \right] \\
A X = b; X \in S^n_+.
\end{cases}$$

Where $b \in \mathbb{R}^m$, $S^n_+$ designates the cone of the positive semidefinite matrix on the linear space of $(n \times n)$ symmetrical matrix $S^n$. $A$ is a linear operator of $S^n$ in $\mathbb{R}^m$ defined by $AX = (\langle A_1, X \rangle, \langle A_2, X \rangle, \ldots, \langle A_m, X \rangle)^t$. The matrices $C$ and $(A_i)_{i=1}^m$ are in $S^n$, $S^n_+$, designate the set of the positive definite matrices of $S^n$. The problem $(SDP)$ based on the direction of Alizadeh, Haeberly and Overton (AHO). To study $(SDP)$, we replace it by the perturbed equivalent problem

$$\begin{cases}
\min \left[ f_\mu(X) = (C, X) + \mu g(X) + n \mu \ln \mu \right] ; \mu > 0 \\
A X = b,
\end{cases}
$$

$$g(X) = \begin{cases}
-\ln (\det X) & \text{if } X \in S^n_+ \\
+\infty & \text{otherwise}.
\end{cases}$$

We establish the existence and uniqueness of the optimal solution of $(SDP)_\mu$ and its convergence to the optimal solution of $(SDP)$. We present some numerical simulations which show the effectiveness.

References


2000 Mathematics Subject Classification: 90C22, 90C51
Keywords: Linear Semidefinite Programming, Primal-Dual Interior Point Methods, Central Trajectory Methods
Generalized nonlinear Schrödinger equation with soliton solutions

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Abstract The propagation of soliton pulses in an homogeneous optical fiber that is described by the nonlinear Schrödinger equation including higher-order nonlinear and dispersion effects is studied. By applying the solitary wave ansatz method, we derive various forms of exact soliton solutions for the considered model. All the physical parameters in the solitary wave solutions are obtained as functions of the dependent model coefficients. Such solutions may be useful to explain the dynamics of wave propagation in nonlinear optical fiber systems with non-Kerr terms. Parametric conditions for the formation of soliton pulses are determined.

2000 Mathematics Subject Classification:
Keywords: Nonlinear Schrödinger equation, soliton solution, Solitary wave ansatz, optical fiber.
Some problems related to the average rank partition lattice a set

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ABSTRACT The problems related to the lattice of partitions of a set are several. Some problems related to the maximum size of an antichain, the minimum size of a cut set and the processing image theory which is one of preoccupation of computer scientists. Our study focus on some parameters related directly to the lattice of partitions set witch was the study objectives of more researchers, K. Engel, R. Canfiled and Sadek Bouroubi. One of this is the Bell numbers representing the numbers of all partitions of set, which is a sum of Sterling numbers of the second space that we show an important property using a random variable. We have also studied another important parameter called the average number of blocks in this lattice which is a quotient of two Bell numbers less then one. We will present some numerical results using Maple software related to this parameter.

References


On the Berezin symbols method,
Abel convergence and related questions

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Abstract We investigate some problems related with Berezin symbols of operators on Hardy and Bergman spaces and their applications in summability theory and in solution of Beurling problem. We also discuss in terms of Berezin symbols the solutions of the Beurling problem.

2000 Mathematics Subject Classification: 47B35.
Keywords: Reproducing kernel, Berezin symbol, Toeplitz operator, Hardy space, Bergman space point.
This work is supported by the Scientific and Technological Research Council of Turkey (TÜBİTAK) with Project 109T590. Also, this work is supported by Süleyman Demirel University with Project 3115-YL-12.
Composited dual summability methods of the new sort

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Abstract

Following Altay and Başar [Some paranormed Riesz sequence spaces of non-absolute type, Southeast Asian Bull. Math. 30(5)(2006), 591–608], we define the duality relation between a pair of infinite matrices. Our focus is the dual summability methods of the new sort. Let us suppose that the infinite matrices

\[ A = (a_{nk}) \text{ and } B = (b_{nk}) \]

transform the sequences \( x = (x_k) \) and \( y = (y_k) \) which are connected with the relation \( y = R^t x \) to the sequences \( u = (u_n) \) and \( v = (v_n) \), respectively, i.e.,

\[
\begin{align*}
  u_n &= (Ax)_n = \sum_{k} a_{nk} x_k \quad \text{for each } n \in \mathbb{N}, \\
  v_n &= (By)_n = \sum_{k} b_{nk} y_k \quad \text{for each } n \in \mathbb{N}.
\end{align*}
\]

It is clear here that the method \( B \) is applied to the \( R^t\)-transform of the sequence \( x = (x_k) \) while the method \( A \) is directly applied to the terms of the sequence \( x = (x_k) \). We shall say in this situation that the methods \( A \) and \( B \) in (0.1), (0.2) are the dual of the new sort if \( u_n \) becomes \( v_n \) (or \( v_n \) becomes \( u_n \)) under the application of the formal summation by parts. This statement is equivalent to the relation

\[
a_{nk} = \sum_{j=k}^{\infty} \frac{t_k}{t_j} b_{nj} \quad \text{or} \quad b_{nk} = \Delta \left( \frac{a_{nk}}{t_k} \right) T_k \quad \text{for all } k, n \in \mathbb{N}.
\]

Suppose that \( C = (c_{nk}) \) is a strongly regular triangle matrix. Define the matrices \( D = (d_{nk}) \) and \( E = (e_{nk}) \) by the usual matrix product as \( D = CA \) and \( E = CB \) which are called as composited matrices while the matrices \( A \) and \( B \) are called as original matrices.

Our main results are:

**Theorem 0.1.** The composited matrices are dual of the new sort if and only if the original matrices are dual of the new sort.

**Theorem 0.2.** Every \( A \) limitable sequence is limitable \( D \). However, the converse of this fact does not hold, in general.

**Theorem 0.3.** Every \( B \) limitable sequence is limitable \( E \). However, the converse of this fact does not hold, in general.

**Theorem 0.4.** The duality relation of the new sort isn’t preserved under the usual inverse operation.

2000 Mathematics Subject Classification: 40C05.
Keywords: Dual summability methods, generalized dual summability methods, Riesz means, almost convergence.
A Note on the Modified Crank-Nicholson Difference Schemes for Ultra Parabolic Equations with the Neumann Condition

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ABSTRACT In this paper, we focus on studying the stability of second order difference scheme for the approximate solution of the initial boundary value problem for ultra parabolic equations

\[
\left\{ \begin{array}{l}
\frac{\partial u(t,s)}{\partial t} + \frac{\partial u(t,s)}{\partial s} + Au(t, s) = f(t, s), \ 0 < t, \ s < T, \\
u(0,s) = \psi(s), \ 0 \leq s \leq T, \\
u(t,0) = \varphi(t), \ 0 \leq t \leq T
\end{array} \right.
\]

in an arbitrary Banach space \( E \) with a strongly positive operator \( A \). For approximately solving this problem, \( r \)-modified Crank-Nicolson difference schemes of the second-order of accuracy are presented. The stability estimates for the solution of these difference schemes is established. In applications, the stability in maximum norm of difference schemes for multidimensional ultra parabolic equations with Neumann condition is established. Applying the difference schemes, the numerical methods are proposed for solving one dimensional ultra parabolic equations.

2000 Mathematics Subject Classification:

Keywords:
Existence and Solutions Set for $\phi$-Laplacian Impulsive Differential Equations

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Abstract
In this paper, we present a couple of results on existence and the topological structure of the solutions set for initial value problems for the following first-order impulsive differential equation,

\begin{align*}
\left\{
\begin{array}{ll}
(\phi(y'))' &= f(t, y(t)), \text{ a.e. } t \in [0, b], \\
y(t_k^+) - y(t_k^-) &= I_k(y(t_k^-)), \quad k = 1, \ldots, m, \\
y'(t_k^+) - y'(t_k^-) &= T_k(y'(t_k^-)), \quad k = 1, \ldots, m, \\
y(0) &= A, \\
y'(0) &= B,
\end{array}
\right.
\end{align*}

where $f : [0, b] \times \mathbb{R} \to \mathbb{R}$ is a given function, $0 = t_0 < t_1 < \ldots < t_m < t_{m+1} = b$, $m \in \mathbb{N}$. The functions $I_k, T_k \in C(\mathbb{R}, \mathbb{R})$ characterize the jump in the solutions at impulse points $t_k$, $k = 1, \ldots, m$, $\phi : \mathbb{R} \to \mathbb{R}$ is a suitable monotone homeomorphism, and $A, B \in \mathbb{R}$. For this setting, the proofs of the two results presented, while involving some cases, are quite straight forward.

For the final result of the paper, the hypotheses are modified so that the nonlinearity $f$ depends on $y'$. For this latter case the impulsive conditions and initial conditions remain the same. Because of the dependency on $y'$, the proof of the result presented is somewhat more involved. Of course, the second case also covers the first case when $f$ is independent of $y'$.

2000 Mathematics Subject Classification: 34A37, 34K45.
Keywords: $\phi$-Laplacian, fixed point theorems, impulsive solution set, compactness.
The Navier-Stokes problem in velocity-pressure formulation: convergence and Optimal Control

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Abstract
In this paper, we study the nonlinear Navier-Stokes problem in velocity-pressure formulation. We construct a sequence of a Newton-linearized problems and we show that the sequence of weak solutions converges towards the solution of the nonlinear one in a quadratic way. A control problem on the homogeneous problem is considered.

References

2000 Mathematics Subject Classification: 35J20, 49J96.
Keywords: Navier-Stokes equations , Newton’s algorithm, Approximation Convergence, Control.
The Algerian-Turkish International days on Mathematics

Space of continuous and bounded functions over the field of non-Newtonian Complex numbers

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Abstract

As an alternative to the classical calculus, Grossman and Katz introduced the non-Newtonian calculus in [1] consisting of the branches of geometric, anageometric and bigeometric calculus. Bashirov et al. [2] have recently emphasized on the non-Newtonian calculus and gave the results with applications corresponding to the well-known properties of derivative and integral in the classical calculus. Recently, Uzer [3] has extended the multiplicative calculus to the complex valued functions and interested in the statements of some fundamental theorems and concepts of multiplicative complex calculus, and demonstrated some analogies between the multiplicative complex calculus and classical calculus by theoretical and numerical examples.

In this study, using the field $\mathcal{C}(G)$ of non-Newtonian complex numbers, we respectively define the sets $B(A)$ non-Newtonian bounded functions space and $C[a,b]$ non-Newtonian continuous functions space. Later we investigate some properties of these function spaces and give the obtained results in theorems.

References


2000 Mathematics Subject Classification: Primary 32C15, 32M25; Secondary 08A05, 30H99.

Keywords: Algebraic structures with respect to non-Newtonian calculus, non-Newtonian bounded functions space, non-Newtonian continuous functions space.
Optimizing a Nonlinear Function over the Integer Efficient Set

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ABSTRACT The problem of optimizing a real valued function over the efficient set of a multiple objective linear program has some applications in multiple objective decisions making. This problem of optimizing over the efficient set can be classified as a hard global optimization problem. The main difficulty of this problem arises from the fact that its feasible domain, in general, is non-convex and not given explicitly as a constrained set of an ordinary mathematical programming problem. In this work an algorithm is developed that optimizes an arbitrary nonlinear function over an integer efficient set of a vector affine fractional program without explicitly having to enumerate all the efficient solutions. The proposed method is based on a cutting plane technique and on a simple selection technique that improves the objective value at each iteration. A numerical illustration is included to explain the proposed method.

2000 Mathematics Subject Classification: 90C10, 90C20, 90C26, 90C29, 90C32
Keywords: Integer programming; Optimization over the efficient set; Multiple objective linear fractional programming; Level sets; Global optimization
Multiplicative method for multi criteria analysis

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ABSTRACT In this paper one new method for multi criteria analysis based on multiplicative evaluations of alternatives by criteria is given.

References


Piecewise Decomposition method for solving fractional differential equation

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Abstract: In this work, a modification of the telescoping decomposition method applied to nonlinear differential equations is presented. This method yields a series solution with accelerated convergence. Some illustrative examples are given with a comparison with the Adomian method.

References


2000 Mathematics Subject Classification:
Keywords:
Galerkin Method Applied for a Boussinesq Equation with Nonlocal Condition

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Abstract This paper deals with the solvability and uniqueness of a higher dimension mixed nonlocal problem for a Boussinesq equation. The uniqueness and existence of a generalized solution is proved with the help of an a priori estimate and the galerkin approximation method, respectively.

References


Domain of the double sequential band matrix in the classical sequence spaces

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Abstract Let \( \overline{r} = (r_n)_{n=0}^{\infty} \) and \( \overline{s} = (s_n)_{n=0}^{\infty} \) be given convergent sequences of positive real numbers. Define the sequential generalized difference matrix \( B(\overline{r}, \overline{s}) = \{b_{nk}(\overline{r}, \overline{s})\} \) by

\[
  b_{nk}(\overline{r}, \overline{s}) := \begin{cases} 
  r_n, & (k = n), \\
  s_n, & (k = n - 1), \\
  0, & (0 \leq k < n - 1 \text{ or } k > n),
  \end{cases}
\]

for all \( k, n \in \mathbb{N} \), the set of natural numbers. Let \( \lambda \) denotes the any one of the classical spaces \( \ell_\infty, c, c_0 \) and \( \ell_p \) of bounded, convergent, null and absolutely \( p \)-summable sequences, respectively, and \( \tilde{\lambda} \) also be the domain of the double sequential band matrix \( B(\overline{r}, \overline{s}) \) in the sequence space \( \lambda \), where \( 1 \leq p < \infty \).

The present paper is devoted for studying on the sequence space \( \tilde{\lambda} \). Furthermore, the \( \beta \)– and \( \gamma \)–duals of the space \( \tilde{\lambda} \) are determined, and the Schauder bases for the spaces \( \tilde{c}, \tilde{c}_0 \) and \( \tilde{\ell}_p \) are given, and some topological properties of the spaces \( \tilde{c}_0, \tilde{\ell}_1 \) and \( \tilde{\ell}_p \) are examined. Finally, the classes \( (\tilde{\lambda}_1 : \lambda_2) \) and \( (\tilde{\lambda}_1 : \tilde{\lambda}_2) \) of infinite matrices are characterized, where \( \lambda_1 \in \{\ell_\infty, c, c_0, \ell_p, \ell_1\} \) and \( \lambda_2 \in \{\ell_\infty, c, c_0, \ell_1\} \).

2000 Mathematics Subject Classification:

Keywords: Matrix domain of a sequence space, \( \beta \)– and \( \gamma \)–duals, Schauder basis and matrix transformations.
Rothe-Galerkin’s method for a doubly nonlinear integrodifferential equations

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Abstract

In this paper we propose a new approximation scheme for solving doubly nonlinear initial boundary value problem with Volterra operator. Existence, uniqueness of solution as well as some regularity result are obtained via Rothe-Galerkin method.

References


2000 Mathematics Subject Classification: 34K20, 35k55, 35A35, 65M20
Keywords: Rothe’s method, A priori estimate, Integrodifferential equation, Weak solution


Production et Déploiement de logiciels distribuables pour Résolution de Problèmes Min-Max en Controle Optimal

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ABSTRACT Essentiellement les Méthodes du Support et Adaptée Seront Implementées, leurs Déploiements à Travers un Logiciel type Visual Basic Executable nous permettera des Simulations au Controle Optimal type discret et continu. Ces Méthodes trouvent aussi leurs places lorsqu il sagit de résoudre des problèmes quadratiques ou des problèmes non linéaires.

1 Introduction
Dans ce travail on va présenter un logiciel pour la résolution de programmes linéaires et par la suite aux quadratiques avec des méthodes.
-Méthode adaptée-Méthode du support et autres.

Avec contraintes bornées, simples et contraintes généralisées. Cela suppose l’implémentation des Méthodes de résolutions,avec une études comparative. De plus on s’intéressera aux problèmes de Controle Optimal
Les Problèmes de départ : 1) Premier Problème \( f(x) = \min_k (c^t_k x + \alpha_k) \rightarrow \max_x \), \( d_1 \leq x \leq d_2 \)
2) Deuxième Problème \( f(x) = \min_k (c^t_k x + \alpha_k) \rightarrow \max_x \). \( Ax = b; d_1 \leq x \leq d_2 \)

La résolution de ces deux types de Problèmes,avec la Méthode Adaptée ou la Méthode du Support

vont nous permettre de résoudre pratiquement tous les problèmes Quadratiques et tous les problèmes non linéaires moyennant des Algorithmes de corrections établis pour cet effet.

De plus Sont Importants pour la suite,seront utilisés pour la Résolution des Problèmes Min – Max en Controle Optimal du Type par exemple:-le système dynamique:- \( \frac{dx(t)}{dt} = Ax(t) + bu(t) \), \( x(0) = x_0 \), \( T = [0; T_1] \) Intervalle de Temps et par la suite les problèmes Quadratiques.

Nous allons faire cela pour 02 cas -CAS DISCRET (temps discret).

-CAS CONTINU (temps continu).

2000 Mathematics Subject Classification:
Keywords: Min-MAX Méthodes Controle Optimal Discret continu Support Adaptée Déploiement Production Logiciel site http://damoum.voila.net
C ’est à dire que en tout, nous allons résoudre et implementer (05) cinq problèmes. Pour les Détails de la théorie de Résolution ainsi que les Simulations Numeriques Issues de Notre Réalisation Informatique, on peut consulter le Site web http://damoum.voila.net

**Présentation du Plan de Travail:**

Résolution et Implementation de la Méthode adaptée et Support - Simulations et comparaison avec Le Simplexe - Résolution et Implementation de la Méthode adaptée et Support Min-Max avec Contraintes bornées, Simples et Contraintes généralisées - Idem pour: le Problème de Contrôle Optimal Min-Max avec la Méthode adaptée et Support Cas Discret - Résolution et Implementation du Problème de Contrôle Optimal Min-Max avec la Méthode adaptée et Support Cas Continu - Production de Logiciels Perspectives

**Conclusion:** Pour la suite: Méthode du support pour Problèmes Quadratiques convexes et non convexes - Méthode duale du support pour Problèmes Quadratiques convexes et non convexes - Résolution de problèmes non linéaires convexes et non convexes vers une Globalisation. - Méthode du support pour Problèmes Quadratiques en Contrôle Optimal - Méthode duale du support pour Problèmes Quadratiques en Contrôle Optimal.

**References**

MCD-method of minimal suitable values

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ABSTRACT This paper deals with one of the classical multi criteria analysis problems: the alternatives $a_1, a_2, \ldots, a_m$ to be ranked by criteria $c_1, c_2, \ldots, c_n$. Starting with given set of alternatives, we make one finite partially ordered set of new weaker alternatives depended on given ones. In this set we include a set of minimal suitable points $\{P_1, P_2, \ldots, P_k\}$, and by weighted distances between alternatives $a_i$ and points $P_s$, we make the total order of alternatives by new method of multi criteria analysis.

References


Some sequence and function spaces by using the partial metric

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Abstract
The concept of partial metric was introduced by Matthews in [Partial metric topology, in: S. Andima, et al. (Eds.), Proc. 8th Summer Conference on Topology and Its Applications, in: Ann. New York Acad. Sci. 272 (1994), 183–197]. By \( \ell_{\infty} \), \( c \) and \( \ell_{q} \), we denote the classical sequence spaces of all bounded, convergent and absolutely \( q \)-summable sequences, respectively, where \( 1 \leq q < \infty \). In this study, we deal with the partial metric sequence spaces \( (\ell_{\infty}(p), \ell_{\infty}) \), \( (c(p), \ell_{\infty}) \) and \( (\ell_{q}(p), \ell_{q}) \), where

\[
p_{\infty}(x, y) := \sup_{k \in \mathbb{N}} \{p(x_k, y_k)\}; \quad \{x = (x_k), y = (y_k) \in \ell_{\infty}(p) \text{ or } x = (x_k), y = (y_k) \in c(p)\},
\]

\[
p_{q}(x, y) := \left[\sum_{k=1}^{\infty} p(x_k, y_k)^{q}\right]^{1/q}; \quad \{x = (x_k), y = (y_k) \in \ell_{q}(p)\},
\]

where \( \mathbb{N} \) denotes the set of positive integers. We show that the partial metric classical sequence spaces \( (\ell_{\infty}(p), \ell_{\infty}) \), \( (c(p), \ell_{\infty}) \) and \( (\ell_{q}(p), \ell_{q}) \) are complete. Additionally, we also examine the partial metric spaces \( (C[a, b], P_{\infty}) \) and \( (B[a, b], P_{\infty}) \) of non-negative real valued continuous and bounded functions defined on the closed interval \([a, b]\), where

\[
P_{\infty}(f, g) := \sup_{t \in [a, b]} \{p(f(t), g(t))\}; \quad \{f, g \in C[a, b] \text{ or } f, g \in B[a, b]\}.
\]

We also prove that the partial metric function spaces \( (C[a, b], P_{\infty}) \) and \( (B[a, b], P_{\infty}) \) are complete and give some examples of partial metric spaces.

2000 Mathematics Subject Classification: Primary 46A45; Secondary 40C05.
Keywords: Sequence space, space of bounded functions, space of continuous functions, partial metric.
Characterizations of Regular Abel-Grassmann’s Groupoids

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ABSTRACT In this paper, we introduce a new class of a non-associative algebraic structure namely regular AG-groupoid and characterized it using its ideals.

1 Introduction

The idea of generalization of a commutative semigroup was first introduced by Kazim and Naseeruddin in 1972 (see [2]). They named it as a left almost semigroup (LA-semigroup). It is also called an Abel-Grassmann’s groupoid (AG-groupoid) [11].

An AG-groupoid is a groupoid $S$ whose elements satisfy the left invertive law $(ab)c = (cb)a$, for all $a, b, c \in S$. In an AG-groupoid, the medial law [2] $(ab)(cd) = (ac)(bd)$ holds for all $a, b, c, d \in S$. An AG-groupoid may or may not contains a left identity. If an AG-groupoid contains a left identity, then it is unique [5]. In an AG-groupoid $S$ with left identity, the paramedial law $(ab)(cd) = (db)(ca)$ holds for all $a, b, c, d \in S$. If an AG-groupoid contains a left identity, then it satisfies the following law

$$a(bc) = b(ac), \text{ for all } a, b, c \in S. \quad (1)$$

An AG-groupoid is a non-associative and non-commutative algebraic structure mid way between a groupoid and a commutative semigroup. This structure is closely related with a commutative semigroup, because if an AG-groupoid contains a right identity, then it becomes a commutative semigroup [5]. The connection of a commutative inverse semigroup with an AG-groupoid has been given in [6] as: a commutative inverse semigroup $(S, \cdot)$ becomes an AG-groupoid $(S, \cdot)$ under $a \cdot b = b \cdot a^{-1}$, for all $a, b \in S$. An AG-groupoid $(S, \cdot)$ with left identity becomes a semigroup $(S, \circ)$, where “$\circ$” is defined as: for all $x, y \in S$, there exists $a \in S$ such that $x \circ y = (xa)y$ [12].

2000 Mathematics Subject Classification: 20M10, 20N99
Keywords: AG-groupoid, regular AG-groupoid, ideal, bi-ideal and quasi-ideal.
An AG-groupoid $S$ is said to be locally associative if $(aa) = a(aa)$ for all $a \in S$. Mushtaq and Iqbal [7] proved that in a locally associative AG-groupoid $S$, $(ab)^n = a^nb^n$ for all $a, b \in S$. Moreover it has been proved in [8] that if $S$ is a locally associative AG*-groupoid then $a^nb^m = b^ma^n$ for all $a, b \in S$ and $m, n \geq 2$. For basic notions and results one can see [3,12].

An AG-groupoid has many characteristics similar to that of a commutative semigroup. For instance $a^2b^2 = b^2a^2$, for all $a; b$ holds in a commutative semigroup, while this equation also holds for an AG-groupoid with left identity $e$, moreover $ab = (ba)e$ for any subset $\{a, b\}$ of an AG-groupoid. Now our aim is to discover some new investigations for an regular AG-groupoid using the properties of its ideals.

2 Preliminary

Let $S$ be an AG-groupoid. By an AG-subgroupoid of $S$, we means a non-empty subset $A$ of $S$ such that $A^2 \subseteq A$. A non-empty subset $I$ of an AG-groupoid $S$ is called a left (right) ideal of $S$ if $SI \subseteq I (IS \subseteq I)$ and it is called a two-sided ideal if it is both left and a right ideal of $S$. A non-empty subset $B$ of $S$ is called a generalized bi-ideal of $S$ if $(BS)B \subseteq B$ and an AG-subgroupoid $B$ of $S$ is called a bi-ideal of $S$ if $(BS)B \subseteq B$. A subset $Q$ of $S$ is called a quasi-ideal if $QS \cap SQ \subset Q$. An ideal $I$ of $S$ is called an idempotent if $I^2 = I$.

**Definition 2.1.** An element $a$ of an AG-groupoid $S$ is called regular if there exist $x \in S$ such that $a = (ax)a$ and $S$ is called regular, if every element of $S$ is regular.

References


[9] Q. Mushtaq and Madad Khan, Topological structures on Abel-Grassmann’s groupoids, Accepted in Semigroup Forum.


Coset diagram for the action of Picard Group on $\mathbb{Q}(i, \sqrt{3})$

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Abstract The Picard group $\Gamma$ is $PSL(2, \mathbb{Z}[i])$. We have defined coset diagram for the Picard group. It has been observed that some elements of $\mathbb{Q}(i, \sqrt{3})$ of the form $\frac{a+b\sqrt{3}}{c}$ and their conjugates $\frac{a-b\sqrt{3}}{c}$ over $\mathbb{Q}(i)$ have different signs in the coset diagram for the action of $\Gamma$ on the biquadratic field $\mathbb{Q}(i, \sqrt{3})$, these are called ambiguous numbers. We have noticed that ambiguous numbers in the coset diagram for the action of $\Gamma$ on $\mathbb{Q}(i, \sqrt{3})$ form a unique pattern. It has been shown that there are finite number of ambiguous numbers in an orbit $\Gamma\alpha$, where $\alpha$ is ambiguous, and they form a closed path and it is the only closed path in the orbit $\Gamma\alpha$. We have devised a procedure to obtain ambiguous numbers of the form $\frac{a+k\sqrt{3}}{c}$, where $k$ is a positive integer.

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Hyper chaos in a fractional Chua system and its chaos-control and synchronization

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ABSTRACT The chaos control and synchronization of fractional-order chaotic systems has recently attracted increasing attention due to its potential applications in secure communication and control processing. A hyperchaotic phenomenon is characterized by the existence of at least two positive Lyapunov exponents which can increase the randomness and higher unpredictability of the corresponding system and this makes message masking more effective by giving rise to more complex time series. So the hyperchaos may be more useful in secure communication and encryption etc. In this paper, a fractional hyperchaotic four-dimensional Chua’s circuit is introduced, where the capacitor and the inductor of the original circuit are replaced by a fractional electric element called fractance. The resulting circuit is described by four-dimensional fractional system. Based on the Routh-Hurwitz conditions for the fractional-order systems, we obtain the sufficient conditions for realizing the control of the fractional circuit and the synchronization between two hyperchaotic systems with different orders; especially between the fractional system and its integer order counterpart. Numerical simulations show the effectiveness of the theoretical analysis.
Euler Savary’s Formula on Galilean Plane

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Abstract In this work, a canonical relative system for one-parameter Galilean planar motion was defined. In addition, Euler-Savary formula, which gives the relationship between the curvature of trajectory curves, was obtained with the help of this relative system.