

On a fourth order pseudoparabolic equation

A. Maher, Ye.A. Utkkina

The aim of the present paper is devoted to investigation of the Goursat problem of a fourth order pseudoparabolic equation, with the help of Riemann function.

Certain modular identities and evaluation of Ramanujan's theta functions

Remy Y. Denis, S.N. Singh, S.P. Singh

In this paper an attempt has been made to evaluate certain theta functions with the help of certain modular equations established herein. We shall also attempt to evaluate the cubic continued fraction of Ramanujan in special case.

Isoclinism in probability of commuting n -tuples

A. Erfanian, F. Russo

Strong restrictions on the structure of a group can be given, once that it is known the probability that a randomly chosen pair of its elements commutes. Introducing the notion of mutually commuting n -tuples for compact groups (not necessary finite), the present paper generalizes the probability that a randomly chosen pair of its elements commutes. We shall state some results concerning this new concept of probability which has been recently treated in [3]. Furthermore a relation has been found between the notion of mutually commuting n -tuples and that of isoclinism between two arbitrary groups.

On the Goursat problem for a sixth order equation and a spatial equation

A. Maher, Ye.A. Utkkina

In this paper, we investigate the Goursat problem for a sixth order equation and a spatial equation, with the help of a Riemann function. Some results and two theorems are given concerning the existence and uniqueness for solutions of the suggested problems.

The existence of positive solutions for one special class of three-point boundary value problem differential equations

Robabeh Sahandi Torogh

In this paper, by using the fixed point theorem of cone, we prove the existence of positive solutions for the three-point boundary value problem of second order ordinary differential equations

$$\begin{aligned} u''(t) + a(t)u'(t) + b(t)u(t) + f(t, u, u') &= 0 \\ u(0) = 0, \quad u(1) - \alpha u(\eta) &= b \end{aligned}$$

where $0 < \eta < 1$, $0 < \alpha\eta < 1$ and $b \in [0, \infty)$ are given.

$a(t) \in C[0, 1]$, $b(t) \in C([0, 1], (-\infty, 0])$ and $f \in C([0, 1] \times [0, \infty) \times [0, \infty); [0, \infty))$. Under suitable conditions of $f(t, u, u')$, the above boundary value problem has at least one positive solution.

Covering pair of nilpotent groups

Mohammad Reza R. Moghaddam, Ali Reza Salemkar

In 1998, Ellis introduced the concept of covering pair of a pair of groups (G, N) , which is a generalization of the usual covering group, and showed that each pair of finite groups admits at least one covering pair. Now if G is a finite nilpotent group with a normal subgroup N and all Sylow subgroups S_1, \dots, S_k , then the main purpose of the present paper is to establish a connection between the covering pair of (G, N) and the covering pairs of $(S_i, S_i \cap N)$, for $i = 1, \dots, k$.

Conditions for a real Banach *-algebra to be hermitian and skew-hermitian

A. Taghavi, R. Parvinianzadeh

In this paper we study the conditions that under these a real Banach *-Algebra to be hermitian and skew-hermitian. We prove that if A is a real Banach *-algebra and for all $a \in N(A_c)$, $r(a)^2 = r(a^*a)$, then A is hermitian and skew-hermitian, and also if A is hermitian and for all $a \in U(A)$, $r(u) = 1$, then A is skew-hermitian, where A_c is the complexification of A , $N(A_c)$ is set of all normal elements of A_c and $U(A)$ is set of all unitary elements of A .

S-absorbing set and (P)-decomposition in hyper K-algebras

M.A. Nasr-Azadani, M.M. Zahedi

In this manuscript first we give the notion of S -absorbing set and its application to recognize some properties of hyper K -algebras. Then we introduce the notion of H , \bar{C} and C -absorbing hyper K -ideals and obtain some related results. Also we show that any hyper s -reflexive hyper K -ideals is H -absorbing, but the converse is not true in general. Finally we use the notions of (P) -decomposition and (P) -closed union decomposition ((P) - CUD) for hyper K -algebras and give some theorems related to all above notions. Finally we show that if a hyper K -algebra H has a (hyper K -ideal)- CUD , then any ideal of each decomposition's components is a c -hyper K -ideal of H .

Deductive systems and annihilators of pseudo BCK-algebras

Radomír Halaš, Jan Kühn

Pseudo BCK-algebras are a non-commutative generalization of known BCK-algebras. In the paper, we define deductive systems and annihilators of pseudo BCK-algebras. We prove that deductive systems form an algebraic distributive lattice in which the (relative) pseudocomplements are just the (relative) annihilators. We also characterize congruence kernels as certain deductive systems.

Laws of large numbers for random linear programs with associated sequences

S. Jomhoori, V. Fakoore, H. Azarnoosh

The computational solution of large scale linear programming problems contains various difficulties. One of the most difficult things is to ensure numerical stability. We have another difficulty of different nature, namely the original data we are using also contains errors. In this paper we shall show that the effect of the random errors in the original data has a diminishing tendency for the optimal value as the number of constraints and the number of variables increase. We obtain laws of large numbers under random linear programs. We extend Prekopa's results (1972) to the case of associated random variables.

On binomial and trinomial operator representations of certain polynomials

Mumtaz Ahmad Khan, Ajay Kumar Shukla

A new technique is evolved to give operator representation of certain polynomials.

A hybrid method based on the Taylor series and finite element for solving one dimensional Burgers' equation

M. Bakhoday Paskyabi, R. Nabati, S. Mohammad Hosseini

In this paper, in conjunction with a linear base Galerkin finite element for spatial variable and in order to contribute more analytical property of the solution into the numerical method, the Taylor series method of a suitable order for the time variable is employed. The stability and treatment of nonlinearity is also discussed. To evaluate the efficiency of this approach the Burgers' equation is considered with four different initial conditions, and several values of viscosities and times. The numerical results show that the proposed method is efficient and has, in general, a better accuracy in comparison with some published works.

Non-fragile robust H_∞ control of uncertain neutral system with time-varying delays

Baowei Wu, Wenzhi Li, Yunxu Tong, Xian Li

The non-fragile robust H_∞ control problem for a class of uncertain neutral systems with time-varying delays is considered. By choosing a Lyapunov-Krasovskii functional, some delay-dependent and delay-independent criteria are proposed to guarantee stabilization and disturbance attenuation of the systems. Linear matrix inequality (LMI) approach is used to solve the robust H_∞ control problems. A procedure for the controller design is provided. Computer software Matlab can be applied to obtain all the proposed results. Finally, two numerical examples are illustrated to show the use of our obtained results.

Measurement of accuracy of rational cubic function

Maria Hussain, Malik Zawwar Hussain, Germain E. Randriambeloso

The error of rational interpolating function [10] is derived when the function being interpolated is C^3 in an interpolating interval. Convergence is established and it is observed that rational interpolating function is not symmetric about the parameters of rational interpolation. Jump discontinuity of second derivatives of interpolating function at the knots is also measured.

Algebraic hyperstructures obtained from algebraic structures with fuzzy binary relations

Yuming Feng

One associates a partial hypergroupoid $(H, *_R)$ to every groupoid (H, \cdot) equipped with a fuzzy binary relation R . Conditions are found for $(H, *_R)$ to be a H_v -semigroup, semihypergroup or H_v -group. Hyperstructures (H, \wedge_R, \vee) , (H, \vee_R, \wedge) , (H, \wedge_R, \vee_R) are also investigated when (H, \wedge, \vee) is a lattice. Lastly, a commutative hypergroup obtained from a nonempty set with a fuzzy binary relation is considered.

Some properties of the line graph associated to a graph G

Cristina Flaut, Florian Ghionea

The Hamiltonian and Eulerian cycles are applied to many problems: as those of transport and of data transmission network. While for case of Eulerian cycles there are the necessary and sufficient conditions, in the Hamiltonian case we do not have such results. In the next, we use the properties of the associated line graph to a graph G for finding the necessary and sufficient conditions to get a Hamiltonian cycle in G . If a graph G is an Eulerian graph, then its associated line graph $L(G)$ is Hamiltonian. In the next, we try to study the converse problem, that is: to give necessary and sufficient conditions for finding a Hamiltonian cycle in the graph G helping by using of the Eulerian cycles in its associated line graph $L(G)$.

On homological classification of monoids by condition (P_E) of right acts

Akbar Golchin, Hossein Mohammadzadeh

In 1998 we introduced Condition (P_E) and showed that every act over a left inverse monoid S (i.e., S is regular and $fef = fe$ for all $e, f \in E(S)$) satisfies Condition (P_E) . Also we showed that Condition (P_E) implies weak flatness, but the converse is not true. In this paper, we continue the investigation of Condition (P_E) and give a classification of monoids by this Condition of (finitely generated, cyclic, monocyclic, Rees factor) right acts. Also we give a classification of monoids for which Condition (P_E) of their right (Rees factor) acts imply some other properties and vice versa. Finally, we give some equivalent conditions over monoids for which torsion freeness of their acts imply Condition (P_E) and also a new classification of that of Laan (1999), of monoids for which torsion freeness of their right Rees factor acts imply Condition (WP) .

Generating relations of Hermite matrix polynomials by Lie algebraic method

Mohannad J.S. Shahwan, M.A. Pathan

In the present paper, Weisner's group theoretic method is utilized to obtain new generating relations for Hermite matrix polynomials (HMP) $H_n(x, A)$. The Principle interest in our results lies in the fact that a number of special cases would inevitably yield to many new and known results of the theory of special functions, namely as Hermite polynomials $H_n(x)$.

Localisation des résonances pour une barrière de potentiel dégénérée en présence d'une perturbation bornée

Hamadi Baklouti, Maher Mnif

We study resonances of the semi-classical Schrödinger operator $\tilde{H} = -h^2\Delta + V + h^2B(x, hD)$ on $L^2(\mathbb{R}^N)$. We consider the case where the potential V have an absolute degenerate maximum and B is a bounded operator. Then

we prove that \tilde{H} has resonances with energies $E = V_0 + e^{-i\frac{\pi}{\sigma+1}} h^{\frac{2\sigma}{\sigma+1}} k_j + \mathcal{O}(h^{\frac{2\sigma+1}{\sigma+1}})$, where k_j is in the spectrum of some quartic oscillator.

Attractors for hyperdynamical systems

M.R. Molaei, A. Iloonkashkooly

In this paper the notion of attractor for hyperdynamical systems by the use of time hypergroup and semi-bornology is studied. The concept of conjugacy is considered and it is proved that an attractor for a hyperdynamical system is invariant up to a conjugate relation.

Finite groups with $2p^m$ elements of maximal order

Jiang Youyi, Qian Guohua

It is proved that for any odd prime p and any positive integer m , finite groups with $2p^m$ elements of maximal order are solvable.

Common fixed point of coincidentally commuting mappings in non-archimedean Menger spaces

Bijendra Singh, Arihant Jain, Pallavi Agarwal

The object of this paper is to prove a common fixed point theorem for a quasicontraction pair of coincidentally commuting mappings on non-archimedean Menger space. Our result extends and generalizes some known results in metric, probabilistic metric space and nonarchimedean Menger space.

Almost a-statistical convergence in normed linear space

T.A. Chishti, S. Pirzada

The idea of statistical convergence was first introduced by Fast [2] and in recent years this idea has been developed by various authors. Kolk [6] and Savas [13] defined and studied A-statistical convergence and almost A-statistical convergence respectively. In this paper, we define almost A-statistical convergence in a normed space and investigate its relations with strong almost A-summability defined for a sequence of moduli.

Abundant semigroups having a quasi-ideal adequate transversal

Wang Shoufeng

We give a new structure theorem for an abundant semigroup having a quasi-ideal adequate transversal. Our result generalizes a result given by T. Saito. in 1985.

Some sharp weighted estimates for multilinear integral operators

Chen Qiong, Liu Lanzhe

In this paper, the sharp estimates for some multilinear operators related to the Littlewood-Paley operator and Marcinkiewicz operator are obtained. As the corollaries, we get the weighted $L^p(p > 1)$ norm inequalities and $L \log L$ type estimate for the multilinear operators.

Some properties of shift operators on Banach spaces of formal power series

K. Hedayatian

For a certain backward shift operator B on a Banach space of formal power series, we give necessary and sufficient conditions so that the operators $B - \lambda I$, $\lambda \in \mathbb{C}$, are surjective. Also it is shown that the forward shift on a large class of Banach spaces of formal power series is reflexive. This improves a result that is recently obtained.

Compactness and weak compactness of Gelfand transform in commutative Banach algebras

F. Behrouzi, H. Mahyar

In this paper we investigate commutative Banach algebras whose Gelfand transforms are compact (weakly compact) homomorphisms and we obtain some properties of these algebras. It is shown that the maximal ideal spaces of these algebras are σ -compact, indeed, in amenable commutative Banach algebras weak compactness of Gelfand transform is equivalent to finiteness of the maximal ideal space. We also show that a uniform algebra on a compact Hausdorff space X has compact (weakly compact) Gelfand transform if and only if X is a finite set. For a compact metric space (X, d) , the Lipschitz algebra $\text{Lip}(X, d)$ is an interesting Banach algebra whose Gelfand transform is compact. As a final result, we show that Banach function algebras with compact Gelfand transforms are all subalgebras of $\text{Lip}(X, d)$ for some compact metric space (X, d) .