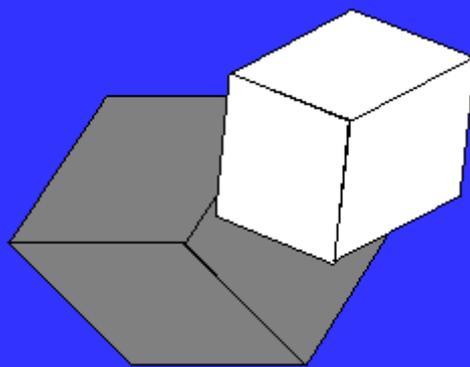


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Papers Abstracts



FORUM

ON GENERALIZATION OF DIVISION NEAR-RINGS

Sanja Jancic Rasovic, Vucic Dasic

In this paper we introduce the class of D-division near-rings as a subclass of near-rings with a defect D and that one of division near-rings. We introduce the notion of D-division near-ring and we state necessary and sufficient condition under which a near-ring with defect of distributivity D is a D-division near-ring.

(pp. 1–8)

BASIC NOTIONS OF PARTIALLY ORDERED HYPERMODULES

H. Mirabdollahi, S.M. Anvariye, S. Mirvakili

In this paper, we construct the ring-like hyperstructures derived from a (partially) quasi ordered ring R , and we study some basic properties to this class. Then, we introduce the new class of (partially) ordered hypermodules by using of the (partially) ordered modules. Moreover, we study some basic properties of this new class and the essential differences between this class and the earlier one (i.e. ordered modules) are also investigated.

(pp. 9–27)

INEQUALITIES OF UNITARILY INVARIANT NORMS FOR MATRICES

Xuesha Wu

We present some inequalities of unitarily invariant norms for matrices by using majorization, Fan dominance principle and some existing inequalities of singular values and unitarily invariant norms for matrices. Our results are refinements or generalizations of ones shown by Audenaert, Al-khlyleh, and Kittaneh.

(pp. 28–33)

IDEAL CONVERGENT GENERALIZED DIFFERENCE SEQUENCE SPACES OF INFINITE MATRIX AND ORLICZ FUNCTION

Kuldip Raj, Charu Sharma

In this paper we introduce some generalized difference sequence spaces by using Musielak-Orlicz function, ideal convergence and an infinite matrix defined on n -normed spaces. We study some basic topological and algebraic properties of these spaces. We also investigate some inclusion relations related to these spaces.

(pp. 34–46)

ON THE ROLE OF THE STOKES PROBLEM IN SECOND GRADE FLUID FLOW IN REGIONS WITH PERMEABLE INTERFACES

R. Maritz, J.M.W. Munganga

The role of the Stokes problem in conducting a theory of existence of solutions, weak as well as classical, is under investigation in this research paper. We model the motion of incompressible flows of non-Newtonian fluids through permeable boundaries in terms of the Stokes equation. The equation of motion in the region $\Omega \in \mathbb{R}^3$ is coupled with the dynamic boundary condition through the permeable boundary Γ , in order to design a transport equation in a product space \mathbf{Y}_m . The existence of a unique solution for the Stokes problem is proved by using a special Helmholtz projection and employing the results from a paper of Agmon et al [?, Theorem 10.5 p.78]. The modelling is done for a special case where a "shear flow" is assumed.

(pp. 47–60)

SOLITON SOLUTIONS FOR NON-LINEAR DISPERSIVE WAVE EQUATIONS WITH VARIABLE-COEFFICIENTS

Ibraheem Abu-Falahah

In this paper, we study the solitary wave solution for the variable-coefficient non-linear dispersive wave equation. We develop a simplified bilinear method to construct the multi-soliton solutions for such an equation. We prove that the proposed scheme is effective and easy to implement. Finally, effects of the inhomogeneities of media on the soliton behavior are discussed with the aid of the characteristic curve method and graphical analysis.

(pp. 61–67)

A DISSIPATIVE HYPERBOLIC SYSTEMS APPROACH TO IMAGE RESTORATION

Junling Sun, Jie Yang, Lei Sun

We present here a new dissipative hyperbolic systems to image restoration. The existence of global dissipative solutions of this system under the Dirichlet boundary conditions and initial condition is shown. To this end, an experimental results are provided to show the efficiency of this kind of model.

(pp. 68–81)

ON PARTIALLY TOPOLOGICAL GROUPS: EXTENSION CLOSED PROPERTIES

Aynur Keskin Kaymakci, Wan Aunin Mior Othman, Cenap Ozel

The partially (para)topological groups were defined in [?]. In this paper, we give more results in partially topological groups in the sense of H. Delfs and M. Knebusch and we prove extension closed property for connectedness, compactness, and separability of partially topological groups.

(pp. 82–89)

ON WEAK MCCOY MODULES OVER COMMUTATIVE RINGS

Ahmad Yousefian Darani, Masoomeh Shabani

Let M be a module over a commutative ring R . In this paper we generalize some annihilator conditions from rings to modules. Denote by $Nil(M)$ the set of all nilpotent elements of M . M is said to be weak McCoy if $f(x)m(x) = 0$, where $f(x) = \sum_{i=0}^k m_i x^i \in R[x] \setminus \{0\}$ and $m(x) = \sum_{j=0}^n a_j x^j \in M[x] \setminus \{0\}$, then $sm_i \in Nil(M)$, for every $1 \leq i \leq k$ and for some $s \in R \setminus \{0\}$. We prove that the class of weak McCoy modules is closed under direct limit, finite direct product and localization. We show that if R is a uniform R -module, then the direct sum of weak McCoy R -modules is again weak McCoy. We prove that over a domain D , the D -module M is weak McCoy provided that if $T(M)$ is weak McCoy, where $T(M)$ is the torsion submodule of M .

(pp. 90–97)

SOME RESULTS ON DISTANCED-BALANCED AND STRONGLY DISTANCE-BALANCED GRAPHS

H. Faramarzi, F. Rahbarnia, M. Tavakoli

Distance-balanced graphs are graphs in which for every edge $e = uv$ the number of vertices closer to u than to v is equal to the number of vertices closer to v than to u . The graph is strongly distance-balanced if the relation holds for every distance of i which $0 \leq i \leq diam(G)$. In this paper, we study some local properties of them and also under some graph operations.

(pp. 98–107)

A POWER INDEX AND ITS NORMALIZATION UNDER FUZZY MULTICRITERIA SITUATION

Yu-Hsien Liao, Tsu-Yin Chen, Ling-Yun Chung

By considering the supreme-utilities among fuzzy level vectors, we propose an index and its normalization in the framework of multicriteria fuzzy transferable-utility (TU) games. We show that there exists a reduced game that could be adopted to analyze these two indexes. Further, alternative formulation for the normalized index is also proposed by applying excess function. Based on reduced game and excess function, we introduce different dynamic processes for the normalized index.

(pp. 108–121)

SOME SUFFICIENT CONDITIONS IMPLYING NILPOTENCY OF FINITE GROUPS

Q.J. Kong, S. Wang

Let G be a finite group. For a weak n -Engel condition, we mean that $[x, {}_n y] \in Z(G)$ for two elements x and y of G , where n is a positive integer. In this paper, we mainly study the influence of the weak n -Engel condition on the nilpotence and p -nilpotence of finite groups. Our results generalize some well-known results.

(pp. 122–125)

GLOBAL EXPONENTIAL STABILITY OF COHEN-GROSSBERG NEURAL NETWORKS WITH TIME-VARYING DELAYS

Xiaohui Wang, Xumeng Li, Xingjie Wu

In this paper, without the assumptions for boundedness, monotonicity, and differentiability on activation functions and symmetry of interconnections, a class of Cohen-Grossberg neural networks with time-varying delays is studied. A new useful criteria on the uniqueness of equilibrium is obtained by utilizing the nonlinear measure. Combining with Dini derivatives and Young inequality, new sufficient condition for the global exponential stability is established by directly estimating the upper bound of solutions of the system. All results are presented in M-matrix form, which extended and generalized the corresponding results in previous literature.

(pp. 126–140)

F-CONTRACTIVE MAPPINGS OF HARDY-ROGERS-TYPE IN G-METRIC SPACES

Hamed M. Obiedat, Ameer A. Jaber

In this paper, we prove some fixed point results for F -contractive mappings of Hardy-Rogers-Type in the setting of G -metric spaces.

(pp. 141–148)

ON POSITIVE WEAK SOLUTIONS FOR A CLASS OF NONLINEAR SYSTEMS

S. A. Khafagy

We study the positive weak solutions for the system

$$\left. \begin{aligned} -\Delta_{P,p}u &= \lambda a(x)f(v) && \text{in } \Omega, \\ -\Delta_{P,p}v &= \lambda b(x)g(u) && \text{in } \Omega, \\ u = v &= 0 && \text{on } \partial\Omega. \end{aligned} \right\}$$

where $\lambda > 0$ is a parameter, $\Delta_{P,p}$ with $p > 1$ and $P = P(x)$ is a weight function, denotes the weighted p -Laplacian defined by $\Delta_{P,p}u \equiv \operatorname{div}[P(x)|\nabla u|^{p-2}\nabla u]$, $a(x)$, $b(x)$ are weight functions and $\Omega \subset \mathbb{R}^N$ is a bounded domain with smooth boundary $\partial\Omega$. We discuss the existence of positive weak solutions for large λ when

$$\lim_{x \rightarrow +\infty} \frac{f^{\frac{1}{p-1}}(M(g(x))^{\frac{1}{p-1}})}{x} = 0, \quad \text{for every } M > 0.$$

In particular, we do not assume any sign-changing conditions on $a(x)$ or $b(x)$. Our approach depends on the method of sub-supersolutions.

(pp. 149–156)

A BIPARTITE GRAPH ASSOCIATED TO A BI-MODULE OF A RING

Z. Fattahi, A. Erfanian, A. Azimi

Let R be a ring, M be a left and right R -module. We associate a bipartite graph to R -module M of ring R , denoted by $\Gamma_{R,M}$ as undirected simple graph whose two parts of vertices are $R \setminus C_R(M)$ and $M \setminus C_M(R)$ and two distinct vertices x and y are adjacent if $xy \neq yx$, where $C_R(M)$ is the set of elements of R that commute with all elements in M . Some graph theoretical properties of this graph stated in this paper.

(pp. 157–163)

AN IMPROVED CLUSTERING METHOD BASED ON DENSITY AND DIVISION METHOD

Zhang Qiu-Ju

Combining partitioning and density - based clustering method, an improved clustering method is proposed in this paper on the basis of objective clustering algorithm. Firstly, the points with greater density which are distant from each other were selected as the initial centers of K -means clustering. Then, Use K -means was used to roughly determine the elements contained in each class. Afterwards, the points with the largest density in each class were searched and taken as the centers to re-conduct K -means clustering. If a class has more than one maximum density points, then the class will have multiple clustering centers, which make the shape of the class not round any longer and facilitate the classification of irregular shapes. Finally, by the dipole idea of the objective clustering algorithm, the optimal number of clusters was determined. The improved algorithm proposed in this paper achieved very good results in the clustering tests on random data set and UCI data set

(pp. 164–171)

EXISTENCE OF MANY NON-RADIAL SOLUTIONS OF AN ELLIPTIC SYSTEM

Zhenluo Lou

In this paper, we consider the following elliptic system

$$\begin{cases} -\Delta u = \mu_1 u^{p-1} + \beta u^{\frac{p}{2}-1} v^{\frac{p}{2}}, & x \in \Omega \\ -\Delta v = \mu_2 v^{p-1} + \beta u^{\frac{p}{2}} v^{\frac{p}{2}-1}, & x \in \Omega \\ u, v > 0, x \in \Omega, \quad u = v = 0, \quad x \in \partial\Omega, \end{cases}$$

where $\Omega \subset \mathbb{R}^N (N > 4)$ is an annulus, $\mu_1, \mu_2 > 0$, $\beta > 0$ and $2 < p < \frac{2N-2}{N-3}$. By variational and rescaling method, we prove that the system has many non-radial solutions.

(pp. 172–179)

PYTHAGOREAN FUZZY HYBRID AVERAGING AGGREGATION OPERATOR AND ITS APPLICATION TO MULTIPLE ATTRIBUTE DECISION MAKING

K. Rahman, F. Hussain, M.S. Ali Khan

In this paper, we introduce the notion of Pythagorean fuzzy hybrid averaging operator, which is the generalization of Pythagorean fuzzy weighted averaging operator and Pythagorean fuzzy ordered weighted averaging operator. We also study several properties of the propose operator. At the last we apply the the proposed operator to deal with MAGDM under Pythagorean fuzzy information.

(pp. 180–187)

1-MOVABLE DOUBLY CONNECTED DOMINATION IN GRAPHS

Renario G. Hinampas Jr., Sergio R. Canoy Jr.

This paper presents some characterizations involving the concept of 1-movable doubly connected domination and investigates the 1-movable doubly connected dominating sets in the join of graphs. Moreover, the 1-movable doubly connected domination number of the join of graphs is determined.

(pp. 188–199)

FIXED POINT THEOREMS FOR FUZZY SOFT CONTRACTIVE MAPPINGS IN FUZZY SOFT METRIC SPACES

A.F. Sayed, Jamshaid Ahmad

The aim of this paper is to examine some important properties of fuzzy soft metric spaces. Fuzzy soft continuous mappings are introduced and some their properties are investigated. Finally, we prove some fixed point theorems of fuzzy soft contractive mappings in fuzzy soft metric spaces.

(pp. 200–214)

COMPARISON OF SURFACE FITTING METHODS FOR MODELLING LEAF SURFACE

Moa'ath N. Oqielat

A novel hybrid method for modelling leaf surface that combines Gaussian radial basis function (RBF) and Clough-Tocher (CT) methods to achieve a continuous surface is proposed by the author [20]. In this paper, we demonstrate the accuracy of the hybrid Gaussian RBF-CT approach by applying it to model the surface of frangipani and anthurium leaves. Furthermore, a comparison between the hybrid Gaussian RBF-CT method and the hybrid multiquadric RBF-CT method introduced by the author Oqielat et al. [17] is presented.

The development of the algorithm has been made to assist the understanding of leaf surface properties. It is found that the hybrid multiquadric RBF-CT surface fitting methodology produces more accurate and realistic leaf surface representation than using the hybrid Gaussian RBF-CT method.

(pp. 215–226)

PRODUCT-TYPE OPERATORS FROM AREA NEVANLINNA SPACES TO BLOCH-ORLICZ SPACES

Zhi-Jie Jiang

Let \mathbb{D} be the unit disk in the complex plane \mathbb{C} and $H(\mathbb{D})$ the class of all analytic functions on \mathbb{D} . Let φ be an analytic self-map of \mathbb{D} and $u \in H(\mathbb{D})$. By constructing some more effective test functions in area Nevanlinna space, in this paper we characterize the boundedness and compactness of product-type operators $D^n M_u C_\varphi$, $D^n C_\varphi M_u$, $C_\varphi D^n M_u$, $M_u D^n C_\varphi$, $M_u C_\varphi D^n$ and $C_\varphi M_u D^n$ from area Nevanlinna spaces to Bloch-Orlicz spaces.

(pp. 227–243)

COMPARISON OF SVM ALGORITHM AND BP ALGORITHM: STUDY ON THE EVALUATION INDEX SYSTEM OF SCIENTIFIC RESEARCH PERFORMANCE OF VOCATIONAL COLLEGES

Jiayin Feng, Dongyan Jia, Li Cui, Jing Cao, Zhuo Lin, Min Zhang

As the education in China develops rapidly, the scientific research of higher vocational education has gradually drawn extensive attentions. In order to construct a reasonable evaluation model of scientific research performance to further enhance the research enthusiasm of teachers, this study constructed a

model based on relevant theories of the support vector machine (SVM) algorithm and the back propagation (BP) algorithm. In addition, the simulation of the model was performed and the accuracy rate and errors of these two algorithms were compared and analyzed. Then the most appropriate algorithm was applied to the evaluation index system. The simulation results showed that, simplified data of scientific research evaluation could be applied as the input data of the SVM algorithm to accurately and effectively construct an evaluation index system of scientific research performances of vocational colleges. Thus a more reasonable and accurate evaluation system was constructed.

(pp. 244–255)

ON CHARACTERIZATION OF MONOIDS BY PROPERTIES OF GENERATORS II

Morteza Jafari, Akbar Golchin, Hossein Mohammadzadeh Saany

Kilp and Knauer in (Communications In Algebra, 20(7), 1841-1856, 1992) gave a characterizations of monoids when all generators in the category of right S -acts (S is a monoid) satisfy properties such as freeness, projectivity, strong flatness, Condition (P) , principal weak flatness, principal weak injectivity, weak injectivity, injectivity, divisibility, strong faithfulness and torsion freeness. Sedaghatjoo in (Semigroup Forum, 87: 653-662, 2013) gave a characterizations of monoids when all generators in the category of right S -acts satisfy properties such as weak flatness, Condition (E) and regularity. Continuing this study the authors (On characterization of monoids by properties of generators, submitted) investigated the corresponding problem for (finitely generated, cyclic, monocyclic) right acts. To our knowledge the problem has not been yet studied for properties such as GP -flatness, strongly (P) -cyclic, (P) -regularity and Conditions (EP) , $(E'P)$, (E') , (P_E) , (PWP) , (PWP_E) , WPF , WKF , $PWKF$, TKF , (WP) etc. In this article we answer the question corresponding to these properties.

(pp. 256–276)

CERTAIN GENERATING FUNCTIONS OF GENERALIZED HYPERGEOMETRIC 2D POLYNOMIALS FROM TRUESDELL'S METHOD

P.L. Rama Kameswari, V.S. Bhagavan

In this paper, the generating functions for generalized Hypergeometric 2D polynomials $U_n(\beta, \gamma, x, y)$ are obtained by using the Truesdell's method giving

a suitable interpretation to the index n . Further, a pair of linearly independent differential recurrence relations are used in order to derive generating functions for $U_n(\beta, \gamma, x, y)$. The principal interest in our results lies in the fact that, how the Truesdell's method is utilized in an effective and suitable way to generalized Hypergeometric 2D polynomials in order to derive two generating functions independently from ascending and descending recurrence relations respectively.

(pp. 277–285)

d-MIXING AND *d*-UNIVERSAL *J*-CLASS OPERATORS

A. Tajmouati, M. El Berrag

In this paper, we characterize the notion of d -universal extended (respectively d -universal extended mixing) limit set and we give a relation between d -universal (or d -hypercyclic sequences) and d -universal extended limit set.

(pp. 286–293)

PAIRWISE CONNECTEDNESS IN FUZZY BITOPOLOGICAL SPACES IN QUASI-COINCIDENCE SENSE

Ruhul Amin, Sahadat Hossain

In this paper, we have defined a new notion of fuzzy connectedness in fuzzy bitopological spaces in sense of quasi-coincidence sense. We have found the relations among our and other such notions. We have observed that our notion is stronger than some other such notions. We have shown that the pairwise fuzzy connectedness is preserved under the FP-continuous mapping. Moreover, we have obtained productivity and some other properties of this new concept.

(pp. 294–300)

HOPF BIFURCATION ANALYSIS AND AMPLITUDE CONTROL OF A NEW 4D HYPER-CHAOTIC SYSTEM

Ping Cai

Hopf bifurcation and amplitude control in a new 4D hyper-chaotic system are investigated in this paper. Theoretical analysis shows that the system will exhibit Hopf bifurcation at equilibrium when the Hopf bifurcation conditions are satisfied. Relationship between the amplitude and control gains is given. Hence the amplitude of the limit cycle can be controlled by choosing suitable

control gains, ensuring the stability of the bifurcating period solution. Finally, some applications of the amplitude control are carried out to illustrate the effectiveness of the main theoretical results. The accuracy of different kinds of control function are also compared.

(pp. 301–310)

SOLUTION OF LINEAR AND NONLINEAR SINGULAR BOUNDARY VALUE PROBLEMS USING LEGENDRE WAVELET METHOD

Javid Iqbal, Rustam Abass, Puneet Kumar

In this paper, we utilize a robust and precise method for solving both linear and nonlinear singular initial or boundary value problems. We use Legendre wavelets to construct operational matrix of integration and product operational matrix to solve the problems. This method reduces the problems into algebraic equations and gives a fast convergent series of easily computable components. Illustrative examples are incorporated to show the productivity and exactness of the technique. The outcomes obtained by the utilized method demonstrate that the proposed way is entirely sensible when compared with exact solution.

(pp. 311–328)

ON THE APPLICATION OF THE ADOMIAN DECOMPOSITION METHOD TO SOLVE NON-LINEAR BOUNDARY VALUE PROBLEMS OF A STEADY STATE FLOW OF A LIQUID FILM

A.R. Hassan, R. Maritz, M. Mbehou

This paper shows the reliability of the Adomian Decomposition Method (ADM) for solving a non-linear boundary value problem in a steady state flow of a liquid film. The solutions of the momentum and energy equations are solved through ADM and the results were compared with previously obtained results by the Homotopy Perturbation Method (HPM) and Hermite - Pade Approximation method (HPA). It is observed that solutions obtained by the ADM takes the form of a convergent series that is capable of greatly reducing the size of computation and solve a large class of non-linear equations effectively and accurately. The results of the boundary value problem are presented in tables and graphs.

(pp. 329–338)

ENERGY OF A BIPOLAR FUZZY GRAPH AND ITS APPLICATION IN DECISION MAKING

Sumera Naz, Samina Ashraf, Faruk Karaaslan

In many domains of information processing, bipolarity is a core feature to be considered: positive information represents what is possible or preferred, while negative information represents what is forbidden or surely false. If the information is moreover endowed with vagueness and imprecision, then bipolar fuzzy sets (BFSs) constitute an appropriate knowledge representation framework. In this paper, we introduce the novel concepts of energy of a graph in the context of a bipolar fuzzy environment and investigate some of their properties. We show that if \mathcal{G} is a bipolar fuzzy graph (BFG) on n vertices, then $E(\mathcal{G}) \leq \frac{n}{2}(1 + \sqrt{n})$ must hold. Moreover, we introduce the concept of energy of bipolar fuzzy digraphs (BFDGs) along with its application in decision making problem.

(pp. 339–352)

COMMUTATIVE NEUTROSOPHIC TRIPLET GROUP AND NEUTRO-HOMOMORPHISM BASIC THEOREM

X. Zhang, F. Smarandache, M. Ali, X. Liang

Recently, the notions of neutrosophic triplet and neutrosophic triplet group are introduced by Florentin Smarandache and Mumtaz Ali. The neutrosophic triplet is a group of three elements that satisfy certain properties with some binary operations. The neutrosophic triplet group is completely different from the classical group in the structural properties. In this paper, we further study neutrosophic triplet group. First, to avoid confusion, some new symbols are introduced, and several basic properties of neutrosophic triplet group are rigorously proved (because the original proof is flawed), and a result about neutrosophic triplet subgroup is revised. Second, some new properties of commutative neutrosophic triplet group are founded, and a new equivalent relation is established. Third, based on the previous results, the following important propositions are proved: from any commutative neutrosophic triplet group, an Abel group can be constructed; from any commutative neutrosophic triplet group, a BCI-algebra can be constructed. Moreover, some important examples are given. Finally, by using any neutrosophic triplet subgroup of a commutative neutrosophic triplet group, a new congruence relation is established, and then the quotient structure induced by neutrosophic triplet subgroup is constructed and the neutro-homomorphism basic theorem is proved.

(pp. 353–375)

DERIVABLE MAPPINGS AND COMMUTATIVITY OF ASSOCIATIVE RINGS

Gurninder S. Sandhu, Deepak Kumar

Let R be a ring with center $Z(R)$. A mapping $F : R \rightarrow R$ (not necessarily additive) is called a multiplicative (generalized)-derivation of R if it is uniquely determined by a mapping $d : R \rightarrow R$ such that $F(xy) = F(x)y + xd(y)$ for each $x, y \in R$. In the present paper, we investigate the commutativity of a semiprime (prime) ring via studying a number polynomial constraints involving multiplicative (generalized)-derivations. Moreover, some annihilator conditions are also examined.

(pp. 376–393)

FIXED POINT RESULTS OF F -RATIONAL CYCLIC CONTRACTIVE MAPPINGS ON 0-COMPLETE PARTIAL METRIC SPACES

Z. Mustafa, S.U. Khan, M.M.M. Jaradat, M. Arshad, H.M. Jaradat

Wardowski [?] introduced a new concept of contraction which called F -contraction and proved a fixed point theorem on complete metric space. Following this direction of research, in this paper, we introduce an F -rational cyclic contraction on partial metric spaces and we present new fixed point results for such cyclic contraction in 0-complete partial metric spaces. An example is given to illustrate the main result, also an application to integral equation is given to show the usability of our results.

(pp. 394–409)

CLASS OF ADMISSIBLE PERTURBATIONS OF SPECIAL EXPRESSIONS INVOLVING COMPLETELY MONOTONIC FUNCTIONS

J.B. Bacani, J.F.T. Rabago

In this article, a class \mathbf{M}_2 of admissible perturbations of the special expression $\mathbf{M}_0 = \sum_{k=0}^r c_k t^{\alpha_k} D_t^{\rho_k}$ in the weighted space $\mathcal{L}_\omega^2([1, \infty))$ will be presented. It will be shown that the operator $\omega^{\frac{1}{2}} \mathbf{M}_2 \omega^{-\frac{1}{2}}$, where ω belongs to the family of completely monotonic functions, is an admissible perturbation of \mathbf{M}_0 in the non-weighted space $\mathcal{L}^2([1, \infty))$, and eventually preserves the essential spectrum and nullity of \mathbf{M}_0 in that space. Our discussion will be limited only to special expressions with $\alpha_1 < \rho_1$.

(pp. 410–423)

THE TOPOLOGICAL INDICES OF THE CAYLEY GRAPHS OF DIHEDRAL GROUP D_{2n} AND THE GENERALIZED QUATERNION GROUP Q_{2^n}

S. Shokrolahi Yancheshmeh

A topological index of a simple connected graph Γ is a numeric quantity related to the structure of the graph Γ . The set of all automorphisms of Γ under the composition of mapping forms a group which is denoted by $\text{Aut}(\Gamma)$. Let G be a group, and let $S \subset G$ be a set of group elements such that the identity element $1 \notin S$. The Cayley graph associated with (G, S) is defined as the directed graph with vertex set G and edge set E such that $e = xy$ is an edge of E if $(x^{-1}y) \in S$ for every vertices x, y in G . In this paper we define the Cayley graph of the Dihedral group D_{2n} and the Cayley graph of the generalized quaternion group Q_{2^n} on the specified subsets of these groups, and compute the Wiener, Szeged and PI indices of these graphs.

(pp. 424–433)

GOING BEYOND THE STANDARD MODEL

B.G. Sidharth

In this communication we argue that we can account for the shortcomings of the Standard Model by including noncommutative geometry leading to a non-zero (electron) neutrino mass.

(pp. 434–437)

ON THE JOINT (m, q) -PARTIAL ISOMETRIES AND THE JOINT m -INVERTIBLE TUPLES OF COMMUTING OPERATORS ON A HILBERT SPACE

Ould Ahmed Mahmoud Sid Ahmed

The study of tuples of commuting operators was the subject of intensive study by many authors. Our aim in this work is to consider a generalization of the notions of m -partial isometries and (m, q) -partial isometries (resp. m -left inverse and m -right inverse) of a single operator done in [?] and [?] (resp. in [?],[?], [?]) to the multivariable operators. We study some of the basic properties of these tuples of commuting operators. A commuting d -tuple of operators

$\mathbf{T} = (T_1, \dots, T_d)$ acting on a Hilbert space \mathcal{H} is called a joint $(m; (q_1, \dots, q_d))$ -partial isometry, if

$$\mathbf{T}^q \left(\sum_{0 \leq k \leq m} (-1)^k \binom{m}{k} \sum_{|\alpha|=k} \frac{k!}{\alpha!} \mathbf{T}^{*\alpha} \mathbf{T}^\alpha \right) = 0.$$

(pp. 438–463)

SEPARATION AXIOMS IN TOPOLOGICAL ORDERED SPACES

S. Shanthi, N. Rajesh

In this paper, we introduce and study some new type of separation axioms in topological ordered spaces via ω -open sets.

(pp. 464–473)

CONFORMAL ANTI-INVARIANT SUBMERSIONS FROM KENMOTSU MANIFOLDS ONTO RIEMANNIAN MANIFOLDS

Sushil Kumar, Rajendra Prasad

In this paper, we define conformal anti-invariant submersions from Kenmotsu manifolds onto Riemannian manifolds. Further we obtain some results on such submersions from Kenmotsu manifolds into Riemannian manifolds admitting vertical or horizontal structural vector fields. Among the results we find necessary and sufficient conditions for conformal anti-invariant submersions to be totally geodesic. Moreover, we derive decomposition theorems by using the existence of conformal anti-invariant submersions. Finally, we give some examples of conformal anti-invariant submersions such that characteristic vector field ξ is horizontal or vertical.

(pp. 474–500)

THE EFFECT OF METHODS OF OPERATION RESEARCH IN OBTAINING THE BEST RESULTS IN THE TRADE

A.A. Alsaraireh, M. Almasarweh, M. B. Alnawaiseh, S. Al Wadi, V. Bhama

This study aims to determine the most effective method in operation research regarding the potential to reduce the cost in a minimum time and achieving more profit. In this study, three methods were used : Simplex method, Simplex method and transportation problems and Simplex method, transportation problems, and critical path method. A sample of 10 traders, who work in the same field and import the same commodities, participated in the study. Three models were applied to evaluate the result and compare between them, actual result from these models and randomly results. After that the researchers applying the survey to find the degree of traders satisfaction for these models and results.

The Statistical Package (SPSS) software was used for data analysis. The results of this study indicated that a three methods were a better. Also the results of questioner are linked to the satisfaction of traders on the three methods.

(pp. 501–509)

SOME NEW k -FRACTIONAL INTEGRAL INEQUALITIES CONTAINING MULTIPLE PARAMETERS VIA GENERALIZED (s, m) -PREINVELOCITY

Yao Zhang, Tingsong Du, Hao Wang

We establish some new k -fractional integral inequalities for differentiable functions based on generalized (s, m) -preinvexity. We also prove Hadamard-type inequalities involving products of two generalized (s, m) -preinvex functions. These inequalities include some previously known results as special cases.

(pp. 510–527)

SOME OPERATOR α -GEOMETRIC MEAN INEQUALITIES

Jianming Xue

In this paper, we refine an operator α -geometric mean inequality as follows: let Φ be a positive unital linear map and let A and B be positive operators. If $0 < m \leq A \leq m' < M' \leq B \leq M$ or $0 < m \leq B \leq m' < M' \leq A \leq M$, then for each $\alpha \in [0, 1]$,

$$(\Phi(A) \sharp_{\alpha} \Phi(B))^2 \leq \left(\frac{K(h)}{K^{2r}(h')} \right)^2 \Phi^2(A \sharp_{\alpha} B),$$

where $K(h) = \frac{(h+1)^2}{4h}$, $K(h') = \frac{(h'+1)^2}{4h'}$, $h = \frac{M}{m}$, $h' = \frac{M'}{m'}$ and $r = \min\{\alpha, 1 - \alpha\}$.
(pp. 528–534)

THE HOMO SEPARATION ANALYSIS METHOD FOR SOLVING THE PARTIAL DIFFERENTIAL EQUATION

M. Zuriqat

In this work, the homo separation analysis method (HSAM) is applied to obtain the exact solution for linear and nonlinear partial differential equation. The proposed algorithm presents a procedure of constructing the set of base functions and gives the one-order deformation equation in a simple form. This analytical method is a combination of the homotopy analysis method (HAM) with the separation of variables method. The exact solution is constructed by choosing an initial guess in addition to only one term of the series obtained by HAM. This work verifies the validity and the potential of the HSAM for the study of nonlinear partial differential equation.

(pp. 535–543)

GLOBAL DYNAMICS OF AN SIVS EPIDEMIC MODEL WITH BILINEAR INCIDENCE RATE

Mahmood Parsamanesh

An SIS type epidemic model with variable population size is considered. The model includes a temporary vaccination program to prevent individuals from infection and to eradicate the disease. If $\mathcal{R}_0 < 1$, the disease-free equilibrium is locally and globally asymptotically stable i.e. the disease will be wiped out from population. When $\mathcal{R}_0 > 1$, the endemic equilibrium is locally asymptotically stable employing a result in stability of the second additive compound matrix. In addition, by using a geometric approach it is shown that this equilibrium is also globally asymptotically stable. So in this case, the disease will persist in population permanently. Also, a briefly discussion is made on the minimum amount of vaccination which is necessary to eradicate the disease. Finally, some numerical examples are given to confirm the obtained results.

(pp. 544–557)

USING MULTI-SCALE AUTO CONVOLUTION MOMENTS TO GET IMAGE AFFINE INVARIANT FEATURES

Fengwen Zhai, Jianwu Dang, Yangping Wang, Jing Jin

This paper includes two important works. First of all, the complete mathematical proof procedure of Multi-Scale Auto convolution was summarized and the simplified geometric proof the procedure was proposed. Secondly, Multi-Scale Auto convolution moments were adopted to describe images' maximally stable extremal regions to get affine invariant features of images. In the second job, the Multi-Scale Auto convolution moments of the image features were calculated on each feature's MSER region to form image features' descriptors, and then the image feature matching was performed. In order to verify the validity of the second job, the proposed algorithm were compared with the SIFT algorithm and MSER_SURE algorithm. Simulation experiments show that, for affine transformed images, the feature matching accuracy of the second job is much higher than the classical SIFT algorithm and the MSER_SURE algorithm, which indicates that using Multi-Scale Auto convolution moments on the MSER regions could get effective affine invariant image features.

(pp. 558–571)

ON THE DOUBLE FROBENIUS GROUP OF THE FORM $2^{2r}:(\mathbb{Z}_{2^{r-1}}:\mathbb{Z}_2)$

J. Moori, P. Perumal

Let G be a finite group. Let $\overline{H} = NH$ be a Frobenius group with kernel N and complement H . If G admits \overline{H} as a group of automorphisms such that $C_G(N) = \{1_G\}$ and GN is also a Frobenius group with kernel G and complement N , then $\overline{G} = GNH$ is called a double Frobenius group (or 2-Frobenius group). The group $\overline{G} = GNH$ is a product of subgroups $G \leq \overline{G}$, $N \leq \overline{G}$, $H \leq \overline{G}$ with $G \trianglelefteq \overline{G}$, $GN \trianglelefteq \overline{G}$ and $\overline{G} = G:NH = GN:H$. In this article we shall construct a double Frobenius group of the form $\overline{G} = 2^{2r}:(\mathbb{Z}_{2^{r-1}}:\mathbb{Z}_2)$, where $G \cong 2^{2r}$, $N \cong \mathbb{Z}_{2^{r-1}}$ and $H \cong \mathbb{Z}_2$, where $r \in \mathbb{N}, r \geq 2$. The construction is a general one that gives examples of double Frobenius groups for particular values of n . In addition to the general construction of the group $\overline{G} = 2^{2r}:(\mathbb{Z}_{2^{r-1}}:\mathbb{Z}_2)$, we calculate in general the conjugacy classes, Fischer matrices and character table of the group. One example $\overline{G} = 2^4:(\mathbb{Z}_3:\mathbb{Z}_2)$, (the case $r = 2$) is demonstrated.

(pp. 572–599)

FINITE GROUPS WHOSE ALL PROPER SUBGROUPS ARE GPST-GROUPS

Pengfei Guo, Yue Yang

A set $\mathcal{W} = \{W_1, \dots, W_t\}$ of nilpotent Hall subgroups of G is a complete Wielandt set if $(|W_i|, |W_j|) = 1$ for all i, j . A finite group G is called a GPST-group if G has a complete Wielandt set \mathcal{W} such that every member in \mathcal{W} permutes all maximal subgroups of any non-cyclic subgroup S in \mathcal{W} . In this paper, we give a complete classification of those groups which are not GPST-groups but all of whose proper subgroups are GPST-groups, i.e., they are precisely minimal non-PST-groups.

(pp. 600–606)

INDUSTRIAL DATA FORECASTING USING DISCRETE WAVELET TRANSFORM

S. Al Wadi, Ahmed Atallah Alsaraireh

Since the industrial data plays significant element in any economic growth and these data have many factors that effect on its behavior. Therefore, in this article events of productivity of the Extractive Industry in Jordan will be forecasted using some of traditional model which is (ARIMA model) compound with Orthogonal wavelet transform (OWT) in order to improve the forecasting accuracy. First, the series of dataset will be decomposed by OWT's then the smooth's series will be predicted using ARIMA model, OWT+ ARIMA model in order to improve the forecasting accuracy. As a results the compound model (OWT+ ARIMA) is better than the ARIMA model directly in forecasting accuracy.

(pp. 607–614)

THREE-DIMENSIONAL AIR QUALITY ASSESSMENT SIMULATIONS INSIDE SKY TRAIN PLATFORM WITH AIRFLOW OBSTACLES ON HEAVY TRAFFIC ROAD

Kewalee Suebyat, Nopparat Pochai

Air pollutant levels in Bangkok are generally high in street tunnels. They are particularly elevated in almost closed street tunnels such as an area the Bangkok sky train platform with high traffic volume where dispersion is limited. This area has no air quality measurement stations even though there is a high percentage of people living around this vicinity. We are interested to conduct a

research the Bangkok sky train platform due to the traffic density and enormous polluted areas. Therefore, we proposed a numerical modeling of air pollution concentration in sky train platform with airflow obstacles on heavy traffic road as an approximated solution of the three-dimensional advection-diffusion equation by using the finite difference methods. Our research presentation is based on how air pollution model depends on the flow of air pollution and wind directions including the governing equation of the corresponding three-dimensional advection-diffusion equation is presented. This also includes the initial condition and boundary conditions of traffic and polluted areas. In order to illustrate the performance of the model, the numerical experiments are presented. The comparison between the two methods and the simulations of air pollution control are proposed. The three-dimensional advection-diffusion equation is solved by using the Forward Time, Centered Space (FTCS) and Forward Time, Backward Space (FTBS) schemes. The results obtained indicate that the FTCS method provides a better result than FTBS method. Furthermore, the proposed experimental variations of the boundary condition in the entrance gate do affect the air pollutant concentration of each floor.

(pp. 615–632)

A CONSTRUCTION OF CONGRUENCE-SIMPLE SEMIRINGS

Barbora Batíková, Tomáš Kepka and Petr Němec

A construction of congruence-simple semirings is presented.

(pp. 633–655)

ON THE CONFORMAL CURVATURE TENSOR OF ϵ -KENMOTSU MANIFOLDS

Abdul Haseeb, Mobin Ahmad, Sheeba Rizvi

The conformal curvature tensor under certain curvature conditions has been studied for an ϵ -Kenmotsu manifold with respect to the semi-symmetric non-metric connection. Finally, we give an example of a 3-dimensional ϵ -Kenmotsu manifold with respect to the semi-symmetric non-metric connection.

(pp. 656–670)

EXPONENTIAL STABILITY OF NONLINEAR SYSTEMS VIA ALTERNATE CONTROL

Xingkai Hu, Linru Nie

In this paper, the exponential stability of nonlinear systems via alternate control is considered. Our result avoids solving linear matrix inequalities. A numerical example is given to show effectiveness of the result.

(pp. 671–678)

ROUGH APPROXIMATIONS IN KU -ALGEBRAS

Moin Akhtar Ansari, Ali N.A. Koam

In this paper, the concept of roughness in KU -algebras is introduced. We study the lower and upper approximations of KU -subalgebras and KU -ideals and proved that the lower/upper approximation of KU -subalgebra (resp., KU -ideals) is a KU -subalgebra (resp., KU -ideals). A connection between rough sets and KU -Algebras with their weak and strong ideals have also been taken under consideration and some related results have been shown.

(pp. 679–691)

ON HYPERIDEALS OF ORDERED SEMIHYPERGROUPS

Ze Gu

Prime, weakly prime and semiprime hyperideals in ordered semihypergroups were studied by Kehayopulu. In this paper, we introduce the concepts of weakly semiprime and irreducible hyperideals in ordered semihypergroups. The relationship between the five classes of hyperideals is established. Finally, we characterize semisimple ordered semihypergroups and intra-regular ordered semihypergroups in terms of these hyperideals.

(pp. 692–698)

BAYESIAN ESTIMATION AND PREDICTION BASED ON EXPONENTIAL RESIDUAL TYPE II CENSORED LIFE DATA

Ghassan K. Abufoudeh, Raed R. Abu Awwad

In this paper, we consider statistical inference problems for the residual life data come from exponential model based on type II censored data. Maximum likelihood and Bayesian approaches are used to estimate the scale parameter for exponential model also we construct symmetric credible intervals. Further, we propose to estimate the posterior predictive density of the future ordered observations and then obtain the corresponding predictors and we obtain the predictive survival function to compute the predictive interval for the missing order statistics. Numerical comparisons are conducted to assess the performance of the estimators of the parameter as well as the predictors of future ordered data.

(pp. 699–710)

ON COMPUTING DIFFERENTIAL TRANSFORM OF NONLINEAR NON-AUTONOMOUS FUNCTIONS AND ITS APPLICATIONS

Essam R. El-Zahar, Abdelhalim Ebaid

Although being powerful, the differential transform method yet suffers from a drawback which is how to compute the differential transform of nonlinear non-autonomous functions that can limit its applicability. In order to overcome this defect, we introduce in this paper, new general formulas and their related recurrence relations for computing the differential transform of any analytic nonlinear non-autonomous function with one or multi-variable. Several test examples for different types of nonlinear differential and integro-differential equations are solved to demonstrate the applicability and validity of the present method. The obtained results declare that the suggested approach not only effective but also a straightforward and powerful for solving differential and integro-differential equations with complex nonlinearities.

(pp. 711–723)

NAGSC: NESTEROV'S ACCELERATED GRADIENT METHODS FOR SPARSE CODING

Liang Liu, Ling Zhang, Xiangguang Dai, Yuming Feng

This paper proposes efficient algorithms for Sparse Coding. Firstly, Sparse Coding is divided into two sub-convex problems including L1 and L2 problems. Secondly, we transform the nonsmooth L1 problem into two smooth sub-problems, and alternatively optimize them by Nesterov's Accelerated Gradient methods (NAG). Thirdly, we apply NAG to optimize L2 problem. Finally, L1 and L2 problems are iteratively solved until convergence. Experiments show that our proposed algorithms are effective to optimize L1, L2 and learn over-complete bases.

(pp. 724–735)

CONTRA WEAKLY- θ_I -PRECONTINUOUS FUNCTIONS IN IDEAL TOPOLOGICAL SPACES

Manisha Shrivastava, Takashi Noiri, Purushottam Jha

The present authors [?] introduced and studied the notion of weakly θ_I -preopen sets in ideal topological spaces. In this paper, we apply this set to introduce and study a new class of functions called contra weakly θ_I -precontinuous functions in ideal topological spaces. Some characterizations and several basic properties of this class of functions are obtained. Further, we introduce the notions of contra- θ_I -precontinuous, contra- θ_I - α -continuous, contra- θ_I -semicontinuous and contra- θ_I - β -continuous functions in ideal topological spaces and also establish relationships among these new classes of functions.

(pp. 736–747)

NONEXISTENCE OF GLOBAL SOLUTIONS TO A FRACTIONAL NONLINEAR ULTRA-PARABOLIC SYSTEM

Lamairia Abd Elhakim, Haouam Kamel, Rebiai Belgacem

In this work, we study the sufficient conditions for that ensure the nonexistence of global solutions to a Cauchy problem for a fractional nonlinear ultra-parabolic system. The Blowing-up solutions is also presented. Our method of proof relies on a suitable choice of a test function and the weak formulation approach of the sought for solutions.

(pp. 748–755)

A NEW INTUITIONISTIC FUZZY DIVERGENCE MEASURE AND ITS APPLICATIONS TO HANDLE FAULT DIAGNOSIS OF TURBINE

Rakesh Kumar, Om Parkash

The literature of probability, fuzzy and intuitionistic fuzzy divergence measures provides the applications of a variety of divergence measures to different disciplines dealing with real life problems. Many such divergence measures have been generated through different approaches but still there is a scope that better ones can be developed which will provide applications to variety of disciplines. The present communication involving the development of a new intuitionistic measure of divergence for fuzzy distributions is a motivation in this direction. The newly proposed mathematical model is helpful for the study of fault diagnosis of turbine. In the present paper, we have provided an algorithm which can handle the main faults in the turbine along with useful information for future trends and verified the results numerically.

(pp. 756–771)

FUZZY PROTECTION METHOD FOR FLOOD ATTACKS IN SOFTWARE DEFINED NETWORKING (SDN)

Mohammad Hadi Zahedi, Abbas Ali Rezaee and Zeinab Dehghan

Flood attacks (FA) are a type of distributed denial of service (DDoS) attacks. In FA, an attacker sends massive floods of packets to consume all resources. Hierarchical architecture and numerous weaknesses in the structure of communication protocols in conventional networks lead to the fact that firewalls are incapable to provide an integrated and effective mechanism against these attacks. With the emergence of Software Defined Networking (SDN), there are new prospects for solving structural and security problems in conventional networks. This study investigates some ideas for protecting against distributed FA using SDN. Later, by analyzing the strengths and weaknesses of these ideas, a heterogeneous method is proposed based on a combination of conventional service provider and the Software Defined controller. In the proposed method, the attack detection and the fuzzy decision modules are located in the service provider and the controller (i.e. SDN), respectively. In order to simulate the heterogeneous method the MiniNet emulator is applied in combination with the Pox controller. Afterwards, the simulated model is evaluated. Results show that besides protecting against attacks in conventional networks, the proposed method provides other benefits including the extent of computational load and the response time in comparison to other Software Defined methods.

(pp. 772–789)