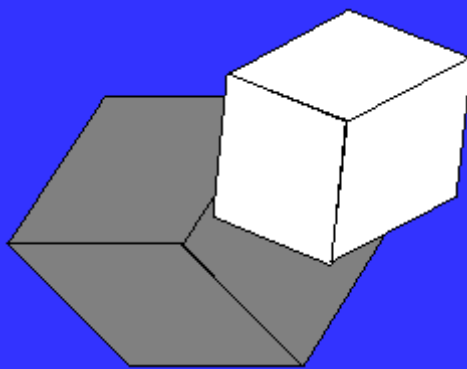


N° 38 – July 2017

Italian Journal of Pure and Applied Mathematics

ISSN 2239-0227

Papers Abstracts



FORUM

PRESERVING INJECTIVE PROPERTIES OF ACTS OVER MONOIDS UNDER LIMITS AND THEIR TRANSFER FROM COLIMITS TO THE COMPONENTS

Mojtaba Sedaghatjoo, Salimeh Dehghani

This paper is devoted to the preservation of injective properties under limits and their transfer from colimits to the components. We prove that an injective property α is preserved under limits if and only if all acts satisfy property α . Besides we prove that an injective property α is transferred from colimits to their components if and only if all acts satisfy property α . (pp. 1-7)

ON DERIVED OF SOME POLYGROUPS AND GENERALIZED ALTERNATIVE POLYGROUPS

M. Jafarpour, B. Davvaz

In this paper, we investigate the derived of some polygroups and we give some results on them. Also, we define generalized alternative polygroups which is the derived of generalized symmetric polygroups. (8–17)

n -EDGE-DISTANCE-BALANCED GRAPHS

M. Faghani, E. Pourhadi

Throughout this paper, we present a new class of graphs so-called n -edge-distance-balanced graphs inspired by the concept of edge-distance-balanced property initially introduced by Tavakoli et al. [Tavakoli M., Yousefi-Azari H., Ashrafi A.R., Note on edge distance-balanced graphs, Trans. Combin. 1 (1) (2012), 1-6]. Moreover, we propose some characteristic results to recognize 2-edge-distance-balanced graphs by using the lack of 2-connectivity in graphs. Some examples are provided in order to illustrate the obtained conclusions. (18–31)

A CHARACTERIZATION OF SOME PROJECTIVE SPECIAL LINEAR GROUPS

Ashraf Daneshkhah, Younes Jalilian

In this paper, we show that projective special linear groups $S := L_3(q)$ with q less than 100 are uniquely determined by their orders and degree patterns of their prime graphs. Indeed, we prove that if G is a finite group whose order and degree pattern of its prime graph is the same as the order and the degree pattern of S , then G is isomorphic to S . (32–44)

ZERO KNOWLEDGE UNDENIABLE SIGNATURE SCHEME OVER SEMIGROUP ACTION PROBLEM

Neha Goel, Indivar Gupta, B. K. Dass

The concept of Semigroup Action Problem (SAP) was introduced by C. Monico in 2002. He defined Diffie-Hellman key exchange and ElGamal cryptosystem taking SAP as an underlying problem.

The aim of this paper is to define the application of SAP in designing a zero knowledge undeniable signature scheme. We also discuss the security analysis of the proposed scheme. (45–53)

ON c -NORMAL AND S -QUASINORMALLY EMBEDDED SUBGROUPS OF A FINITE GROUP

Hong Pan

If P is a p -group for some prime p we shall write $\mathcal{M}(P)$ to denote the set of all maximal subgroups of P and $\mathcal{M}_d(P) = \{P_1, \dots, P_d\}$ to denote any set of maximal subgroups of P such that $\bigcap_{i=1}^d P_i = \Phi(P)$ and d is as small as possible. In this paper, the structure of a finite group G under some assumptions on the c -normal or S -quasinormally embedded subgroups in $\mathcal{M}_d(P)$, for each prime p , and Sylow p -subgroups P of G is researched. Some known results are generalized. (54–60)

STUDY OF INTEGRAL TRANSFORMS ASSOCIATED WITH GENERALIZED BESSEL FUNCTION

N.U. Khan, M. Ghayasuddin, Waseem A. Khan, Sarvat Zia

Integral transforms involving Bessel functions play a crucial role in problems related to many diverse field of mathematical physics. Due to the importance of such type of transforms, in this paper, we present (presumably) a new (potentially) useful integral transform involving the product of Whitaker and generalized Bessel functions, which is expressed in terms of Kampé de Fériet functions. Some more results as special cases of our main integral transform are also considered. (61–68)

ENTIRE FUNCTIONS SHARING TWO SMALLER ORDER ENTIRE FUNCTIONS WITH THEIR DIFFERENCE OPERATORS

Guowei Zhang

In this paper we mainly study the uniqueness of entire functions with finite order sharing two smaller order entire functions with their difference operators. Our results improve some recent theorems due to Liu and Mao, Zhang and Liao. (69–80)

SOME VERTEX-DEGREE-BASED TOPOLOGICAL INDICES UNDER EDGE CORONA PRODUCT

I. Rezaee Abdolhosseinzadeh, F. Rahbarnia, M. Tavakoli, A. R. Ashrafi,

A topological index is called vertex-degree-based if it can be defined by vertex degrees. The harmonic, atom-bond connectivity and Randić indices are three important examples of such topological indices. The aim of this paper is to find lower and upper bounds for Randić, harmonic and atom-bond connectivity indices of edge corona product of graphs. Some closed formulas are obtained when the factors are regular graphs. (81–91)

ON AN EXTENSION TO KHAN'S FIXED POINT THEOREM

V. Srinivasa Kumar, K. Kumara Swamy, Tvl. Narayana

In this present paper, the fixed point theorem that was proved by Khan [2] is extended to sequences of self maps through rational expressions. The present theorem includes non-continuous maps also. (92–97)

SOFT ROUGH *BCI*-ALGEBRAS AND CORRESPONDING DECISION MAKING

Xueling Ma, Jianming Zhan

In this paper, we study soft rough *BCI*-algebras with respect to *MS*-approximation spaces. Some new soft rough operations over *BCI*-algebras are explored. In particular, lower and upper soft rough *BCI*-algebras with another soft set are investigated. Finally, a kind of decision making method for soft rough *BCI*-algebras are originally investigated. (98–112)

ON INTUITIONISTIC PRODUCT FUZZY GRAPHS

Talal Al-Hawary, Bayan Hourani

In this paper, we provide three new operations on intuitionistic product fuzzy graphs; namely direct product, semi-strong product and strong product. We discuss which of these operations preserves the notions of strong and complete. We also give some new properties of balanced intuitionistic fuzzy graphs. (113-126)

ON SOME SUBCLASSES OF MEROMORPHIC FUNCTIONS DEFINED BY FRACTIONAL DERIVATIVE OPERATOR

Khalida Inayat Noor, Qazi Zahoor Ahmad, Nazar Khan

In this paper, we use fractional derivative operator to define new classes of meromorphic functions related to conic domains. Using convolution and differential subordination techniques, we prove some interesting properties of these newly defined classes. (127-136)

ON THE SUM OF THE SQUARES OF ALL DISTANCES IN SOME GRAPHS

Xianya Geng, Zhixiang Yin, Xianwen Fang

Denote the sum of the squares of all distances between all pairs of vertices in G by $S(G)$. In this article, through the given vertices number of a graph and the chromatic, a lower bound of $S(G)$ is discussed. By giving the vertices number and the clique number of a graph, the upper and lower bounds of the $S(G)$ are discussed. (137-144)

QUALITATIVE STUDY OF A GENERALISED BRUSSELATOR TYPE EQUATION

B.S. Lakshmi, S.S. Phulsagar, M.A.S. Srinivas

In this paper we discuss a system of equations which is a generalisation of the Brusselator equations [13]. Such equations usually deal with some autocatalytic reactions. Some equations related to non-allosteric enzyme reactions which are similar to the Michaelis-Menten equations with regard to functional response term are also analysed. (145-157)

SOFT ROUGH GROUPS AND CORRESPONDING DECISION MAKING

Wenjun Pan, Jianming Zhan

In this article, we apply soft rough sets (briefly, *SR*-sets) to the special algebraic structure-group and give the concepts of soft rough groups (briefly, normal subgroups) (briefly, *SR*-groups, *SRN*-subgroups), which is an extended definition of rough groups. Further, we use the terminologies of *C*-soft sets and *CC*-soft sets to research soft rough algebraic structures. Moreover, the roughness in groups w.r.t. *MSR*-approximation spaces are investigated. At the same time, we study some soft rough operations over groups. Specially, upper and lower *SR*-groups (*SRN*-subgroups) are explored. Finally, we raise a kind of decision making method (DM-method) for *SR*-groups and give an actual example to illustrate. (158–171)

CRITICAL SEMIMODULES

Barbora Batíková, Tomáš Kepka and Petr Nĕmec

In the paper, a particular class of semimodules (so called critical semimodules) typical for additively idempotent semirings possessing at least two right multiplicatively absorbing elements is investigated. (172–183)

SOLUTION OF STEADY-STATE HAMILTON-JACOBI EQUATION BASED ON ALTERNATING EVOLUTION METHOD

A. Tongxia Li

Hamilton-Jacobi equation is a kind of highly nonlinear partial differential equation which is difficult to be solved. The boundary value problem of steady-state Hamilton-Jacobi equation is supposed as $H(x, \nabla x \phi(x)) = 0$, $x \in \Omega/\Gamma$; $\phi(x) = q(x)$, $x \in \Gamma$ ($\Omega \in R^d$, d stands for the space dimensionality, Ω stands for a bounded open set with a boundary of Γ , and H stands for a given non-linear function, called Hamiltonian). Even though Hamiltonian function is smooth, the derivative of its solution may be disconnected at some cuspidal points. There are many ways to solve a steady-state Hamilton- Jacobi equation, among which, fast marching method (FMM) and fast sweeping method (FSM) are famous. This study solved Hamilton-Jacobi equation using alternating evolution method (AE). Firstly, an initial Hamilton-Jacobi equation was described using AE; then polynomials were constructed to approach the Hamilton-Jacobi equation and the equation was finally solved by selecting proper iterative methods and correct boundary conditions. An artificial parameter was generated in the process of construction of iterative format; the selection of the parameter could directly affect the stability and convergence of the iterative format. On account of this, the stability and convergence of the first-order AE algorithm was analyzed and the effectiveness and accuracy of the algorithm was proved by a numerical experiment. (184–193)

STOCHASTIC FINANCIAL MODEL BASED ON FRACTIONAL BROWN MOTION

A. Wei Su, B. Lei Wang

Fractional brown motion (FBM) is featured by long-term memory and selfsimilarity compared to standard brown motion. Because of the properties, it can be used to describe the phenomenon (e.g. seasonal effect, scale effect and sharp peak and heavy tail) which cannot be described by some typical analytical methods in financial market. The fractal features of fractional brown motion make it a more suitable tool in financial studies. This study simulated the increment of FBM and the square of the increment using extended Maruyama symbols as well as the change path of underlying asset price and obtained the formula for European option pricing using insurance actuary pricing. (194–203)

CERTAIN PROPERTIES ASSOCIATED WITH B-PREINVELX FUZZY MAPPINGS

Jiagen Liao, Tingsong Du

We establish several new characterizations for B-preinvex fuzzy mappings. Under the condition of upper or lower semi-continuity and the well known Condition C introduced by Mohan and Neogy [J. Math. Anal. Appl., 189 (1995) 901-908], we obtain a sufficient condition for B-preinvex fuzzy mappings. Several necessary conditions for differentiable and twice differentiable B-preinvex fuzzy mappings are also presented and proved. (204–217)

DYNAMICS OF ALMOST PERIODIC NICHOLSON'S BLOWFLIES MODEL WITH NONLINEAR DENSITY-DEPENDENT MORTALITY TERM

Zhijian Yao, Jehad Alzabut

This paper deals with the dynamics of almost periodic Nicholson's blowflies model with nonlinear density-dependent mortality. Prior to the main results, we prove the boundedness and extinction of the solutions for the addressed model. By applying Schauder's fixed point theorem, we establish sufficient conditions for the existence of almost periodic positive solution. Under less restrictive assumptions, the exponential stability is derived by means of the Liapunov functional method. The reported results give an affirmative answer to the problem raised by L. Berezansky. (218–234)

PERSONAL CREDIT SCORING MODEL RESEARCHBASED ON THE RF-GA-SVM MODEL

Zhang Qiuju

The importance measure of variables in the random forests algorithm is used to carry out a rank ordering to the importance of variables, so as to extract feature attributes on this basis. The feature attributes are regarded as inputs to conduct parameter optimization in order to support vector machine (SVM) model by using the genetic algorithm, building the classifier model by selecting the parameter with the highest accuracy of 5-fold cross-validation. The classifier model is utilized for empirical research, and the results show that the classifier is better than random forest classifier and support vector machine classifier in its higher classification accuracy. (235–242)

OPTIMIZATION OF AGRICULTURAL PRODUCTION CONTROL BASED ON DATA PROCESSING TECHNOLOGY OF AGRICULTURAL INTERNET OF THINGS

A.F. Zhai, B.M. Cheng, C.L. Zhang, D.T. Ding, E.Y. Liu

Internet of things is an important part of a new generation of information technology and it is a big step towards modern informationization for modern agriculture for us to introduce and apply the Internet of Things technology in agriculture which will lead the development of intelligent agriculture. In order to optimize the agricultural production control ability, realize automatic production, optimization control and intelligent management, improve the crop yield and quality, this paper carries out a design study on the optimization of agricultural production and control on the basis of fully understanding the agricultural thing networking data processing technology. Firstly, a service framework was put forward for the analysis of different agricultural products. Secondly, an agricultural information forecasting model based on an output-input feedback mechanism was applied to effectively control the growth environment of crops. Finally, the service framework, forecasting system and other modules were integrated into an application platform, which was then tested and showed a good read and write rate and a precise retrieval accuracy rate, could effectively predict environmental factors and give feedbacks, realize real-time monitoring of the environmental parameters and control the agricultural production. (243–252)

THE APPLICATION OF INFORMATION ENTROPY THEORY BASED DATA CLASSIFICATION ALGORITHM IN THE SELECTION OF TALENTS IN HOTELS

A. Youyu Hu

Background: With the rapid development of the society, some excellent enterprises are having a growing demand for talents. The recruitment and selection of talents is always concerned by the managers of enterprises. Materials and methods: This study analyzed the human resource of hotels and introduced C4.5 algorithm in decision tree algorithm and its implementation procedures. Talents were selected by investigating data of relevant ability of them and performing data analysis and data mining using C4.5 algorithm. Objective: Information entropy based data classification C4.5 algorithm was used to screen hotel talents. Results: Decision tree was obtained by calculating the comprehensive ability, working experience, random response capability and psychological quality of the enrolled employees. During the talents selection in hotels, the C4.5 algorithm can make the process simple and convenient. Decision tree algorithm can be used in the selection of talents in enterprises to preprocess data, construct data mining model of talent selection, and solve problems appearing in the recruitment and selection of talents. (253–260)

ACTIVE FREQUENCY DRIFT ISLANDING DETECTION ALGORITHM FOR SINGLE-PHASE PHOTOVOLTAIC GRID-CONNECTED INVERTER

A. Guangping Lu, B. Lanhong Zhang, C. Yingchu Bu, D. Yunlong Zhou

As the photovoltaic generation industry rises, the requirements for the reliability of photovoltaic power generation have become higher. The traditional active frequency drift islanding detection algorithm has advantages of simple operation, easy implementation, high speed and high detection rate of island; however, the large impact of the algorithm on the detection performance can bring harmonic pollution to power grid and even induce voltage flicker and instability of the network system. When multiple photovoltaic systems work in the form of grid connection, frequency drift appears and the effects cancel each other out, leading to the appearance of non-detection zones.

This study simulated a positive feedback islanding detection method using SIMULINK and proposed a novel active positive feedback active frequency drift detection method that could realize frequency drift by increasing disturbance with piecewise function based on the drawbacks of the active frequency drift islanding detection algorithm. Finally, the advantages of the system in resisting islanding were verified through computer simulation. (261–270)

IMPLEMENTATION OF PARALLELIZING MULTI-LAYER NEURAL NETWORKS BASED ON CLOUD COMPUTING

Hai Wang, Yi Wang and Dongming Ma

Background: Cloud computing, as a technology developed under the rapid development of modern network, is mainly used for processing large-scale data. The traditional data mining algorithms such as neural network algorithm are usually used for processing small-scale data. Therefore, the calculation of large-scale data using neural network algorithm must be based on cloud computing. Materials and Methods: Firstly a Hadoop system was established taking MapReduce as the programming framework. Then the parallelized traditional data mining algorithm was investigated based on cloud computing cluster to verify its feasibility in processing large-scale data. Finally, the speed and training precision of the algorithm were tested. Results: It was feasible to process large-scale data with cloud computing based parallelizing multi-layer neural network algorithm. The speed of parallel processing was faster if data size was larger, especially if the sample was in a size of more than 1 million. It was more superior to the serial back propagation network in training preciseness. Conclusion: Parallelizing multi-layer neural network based on cloud computing platform can process large-scale data effectively in the perspectives of time and quality.

(271–281)

DIGITAL INTEGRATION OF SERVICE MODES OF LIBRARIES BASED ON HYBRID METADATA

Fujun Zhang, Quanhui Ye, Shuwei Zhang

Public library is the largest repository of the information society. With the development of the network and the information technology, the demand for digital information is increasing, and library structure and service are beginning to develop in the direction of digital resources. With culture and civilization rooted in various kinds of books and resources, it is of great significance to strengthen the development and construction of cultural resources within libraries, so as to effectively strengthen cultural transmission and promote the integration of cultural resources as well as cultural construction. To explore the service mode of library resources in a digital environment from an integration perspective can effectively promote the construction of national culture. Based on a centralized, distributed and shared metadata management model, this paper designs a hybrid metadata management model suitable for the digital resource management of libraries, and designs a new library digital fusion service platform based on this. At the same time, this paper uses the fuzzy mathematics theory to evaluate the digital fusion service quality of libraries, which provides a new idea for activating the national cultural resources and inheriting civilization, which is of great significance for the promotion of the digital fusion service of libraries. (282–290)

REPRESENTATION OF GRAPHS USING m -POLAR FUZZY ENVIRONMENT

Musavarah Sarwar, Muhammad Akram

In this research article, we introduce the concepts of products in m -polar fuzzy graphs and investigate some of their interesting properties. We describe various properties of certain m -polar fuzzy graphs. We establish formulae of distance in complete m -polar fuzzy graphs and complete bipartite m -polar fuzzy graphs. We present an algorithm for computing the distance matrix, eccentricity of the vertices, radius and diameter in m -polar fuzzy graphs. We also discuss applications of m -polar fuzzy graphs in traveling and product manufacturing. (291–312)

A HYBRID EMD-MA FOR FORECASTING STOCK MARKET INDEX

Ahmad M. Awajan, Mohd Tahir Ismail, S. Al Wadi

Nowadays, stock market data forecasting has drawn a high attention in the field of non-stationary and nonlinear time series data with a high heteroscedasticity, since improving the forecasting accuracy is a hot topic for the researchers. Therefore, in this article the authors are proposed a new methodology via combining Empirical Mode decomposition and Moving Average model as a modified method to improve forecasting accuracy in content of stock market data. The strength of this proposed methodology lies in its ability to forecast nonlinear and non-stationary financial data without a need to use any transformation method. Moreover, this method provides a better model with sufficient forecasting accuracy. The daily stock market data of fourteen countries is applied to show the forecasting performance of the proposed method. Based on the five forecast accuracy measures, the results indicate that proposed forecasting method performance is superior to four selected forecasting techniques. (313–332)

COMMON FIXED POINT RESULTS IN S -FUZZY METRIC SPACES

Surendra Kumar Garg, Manoj Kumar Shukla, Suresh Kumar Bhatt

In this paper we prove fixed point results in integral type mapping with rational expression under weak compatible condition. (333–344)

RIEMANN-LIOUVILLE FRACTIONAL SIMPSON'S INEQUALITIES THROUGH GENERALIZED (m, h_1, h_2) -PREINVEXITY

Cheng Peng, Chang Zhou, Tingsong Du

The authors first introduce the concept of generalized (m, h_1, h_2) -preinvex function. Second, a new Riemann-Liouville fractional integral identity involving first order differentiable function on an m -invex is found. By using this identity, we present new Riemann-Liouville fractional Simpson's inequalities through generalized (m, h_1, h_2) -preinvexity. These inequalities can be viewed as significant generalization of some previously known results. (345–367)

NOVEL MULTIPLE CRITERIA DECISION MAKING METHODS BASED ON BIPOLAR NEUTROSOPHIC SETS AND BIPOLAR NEUTROSOPHIC GRAPHS

Muhammad Akram, Musavarah Sarwar

In this research article, we present certain notions of bipolar neutrosophic graphs. We study the dominating and independent sets of bipolar neutrosophic graphs. We describe novel multiple criteria decision making methods based on bipolar neutrosophic sets and bipolar neutrosophic graphs. We develop an algorithm for computing domination in bipolar neutrosophic graphs. We also show that there are some flaws in Broumi et al. [11]'s definition of complement of a bipolar neutrosophic graph. (368–389)

SOME PROPERTIES OF NEAR LEFT ALMOST RINGS BY USING IDEALS

Fawad Hussain, Zeenat Jadoon, Saleem Abdullah, Nazia Sadiq

The aim of this paper is to characterize near left almost rings by using ideals. We define a fully idempotent near left almost ring and discuss some of their properties. We then define prime, fully prime and irreducible ideals in a near left almost ring and explore some of their properties. Lastly we define M -system, P -system and I -system in a near left almost ring and discuss some of their properties. (390–401)

SOME PROPERTIES OF A NEW KIND OF DOWNWARD SETS IN CERTAIN BANACH SPACES

Sh. Al-Sharif, M. Al-Qahtani

Let X be a Banach lattice with strong unit. In this paper, we give some characterizations of certain kind of downward sets in the sequence space $\ell^\infty(X)$. Further some results on best approximation of those sets are presented. (402–413)

ON PÁL-TYPE INTERPOLATION II

Swarnima Bahadur

In this paper, we study the convergence of Pál-type interpolation on two sets of non-uniformly distributed zeros on the unit circle, which are obtained by projecting vertically the nodes of the real line. (414–418)

COMMON FIXED POINT THEOREMS FOR FUZZY MAPPINGS IN b -METRIC SPACE

Aqeel Shahzad, Abdullah Shoaib, Qasim Mahmood

In this paper we establish some fixed point results for fuzzy mapping in a complete b -metric space. Our results unify, extend and generalize several results in the existing literature. An example is also given to support our results. (419–427)

WIRELESS ACCESS CHANNEL AND BROADBAND DYNAMIC REGULATION BASED ON LAN

S. Chen, Y. Fang, Y. Zhu, J. Luo, F. Pan, L. Shi, Z. Pang

As the wireless local area network developed from spare framework to centralized framework, wireless access points tended to interfere with each other, resulting in the fluctuation of network environment and properties. In order to improve such condition in the dense wireless local area network environment, this study calculated interference factors and evaluation factors of information channels, as well as explored channel allocation and interference coordination methods of wireless network based on multiple access control protocol and control and provisioning of wireless access points protocol. Moreover, the study put forward to reduce the interference among wireless access points based on power control. At last, this study put forward a dynamic optimization and regulation scheme based on wireless access points and the scheme was tested. Test results indicated that, dynamic power control could further optimize the wireless local area network environment; the dynamic regulation scheme could effectively reduce the interference of access points as well as improve network performance, which could satisfy users' requirements. (428–440)

PAIRING-FRIENDLY ELLIPTIC CURVES OF EMBEDDING DEGREE 1 AND APPLICATIONS TO CRYPTOGRAPHY

Rajeev Kumar, S.K. Pal, Arvind

Recently, Wang et al. [1] proposed a new method for constructing pairing-friendly elliptic curves of embedding degree 1. Authors claim that this method significantly improves the efficiency of generating elliptic curves. In this paper, we give the arithmetic of pairing-friendly elliptic curves of embedding degree 1. We prove that conventional classification of pairings into Type 1, 2, 3 and 4 is applicable for the elliptic curves of embedding degree 1 proposed by Wang et al. We highlight the selection of pairing-friendly elliptic curves of embedding degree 1 for design of efficient cryptosystems. We compare security and efficiency of cryptosystems based on these pairing-friendly elliptic curves with the existing cryptosystems. By using these elliptic curves we propose a new asymmetric group key agreement (ASGKA) scheme from Tate pairing. We discuss the security and efficiency of the proposed ASGKA scheme. (441–454)

ON GENERALIZED SOME INEQUALITIES FOR CONVEX FUNCTIONS

Samet Erden, Mehmet Zeki Sarikaya

In this paper, a general integral identity for differentiable mapping is derived. Then, we extend some estimates of the right hand and left hand side of a Hermite- Hadamard-Fejér type inequality for functions whose first derivatives absolute values are convex. Some applications for special means of real numbers are also provided. The results presented here would provide extensions of those given in earlier works. (455–468)

A NEW PROOF FOR THE GLOBAL CONVERGENCE OF THE BFGS METHOD FOR NONCONVEX UNCONSTRAINED MINIMIZATION PROBLEMS

Hakima Degaichia, Salah Boulaaras

In this paper we give a new proof for the global convergence of the BFGS method for nonconvex unconstrained minimization problems and we prove that the condition of the appropriate method is to satisfy implicitly with inaccurate linear search of Wolfe type. Furthermore, we have checked directly the convergence of the method BFGS with the inaccurate linear search of Wolfe. (469–486)

SOME PROPERTIES OF SOFT β -COMPACT AND RELATED SOFT TOPOLOGICAL SPACES

S.S. Benchalli, P.G. Patil, Abeda S. Dodamani

Benchalli et al. [4] introduced the notion of soft β -compactness by using soft filter basis. In continuation, in this paper we further study some more properties of soft β -compactness in soft topological spaces. Furthermore we introduce and discuss, soft β -first countable, soft β -second countable spaces, soft β -closed spaces and soft generalized β -compact spaces in soft topological spaces. (487–496)

REPRESENTATION OF UP -ALGEBRAS IN INTERVAL-VALUED INTUITIONISTIC FUZZY ENVIRONMENT

Tapan Senapati, G. Muhiuddin, K.P. Shum

In this paper, the concept of interval-valued intuitionistic fuzzy set to UP -subalgebras and UP -ideals of UP -algebras are introduced. Relations among IVIF UP -subalgebras with IVIF UP -ideals of UP -algebras are investigated. The homomorphic image and inverse image of IVIF UP -subalgebras and IVIF UP -ideals are studied and some related properties are investigated. Equivalence relations on IVIF UP -ideals are discussed. Also, the product of IVIF UP -algebras are investigated. (497–518)

TRIPLE POSITIVE SOLUTIONS FOR A THIRD-ORDER THREE-POINT BOUNDARY VALUE PROBLEM WITH SIGN-CHANGING GREEN'S FUNCTION

Dapeng Xie, Hui Zhou, Chuanzhi Bai, Yang Liu

In this paper, we discuss the existence of triple positive solutions for a third-order three-point boundary value problem

$$\begin{cases} u'''(t) = f(t, u(t)), & t \in (0, 1), \\ u'(0) = 0, \quad u(1) = \alpha u(\eta), \quad u''(\eta) = 0, \end{cases}$$

where $0 < \alpha < 1$, $\max\{\frac{1+2\alpha}{1+4\alpha}, \frac{1}{2-\alpha}\} < \eta < 1$. We first study the associated Green's function and obtain some useful properties. Our main tool is the fixed point theorem due to Avery and Peterson. It is to be observed that although the associated Green's function is sign-changing, the solution obtained is still positive. The results of this paper are new. An example demonstrates the main results. (519–530)

ON THE ANNIHILATOR INTERSECTION GRAPH OF A COMMUTATIVE RING

M. Vafaei, A. Tehranian, R. Nikandish

Let R be a commutative ring with identity and $A(R)$ be the set of ideals with non-zero annihilator. The annihilator intersection graph of R is defined as the graph $\mathbb{A}\mathbb{I}\mathbb{G}(R)$ with the vertex set $A(R)^* = A(R) \setminus \{0\}$ and two distinct vertices I and J are adjacent if and only if $\text{Ann}(IJ) \neq \text{Ann}(I) \cap \text{Ann}(J)$. It follows that the annihilating-ideal graph $\mathbb{A}\mathbb{G}(R)$ (a well-known graph with the same vertices and two distinct vertices I, J are adjacent if and only if $IJ = 0$) is a subgraph of $\mathbb{A}\mathbb{I}\mathbb{G}(R)$. It is proved that $\mathbb{A}\mathbb{I}\mathbb{G}(R)$ is connected with diameter at most two and with girth at most four, if $\mathbb{A}\mathbb{I}\mathbb{G}(R)$ contains a cycle. Moreover, we characterize all rings whose annihilator intersection graphs are complete or star. Furthermore, we study the affinity between annihilator intersection graph and annihilating-ideal graph associated with a ring. (531–541)

SYMMETRIC METRIC SPACE

Yuming Feng

We first introduce the concept of symmetric metric space, then we prove that for any point symmetric metric space there is one and only one fixed point, lastly, we list some properties of the finite point symmetric metric spaces. (542–545)

A NOTE ON STRONGLY FULLY STABLE BANACH ALGEBRA MODULES RELATIVE TO AN IDEAL

Suaad Naji Kadhim

Let A be a unital algebra, a Banach algebra module M is strongly fully stable Banach A -module relative to ideal K of A , if for every submodule N of M and for each multiplier $\theta : N \rightarrow M$ such that $\theta(N) \subseteq N \cap KM$. In this paper, we adopt the concept of strongly fully stable Banach Algebra modules relative to an ideal which generalizes that of fully stable Banach Algebra modules and we study the properties and characterizations of strongly fully stable Banach A -module relative to ideal K of A . (546–550)

FIXED POINT RESULT FOR NEW RATIONAL TYPE CONTRACTION ON CLOSED BALL FOR MULTIVALUED MAPPING

Tahair Rasham, Abdullah Shoaib, Muhammad Arshad, Sami Ullah Khan

The purpose of this paper is to introduce the idea of new rational type contractive condition on multivalued mapping to find the fixed point results for such mapping on a closed ball in complete metric space. Example has been given to demonstrate the variety of our result. Our results combine, extend and infer several comparable results in the existing literature. (551–560)

POINTWISE SLANT SUBMERSIONS FROM KENMOTSU MANIFOLDS INTO RIEMANNIAN MANIFOLDS

Sushil Kumar, Amit Kumar Rai, Rajendra Prasad

The purpose of this paper is to study pointwise slant submersions from Kenmotsu manifolds onto Riemannian manifolds admitting vertical and horizontal structure vector fields and find some results related to totally geodesic and harmonic properties. (561–572)

APPLICATION OF MATHEMATICAL MODELING IN MANAGEMENT ACCOUNTING

Jiixin Wang, Donglin Wang

Mathematics as a basic science plays an important role in the field of economic management field. In processing management accounting business, the combination of mathematical models and the actual condition of enterprises and public institutions can effectively solve various management problems and evade different operational risks, which is of great significance to the prediction, planning and control of enterprise operation activities. This study analyzed five common mathematical models associated to management accounting, made analyses with examples, and pointed out the innovation direction of management accounting based on internet development, aiming to provide a reference for the improvement of management accounting level. (573–580)

EFFECT OF ALBEDO ON THE MOTION OF THE INFINITESIMAL BODY IN CIRCULAR RESTRICTED THREE BODY PROBLEM WITH VARIABLE MASSES

Abdullah A. Ansari

This paper presents the investigation of the effect of Albedo on the motion of the infinitesimal body in the circular restricted three body problem with the variation of all masses (primaries as well as infinitesimal body) with time. The radiation pressures fall on the surfaces of the planets, some of radiations are absorbed by them but some radiations are reflected back into the space. These radiations from the planets to the space are known as Albedo (i.e. $\text{Albedo} = (\text{radiation reflected back into the space})/(\text{incident radiation})$).

The equations of motion have been evaluated by using Meshcherskii transformation and found the expression for the variation of the Jacobi integral constant. We have drawn the locations of the equilibrium points, the periodic orbits, Poincaré surface of sections and basins of attraction for four cases (a. Classical Case, b. Variation of mass, c. Solar radiation pressure effect, d. Albedo effect) and also the surfaces of the motion of the infinitesimal body have been drawn with the effect of Albedo only.

Finally, we have examined the stability of the equilibrium points under the effect of Albedo and found that all the equilibrium points are unstable. (581–600)

THE MAXIMUM PRINCIPLE OF TSALLIS ENTROPY IN A COMPLEX DOMAIN

Rabha W. Ibrahim

In this paper, we extend the concept of Tsallis entropy in a complex domain. Based on this extension, we define some new classes of analytic functions (type Schwarz function). Other geometric properties are illustrated in the sequel. Our technique is delivered by the Maxwell Lemma and Jack Lemma. (601–606)

POSITIVE IMPLICATIVE ENERGETIC SUBSETS OF *BCK*-ALGEBRAS

Xiao Long Xin, Young Bae Jun

The notion of *PI*-energetic subsets in *BCK*-algebras is introduced, and several properties are investigated. Characterizations of *I*-energetic subsets and *PI*-energetic subsets are discussed, and conditions for a subset to be an *I*-energetic subset and a *PI*-energetic subset are provided. Relations between *I*-energetic subsets and *PI*-energetic subsets are considered, and conditions for an *I*-energetic subset to be a *PI*-energetic subset are given. Using *PI*-energetic subset, a positive implicative ideal is constructed. The condensational property of *PI*-energetic subset is established. (607–614)

(ϵ)-KENMOTSU MANIFOLDS ADMITTING A SEMI-SYMMETRIC METRIC CONNECTION

Venkatesha, Vishnuvardhana S.V.

The object of the present paper is to study some properties of quasi-conformal and concircular curvature tensor on (ϵ)-Kenmotsu manifolds with respect to a semi-symmetric metric connection. (615–623)

A NEW CHARACTERIZATION OF $L_2(p)$ WITH $p \in \{19, 23\}$ BY NSE

Qinhui Jiang, Changguo Shao

Let G be a group. We denote by $nse(G) := \{m_k \mid k \in \pi_e(G)\}$, where $\pi_e(G)$ is the set of element orders of G and m_k is the number of elements of order k in G . In this paper, we characterize simple linear group $L_2(p)$ uniquely by set $nse(L_2(p))$ when $p \in \{19, 23\}$. (624–630)

n -FOLD (POSITIVE) IMPLICATIVE FILTERS OF HOOPS

Chengfang Luo, Xiaolong Xin, Pengfei He

The aim of this paper is to develop the filter theory of hoops. First, the concept of n -fold (positive) implicative (bounded) hoop and n -fold (positive) implicative filter are introduced. Also, the relationship between these filters and other filters on hoops are discussed. Moreover, conditions for a filter becomes a n -fold (positive) implicative filter are given. Finally, we consider some relations between these filters and quotient algebras. (631–642)

PSEUDO-TOPOLOGICAL HYPERVECTOR SPACES AND THEIR PROPERTIES

E. Zangiabadi, Z. Nazari

In this paper we introduce and study the concepts of a pseudo-topological hypervector space and strongly pseudo-topological hypervector space. Further, we define a regular equivalence relation on a hypervector space and construct a new hypervector space with respect to this regular equivalence relation. Finally, by using a topology on the power set of a hypervector space, we introduce a topological hypervector space and investigate some of its properties. (643–652)

A SEPARATION METHOD FOR MAXIMAL COVERING LOCATION PROBLEMS WITH FUZZY PARAMETERS

Vadim Azhmyakov, Juan Pablo Fernández-Gutiérrez, Stefan Pickl

Our paper discusses a novel computational approach to the extended Maximal Covering Location Problem (MCLP). We consider a fuzzy-type formulation of the generic MCLP and develop the necessary theoretical and numerical aspects of the proposed Separation Method (SM). A specific structure of the originally given MCLP makes it possible to reduce it to two auxiliary Knapsack-type problems. The equivalent separation we propose reduces essentially the complexity of the resulting computational algorithms. This algorithm also incorporates a conventional relaxation technique and the scalarizing method applied to an auxiliary multiobjective optimization problem. The proposed solution methodology is next applied to Supply Chain optimization in the presence of incomplete information. We study two illustrative examples and give a rigorous analysis of the obtained results. (653–670)

A CHARACTERIZATION OF MATHIEU GROUPS BY THEIR ORDERS AND CHARACTER DEGREE GRAPHS

Shitian Liu, Xianhua Li

Let G be a finite group. The character degree graph $\Gamma(G)$ of G is the graph whose vertices are the prime divisors of character degrees of G and two vertices p and q are joined by an edge if pq divides some character degree of G . Let $L_n(q)$ be the projective special linear group of degree n over finite field of order q . Xu et al. proved that the Mathieu groups are characterized by the order and one irreducible character degree. Recently Khosravi et al. have proven that the simple groups $L_2(p^2)$, and $L_2(p)$ where $p \in \{7, 8, 11, 13, 17, 19\}$ are characterizable by the degree graphs and their orders. In this paper, we give a new characterization of Mathieu groups by using the character degree graphs and their orders. (671–678)

HYPERMATRIX REPRESENTATIONS OF SINGLE POWER CYCLIC HYPERGROUPS

M. Al Tahan, B. Davvaz

Cyclic hypergroups are special type of hypergroups that have some importance for their applications in different fields. In this paper, we deal with hypermatrix representations of single power cyclic hypergroups. First, we consider single power cyclic hypergroups with infinite period, define a commutative semihyperring and construct non-trivial hypermatrix representations over our defined semihyperring. Then we do the same for single power cyclic hypergroups with finite period. Many properties of these hypermatrix representations are presented. (679–696)

EXTENDED d -HOMOLOGY

S.N. Hosseini, M.Z. Kazemi Baneh

In this article, in more general categories than the abelian categories, we define a homology functor with respect to a kernel transformation d , called the extended d -homology. We then compare the standard homology and the extended d -homology functors. (697–706)

A NOTE ON Z -ALGEBRA

M. Chandramouleeswaran, P. Muralikrishna, K. Sujatha, S. Sabarinathan

This paper introduces a new notion of algebra called Z -algebra and some of its properties are discussed in detail. It reveals also that Z -algebra is completely different from some of other abstract algebras. (707–714)

ON THE SOLVABILITY OF TWO-POINT IN TIME PROBLEM FOR PDE

Oksana Malanchuk, Zinovii Nytrebych, Volodymyr Il'kiv, Petro Pukach

We prove that the solution of problem for homogeneous partial differential equation of the second order in time variable in which nonhomogeneous local two-point conditions are given, and infinite order in spatial variables, may not exist in the class of entire functions in the case when the characteristic determinant of the problem equals zero identically. In the case of existence of the solution of the problem, we propose the formula of finding its particular solutions. (715–726)

MINIMAL MODELS OF SELF-ORGANIZED CRITICALITY

L.C. Piccinini, M.A. Lepellere, T.F.M. Chang, L. Iseppi

The paper deals with an evaluation of the behavior of non equilibrium systems displaying self-organized criticality, according to the concept of Bak-Tang-Wiesenfeld ([3]). One of the fundamental characteristics of a system in a self-organized state is to exhibit a stationary state with a long-range power law of decay of both spatial and temporal correlations. (727–740)

HEPTAVALENT SYMMETRIC GRAPHS OF ORDER $6p$

Song-Tao Guo

acts transitively on the set of arcs of the graph. In this paper, we classify connected heptavalent symmetric graphs of order $6p$ for each prime p . As a result, there are three sporadic such graphs: one for $p = 5$ and two for $p = 13$. (741–750)

A VIEW ON QUASI λ -OPEN M -SETS IN M -TOPOLOGICAL SPACES

B. Amudhambigai, G.K. Revathi And K.A. Sunmathi

In this article the concepts of Λ -open M -sets, λ -open M -sets, λ -continuous M -set functions, quasi λ -open M -set functions and λ -irresolute M -set functions are introduced and studied. Also, their properties and characterizations are discussed. (751–756)

ALMOST STRONGLY ω -CONTINUOUS FUNCTIONS

Heyam H. Al-Jarrah, Abdo Qahis, Takashi Noiri

The aim of this paper is to introduce and investigate a new class of continuity, called almost strongly ω -continuous function, which contains the class of strongly θ -continuous functions and it is contained in the class of almost ω -continuous functions. (757–768)

SCHUR m -POWER CONVEXITY OF GEOMETRIC BONFERRONI MEAN

Huan-Nan Shi, Shan-He Wu

In this paper the Schur m -power convexity of the geometric Bonferroni mean for n variables is discussed. (769–776)

STUDY ON THE SEQUENCE VOLATILITY OF FINANCIAL ASSETS BASED ON MARKOV CHAIN MONTE CARLO SIMULATION

Ying Han

In recent years, a new issue occurs in the financial academy and business circles, i.e., dynamics of the financial asset price and its volatility model. However, lots of problems in the financial asset price and its volatility model at present have made the motor behaviors of emergencies in the fitting financial market become difficult; what's more, the limitation of parameter estimation on the practical application of models can increase with the increase of model complexity. Estimation of financial temporal models is usually based on classical statistical methods, and the measuring standard of the volatility estimation model is calculated using the actual volatility of low-frequency data. Therefore, taking the price fluctuation of Shanghai Stock Exchange A-share index as an example, this study constructed a model and aimed to analyze the sequence volatility of financial assets based on Markov chain Monte Carlo simulation methods. (777–786)

OPTIMAL MATHEMATICAL MODEL OF DELIVERY ROUTING AND PROCESSING TIME OF LOGISTICS

Nie Xiaoyi

As a newly-developing service industry that has a broad prospect and enormous market potential under the environment of electronic commerce, logistics is characterized by intellectualization, exhibility, informatization, networking and automation, etc. However, with the rapid development of economy, clients requirements on logistics services are increasing gradually. Therefore, how to reasonably control delivery costs while still maintaining the high-standard quality and timeliness has become a new challenge for logistics. On the basis of the earliest and latest service time allowed by clients, the problem of time window constraints should be especially considered for the distribution problems of multiple batches, multiple species and small batch quantity. Due to the practical significance of studying the routing problem of vehicles with time windows, this study explored the key optimization problem of logistics as well as the problem of distribution routing selection and processing time according to characteristics of logistics under the environment of electronic commerce, using ant colony algorithm (ACA) and particle swarm optimization (PSO). (787–796)

ON SOFT LA-MODULES AND EXACT SEQUENCES

Asima Razzaque, Inayatur Rehman, Kar Ping Shum

We introduce the concepts of soft LA-modules, Soft homomorphisms and the exact sequences of soft LA-modules. Some properties concerning the exact sequences of the LA-modules are investigated. A functional approach to study the soft LA-modules is adopted so that a characterization theorem of soft LA-modules is obtained. (797–814)