

**HYPERGROUPS, HOMOMORPHISMS AND BOOLEAN HYPERRINGS**  
**D. Stratigopoulos**

Idempotent hypergroups, Fixed points of endomorphisms, Theory of commutators on hypergroups, Theory of ideals on Boolean hyperrings.

**THE GENERAL STRICT TOPOLOGY IN LOCALLY CONVEX MODULES OVER LOCALLY CONVEX ALGEBRAS – II**  
**K.V. Shantha**

Let  $(X, \Gamma)$  be a locally convex left  $A$ -module over a locally convex algebra  $A$  with bounded approximate identity. In this paper we consider the strict topology  $\beta$  on  $X$  induced by  $A$  and characterize the strict dual  $(X_\beta)^*$  and the  $\beta$ -equicontinuous subsets of  $(X_\beta)^*$ . We also show that the strict topology  $\beta$  enjoys the classical property of earlier strict topologies, namely it is the finest locally convex topology on  $X$  which agrees with itself on its bounded sets.

**LOCAL STABILITY, HOPF BIFURCATIONS FOR A SYSTEM OF HARMONIC OSCILLATORS WITH TIME DELAY**  
**I.D. Albu, D. Opris**

A system of harmonic oscillators with discrete time delay is considered. The local stability of the zero solution of their equations is investigated by analyzing the corresponding transcendental characteristic equation of the linearized equations. By choosing the delay as a bifurcation parameter, the model is found to undergo a sequence of Hopf bifurcations. The direction and the stability of the bifurcating periodic solutions are determined by using the normal form theory. Some numerical examples are finally given for justifying the theoretical results.

**ON  $\mathcal{I}$ -CONVERGENCE FIELD**  
**Tibor Šalát, Binod Chandra Tripathy, Miloš Ziman**

In this paper we introduce the notion of  $c_A^{\mathcal{I}}$  and  $m_A^{\mathcal{I}}$ , the  $\mathcal{I}$ -convergence field and bounded  $\mathcal{I}$ -convergence field of an infinite matrix  $A$ . We restrict our study to diagonal matrices. We find necessary and/or sufficient conditions on the elements of  $A$  for solidity of  $c_A^{\mathcal{I}}$  and  $m_A^{\mathcal{I}}$ .

**$\aleph$ -SPACES AND  $\sigma$ -MAPPINGS**  
**Jinjin Li**

In this paper, the relationships between metric spaces and  $\aleph$ -spaces are established by certain sequence-covering mappings. Those are some answers to Alexandroff's problems.

**UNIFORM STRUCTURE ON HYPER  $BCK$ -ALGEBRAS**  
**Borumand Saeid, M.M. Zahedi**

In this note by considering a reflexive hyper  $BCK$ -ideal in a hyper  $BCK$ -algebra  $H$ , we define a relation  $\sim_I$  on  $H$ , and then we show that this relation is an equivalence relation on  $H$ . Then we show that this equivalence relation gives a uniform structure on  $H$ , when this uniformity constructs a topology on  $H$ .

**(ANTI-)FUZZY DUAL POSITIVE IMPLICATIVE HYPER  $K$ -IDEALS**  
**L. Torkzadeh, M.M. Zahedi**

In this note first we define the concepts of (anti-)fuzzy dual positive implicative hyper  $K$ -ideals of types 1,2,3,4 and fuzzy hyper  $K$ -ideal. Then we give some classifications about these notions according to

the (weak, strong) level subsets. Also by given some examples we show that these notions are not equivalent, however we prove some theorems which show that there are some relationships between this notions. Finally we define the notions of product and anti-product of two fuzzy subsets and then give some theorems about the relationships between the properties of two (anti-)fuzzy dual positive implicative hyper  $K$ -ideal of types 1,2,3,4 and their (anti-)product, in particular we give a decomposition theorem.

## **EXTENSION OF LINEAR SELECTORS OF LINEAR FUZZY MULTIVALUED OPERATORS**

**Ismat Beg**

We prove an extension theorem for linear selectors of linear fuzzy multivalued operators.

## **A METHOD FOR THE REDUCTION OF FOUR DIMENSIONAL MIXED PROBLEMS WITH GENERAL BOUNDARY CONDITIONS TO A SYSTEM OF SECOND KIND FREDHOLM INTEGRAL EQUATIONS**

**F. Bahrami, N. Aliev**

In this paper a mixed four dimensional problem with some general boundary conditions is considered. Using the Laplace transform and the fundamental solution of its adjoint equation, the problem is reduced to a system of regular second kind Fredholm integral equations. Some singularities appear for which we have introduced a special treatment.

## **CLOSABLE MODULE DERIVATIONS**

**M. Hassani, A. Niknam**

Let  $A$  be a Banach algebra and  $E$  be an  $A$ -bimodule. In this paper we show that if  $E$  is simple and  $\delta$  is a module derivation such that the range of  $\delta$  is not dense in  $E$ , then  $\delta$  admits a closed extension, we also show that for a torsion-free  $A$ -bimodule  $E$ , a module derivation  $\delta$  is closable if the restriction of  $\delta$  on some nonzero ideal  $I$  is closable. Moreover suppose  $E$  is a  $A$ -bimodule Hilbert  $C^*$ -module. Then  $\delta$  is closable if the restriction  $\delta$  on every ideal generated by one element is closable. Finally we prove that every derivation  $\delta$  of  $L(E)$  is closable if  $E$  is simple module and the range of  $\delta$  is not dense.

## **ON SOME CLASSES OF $H_v$ -STRUCTURES**

**A. Dramalides**

In this paper we introduce the notion of the containing  $H_v$ -semigroup, investigating some properties of this. Also, we study the concept of dual  $H_v$ -field, giving examples and study some results in this respect.

## **ON DUALITY OF $H_b$ -RINGS**

**A. Dramalides**

In this paper we study the concept of dual  $H_b$ -rings, as well as the very thin dual  $H_b$ -rings, giving examples and study some results in this respect.

## **GEVREY CLASSES AND $p$ -EVOLUTION EQUATIONS**

**Rossella Agliardi**

We consider  $p$ -evolution partial differential equations with real characteristics. In particular, Schrödinger type equations ( $p = 2$ ) and hyperbolic equations ( $p = 1$ ) are included in this framework. We make an assumption, on the lower order terms, which guarantees the well-posedness of the Cauchy problem in Gevrey spaces.

**ABOUT HYPERSTRUCTURES ASSOCIATED WITH FUZZY SETS OF TYPE 2**  
**Violeta Leoreanu**

In this paper, some results concerning the hyperstructures associated with fuzzy sets of type 2 are presented; particularly, we have studied several situations when these hyperstructures are join spaces.

**FUZZY  $\alpha$ -ALMOST CONVEX MAPPINGS AND FUZZY FIXED POINT THEOREMS FOR FUZZY MAPPINGS**

**Wang Guixiang, Wu Cong, Wu Congxin**

In this paper, we introduce the concept of fuzzy fixed points of fuzzy mappings (it contains none-less  $r$ -degree fixed points and  $r$ -degree fixed points) which is the generalization of the concept of fixed points of fuzzy mappings, and also introduce the concept of fuzzy  $\alpha$ -almost convex mappings (it contains none-less  $r$ -degree  $\alpha$ -almost convex mappings and  $r$ -degree  $\alpha$ -almost convex mappings) which is the generalization of the concept of  $\alpha$ -almost convex mappings (classic ordinary point-to-point mappings). We also introduce the concepts of none-less  $r$ -degree contraction (and nonexpansive) mappings and  $r$ -degree contraction (and nonexpansive) mappings. And we obtain some results about fuzzy fixed point of fuzzy  $\alpha$ -almost convex mappings and fuzzy fixed point theorems of fuzzy contraction mappings that generalize some corresponding results that have been obtained by other authors.

**A NOTE ON RATE OF CONVERGENCE OF SEQUENCES AND DENSITY OF SUBSETS OF NATURAL NUMBERS**

**Binod Chandra Tripathy, Mausumi Sen**

In this article we introduce the notion of statistical acceleration convergence of sequences. We prove the decomposition theorems for statistical acceleration convergence of any two sequences as well as for the subsequence transformations. we have provided an example to show that a conjecture due to Keagy and Ford [Pacific J. Math. 132 (no. 2), (1988); 357–362] is false. Some other interesting results are proved. We have provided examples, where the results of acceleration convergence fails to hold for the statistical cases.

**ON COMPLETELY SIMPLE SEMI-GROUPS**

**H. Fazaeli, M.R. Molaei**

In this paper direct products and e-components of completely simple semi-groups are considered. A main theorem by use of e-components is proved. As a result of this theorem the product tables of completely simple semi-groups of order 4 are presented.

**AN INTEGER PROGRAMMING MODEL FOR PROMETHEE II**

**M.A. Yaghoobi, H.R. Maleki, M. Mashinchi**

PROMETHEE II is one of the multicriteria decision making procedures which has been applied to a lot of ranking problems. In PROMETHEE II the concept of valued outranking graph is used to build a total preorder on a set of possible alternatives or actions. In this paper we propose a model which converts the problem of ranking alternatives to solve an integer programming problem. Further, it is shown that this model and PROMETHEE II identify the same ranking.

**GENERALIZED SOLUTIONS OF DIFFERENTIAL INCLUSIONS AND STABILITY**

**A. Bacciotti**

This paper is a contribution to the development of a theory concerning stability of equilibrium positions with respect to Sentis solutions of ordinary differential equations with discontinuous right hand side.

**THE MAXIMAL BOUND OF FINITE  $p$ -GROUPS WITH CERTAIN DEGREE**  
**Mehdi Alaeiyan**

Let  $G$  be a permutation group on a set  $\Omega$  with no fixed points in  $\Omega$  and let  $m$  be a positive integer. Then we define the movement of  $G$  as

$$m := \text{move}(G) := \sup_{\Gamma} \{|\Gamma^g \setminus \Gamma| \mid \Gamma \subseteq \Omega, g \in G\}.$$

If  $G$  is a  $p$ -group,  $p$  is an odd prime, such that  $\text{move}(G) = m$ , then we prove that the maximum possible size of  $\Omega$  is less than or equal to  $p(2mp - p + 1)/(p - 1)^2$  with equality if and only if  $m = p^d \cdot (p - 1)/2$  for some non-negative integer  $d$ , and provide examples of groups meeting the bound.

**THE REES QUOTIENT ORDERED GROUPOIDS**  
**N. Kehayopulu, K.P. Shum, M. Tsingelis**

The Rees quotient ordered semigroups having first considered by Kehayopulu and Tsingelis play an important role in studying the structure of ordered semigroups. Given an ordered groupoid  $S$  and an ideal  $I$  of  $S$ , we choose an arbitrary element  $0$  of  $I$  and we set  $S|I := S \setminus I \cup \{0\}$ . The set  $S|I$  with an appropriate multiplication and an order on  $S|I$  is an ordered groupoid called the Rees quotient ordered groupoid and  $0$  is its zero. In particular, if  $S$  is a semigroup, then the Rees quotient  $S|I$  is an ordered semigroup, as well. If we choose another element of the ideal  $I$  instead of the element  $0$ , then the Rees quotient we obtain is equivalent to the first one. In this note we give a second definition, equivalent to the already known, in which the element which plays the role of the zero of the Rees quotient is fixed.

**INTERPOLATING SEQUENCES FOR MULTIPLIERS OF BANACH SPACES OF ANALYTIC FUNCTIONS**  
**B. Yousefi, K. Mosaleheh**

Let  $G$  be a finitely connected domain and  $X$  be a reflexive Banach space of functions analytic on  $G$  such that each point of  $G$  is a bounded point evaluation. Also  $1 \in X$  and  $M_z$  is polynomially bounded on  $X$ . We give some sufficient conditions on the set of multipliers of  $X$ ,  $M(X)$ , such that a sequence which converges to  $\partial G$  has an interpolating subsequence for  $M(X)$ .<sup>1</sup>

**LINEAR TRANSFORMATION SEMIGROUPS ADMITTING THE STRUCTURE OF A SEMIHYPERRING WITH ZERO**  
**Sureporn Chaopraknoi, Yupaporn Kemprasit**

A semigroup  $S$  is said to *admit the structure of a semihyperring with zero* if there exists a hyperoperation  $+$  on  $S^0$  such that  $(S^0, +, \cdot)$  is a semihyperring with zero where  $\cdot$  is the operation on  $S^0$ . Let  $V$  be a vector space over a division ring,  $L(V)$  the semigroup under composition of all linear transformations  $\alpha : V \rightarrow V$ ,  $K(V, k) = \{\alpha \in L(V) \mid \dim \text{Ker } \alpha \geq k\}$  and  $CI(V, k) = \{\alpha \in L(V) \mid \dim (V/\text{Im } \alpha) \geq k\}$  where  $k$  is a cardinal number with  $k \leq \dim V$ . The semigroups  $K(V, \aleph_0)$  and  $CI(V, \aleph_0)$  have been shown not to admit the structure of a semihyperring with zero. In this paper, these results are generalized by characterizing when the semigroups  $K(V, k)$  and  $CI(V, k)$  admit this structure. Moreover, the semigroup  $I(V, k) = \{\alpha \in L(V) \mid \dim \text{Im } \alpha \leq k\}$  is also studied in the same matter.

**LES CORPS CYCLOTOMI-QUADRATIQUES**  
**Ahmed Asimi, Aboubakr Lbekkouri**

no abstract