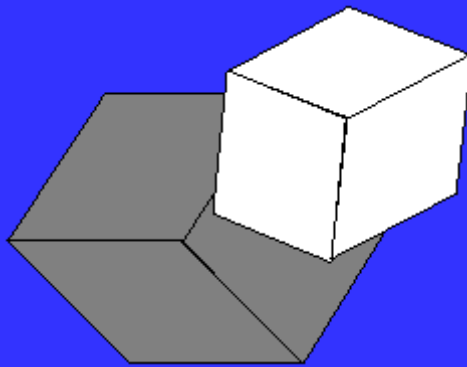# Italian Journal of Pure and Applied Mathematics

Papers Abstracts

COCATÉGORIE ET NILPOTENCE
Mohammed El Haouari

The Lusternik-Schnirelmann category of a topological space X, denoted $catX$, is the least integer n such that X can be covered by $n+1$ open sets, each of them contractible in X. This is a homotopical invariant. We give dualisation of this invariant in the sense of Eckmann-Hilton and we show that the nilpotent class of the space $[G, X]$ is a lower bound. (pp. 7-14)

LIE IDEAL AND GENERALIZED JORDAN LEFT DERIVATION ON SEMIPRIME RINGS
R.K. Sharma, B. Prajapati

Let R be a 2-torsion free semiprime ring in which $x^2 = 0$ implies $x = 0$. Let g be a generalized Jordan left (right) derivation associated with Jordan left (right) derivation d on R. Then g is a generalized left (right) derivation on R. It is proved that if $Q_r(S)$ is the Martindale quotient ring of S then there exists $q \in Q_r(S)$ such that $g(x) = qx + d(x)$ for all $x \in R$. (In right derivation case). (pp. 15-22)

WEAKLY b-I-OPEN SETS AND WEAKLY b-I-CONTINUOUS FUNCTIONS
Jamal M. Mustafa, Samer Al. Ghour, Khalid Al Zoubi

The notion of weakly b-I-open sets is introduced and used to define the notions of weakly b-I-continuous functions, weakly b-I-open functions, and weakly b-I-closed functions. Some characterizations and properties regarding these concepts are discussed. (pp. 23-32)

REDEFINED GENERALIZED FUZZY R-SUBGROUPS OF NEAR-RINGS
Fen Luo, Jianming Zhan

By means of a kind of new idea, we redefine generalized fuzzy R-subgroups of a near-ring and investigate some of its related properties. Some new characterizations are also given. In particular, we introduce the concepts of strong prime (semiprime) $(\in, \in \vee q)$-fuzzy R-subgroups of near-rings, and discuss the relationship between strong prime (resp., semiprime) $(\in, \in \vee q)$-fuzzy R-subgroups and prime (resp., semiprime) $(\in, \in \vee q)$-fuzzy R-subgroups of near-rings. (pp. 33-42)

GENERALIZED FUZZY ALGEBRAIC HYPERSYSTEMS
Jianming Zhan, Bijan Davvaz, Young Bae Jun

The concept of quasi-coincidence of a fuzzy interval value with an interval valued fuzzy set, which is a generalization of quasi-coincidence of a fuzzy point with a fuzzy set, is introduced. Using this new idea, the notion of interval valued (α, β)-fuzzy subalgebraic hypersystems in an algebraic hypersystem, which is a generalization of a fuzzy subalgebraic system, is defined, and related properties are investigated. We also discuss entropy of interval valued (α, β)-fuzzy subalgebraic hypersystems. In particular, the study of interval valued $(\in, \in \vee q)$-fuzzy subalgebraic hypersystems of an algebraic hypersystem is dealt with. Finally, we consider the concept of implication-based interval valued fuzzy subalgebraic hypersystems. (pp. 43-58)

NEW RESULTS ON REMOTALITY IN BANACH SPACES
M. Sababheh, R. Khalil

A set E in a Banach space X is called remotal if for each $x \in X$, there exists an $e \in E$ such that $\|x - e\| = \sup\{\|x-e\| : e \in E\}$. If e is unique, E is called uniquely remotal. One of the main results of this paper is: a weakly closed bounded set E in a reflexive Banach space is uniquely remotal if and only if the weak closed convex hull of E is uniquely remotal. (pp. 59-66)

THE HYPERBOLIC MENELAUS THEOREM IN THE POINCARÉ DISC MODEL OF HYPERBOLIC GEOMETRY
Florentin Smarandache, Cătălin Barbu

In this note, we present the hyperbolic Menelaus theorem in the Poincaré disc of hyperbolic geometry. (pp. 67-72)

ON THE FINITE GROUPS WITH AVERAGE LENGTH 3 OF CONJUGACY CLASSES
Xianglin Du

This article studies the problem of average length of conjugacy classes of finite groups, and classifies all finite groups with the average length 3 of conjugacy classes. (pp. 73-78)

ON (λ, μ)-FUZZY SUBHYPERLATTICES
Yuming Feng, Qingsong Zeng, Huiling Duan

We first introduce the concepts of (λ, μ)-fuzzy subhyperlattices and (λ, μ)-fuzzy ideals. Secondly, we list some equivalent conditions of them. Lastly, we prove that the Cartesian product of two (λ, μ)-fuzzy subhyperlattices is still a (λ, μ)-fuzzy subhyperlattice. This paper can be seen as a generalization of [1].(pp. 79-86)

BLOCKWISE REPEATED LOW-DENSITY BURST ERROR CORRECTING LINEAR CODES

Dass Bal Kishan, Madan Surbhi

The paper presents necessary and sufficient condition on the number of parity-check digits required for the existence of a linear code capable of correcting errors in the form of 2-repeated low-density bursts occurring within a sub-block. An illustration of a code of length 24 correcting all 2-repeated low-density bursts of length 3 or less with weight 2 or less occurring within a sub-block of length 12 has also been provided.   (pp. 87-100)

MULTIDIMENSIONAL GENERATING RELATIONS SUGGESTED BY A GENERATING RELATION FOR HYPER-BESSEL FUNCTIONS

M.A. Pathan And M.G. Bin-Saad

The authors derive a general theorem on multidimensional generating functions involving arbitrary coefficients. By appropriately specializing these coefficients a number of (known and new) results are shown to follow as applications of the theorem.   (pp. 101-108)

RARELY b-CONTINUOUS FUNCTIONS

Saeid Jafari, Uğur Şengül

In this paper we introduce a new class of functions called rarely b-continuous. Some characterizations and several properties concerning rare b-continuity are obtained.   (pp. 109-116)

A STUDY ON AUGMENTED GRADED RINGS

Mashhoor Refai

In this paper, we study some properties of augmented graded rings and give the relationships between augmented graded rings and other types of well known strongly graded rings.   (pp. 117-124)

WEAK LATTICES

Ivan Chajda, Helmut Länger

The ordered set induced by a BCK-algebra $\mathcal{A}$ can be equipped with a binary term operation on $\mathcal{A}$ such that the resulting structure is a so-called weak semilattice. If this structure is endowed with an antitone involution we can introduce a second binary operation and the structure arising this way is called a weak lattice. Properties of weak lattices and weak semilattices are investigated and connections to directoids and semilattices are established. Moreover, a derived structure similar to basic algebras is introduced and called a skew basic algebra. An axiomatization of these algebras is presented. It is shown that every bounded poset can be organized into a weak lattice and the number of non-isomorphic weak lattices of cardinality less than five is determined.   (pp. 125-140)

4

GENERALIZED QUASI-COINCIDENCE IN FUZZY SUB-HYPERMODULES
R. Ameri, H. Hedayati, M. Norouzi

We consider a general form of the notion of quasi-coincidence of a fuzzy point with a fuzzy set. We introduce the notions of $(\in, q_k)$-fuzzy sub-hypermodule and $(\in, \in \vee q_k)$-fuzzy sub-hypermodule of a given hypermodule, and investigate several properties of these notions. (pp. 215-232)

SOME MODULAR EQUATIONS IN THE FORM OF SCHLÄFLI
M.S. Mahadeva Naika, K. Sushan Bairy

On page 90 of his first notebook, S. Ramanujan records Schläfli-type modular equations for degrees 3, 5, 7, 11, 13, 17 and 19. In this paper, we establish Schläfli-type modular equations for degrees 11, 13, 17 and 19 which are recorded by Ramanujan in his first notebook. We also establish several new Schläfli-type modular equations of degrees 2, 4, 9, 15, 23, 25, 29, 31, 47 and 71. As an application, we deduce some explicit evaluations of Ramanujan-Weber class invariants. (pp. 233-252)

COMMON FIXED POINTS FOR WEAKLY COMPATIBLE MAPPINGS AND APPLICATIONS IN DYNAMIC PROGRAMMING
Hemant Kumar Pathak, Rakesh Tiwari

In this note, we establish a common fixed point theorem for a quadruple of self mappings on a complete metric space satisfying weak compatibility and a generalized Φ-contraction. Our main result improves and extends some known results. As an application, we use our main result to obtain common solutions of certain functional equations arising in dynamic programming. We also discuss an illustrative example to validate all the conditions of the main result in dynamic programming. (pp. 253-268)

ON BOUNDEDNESS AND CONTNUITY OF JORDAN, ORDINARY AND QUADRATIC PRODUCT IN ALTERNATIVE SEMI-PRIME ALGEBRAS
A. Tajmouati

In this work we prove that, if A is an alternative semi-prime algebra, which is considered as a complete convex bornological vector space (respectively, completely bornological locally convex space) and its bornology has a net, then there is equivalent between separating boundedness (resp. separating continuity) of Jordan, ordinary product and quadratic product. If A is again topological, then the boundedness is global and if A is Fréchet space, there is an equivalence between the continuity of these three products. (pp. 269-278)

ON HYPERRINGS ASSOCIATED WITH BINARY RELATIONS ON SEMIHYPERGROUP

Sanja Jančić Rašović

In this paper we construct a class of hyperrings associated with binary relations on semihypergroup. We establish a connection between the constructed hyperring $(H, +_{\rho_1}, \circ_{\rho_2})$ and the hyperring of multiendomorphisms of hypergroup $(H, +_{\rho_1})$. Also, we analyze subclasses of the constructed class, which are associated with partial orderings on a set of multimappings.   (pp. 279-288)

CENTRALIZERS ON SEMIPRIME GAMMA RINGS
M.F. Hoque, A.C. Paul

Let M be a 2-torsion free semiprime Γ-ring satisfying a certain assumption and let $T : M \to M$ be an additive mapping such that

$$T(x\alpha y\beta x) \quad = x\alpha T(y)\beta x$$

holds for all $x, y \in M$, and $\alpha, \beta \in \Gamma$. Then we prove that T is a centralizer. We also show that T is a centralizer if M contains a multiplicative identity 1.(pp. 289-302)

INTEGRAL FILTERS AND INTEGRAL BL-ALGEBRAS
Rajab Ali Borzooei, A. Paad

In this paper, we introduce the concepts of integral filters and integral BL-algebras. With respect to concepts, we give some related results. In particular, we prove that an integral BL-algebra is a perfect, local, directly indecomposable BL-algebra and SBL-algebra. Also, we give some relations among integral filters and some types of filters in BL-algebras, such as prime, primary, perfect, fantastic, positive implicative and obstinate filters.   (pp. 303-316)

HAAR WAVELET METHOD FOR NUMERICAL SOLUTION OF TELEGRAPH EQUATIONS
Naresh Berwal, Dinesh Panchal, C.L. Parihar

In this paper we modified the result given by Hariharan [18] on the solution of Fisher's equation. We are giving the solution of second -order linear hyperbolic telegraph equation in one - space dimension. The telegraph equation is solved numerically by Haar wavelet method. Two numerical examples show the accuracy of the method. The present method is very simple, small computation costs and flexible.   (pp. 317-328)

CAUCHY'S METHOD AND BILATERAL BASIC HYPERGEOMETRIC SERIES
Roselin Antony, Hailemariam Fiseha

In this paper, we find bilateral basic hypergeometric series adapting Cauchy's method used by Bailey, Slater, Fredric Jouhet and Michael Schlosser.

SOME CLASSES OF p-VALENT MEROMORPHIC FUNCTIONS DEFINED BY A NEW OPERATOR
M.K. Aouf, A.O. Mostafa, A. Shamandy, E.A. Adwan

In this paper, we introduce some classes of p-valent meromorphic functions associated with a new operator and investigate various properties for these subclasses. (pp. 337-348)

ALGEBRAIC HYPERSTRUCTURES OF SOFT SETS ASSOCIATED WITH TERNARY SEMIHYPERGROUPS
Kostaq Hila, Krisanthi Naka, Violeta Leoreanu-Fotea, Sabri Sadiku

Molodtsov introduced the concept of soft set, which can be seen and used as a new mathematical tool for dealing with uncertainty. In this paper we introduce and initiate the study of soft ternary semihypergroups by using soft set theory. The notions of soft ternary semihypergroups, soft ternary subsemihypergroups, soft left (right, lateral) hyperideals, soft hyperideals, soft quasi-hyperideals and soft bi-hyperideals are introduced, and several related properties are investigated. (pp. 349-372)

A NEW CHARACTERIZATION OF SPORADIC SIMPLE GROUPS
Li-Guan He, Gui-Yun Chen, Hai-Jing Xu

Let G be a finite group, $k_1(G)$ denote the largest element order of G, and $k_2(G)$, the second largest element order. In this paper, we show that each sporadic simple group G can be uniquely determined by the order of G and $k_i(G)$, where $i \leq 2$. (pp. 373-392)

MODIFIED (G'/G)-EXPANSION METHOD WITH GENERALIZED RICCATI EQUATION TO THE SIXTH-ORDER BOUSSINESQ EQUATION
Muhammad Shakeel, Syed Tauseef Mohyud-Din

In this article, abundant traveling wave solutions of the sixth-order Boussinesq equation have been obtained in a uniform way by using the alternative (G'/G)-expansion method wherein the generalized Riccati equation is used. It is shown that the alternative (G'/G)-expansion method together with the generalized Riccati equation provides advance mathematical tool for solving nonlinear partial differential equations. Numerical results coupled with the graphical representation explicitly reveal the complete reliability and high efficiency of the proposed algorithm. (pp. 393-410)

CERTAIN PROPERTIES OF MITTAG-LEFFLER FUNCTION WITH ARGUMENT x^α, $\alpha > 0$

Jyotindra C. Prajapati

In this paper, author discusses some interesting properties such as Composition property, Power series expansion, Inverse property, Increasing property, Positivity and Limiting case of Mittag-Leffler function with argument x^α, $\alpha > 0$.

LOCALIZED NEARLY m-EMBEDDED PROPERTY OF SOME SUBGROUPS OF FINITE GROUPS

Yong Xu

Let A be a subgroup of a finite group G and $\Sigma : G_0 \leq G_1 \leq \cdots \leq G_n$ some subgroup series of G. Suppose that for each pair (K, H) such that K is a maximal subgroup of H and $G_{i-1} \leq K < H \leq G_i$, for some i, either $A \cap H = A \cap K$ or $AH = AK$. Then A is said to be Σ-embedded in G; A is said to be nearly m-embedded in G if G has a subgroup T and a $\{1 \leq G\}$-embedded subgroup C in G such that $G = AT$ and $T \cap A \leq C \leq A$. In this paper, we localize the above conditions in the G-normalizer of Sylow subgroups of the group G. Some new characterizations of some classes of finite groups are given.