

INDIAN MATHEMATICAL SOCIETY
79th ANNUAL CONFERENCE
(DECEMBER 28-31, 2013)

ABSTRACTS OF PAPERS

Organized by

*Rajagiri School of Engineering and Technology,
Cochin (Kerala)*

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ABSTRACT OF THE PAPERS FOR AMU PRIZE

AMU-1: Generalized derivations and commutativity in near rings,
Phool Miyan (Aligarh : phoolmiyan83@gmail.com).

Let N be a near ring. An additive mapping $f : N \rightarrow N$ is said to be a right generalized (resp. left generalized) derivation with associated derivation d on N if $f(xy) = f(x)y + xd(y)$ (resp. $f(xy) = d(x)y + xf(y)$) for all $x, y \in N$. A mapping $f : N \rightarrow N$ is said to be a generalized derivation with associated derivation d on N if f is both a right generalized and a left generalized derivation with associated derivation d on N . The purpose of the present paper is to prove some theorems in the setting of a semigroup ideal of a 3-prime near ring admitting a generalized derivation, thereby extending some known results proved by Bell and Mason [North-Holland Mathematical Studies, 137 (1987), 31-35] and Bell [Kluwer Academic Publ. Math. Appl. Dordr., 426 (1997), 191-197] on derivation to generalized derivation of a 3-prime near ring.

AMU-2: Characterization of symmetric biderivations on prime rings,
Faiza Shujat (Aligarh : faiza.shujat@gmail.com)

The purpose of the present paper is to prove some results concerning symmetric biderivation on a one sided ideal of a ring, which are of independent interest. Moreover, we obtain a generalization of a result of Bresar [J. Algebra 172 (1995)]. A biadditive mapping $D : R \times R \rightarrow R$ is called a biderivation if for every $x \in R$, the map $y \mapsto D(x, y)$ as well as for every $y \in R$, the map $x \mapsto D(x, y)$ is a derivation of R , i.e., $D(xy, z) = D(x, z)y + xD(y, z)$ for all $x, y, z \in R$ and $D(x, yz) = D(x, y)z + yD(x, z)$ for all $x, y, z \in R$. In [Canad Math Bull. 22(4) (1979)] Herstein determined the structure of a prime ring R admitting a nonzero derivation d such that the values of d commute, that is for which $d(x)d(y) = d(y)d(x)$ for all $x, y \in R$. Perhaps even more natural might be the question of what can be said on a derivation when elements in a prime ring commute with all the values of a nonzero derivation. Herstein addressed this question by proving the following result. If d is a nonzero derivation of a prime ring R and $a \notin Z(R)$ is such that $[a, d(x)] = 0$ for all $x \in R$, then R has a characteristic 2, $a^2 \in Z(R)$ and $d(x) = [\lambda a, x]$, for all $x \in R$ and $\lambda \in C$, the extended centroid of R . In the mentioned paper, Bresar generalized above result of

Herstein and gave a dscription of derivations d , g and h of a prime ring satisfying $d(x) = ag(x) + h(x)b$, $x \in R$, where a, b are some fixed elements in R . Then d, g, h has the following forms $d(x) = [\lambda ab, x]$, $g(x) = [\lambda b, x]$ and $h(x) = [\lambda a, x]$ for all $x \in R$. Inspired by all these observations, our aim is to generalize above results for the case of biderivations on two sided ideals of prime rings. We prove the following. Let R be a prime ring of $\text{char} \neq 2$, I a nonzero ideal of R and $D, G, H : I \times I \rightarrow Q$ be biderivations of R with trace d, g, h , respectively. Suppose there exists $a, b \in R$ such that $D(x, x) = aG(x, x) + H(x, x)b$ for all $x \in I$. If $a, b \notin Z(R)$, then there exists $\lambda \in C$ such that $d(x) = [\lambda ab, x]$, $g(x) = [\lambda b, x]$ and $h(x) = [\lambda a, x]$ for all $x \in I$.

**ABSTRACT OF THE PAPERS FOR
V.M. SHAH PRIZE**

VM Shah-1: Bi Unique Range Sets For Meromorphic Functions,
Abhijit Banerjee (West Bengal : abanerjee_kal@yahoo.co.in, abanerjeekal@gmail.com).

Let f and g be two non-constant meromorphic functions and S be a set of distinct elements of \mathbb{C} and $E_f(S) = \bigcup_{a \in S} \{z : f(z) = a\}$, where each point is counted according to its multiplicity. Denote by $\overline{E}_f(S)$ the reduced form of $E_f(S)$. If $E_f(S) = E_g(S)$, we say that f and g share the set S CM. If $\overline{E}_f(S) = \overline{E}_g(S)$, we say that f and g share the set S IM. In this paper we introduce a new kind of pair of finite range sets in \mathbb{C} such that two meromorphic functions share the sets with some relaxed sharing conditions become identical.

ABSTRACT OF THE PAPERS FOR IMS PRIZE (GROUP -I)

IMS-1: Modified lattice paths and Gordon-McIntosh eight order mock theta functions, *Rachna Sachdeva (Chandigarh: rachna.sachdeva.1989@gmail.com)*.

We modify the lattice paths introduced by Agarwal and Bressoud in 1989. We use these modified lattice paths to provide combinatorial interpretations of two Gordon-McIntosh eight order mock theta functions.

IMS-2: Number of self-orthogonal negacyclic codes over finite fields, *Amita Sahni (Chandigarh : sahniamita05@gmail.com)*.

The main objective of this article is to study self-orthogonal negacyclic codes of length n over a finite field \mathbb{F}_q , where the characteristic of \mathbb{F}_q does not divide n . We investigate issues related to their existence, characterization and enumeration. We find the necessary and sufficient conditions for the existence of self-orthogonal negacyclic codes of length n over a finite field \mathbb{F}_q . We characterize the defining sets and the corresponding generator polynomials of these codes. We obtain formulae to calculate the number of self-dual and self-orthogonal negacyclic codes of a given length n over \mathbb{F}_q . The enumeration formula for self-orthogonal negacyclic codes involves a two-variable function χ defined by $\chi(d, q) = 0$ if d divides $(q^k + 1)$ for some $k \geq 0$ and $\chi(d, q) = 1$, otherwise. We have found necessary and sufficient conditions when $\chi(d, q) = 0$ holds.

IMS-3: The b-chromatic number of graphs, *Aparna Lakshmanan S. (Kerala : aparnaren@gmail.com)*.

Given a coloring of G , a color class of G is the collection of all vertices having the same color. A coloring of G is a b -coloring if every color class contains a vertex that is adjacent to at least one vertex in each of the remaining color classes. The b -chromatic number of G , denoted by $\varphi(G)$, is the largest integer k such that G admits a b -coloring with k colors. In this paper, we find the b -chromatic number of complete- n -partite graphs and the double graph of the complete graphs, cycles and paths. In the last section, the problem of "for what values of $a \in [\chi(G), d + 1]$ does there exist a d -regular graph G , with $\varphi(G) = a$ " is discussed.

IMS-4: Combinatorial Interpretations of two Gordon-McIntosh eight order mock theta functions, *Garima Sood (Chandigarh : garima-sood18@gmail.com).*

In 2004, A.K. Agarwal gave the combinatorial interpretations of four mock theta functions of Srinivasa Ramanujan using n -color partitions which were introduced by himself and G.E. Andrews in 1987. In this paper we introduce a new class of partitions and call them “split $(n+t)$ -color partitons”. These new partitions generalize Agarwal-Andrews $(n+t)$ -color partitons. We use these new combinatorial objects and give combinatorial meaning to two eight order mock theta functions of Gordon-McIntosh found in 2000. The work done here has great potential for further research.

IMS-5: On Some Modular Equations In The Spirit Of Ramanujan, *B.R. Srivatsa Kumar, (Manipal : sri_vatsabr@yahoo.com).*

We establish certain new modular equations, by employing Ramanujan’s modular equations.

IMS-6: Equitable Δ -coloring conjecture for generalized Mycielskian of graphs, *T. Kavaskar (t.kavaskar@yahoo.com).*

A graph G is equitably k -colorable if G has a proper k -coloring in which any two color classes differ in size by at most 1. The smallest integer k for which G is equitably k -colorable is defined to be the equitable chromatic number of G , denoted by $\chi = (G)$. In 1994, Chen, Lih and Wu conjectured that, every connected graph G , different from complete graph, odd cycle or $K_{2n+1,2n+1}$, is equitably ∇ -colorable. Only few families of graphs have been proved to satisfy this conjecture. In this paper, we prove that one more family of graphs satisfies this conjecture, namely, the generalized Mycielskian of some families graphs.

**ABSTRACT OF THE PAPERS FOR
IMS PRIZE (GROUP -II)**

IMS-7: Existence Theorems for Solvability of Functional Equations arising in Dynamic Programming, Deepmala (Raipur : dm-rai23@gmail.com).

The existence problems of solutions of various functional equations arising in dynamic programming are both theoretical and practical interest. Under certain conditions, we give some sufficient conditions ensuring both the existence and the uniqueness of solutions for functional equation arising in dynamic programming of multistage decision processes. Here, we use Boyd-Wong fixed point theorem to show the solvability of the functional equation arising in dynamic programming. Our main results extend, improve and generalize the results due to several authors. Thus, we can say that the method described in our main section is an important procedure which is helpful for engineers, computer scientists, economists and researchers for finding the existence and uniqueness of the solutions of functional equations arising in dynamic programming. An example is also given to demonstrate the advantage of our results then existing ones in the literature.

**ABSTRACT OF THE PAPERS FOR
IMS PRIZE (GROUP -III)**
{no paper}

**ABSTRACT OF THE PAPERS FOR
IMS PRIZE (GROUP -IV)**

IMS-8: Solution and stability of a functional equation originating from consecutive terms of a geometric progression, *M. Arunkumar* (Tiruvannamalai : *annarun2002@yahoo.co.in*)

In this paper, the author has proved the generalized Ulam-Hyers stability of a new type of the functional equation

$$l(uv) + l\left(\frac{u}{v}\right) = 2l(u),$$

with $v \neq 0$, which is originating from consecutive terms of an geometric progression. An application of this functional equation is also studied.

IMS-9: Existence and controllability results for mixed functional integrodifferential equations with infinite delay, *Kishor D. Kucche* (Maharashtra : *kdkucche@gmail.com*).

Sufficient conditions are established for the existence of mixed neutral functional integrodifferential equations with infinite delay. The results are obtained using the theory of fractional powers of operators and the Sadovskii's fixed point theorem. As an application we prove a controllability result for the system.

**ABSTRACT OF THE PAPERS FOR
IMS PRIZE (GROUP -V)**
{no paper}

**ABSTRACT OF THE PAPERS FOR
IMS PRIZE (GROUP -VI)**

IMS-10: Mathematical Modeling of delivery of molecular medicine to solid tumors with chemotherapy, Ram Singh (Rajouri : *singh_ram2008@hotmail.com*).

The key aim of this investigation is to develop a pharmacokinetic mathematical model for the localization of anti-cancer agents in the solid tumor tissues and subsequent intra tumoral drug generation associated with two-step cancer chemotherapy. The equations governing the diffusion of large anti-cancer molecular conjugate out of vasculature and into the tumor are derived and numerically analyzed. The expressions for the concentration of molecular agents into various compartments have been obtained. The effects of the tumor vasculature, binding kinetics, and administration schedule on the intratumoral conjugate concentration are investigated and the critical parameters that influence the localization and retention of the agent in the tumor are determined. We have incorporated the different cases of dosing intervals in the present model which makes our model more realistic than the model have been presented so far. Sensitivity analysis has been performed to validate the obtained analytical results. The finite difference technique has been used to solve the partial differential equations. Predictions made by the developed model can lead for the improvement of treatment protocols for two-step cancer chemotherapy.

A: Combinatorics, Graph Theory and Discrete Mathematics

A-1: The diameter variability of the strong product of graphs, *Chithra M.R. and A. Vijayakumar (Cochin).*

The diameter of a graph can be affected by the addition or the deletion of edges. In this paper we examine the strong product of graphs whose diameter increases (decreases) by the deletion (addition) of a single edge. The problems of minimality and maximality of the strong product with respect to its diameter are also solved. These problems are motivated by the fact that a good network must be hard to disrupt and the transmissions must remain connected even if some vertices or edges fail.

A-2: Friendly Index Set of One Point Union of Two Complete Graphs, *Pradeep G. Bhat and Devadas Nayak C (Manipal : devadas-nayakc@yahoo.com).*

Let G be a graph with vertex set $V(G)$ and edge set $E(G)$. Consider the set $A = \{0, 1\}$. A labeling $f : V(G) \rightarrow A$ induces a partial edge labeling $f^* : E(G) \rightarrow A$ defined by $f^*(xy) = f(x)$, if and only if $f(x) = f(y)$, for each edge $xy \in E(G)$. For $i \in A$, let $v_f(i) = |\{v \in V(G) : f(v) = i\}|$ and $e_{f^*}(i) = |\{e \in E(G) : f^*(e) = i\}|$. A labeling f of a graph G is said to be friendly if $|v_f(0) - v_f(1)| \leq 1$. The balance index set of a graph G , denoted by $BI(G)$ is defined as $\{|e_{f^*}(1) - e_{f^*}(0)| : \text{where } f^* \text{ runs over all friendly labeling } f \text{ of } G\}$. If the labeling $f : V(G) \rightarrow A$ induces an edge labeling $f^* : E(G) \rightarrow A$ defined by $f^*(xy) = |f(x) - f(y)|$ for each edge xy in $E(G)$, then the friendly index set of a graph G , denoted by $FI(G)$ is defined by $\{|e_{f^*}(1) - e_{f^*}(0)| : \text{where } f^* \text{ runs over all friendly labeling } f \text{ of } G\}$. In this paper we obtain the relation between balance index set and friendly index set. Also we obtain friendly index set of one point union of two complete graphs.

A-3: On The Path Eigenvalues Of Graphs, *S.C. Patekar (Pune : 2008scpatekar@math.unipune.ac.in).*

We introduce the concept of Path Matrix for a graph and explore the eigen-values of this matrix. We call these eigenvalues as the path eigenvalues of the graph. Some results concerning path eigenvalues have been

investigated.

A-4: Removal cycles avoiding two connected subgraphs, *Y. M. Borse and B. N. Waphare (Pune : ymborse@math.unipune.ac.in; ymborse11@gmail.com).*

In this paper, we provide a sufficient condition for the existence of a cycle C in a connected graph G which is edge-disjoint from two connected subgraphs of G such that $G - E(C)$ is connected.

A-5: A Characterization of n -Connected Matroids, *P.P. Malavadkar (Pune : pmalavadkar@gmail.com).*

It is known that if M is n -connected matroid then, its girth and cogirth is at least n . This condition is necessary but not sufficient. In this paper we give a necessary and sufficient condition for a $(n - 1)$ -connected matroid to be n -connected.

A-6: On 3-connected es-splitting binary matroids, *S.B. Dhotre (Pune).*

The es-splitting operation on a 3-connected matroid need not pre-serve the 3-connectedness of the matroid. In this paper, we provide a sufficient condition for a 3-connected binary matroid which yields a 3-connected binary matroid by es-splitting operation. We derive a splitting lemma for 3-connected matroids from the results obtained in the process.

A-7: Hexagonal array grammar system, *Jismy Joseph, Dersanam-bika K.S. and Sujathakumari K. (Kerala : jismykjoseph@gmail.com, dersanapdf@yahoo.com, nksujathakumari@gmail.com).*

Cooperating rectangular array grammar system was introduced in 1995 by J.Dassow, R.Freund and G.Paun. The results of the rectangular array grammar system either contradict the corresponding result for string grammar system or are not even known for the string grammar system. Motivated by their work here we introduce hexagonal array grammar system which is an extension of rectangular array grammar system. Also we investigate about the generating power of hexagonal array grammar system and compare different types of hexagonal array grammar system.

B: Algebra, Number Theory and Lattice Theory

B-1: Multiplicative generalized derivations in semiprime rings, *Asma Ali and Shahoor Khan (Aligarh : asma.ali2@rediffmail.com, shahoor.khan@rediffmail.com).*

Let R be a semiprime ring and let $F, f : R \rightarrow R$ be maps (not necessarily additive) satisfying $F(xy) = F(x)y + xf(y)$ for all $x, y \in R$. The purpose of the paper is to study the following identities: (i) $F(xy) \pm [x, y] \in Z(R)$, (ii) $F(xy) \pm (x \circ y) \in Z(R)$, (iii) $F(x)F(y) \pm [x, y] \in Z(R)$, (iv) $F(x)F(y) \pm (x \circ y) \in Z(R)$, (v) $F([x, y]) \pm [x, y] = 0$, (vi) $F([x, y]) \pm xy = 0$, (vii) $F(x \circ y) \pm (x \circ y) = 0$, (viii) $F(xy) = F(x)F(y)$ and (ix) $F(xy) = F(y)F(x)$ for all x, y in some appropriate subset of R .

B-2: Some Results on Derivations on Semirings, R . *Vembu (Tamilnadu).*

In the recent past the concept of derivation on many algebraic structures were defined and theories were developed to a certain extent on them. Derivation on semirings, derivations on semi-prime rings and Jordan derivation on semirings are a few among them. The theory available in the literature on these derivations contains many conceptual and logical errors. In this paper we point out some of such errors and correct them. We also prove some results on derivations on semirings in this paper.

B-3: Special Jacobson radicals for near-rings, *Ravi Srinivasa Rao and K.J. Lakshmi Narayana (Andhra Pradesh).*

For a right near-ring R , right R -groups of type- d_ν are introduced, which is a class of distributively generated right R -groups, $\nu \in \{0, 1, 2\}$. Using them the right Jacobson radicals of type- d_ν , $J_{d_\nu}^r$, are introduced for near-rings which generalize the Jacobson radical of rings. It is proved that $J_{d_\nu}^r$ is a special radical in the class of all near-rings.

B-4: $(\alpha, 1)$ Derivations on Semirings, *S.P. Nirmala Devi and M. Chandramouleeswaran (Tamil Nadu : moulee59@gmail.com, spnirmala1980@gmail.com).*

The notion of a semiring was introduced by H.S. Vandiver in 1934. The

notion of derivations of rings can be naturally extended in semirings. The theory of derivations on semirings is not well developed as compared to the theory of derivations on rings due to the absence of additive inverse and the lack of some important concepts included by commutators. This motivated Chandramouleeswaran and Thiruveni to discuss in detail the notion of derivations on semirings in 2010. In 2008, Mustaf Kazaz and AkinAlkan introduced the notion of two-sided $\Gamma - \alpha -$ derivations in prime and semiprime Γ -near-rings. In this paper, we introduce the notion of two sided α derivation and $(\alpha, 1)$ derivation on a semiring and derive some of its properties on prime semirings.

B-5: Left Jordan Derivations on Semirings, V. Thiruveni and M. Chandramouleeswaran (Tamil Nadu : moulee59@gmail.com, thiriveni2009@gmail.com).

Based on the works on derivations on rings and near rings, in 2010, we introduced the notion of derivation on semirings. Here, we introduce the notion of Left Jordan derivation on semirings and the main theorem of this paper states that the existence of a nonzero Left Jordan derivation $D : S \rightarrow X$ forces S to be commutative.

B-6: On Left Derivations on TM-algebras, T. Ganesh Kumar and M. Chandramouleeswaran (Tamil Nadu : moulee59@gmail.com, ganeshkumar.wbc@gmail.com).

It is well known that BCK and BCI-algebras are two classes of algebras of logic. They were introduced by Imai and Iseki and have been extensively investigated by many researchers. It is known that the class of BCK-algebras is a proper subclass of the class of BCI-algebras. Recently another algebra based on propositional calculi was introduced by Tamilarasi and Mekalai in the year 2010 known as TM-algebras. Motivated by the notion of derivations on rings and near-rings Jun and Xin studied the notion of derivation on BCI-algebras. Recently, in 2012 we have introduced the notion of derivation on TM-algebras. In this paper, we introduce the notion of left derivation on TM-algebras. We study the properties of regular left derivations on TM-algebras and prove that the set of all left derivations on a TM-algebra forms a semi group under a suitable binary composition.

B-7: Level β -subalgebras of β -algebras, M. Abu Ayub Ansari and M. Chandramouleeswaran (Tamil Nadu : moulee59@gmail.com,

ayubansari61@gmail.com).

In 1966, Y.Imai and K.Iseki introduced two new classes of abstract algebras: BCK-algebras and BCI-algebras. It is known that the class of BCK-algebras is a proper subclass of the class of BCI-algebras. In 2002, J.Neggers and H.S.Kim introduced the notion of α -algebras. In 2012 Y.H.Kim investigated some properties of α -algebras. Lofti A.Zadeh, In 1965 introduced the theory of fuzzy sets . The study of fuzzy algebraic structures was started with the introduction of the concept of fuzzy subgroups in 1971, by Rosenfeld. O.G.Xi applied the concept of fuzzy sets to BCK-algebras and got some results in 1991. In 1993, Y.B.Jun applied it to BCI-algebras. This motivated us to study the fuzzy algebraic structures on α -algebras. Recently, we have introduced the notion of fuzzy α -subalgebras on α -algebras and investigated some of their properties. In this paper, we introduce the notion of level α -subalgebras of a α -algebra and investigate some of their properties.

B-8: Cocentralizing derivations on prime rings, Asma Ali and Farhat Ali (Aligarh : asma_ali2@rediffmail.com, 04farhatamu@gmail.com)

Let R be a ring with center $Z(R)$. An additive mapping $f : R \rightarrow R$ is said to be a derivation on R if $f(xy) = f(x)y + xf(y)$, for all $x, y \in R$. We extend the result of Samman and Thaheem to the case of Lie ideals. In the present note, we prove that let R be a semiprime ring L be a non zero square closed Lie ideal of R such that $L \not\subseteq Z(R)$ and f, g are derivations of R such that $f(x)y + yg(x) = 0$ for all $x, y \in L$. If $f(L) \subseteq L$ and $g(L) \subseteq L$, then $f(u)[x, y] = 0 = [x, y]g(u)$ for all $x, y, u \in L$ and f, g are central on L . If R is a prime ring with $char R = 2$, then $f = g = 0$ on R .

B-9: On symmetric generalized biderivations of prime and semiprime rings, Asma Ali and Khalid Ali Hamdin (Aligarh : asma_ali2@rediffmail.com, hamdinkh@yahoo.com)

Let R be a ring with center $Z(R)$. A biadditive mapping $D(., .) : R \times R \rightarrow R$ is said to be a biderivation if for all $x, y \in R$, the mappings $y \mapsto D(x, y)$ and $x \mapsto D(x, y)$ are derivations of R . A mapping $f : R \rightarrow R$ defined by $f(x) = D(x, x)$ for all $x \in R$, is called trace of D . A biadditive mapping $\Delta : R \times R \rightarrow R$ is said to be a generalized D -biderivation if for every $x \in R$, the map $y \mapsto \Delta(x, y)$ is a generalized derivation of R associated with the function $y \mapsto D(x, y)$ as well as for every $y \in R$, the map $x \mapsto \Delta(x, y)$ is a generalized derivation of R associated with the function $x \mapsto D(x, y)$,

where D is a biadditive map on R . In this paper, motivated by a result of Vukman, we prove that if L is a noncentral square closed Lie ideal U of a prime ring R admitting a symmetric generalized D -biderivation Δ is commuting on U , then $\Delta = 0$ on U . Moreover, we prove that a nonzero left ideal L of a 2-torsion free semiprime ring is central if it satisfies one of the following properties: (i) $[x, y] = f(xy) - f(yx)$, (ii) $[x, y] = f(yx) - f(xy)$, (iii) $xy - D(x, x) = yx - D(y, y)$, (iv) $xy + D(x, x) = yx + D(y, y)$, (v) $yx - D(x, x) = xy - D(y, y)$ and (vi) $yx + D(x, x) = xy + D(y, y)$, for all $x, y \in L$, where f stands for the trace of symmetric biderivation $D(., .) : R \times R \rightarrow R$.

B-10: On classical prime subtractive subsemimodules of quotient semimodule, *Jayprakash Ninu Chaudhari (Jalgaon : jnchaudhari@rediffmail.com).*

In this paper, we obtain the relation between classical prime (weakly classical prime) subtractive subsemimodules containing a Q -subsemimodule N of an R -semimodule and classical prime (weakly classical prime) subtractive subsemimodule of the quotient semimodule $M/N_{(Q)}$.

B-11: On generalization of classical prime subsemimodules, *Dipak Ravindra Bonde (Dharangaon : drbonde@rediffmail.com).*

In this paper, the concept of classical prime subsemimodule is generalized to weakly classical prime subsemimodules of semimodules over semirings. We prove that, if N is a weakly classical prime subtractive subsemimodule of a semimodule M over an entire semiring R , then either N is classical prime or $(N : M)(N : M)N = 0$.

B-12: Characterization of strong regularly in near-rings, *Dr. M.K. Manoranjan (Madhepura : manojmanoranjan.kumar@gmail.com).*

In this paper, we shall prove some characterizations of the strong regularity in near-rings which are closely related with strongly reduced near-rings. A near-ring R is said to be left regular if for each $a \in R$ there exists $x \in R$ such that $a = xa^2$. A near-ring is called strongly left regular if R is left regular and regular, similarly we define right regular. A strongly left regular and strongly right near-ring is called strongly regular near-ring. Equivalently, left and right regularity implies strong regularity. Also, the concept of strongly left, strongly right and strong regularities are all equivalent. An idempotent element $e \in R$ is called left semi central if $ea = eae$ for $a \in R$.

Similarly, right semi centrality can be defined in a symmetric way. A near-ring in which every idempotent element is left semi central is called left semi central. A near-ring R is reduced if R has no non-zero nilpotent elements. We find that a strongly regular near-ring is reduced and every strongly reduced near-ring is reduced.

B-13: Ideals In Bisemirings, *M.D. Suryawanshi (Dhule : manohar-suryawanshi65@gmail.com)*.

In this paper, we introduce the notion of a partitioning biideal in a bisemiring and hence the quotient structure of bisemiring is defined. Also we prove that I is the partitioning biideal of a bisemiring R with respect to two subsets Q and Q' , then the quotient bisemiring $\frac{R}{I_Q}$ and $\frac{R}{I_{Q'}}$ are isomorphic.

B-14: Posets dismantlable by doubly irreducibles, *A. N. Bhavale (Pune : ashokbhavale@gmail.com)*.

Benoit Larose and Lfiszl Zadori introduced the concept of a poset dismantlable by irreducibles. We introduce the concept of a poset dismantlable by doubly irreducibles. In order to study these posets we introduce the operations of 1-sum and 2-sum for posets. Using these operations, we obtain the structure theorem for posets dismantlable by doubly irreducibles.

B-15: Some special classes of near-ring modules, *Ravi Srinivasa Rao and K.J. Lakshmi Narayana (Andhra Pradesh : dr_rsr Rao@yahoo.com)*.

Near-rings considered are right near-rings and R is a near-ring. Recently, special classes of near-ring right modules have been introduced and studied. Also Characterization of some concrete special radicals of near-rings in terms of the special classes of near-ring right modules are presented. In this paper six more classes of near-ring right modules have been studied. It is shown that they are all special classes.

B-16: On $X_1^4 + 4X_2^4 = X_3^8 + 4X_4^8$ and $Y_1^4 = Y_2^4 + Y_3^4 + 4Y_4^4$, *Susil Kumar Jena (Bhubaneswar : susil_kumar@yahoo.co.uk)*.

The two related diophantine equations: $X_1^4 + 4X_2^4 = X_3^8 + 4X_4^8$ and $Y_1^4 = Y_2^4 + Y_3^4 + 4Y_4^4$, have infinitely many non-trivial and primitive integral solutions for their parameters. We give two parametric solutions, one for

each of these equations.

B-17: S. Chowla and S.S. Pillai The story of two peerless Indian Mathematician, Dr. Dayasankar Gupta (Sant Kabir Nagar).

This paper represents the Chowla Pillai-Correspondence, Waring's problem, Least prime-quadratic residue, Chowla's counter-examples to a claim of Ramanujan and a disproof of Chowla's conjecture, problem on consecutive numbers, conjecture, independent values of cotangent function, number of permutation of a given order, closed form for the prime case, applications to finite groups, convenient number and class numbers, matrices and quadratic polynomials, average of Euler's phi-functions. A variant of Tic-Tac-Toe- Smooth numbers, Chowla and Langlands conjecture for the various disciplines like as science, engineering, technology, medical, pharmacy, architecture, management and other disciplines. Students of Ph. D. and upper classes D.Sc. for BHU Varanasi, HRI Allahabad, Univ. of Pune, Rajagiri School of Engineering and Technology Cochin, Madras University, M.S. University Baroda and other university of India and Foreign as well as IITs, NITs, RECs, IIITs, IIITMs and other institute of India and Foreign.

C: Real and Complex Analysis (Including Special Functions, Summability and Transforms)

C-1 Some results on a class of entire dirichlet series with complex frequencies, *Niraj Kumar and Garima Manocha (New Delhi : nirajkumar2001@hotmail.com, garima89.manocha@gmail.com)*.

Let F be a class of entire functions represented by Dirichlet series with complex frequencies for which $e^{k|\lambda^k|} |a_k|$ is bounded. Some results for this set are then studied.

C-2: On a class of integral transform of pathway type, *Dilip Kumar (Kerala : dilipkumar.cms@gmail.com)*.

The integral transform named P_α -transform introduced in this paper is a binomial type transform containing many class of transforms including the well known Laplace transform. The paper is motivated by the idea of pathway model introduced by Mathai in 2005 [*Linear Algebra and Its Applications*, **396**, 317-328]. The composition of the transform with differential and integral operators are proved along with convolution theorem. Being a new transform, the P_α -transform of some elementary functions are given in the paper. As an illustration of applications of the general theory of differential equations, a simple differential equation is solved by the new transform. P_α -transform of some generalized special functions such as H -function, G -function, Wright generalized hypergeometric function, generalized hypergeometric function and Mittag-Leffler function are also obtained. Also the solutions of fractional kinetic equations are obtained by using P_α -transform. The results for the classical Laplace transform is retrieved by letting $\alpha \rightarrow 1$.

C-3: An Extension of α -type polynomial sets, *S.J. Rapeli, S.B. Rao and A.K. Shukla (Surat)*.

In this paper, we discuss α -type polynomial sets and also its generalization in two variables. Some properties of certain polynomials have also been shown for in support of α -type zero in two variables.

C-4: Recurrence Relation and Integral Representation of Generalized K -Mittag-Leffer Function, $GE_{k,\alpha,\beta}^{\gamma,q}(z)$, *Kuldeep Singh Gehlot (Ra-*

jasthan : drksgehlot@rediffmail.com).

Recurrence Relation and Integral Representation of Generalized K -Mittag-Leffler Function $GE_{k,\alpha,\beta}^{\gamma,q}(z)$, Kuldeep Singh Gehlot (Jodhpur, Rajasthan). In this paper author calculate the recurrence relations and six different integral representation of Generalized K -Mittag-Leffler function, introduced by Gehlot, Kuldeep Singh,(2012). Also find out six different integral representation of K -Mittag-Leffler function, defined by Dorrego G.A. and Cerutti R.A. (2012). And several special cases have been discussed.

D: Functional Analysis

D-1: Watson transform for boehmians, R. Roopkumar (Karaikudi).

Proving the required auxiliary results, we construct two Boehmian spaces which properly contain $T'(\lambda, \mu)$ and $T'(1 - \mu, 1 - \lambda)$. Next we prove the convolution theorem for the Watson transform on $T'(\lambda, \mu)$ using both Mellin type convolutions \vee and \wedge . Applying the convolution theorem, we extend the Watson transform to the context of Boehmians as a bijective map a Boehmian space onto the other Boehmian space and prove that the extended Watson transform is linear, continuous map with respect to δ -convergence as well as Δ -convergence.

D-2: An iterative algorithm for generalized mixed vector equilibrium problems and relativity non-expansive mapping in Banach spaces, K. R. Kazmi and Mohammad Farid (Aligarh : kekazmi@gmail.com; mohdfrd55@gmail.com).

In this paper, we introduce an iterative schemes for finding a common solution of split generalized vector variational inequality problem and fixed point in areal Hilbert space. We prove that the sequences generated by the proposed iterative scheme converge strongly to the common solution of split generalized vector variational inequality problem and the fixed point problem for nonexpansive mappings. The results presented in this paper are the supplement, extension and generalization of the previously known results in the area.

D-3: An iterative method for split generalized vector equilibrium problem and fixed point problem, K.R. Kazmi, S.H. Rizvi and Mohd. Farid (Aligarh).

In this paper, we introduce and study an explicit iterative method to approximate a common solution of split generalized vector equilibrium problem and fixed point problem for a finite family of nonexpansive mappings in real Hilbert spaces using the viscosity *Cesáro* mean approximation. We prove that the sequences generated by the proposed iterative scheme converge strongly to the common solution of split generalized vector equilibrium problem and fixed point problem for finite family of nonexpansive mappings. Further, we give a numerical a example to justify our main result. The re-

sults presented in this paper are the supplement, extension and generalization of the previously known results in this area.

D-4: Common fixed point theorem for cyclic weak (ϕ, ψ) -contraction in Menger space, *Sahni Mary Roosevelt and Dersanambika K.S. (Kerala : sahnimaryroosevelt@gmail.com; dersanapdf@yahoo.com).*

An altering distance function is a control function which alter the metric distances between two points enabling one to deal with relatively new classes of fixed point problems. But, the uniqueness of control function creates difficulties in proving the existence of fixed point under contractive conditions. Cyclic weak (ϕ, ψ) -contraction mapping is extended to Menger space and fixed point theorem for such mappings are studied in Menger space.

D-5: A unique common fixed point theorem in complete G-metric space with six mappings, *Anushri A. Aserkar and Manjusha P. Gandhi (Nagpur : aserkar_aaa@rediffmail.com).*

In the present paper, we have proved a unique common fixed point theorem for six mappings which is an extension of Gregus theorem [1980] in complete symmetric G -metric space. The mappings in pairs satisfy the weakly compatibility condition. Mustafa and Sims [2006] generalized metric spaces to G metric space. This new structure was a great alternative to amend the flaws in the concept of D -metric spaces. It was proved by Mustafa and Sims that every G -metric space is topologically equivalent to a metric space.

D-6: Common fixed point of coincidentally commuting mappings in 2 non-archimedean menger PM-space, *Bijendra Singh, V. K. Gupta and Jaya Kushwah (Ujjain : kushwahjaya@gmail.com).*

In the present paper, we prove a fixed point theorem for quasi-contraction pair of coincidentally commuting mappings in a 2 non-Archimedean Menger PM-space using idea of Achari [1] and Chamola et.al.[2].

D-7: Common fixed points of generalized Meir-Keeler α -contractions, *Deepesh Kumar Patel, Thabet Abdeljawad and Dhananjay Gopal (Surat : deepesh456@gmail.com, gopal.dhananjay@rediffmail.com).*

Motivated by Abdeljawad (Fixed Point Theory and Applications 2013, 2013:19), we establish some common fixed point theorems for three and

four self-mappings satisfying generalized Meir-Keeler α -contraction in metric spaces. As a consequence the results of Rao and Rao (Indian J. Pure Appl. Math., 16(1)(1985), 1249-1262), Jungck (Internat. J. Math. Math. Sci., 9(4)(1986), 771-779), and Abdeljawad itself are generalized, extended and improved. Sufficient examples are given to support our main results.

D-8: On Existence of Coincidence and Common Fixed Point for Faintly Compatible Maps, Anita Tomar (Dehradun : *anitatmr@yahoo.com*).

In this paper, we discuss the existence of coincidence and common fixed point for faintly compatibility maps satisfying both contractive and non contractive condition . Our results improve the results of Bisht and Shahzad without containment and continuity requirement of involved maps on metric space. Example to demonstrate the validity of results obtained is also finished.

E: Differential Equations, Integral Equations and Functional Equations

E-1: On some mixed integral inequalities and applications, S.D. Kendre (Pune : sdkendre@yahoo.com).

In this paper, we establish some nonlinear mixed integral inequalities which provide an explicit bound on unknown function, and can be used as a tool in the study of certain nonlinear mixed integral equations. The purpose of this paper is to extend certain results which proved by Pachpatte.

E-2: On the fixed solutions of second order nonlinear delay difference equations with asymptotic and stability behaviors, Dr. B. Selvaraj and Mr. S. Raju (Coimbatore : rajumurugasamy@gmail.com).

Some new criteria are obtained for asymptotic and stability behaviors of fixed solutions of the second order nonlinear delay difference equation of the form $\Delta^2(x_n + p_n x_{n-k} - q_n x_{n-1}) + f(x_n) = 0$, $n = 0, 1, 2, 3, \dots$. Examples are inserted to illustrate the results.

E-3: Immovability of a quartic functional equation in Felbin's Type Spaces, M. Arunkumar and S. Karthikeyan (Tiruvannamalai : an-narun2002@yahoo.co.in, karthik.sma204@yahoo.com).

In this paper, the authors investigate the immovability of a quartic functional equation

$$\sum_{i=1}^n f\left(\sum_{i=1}^n x_{ij}\right) = 6 \sum_{1 \leq i < j \leq n} f(x_i + x_j + x_k) - (6n - 18) \sum_{1 \leq i < j \leq n} f(x_i - x_j) \\ + (n - 8)f\left(\sum_{i=1}^n x_i\right) + \left(\frac{3n^2 - 17n + 22}{16}\right) f\left(\sum_{i=1}^n 2x_i\right),$$

where

$$x_{ij} = \begin{cases} -x_j & \text{if } i = j \\ x_j & \text{if } i \neq j \end{cases}$$

in Felbin's type spaces.

E-4: Random stability of an additive quadratic functional equation: a fixed point approach, *M. Arun Kumar and P. Agilan (Tiruvannamalai : annarun2002@yahoo.co.in, agilram@gmail.com).*

Using the fixed point method, we prove the generalized Hyers-Ulam stability of the following additive quadratic functional equation

$$\begin{aligned} & f(3x + 2y + z) + f(3x - 2y + z) + f(3x + 2y - z) + f(3x - 2y - z) \\ & = 12f(x) + 12[f(x) + f(-x)] + 8[f(y) + f(-y)] + 2[f(z) + f(-z)] \end{aligned}$$

in random normed spaces.

E-5: Solution and stability of a n -dimensional quadratic functional equation in quasi-beta normed spaces: direct and fixed point methods, *M. Arun Kumar, S. Murthy, S. Ramamoorthi and G. Ganapathy (Tiruvannamalai : annarun2002@yahoo.co.in, smurthy07@yahoo.co.in, ramsdmaths@yahoo.com, ganagandhi@yahoo.co.in).*

In this paper, the authors has proved the general solution and generalized Ulam-Hyers stability of a n -dimensional quadratic functional equation of the form

$$\sum_{i=0}^n \left[f \left(\frac{x_{2i} + x_{2i+1}}{2} \right) + f \left(\frac{x_{2i} - x_{2i+1}}{2} \right) \right] = \frac{1}{2} \sum_{i=0}^n f(x_{2i}) + f(x_{2i+1})$$

where $n \geq 1$ in Quasi-Beta normed spaces using direct and fixed point methods.

E-6: Permanence of 2-variable additive functional equation in non-archimedean fuzzy ϕ -2-normed space : Hyers direct method, *M. Arunkumar, T. Namachivayam (Tiruvannamalai : annarun2002@yahoo.co.in, namachi.siva@rediffmail.com).*

In this paper, the authors investigate the solution of a 2-variable additive functional equation

$$g(2x \pm y \pm z, 2u \pm v \pm w) = g(x \pm y, u \pm v) + g(x \pm z, u \pm w).$$

Its generalized Ulam-Hyers stability in non-Archimedean fuzzy ϕ -2-normed spaces using Hyers direct method.

E-7: New Oscillation Criteria for Higher Order Non-Linear Functional Difference Equations, *B.Selvaraj and S.Kaleeswari (Tamil Nadu : professorselvaraj@gmail.com, kaleesdesika@gmail.com).*

In this paper some new criteria for the oscillation of high order functional difference equation of the form

$$\Delta^2 \left(r(n) \left[\Delta^{(m-2)} y(n) \right]^\alpha \right) + q(n) f[y(g(n))] = 0,$$

where $\sum_{s=n_0}^{\infty} r^{-\frac{1}{\alpha}}(s) < \infty$ and $m > 1$

are discussed. Examples are given to illustrate the results.

E-8: Battle outcome in a counter insurgency operation by security force under decapitation warfare involving range-dependent attrition-rate coefficients in the regular combat, *Lambodara Sahu (Pune : lsahucme@gmail.com).*

A sharp increase in incidences of insurgency like Naxalites activity and terrorism in the recent times is becoming a cause of deep concern to most of the defence analysts. Because of insurgents' freedom of movement and their active steps to defeat the search in counter insurgency operation, the security force finds difficult to deal with insurgents in regular combat. Security force, as a part of their strategy engage in decapitation, warfare like killing or arresting the key leaders of insurgents, capturing their central base, initiating undermining operations such as precision strike, missile attack, etc., against insurgents to nullify various decapitation strategies adopted by insurgents such as assassination or abduction of key Govt. official, ministers and high profile politicians in addition to other undermining operation like mining roads and bushes used by security forces. In this paper, a conceptual model dealing with certain operational factors like robustness of forces, undermining effects, maximum effective range, break-points, is being discussed referring the concepts of Lanchester-type equations with range-dependent attrition-rate coefficients to project the effectiveness of forces of regular combat under decapitation warfare, while figuring out the importance of undermining operation in addition to the advantage of closeness to the target by considering a few case studies.

F: Geometry

F-1: Contact CR-submanifolds of an indefinite trans-Sasakian manifold, *Bandana Das and Arindam Bhattacharyya.*

This paper is based on contact CR-submanifolds of an indefinite trans-Sasakian manifold of type (α, β) . Here some properties of contact CR-submanifolds of an indefinite trans-Sasakian manifold have been studied and also the sectional curvatures of contact CR-submanifolds of an indefinite trans-Sasakian space form are discussed.

F-2: On generalized φ -recurrent trans-sasakian manifolds, *D.Debnath and A.Bhattacharyya (dipankardebnath123@hotmail.com).*

The object of the present paper is to study generalized φ -recurrent trans-Sasakian manifolds. It is proved that a generalized φ -recurrent trans-Sasakian manifold is an Einstein manifold. Also we obtained a relation between the associated 1-forms A and B for a generalized φ -recurrent and generalized concircular φ -recurrent trans-Sasakian manifolds and finally proved that a three dimensional locally generalized φ -recurrent trans-Sasakian manifold is of constant curvature.

F-3: Some properties of slant and pseudo-slant submanifolds of an ϵ -paracontact Sasakian manifold, *Barnali Laha and Arindam Bhattacharyya (Kolkata : barnali.laha87@gmail.com, bhattachar1968@yahoo.co.in)*

In the present note, we have derived some results pertaining to the geometry of slant and pseudo-slant submanifolds of an ϵ -paracontact Sasakian manifold. In particular, we have obtained the necessary and sufficient conditions of a totally umbilical proper slant submanifold to be totally geodesic, provided the mean curvature vector $H \in \mu$. In addition to this, we have obtained the integrability conditions of the distributions of pseudo-slant submanifold.

F-4: Almost pseudo Ricci symmetric viscous fluid spacetime, *Buddhadev Pal and Arindam Bhattacharyya (Kolkata : buddha.pal@rediffmail.com, bhattachar1968@yahoo.co.in).*

The object of the present paper is to investigate the application of almost

pseudo Ricci symmetric manifolds to the General Relativity and Cosmology. Also, we study the space time when the anisotropic pressure tensor in energy momentum tensor of type $(0, 2)$ takes the different form.

F-5: Evolution of \mathfrak{S} -functional and ω -entropy functional for the conformal Ricci flow, Nirabhra Basu and Arindam Bhattacharyya (West Bengal : *nirabhra.basu@yahoo.com, bhattachar1968@yahoo.co.in*).

In this paper we define the \mathfrak{S} -functional and the ω -entropy functional for the conformal Ricci flow and see how they evolve according to time.

G: Topology

G-1: On b^* - \mathcal{I} -open sets in ideal topological spaces, *K. Viswanathan, S. Jafari and J. Jayasudha.*

In this paper, we introduce and investigate the notions of b^* - \mathcal{I} -open sets in ideal topological spaces. Further we have discussed some properties of b^* - \mathcal{I} -open sets and obtained decomposition of *semi**- \mathcal{I} -continuity.

G-2: Idealization of a Decomposition Theorem, *R. Santhi and M. Rameshkumar (Tamil Nadu : santhifuzzy@yahoo.co.in, rameshngm@gmail.com).*

In this paper we introduce and investigate the notion of regular- \mathcal{I}_s -closed set, $A_{\mathcal{I}_s}$ -set, regular- \mathcal{I}_s -continuous and $A_{\mathcal{I}_s}$ -continuous in ideal topological spaces. Then we show that a function $f : (X, \tau, \mathcal{I}) \rightarrow (Y, \sigma)$ is continuous if and only if it is α - \mathcal{I}_s -continuous and $A_{\mathcal{I}_s}$ -continuous. Also we proved that regular- \mathcal{I}_s -closed set and regular closed are independent.

G-3: Fuzzy generalized minimal continuous maps in fuzzy topological spaces, *Suwarnlatha. N. Banasode (Karnataka).*

In this paper a new class of fuzzy generalized minimal continuous maps that includes a class of fuzzy generalized minimal irresolute maps are introduced and studied in fuzzy topological spaces. A mapping $f : X \rightarrow Y$, from a fts X into a fts Y is said to be fuzzy generalized minimal continuous (briefly f - g - m_i continuous) map if the inverse image of every fuzzy minimal closed set in Y is a fuzzy g - m_i closed set in X .

G-4: Contra functions via b - \mathcal{I} -open sets, *S.P. Jothiprakash (Tamil Nadu).*

In this paper, we introduce contra open, contra closed, irresolute and contra irresolute functions via b - \mathcal{I} -open sets and study some of their properties.

G-5: Soft πg -closed set in soft topological spaces, *A. Selvi and I. Arockiarani (Tamil Nadu : selviantony.pc@gmail.com).*

In 1999, Molodtsov initiated the theory of soft sets as a new mathematical tool for dealing with uncertainties. He has shown several applications of this theory in solving many practical problems in economics, engineering, social science, medical science, etc. Later several other authors have developed many areas of soft set theory. Recently, in 2011, Shabir and Naz introduced soft topological spaces. Kannan introduced soft generalized closed sets in soft topological spaces which are defined over an initial universe with a fixed set of parameters. This paper aims to introduce a new concept as soft πg -closed sets in soft topological spaces and give a study of soft πg -closed set and soft πsg -closed sets in soft topological spaces. Moreover, some of the characterizations are obtained. Then we investigate the relationships of soft πg -closed sets with other existing soft closed sets with counter examples. These results will enable us to carry out a general framework for their applications in real life.

G-6: Pre closed sets in bim spaces, A. Dhanis Arul Mary and I. Arockiarani (Tamil Nadu : dhanisarulmary@gmail.com).

In 2000, V. Popa and T. Noiri introduced the concept of minimal structure space. They also introduced the notion of m_x -open set and m_x -closed set and characterize those sets using m_x -closure and m_x -interior operators, respectively. In 1969, J.C. Kelly introduced the notion of bitopological spaces and extended some of the standard results of separation axioms in a topological space to a bitopological space. Thereafter, a large number of papers have been written to generalize topological concepts to bitopological setting. In 2010, C. Boonpok introduced the notion of biminimal structure spaces. In this paper, we introduce the concept of pre closed sets in biminimal structure spaces and studied $m_x^1 m_x^2$ -pre closed sets and $m_x^1 m_x^2$ -pre open sets and derived some of their properties. Also, we discuss the concept of pre-neighborhood and pre-accumulation points in biminimal structure spaces and obtain some of their characterizations.

G-7: Topologies generated by the a -cuts of a fuzzy set, R. Padmapriya and Dr. P. Thangavelu (Coimbatore : priyabharathi28@gmail.com, thangavelu@karunya.edu)

Zadeh introduced the concept of fuzzy sets in 1965. The a -cuts of a fuzzy subset A of a non-empty set X may generate a topology. Such a topology is called a topology generated by the fuzzy set A of X . The purpose of this paper is to characterize such topologies.

G-8: Generalizations of Pawlaks rough approximation spaces by using $\alpha\beta$ -open sets, K. Reena and I. Arockiarani (Coimbatore : reena-maths1@gmail.com).

This paper extends Pawlaks rough set theory to a topological space model where the set approximations are defined using the topological notion $\alpha\beta$ open sets. A number of important results using the topological notion $\alpha\beta$ -open sets are obtained. We also proved that some of the properties of $\alpha\beta$ Pawlaks rough set model are special instances of those topological generalizations.

G-9: Fuzzy neutrosophic soft matrix theory, I.R. Sumathi and I. Arockiarani (Coimbatore : sumathi_raman2005@yahoo.co.in).

Molodtsov introduced the concept of soft set theory which can be used as a mathematical tool for dealing with uncertainty. The parameterizations tool of soft set theory enhances the flexibility of its application. Moreover, Maji extended soft sets to intuitionistic fuzzy soft set which handles only the truth membership and falsity membership; it does not handle the indeterminacy. Neutrosophic set was initiated by Smarandache which is a mathematical tool for handling problems involving imprecise, indeterminacy and inconsistent data. One of the important theory of mathematics which has a vast application in science and engineering is the theory of matrices. The subject explored in this paper is the matrix representation of fuzzy neutrosophic soft set namely Fuzzy neutrosophic soft matrices. Further, we have defined some basic operations on Fuzzy Neutrosophic soft matrices and have been applied in decision making problem. This study affords us an opportunity to go further on fuzzy neutrosophic soft matrices with new operations and this matrix models could be carried out in the real world problems.

G-10: On generalized fuzzy neutrosophic soft sets, J. Martina Jency and I. Arockiarani (Coimbatore : martinajency@gmail.com).

Molodtsov proposed the novel concept of soft set theory which provides a completely new approach for modeling vagueness and uncertainty. Combining soft sets with intuitionistic fuzzy sets Maji defined intuitionistic fuzzy soft sets for solving decision making problems. F. Smarandache introduced the concept of neutrosophic set which is a mathematical tool for handling

problems involving imprecise, indeterminacy and inconsistent data. Inspired by the varied applications of neutrosophic set in real life situations, we have introduced a new notion of set namely fuzzy neutrosophic soft set. In the present study, we have introduced the concept of generalized fuzzy neutrosophic soft set and studied some of its properties. We have put forward some propositions based on this new notion. We hope that this paper will promote the future study on generalized fuzzy neutrosophic soft set and generalized fuzzy neutrosophic soft topological spaces to carry out a general framework for their application in practical life.

G-11: A Few Covering Properties of the α -Topology, *Shalu (Modinagar : drshalumath@gmail.com)*.

In the present paper we have obtained some results of P -closed properties by using α -topology. A topological space sets (X, T) is para-rc-Lindelof if every cover of X by regular closed sets has a locally countable refinements by regular closed sets .We also prove that T and T^α share these properties.

H: Measure Theory, Probability Theory and Stochastic Processes, and Information Theory

H-1: Reliability of Machine Repair Problem with Spares and Partial Server Vacation Policies for Repairmen , *D.C. Sharma (Rajasthan : dcsharma_1961@yahoo.co.in)*.

In this paper we have taken a machine repairable system with spares and repairmen with the partial server vacation policy. In our system, the first repairman never takes vacations and always available for serving the failed units. The second repairman goes to vacation of random length when number of failed units is less than certain number of machine (say) N . At the end of vacation period, this repairman returns back if there are N or more failed units/machine accumulated in the system. Otherwise this repairman goes for another vacation. Vacation time is exponentially distributed. By using of Markov process theory, we develop the steady state probabilities equations and solve these equations recursively. We present reliability measures. Availability of the system is maintained at certain level and the optimum value of N has been calculated. A Sensitivity analysis is also investigated.

I: Numerical Analysis, Approximation Theory and Computer Science

I-1: On Oscillatory Matrices, *Ravinder Kumar and Ram Asrey Rajput (Agra : ravinder_dei@yahoo.com, ramasreyrajput@yahoo.co.in).*

A real matrix \mathbf{A} is called oscillatory if all its minors are nonnegative and if some power of \mathbf{A} has all minors positive. In this paper we present eigenvalue inequalities that hold for oscillatory matrices. In particular bounds for determinant of an oscillatory matrix are derived.

I-2: A New Technique to Solve Reaction-Diffusion Boundary Value Problems, *Surabhi Tiwari (Allahabad : surabhi@mnnit.ac.in).*

Reaction-diffusion equations are important to a wide range of applied areas such as cell processes, drug release, ecology, spread of diseases, industrial catalytic processes, transport of contaminants in the environment, chemistry in interstellar media, etc. The aim of this paper is to build an efficient initial value technique for solving a third order linear reaction diffusion singularly perturbed boundary value problem. Using this technique, a third order linear reaction diffusion singularly perturbed boundary value problem is reduced to three approximate unperturbed linear initial value problems and then Runge-Kutta fourth order scheme is used to solve these unperturbed linear problems numerically. Numerical examples are solved using this given method. It is observed that the presented method approximates the exact solution very well for crude mesh size h . Error analysis and convergence analysis of the method are also described.

I-3: Simulation of extended spiking neural P systems with astrocytes using petri nets, *Rosini B. and Dersanambika K.S. (Kerala : brosinini@gmail.com, dersanapdf@yahoo.com).*

Spiking Neural $P(SNP)$ system characterizes the movement of spikes among neurons. However, in biological nervous system, besides neurons themselves, astrocytes (star-shaped glial cells spanning around neurons) also play an important role on the functioning and interaction of neurons. In this work, we focus on the excitatory and inhibitory role of astrocytes. This paper proposes the concept of translating Extended Spiking Neural P systems with Astrocytes (ESN PA system) to Petri nets. For a given ESN PA sys-

tem, we are able to model a Petri net, that can be employed to simulate the behavior of an ESN PA system.

I-4: On generalized α -difference operator of third kind and its applications in number theory, *G. Britto Antony Xavier, P. Rajiniganth and V. Chandrasekar (Tamilnadu, shcbritto@yahoo.co.in).*

In this paper, the authors extend the theory of the generalized α -difference operator $\Delta_{\alpha(l)}$ to the Generalized α -difference operator of the third kind $\Delta_{\alpha(l_1, l_2, l_3)}$ for the positive reals l_1 , l_2 and l_3 . We also present the discrete version of Leibnitz Theorem, Binomial Theorem, Newton's formula with reference to $\Delta_{\alpha(l_1, l_2, l_3)}$. Also, by defining its inverse, we establish a few formulae for the sum of the second partial sums of higher powers of arithmetic-geometric progression in number theory.

I-5: Eigen frequency based solutions focusing vibration isolation system design for industrial applications, *S.N. Bagchi (Pune : design@resistoflex.in; www.resistoflex.in).*

This is an industry-academia oriented presentation related to the mathematical solutions focusing Vibration and Shock isolation system design for industrial applications, covering power plants to transportation. The application of Air springs in deluxe buses and railways for a comfortable journey will be highlighted. The resonance frequency of our flexible body organs like intestine ,backbone, shoulder joints, neck and knee joint etc., are all in the low frequency range. Hence during a long journey on a rough road, some of the body organs are excited by road vibrations. A fuzzy model and the statistical data of the human body response is used to optimize the bus suspension design using a low natural frequency Air Spring for a comfortable long journey. The mathematical approach and modalities have an engineering-physics orientation. In view of the inter-disciplinary nature of the subject and wide spectrum of coverage from Molecular vibration to Machine vibration the presentation will be based on simple spring mass models of polyatomic molecule to spring supported industrial machines. The introduction starts with the historical study of oscillation of pendulum and its correlation with time and frequency by Galileo and his students way back in 1605 or so. Later on the mechanical pendulum clock was built with length adjustment mechanism to adjust the time depending on the gravitational field at the site location. Further, in 1885 Balmer observed the Atomic spectra of Hydrogen and formulated a mathematical relation to calculate

the wave length of the hydrogen series. Max Planck in 1900 introduced the quantum concept using simple harmonic oscillator. The discovery of Ammonia clock was based on molecular vibration. Vibration in quantum universe is universal. Mathematics is a subject of unification. Based on spring-mass model of a system the eigen-frequency is calculated which is the solution of a differential equation. The response of the spring supported system due to any exciting force of dynamic nature depends on the unique value of eigen-frequency in x , y and z direction. An optimized design calculation of a rotating machine will be presented. The seismic isolators used for the Earthquake protection of buildings will be briefed.

I-6: A numerical method for weighted low-rank matrix approximation, *Aritra Dutta (Florida : d.aritra2010@knights.ucf.edu)*.

In scientific and engineering field, the best approximation by a low-rank matrix has become an important tool in dimensional reduction of data and matrix decomposition. When the Frobenius norm or ℓ_1 -norm is used, the best low rank approximation has a closed form formula in terms of Principal Component Analysis [1] or Robust Principal Component Analysis [2]. When a weight is inserted in the norm, the corresponding weighted approximation problem is much harder to solve. Indeed, according to Srebro and Jaakkola [3] the weighted low-rank approximation problems do not admit a closed form solution in general. In this presentation, I am going to propose a new numerical method to solve the weighted low-rank approximation problem. More precisely, we are going to use the optimization approach using the Augmented Lagrange Method (ALM) together with the penalty terms and then using the alternating directional method to solve the problem numerically. I also plan to present some numerical experiments to show the effectiveness of the new algorithm.

I will also show, as a limiting case, how our algorithm for the weighted low-rank approximation is related to the work of Golub-Hoffman-Stewart [4] where they showed how to obtain a best approximation of a low rank matrix in which a specified set of columns of the matrix remains fixed. Finally, I will discuss some applications of the weighted low-rank approximation in image and video analysis.

J: Operations Research
{no paper}

K: Solid Mechanics, Fluid Mechanics, Geophysics and Relativity

K-1: Effects of piezoelectricity on waves in monoclinic poro-elastic materials, *Anil K. Vashishth and Vishakha Gupta (Kurukshetra : akvashishth@kuk.ac.in, vi_shu85@yahoo.co.in)*.

Piezoelectric materials are materials which produce electric field when stress is applied and get strained when electric field is applied. Piezoelectric materials are acting as very important functional components in sonar projectors, fluid monitors, pulse generators and surface acoustic wave devices. Wave propagation in porous piezoelectric material having crystal symmetry 2 is studied analytically. The Christoffel equation is derived. The phase velocities of propagation and the attenuation quality factors of all these waves are described in terms of complex wave velocities. The effects of phase direction, porosity, wave frequency and the piezoelectric interaction on phase velocities are studied numerically for a particular model. The results are reduced for the crystal classes $2mm$ and $6mm$ from the class 2.

K-2: Uniqueness theorem and theorem of reciprocity in the Linear Theory of Porous Piezoelectricity, *Anil K. Vashishth and Vishakha Gupta (Kurukshetra : akvashishth@kuk.ac.in, vi_shu85@yahoo.co.in)*.

General theorems of classical elasticity are generalized for the linear theory of porous piezoelectric material. The constitutive equations are formulated for the porous piezoelectric materials. The reciprocal relation in the linear theory of porous piezoelectric materials is proved. The uniqueness theorem is established for the three dimensional porous piezoelectric body with assumption of positive definiteness of elastic fields. Alternative proof of the uniqueness theorem, without using the assumption of positive definiteness of elastic fields, is also given.

K-3: Pulsatile flow in carotid artery bifurcation in reference to atherosclerosis with varying frequencies, *G. Manjunatha and K.S. Basavarajappa (Manipal : gudekote_m@rediffmail.com)*.

The mathematical model is studied to analyze the plaques of atherosclerosis in the common carotid and internal carotid arteries (CCA and ICA) of the vascular bifurcations. 'Y' model with flow ratio 70%: 30% between internal carotid artery (ICA) and external carotid artery (ECA) from the

neck of the common carotid artery (CCA) is employed in the analysis. The dilation of the offspring (the carotid sinus or bulb) is analyzed for plaques. For a pulsatile flow, a representative normal carotid artery bifurcation wave form is imposed at the carotid artery (CCA) inlet of the model with mean and peak flow rates 6.0 - 23.8 m/sec. Peak systolic and diastolic pressure are compared with varying cardiac cycle (< 70 and > 70 beats per min). Series solution method is used to study the governing equations of motions with perturbations on the characterizing physiological flow parameters.

K-4: Numerical simulation of Bödewadt flow of a non-Newtonian fluid, Bikash Sahoo (Rourkela).

Both Newtonian and non-Newtonian flows past rotating disks have drawn the attention of many researchers due to their fundamental immense engineering and industrial applications. The problem arising when a viscous fluid rotates with a uniform angular velocity at a larger distance from a stationary disk is one of the few problems in fluid dynamics for which the Navier-Stokes equations admit an exact solution. This problem was initially studied by *Bödewadt* by making boundary layer approximations. That is why the flow is well known as *Bödewadt* flow. However, the Navier-Stokes equations for the *Bödewadt* flow for a non-Newtonian fluid do not possess an exact solution and one has to adopt effective numerical method to solve the resulting nonlinear differential equations. In this paper, the steady *Bödewadt* flow of a non-Newtonian Reiner-Rivlin fluid has been considered. The resulting highly nonlinear differential equations are solved by a second order finite difference method. The effects of non-Newtonian cross-viscous parameter K on the velocity field has been studied in detail and shown graphically. One of the important findings of the present investigation is that when the non-Newtonian parameter K is increased, solutions to the boundary value problem tend to approach their far-field asymptotic boundary values more rapidly.

L: Electromagnetic Theory, Magneto-Hydrodynamics Astronomy And Astrophysics

L-1: Effect of Thermal Radiation on MHD flow with variable Viscosity and Thermal Conductivity over a Stretching Sheet in Porous Media, *Pentyala Srinivasa Rao, B. Kumbhakar and B.V. Rathish Kumar (Dhanbad : pentyalasinivasa@gmail.com).*

An investigation has been made for two dimensional steady stagnation point flow of a viscous incompressible electrically conducting fluid over a linearly stretching sheet in porous media with variable viscosity and thermal conductivity. The viscosity and thermal conductivity are taken as inverse linear and linear functions of temperature respectively. The medium is influenced by a traverse magnetic field and volumetric rate of heat generation or absorption in the presence of radiation effect. The governing boundary layer equations are transformed into ordinary differential equations by taking suitable similarity variables. The resulting coupled nonlinear differential equations are solved numerically by using fourth order Runge Kutta method along with shooting method. The effect of various parameters such as radiation, porosity, viscosity, thermal conductivity, Hartmann number, Prandtl number etc. have been discussed in detail with computer generated figures and tables.

L-2: Effect of nonuniform temperature gradients and DC electric field on thermal convective instability in an Oldroyd-B fluid saturated porous media, *Deepa K Nair, Potluri Geetha Vani and I. S. Shivakumara (Bangalore : vijaydeepavijay@rediffmail.com, shivakumarais@gmail.com, gipotluri@gmail.com).*

The effect of vertical DC electric field on the onset of convection in a horizontal layer of an Oldroyd-B viscoelastic dielectric fluid saturated Brinkman porous medium heated either from below or from above is investigated. The isothermal boundaries are considered to be either rigid or free. The resulting eigenvalue problem is solved using the Galerkin method for three kinds of velocity boundary conditions namely, free-free, rigid-rigid, and lower rigid and upper free. The results indicate that the instability behavior depends significantly on the nature of boundaries. The effects of Darcy number, the Prandtl number, the ratio of strain-retardation time to the stress-relaxation

time and the stress-relaxation parameter are analyzed on the stability of the system. Besides, the similarities and differences between free-free, rigid-rigid and rigid-free boundaries are emphasized in triggering convective instability. The stress-free boundaries are found to be less stable than that of rigid-rigid and rigid-free boundaries. The existing results in the literature are obtained as special cases from the present general study.

L-3: Solution of Flow of Current in Electrical Circuit via Fractional Calculus Approach, *P.V. Shah, A.D. Patel and A.K. Shukla (Surat)*.

The present paper deals with the solution of Flow of Current in Electrical Circuit by using fraction calculus approach. We also discuss different cases of R-I(Resistance-Inductance) circuit. We also analyze the main result.

M: Bio-Mathematics

M-1: Fractional Bioheat Model to Study Effect of Frequency and Blood Perfusion in Skin Tissue with Sinusoidal Heat Flux Condition on Skin Tissue, *R.S. Damor, S. Kumar and A.K. Shukla (Surat).*

This paper deals with the study of fractional bioheat model for heat transfer in skin tissue with sinusoidal heat flux condition to evaluate effect of different frequency and blood perfusion on skin tissue. Numerical solution is obtained by implicit finite difference method. The effect of anomalous diffusion in skin tissue has been studied with different frequency and blood perfusion respectively, the temperature profiles are obtained for different order fractional bioheat model.

M-2: Study of magnetic fluid hyperthermia, *Sonalika Singh and Sushil Kumar (Surat).*

Hyperthermia is a type of cancer treatment which kills cancerous cells, usually with minimal damage to normal tissues. The present study has been discussed the numerical methods to solve mathematical model of single phase lag heat transfer in bi-layered spherical tissue during magnetic fluid hyperthermia treatment for tumour.

M-3: A probabilistic model to study the gene expression in a cell, *Amit Sharma and Neeru Adlakha (Surat : amitsharmajrf@gmail.com, neeru.adlakha21@gmail.com).*

Cell is the primordial unit of all living organisms and to understand the mechanism of cell, it is important to understand the transcription and translation process in the cell. A mathematical model of gene expression is developed to understand these processes. In this paper, future state of the model is predicted on the base of present state. The initial state of the system is assumed to be known. Based on the initial state, the successive states are predicted using probabilities. The model is used to predict the final state of central dogma.

M-4: Biomathematics : modular forms and Galois representation of BIS process, *Ashwini K. Sinha, M.M. Bajaj and Rashmi Sinha.*
 $GL_2(\mathbb{R})$ consisting of matrices with positive determinant. Let \mathbb{H} be the

complex upper half plane endowed with its natural $GL_2^+(\mathbb{R})$ action by linear fractional transformations: $\gamma : z := \frac{az + b}{cz + d}$, where a, b, c, d are the entries of γ as above and $z \in \mathbb{H}$. If f is any \mathbb{C} -valued function on \mathbb{H} . wstabilizer of ∞ in $SL_2(\mathbb{Z})$. Assume conditions Adding the cusps oince $f \in M_k(SL_2(\mathbb{Z}))$ is a cusp form iff u vanishes infinity there is an exact sequence for even $k \geq 4$

$$0 \rightarrow S_k(SL_2(\mathbb{Z})) \rightarrow M_k(SL_2(\mathbb{C})) \rightarrow \mathbb{C} \rightarrow 0$$

induced by the map

$$\sum_{n \geq 0} a_n q^n \rightarrow a_0.$$

It follows that in this case there is a unique normalized modular form.

N: History And Teaching Of Mathematics
{no paper}