International Conference on Recent Developments in Research

18th & 19th March, 2025

ORGANISED BY

Department of Mathematics & Department of B.Ed.

In collaboration with IQAC

TAMRALIPTA MAHAVIDYALAYA

TAMLUK- 721636, PURBA MEDINIPUR

WEST BENGAL, INDIA

NAAC ACCREDITED 'A' (2nd Cycle) GRADE COLLEGE

BOOK OF ABSTRACTS

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ISBN: 9798314091937

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2ND International Conference on Recent Developments in Research

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PREFACE

The International Conference on Recent Developments in Research (ICRDR) was held on March 18th and 19th, 2025, at the Seminar Hall of Tamralipta Mahavidyalaya. The event was organized by the Department of Mathematics, the Department of B. Ed, and the Internal Quality Assurance Cell (IQAC) of Tamralipta Mahavidyalaya, West Bengal, India. The conference aimed to provide an academic platform for researchers, academicians, students and practitioners to exchange ideas, share experiences, and present their latest findings in various fields of Mathematics, Science, Education, Engineering, Technology and Teaching Learning methods. The conference also adopted collaborations and networking among the participants from different institutions.

The conference received a total of 195 submissions from different parts of India and abroad, such as South Korea and Iran. The accepted abstracts covered a wide range of topics, such as fuzzy graph theory, algebra, applied mathematics, artificial intelligence, bioinformatics, biotechnology, computer science, data science, physics and teaching learning methods. The abstract book contains the abstracts of all the accepted presentations.

We would like to express our sincere gratitude to all the authors for their valuable contributions. We would also like to thank the invited speakers and session chairs for their insightful talks and discussions. We are grateful to Dr. Abdul Motin, Principal, Tamralipta Mahavidyalaya for inspiring us to organise the conference. We are thankful to IQAC, Tamralipta Mahavidyalaya for advising us to organise the conference. We are grateful to the Department of Mathematics, Tamralipta Mahavidyalaya, and Dept. of B.Ed for hosting the conference and providing all the necessary facilities and support. We appreciate the efforts of the organising secretaries, advisory committee, the program committee and the volunteers for their hard work and dedication in making the conference a success.

We hope that the abstract book will serve as a useful reference for researchers and students interested in the recent developments in research. We expect the conference to inspire further research and collaborations among the participants and beyond.

Convenors

Dr. Tapan Kumar Pattanayak
Dr. Sovan Samanta
Dr. Manotosh Mandal
Dr. Pintu Das

ABOUT TAMRALIPTA MAHAVIDYALAYA

Since its inception in the 1948-49 academic session, the college was affiliated with the University of Calcutta for courses in English, Bengali, Sanskrit, History, and several other disciplines. From the very beginning, the Commerce Department operated in the evening to accommodate students who were otherwise employed. However, with the increasing enrollment of female students in commerce, the department was shifted from the evening to the morning session. In response to the growing academic demand of the locality, the University of Calcutta successively granted affiliation for Honours courses in Bengali, English, Chemistry, History, Political Science, Mathematics, Economics, and Accountancy at the degree level. However, in 1985, as per government policy, the affiliation of colleges in the undivided Midnapore district was transferred from Calcutta University to Vidyasagar University (V.U.). Subsequently, the college obtained affiliation from V.U. for Honours courses in Physics, Zoology, Botany, Physiology, Philosophy, and Sanskrit. In recent years, self-financed courses in Geography, Education, Physical Education, and Computer Science have been introduced. The college is now well-equipped with a substantial number of faculty members, technical staff, and administrative personnel. It currently offers undergraduate programs (B.A., B.Sc., and B.Com.) as well as select postgraduate courses. The institution operates under the governance of a well-coordinated Governing Body.

ABOUT THE DEPARTMENTS

MATHEMATICS: The Department of Mathematics is the oldest Honours-teaching Science department at the college. It initially existed at the I.Sc. level before the introduction of the Honours course. The department received Honours affiliation from the University of Calcutta in the academic session 1961–62, as per Memo No. C.U/C/2485/88/Aff., dated 14.06.1961.

With a highly distinguished faculty, the department takes pride in producing University toppers and successful candidates in various competitive examinations such as JAM, NET, GATE, and JECA. Additionally, its students have excelled in academia, research institutions, and various professional fields both in India and abroad.

Teaching in the department primarily employs audio-visual methods, and students have access to the Departmental and Central Library, as well as internet facilities. The department boasts a pass percentage exceeding 90%.

B.ED.: The Department of B.Ed. at Tamralipta Mahavidyalaya initially operated under the affiliation of the University of Calcutta before transitioning to Vidyasagar University in 1985. It received recognition from the NCTE (ERC), Bhubaneswar, in 2007 and has been functioning under the revised NCTE regulations since 2015. The department has played a pivotal role in training teachers for secondary and higher secondary education. Starting with an intake capacity of 125 seats, the department currently accommodates 100 students. Over the years, the range of method subjects has expanded from Bengali, English, History, and Mathematics to include Geography and Physical Science, with further additions post-2015. The department is well-equipped with ICT facilities, specialized laboratories, and an enriched library. Student assessment includes regular class tests, micro-teaching sessions, internships, and various co-curricular activities. Faculty members actively participate in professional development through seminars, workshops, and research publications. Students of the department have consistently performed well in competitive examinations such as UGC-NET, CSIR-NET, and GATE. The curriculum followed was designed by Vidyasagar University until 2014–15; since 2015–16, the department has adhered to the standardized curriculum structure mandated by NCTE regulations.

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International Conference on Recent Developments in Research

18th & 19th March, 2025

Conference Schedule

Venue: Seminar Hall, Tamralipta Mahavidyalaya

Day-01: 18th March, 2025 (Link for online participants https://meet.google.com/rhh-rdxt-dne)

REGISTRATION: 8:30 AM—9:30 AM.

INAUGURATION: 9.30 AM—10.30 AM.

- Welcome Song
- Felicitation
- Lighting Candle
- Watering Plants
- Publication of Abstract Books
- Welcome Address: Dr. Abdul Motin, Principal, Tamralipta Mahavidyalaya
- Inaugural Address: Dr. Tapan Kumar Pattanayak, Convenor, ICRDR-2025
- Introduction about college: Dr. Pritiranjan Pahari, IQAC Coordinator, Tamralipta Mahavidyalaya
- Speech on recent developments in research in India: Dr. Vivek Kumar Dubey, Former-Faculty, IIT KGP
- Speech on recent developments in research abroad: Prof. Tofigh Allahviranloo, Professor, Istinye University, Istanbul, Turkey

Time	Date: 18th March, 2025	Speaker	Title	Session Chair
10:30 – 11:45	Invited Talk	**Dr. Debiprosad Duari**	A Journey to the Stars	**Dr. Vivek Kumar Dubey**
11:45 – 12:45	Invited Talk	**Prof. Madhumangal Pal**	Graph Theory Applications in Ecosystem Modeling: Food Webs, Competition Graphs, and Ecological Analysis	**Prof. Sankar Kumar Roy**
12:45 – 1:45	**Lunch**			
1:45 – 2:30	Invited Talk	**Prof. Sankar Kumar Roy**	Three-Way Decision Making in Multi-Attribute Decision Making	**Prof. Madhumangal Pal**
2:30 – 3:15	Invited Talk	**Prof. (Dr.) Tofigh Allahviranloo**	Soft Computing – A Framework for Uncertainty and Intelligent Systems	**Dr. Vivek Kumar Dubey**
3:15 – 3:30	**Tea Break**			

3:30 – 5:00	Session	Paper Id	Co-ordinator	Session Chair
	Paper Presentation **(Offline)** Technical Session **IA** Venue: Seminar Hall	**IA01 - IA16**	Dr. Ajay Babu	**Prof. Madhumangal Pal & Prof. Sankar Kumar Roy**
	Paper Presentation **(Online)** Technical Session **IB1** Link: https://meet.google.com/fnw-oonq-ppj	**IB101 - IB116**	Mrs. Sanchita Guchhait	**Dr. Sujit Kumar Bera & Dr. Sudhansu Khanra**
	Paper Presentation **(Online)** Technical Session **IB2** **Link: https://meet.google.com/ryv-xqpu-tfp**	**IB201-IB216**	Mr. Debraj Roy	**Dr. Kalyan Kumar Rana & Dr. Chandan Bikash Das**

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DAY-02: 19th March, 2025 (Link for online participants https://meet.google.com/rhh-rdxt-dne)

Time	Date: 19th March, 2025	Speaker	Title	Session Chair
10:30 – 11:30	Invited Talk	**Dr. Somnath Bera**	Parikh matrices: connecting words and graphs	**Dr. Gopal Maity**
11:30- 12:15	Invited Talk	**Dr. Dipak Kumar Jana**	Advanced Fuzzy Logic Inference Systems: Exploring Type-2 and Type-3 Fuzzy Systems and Their Industrial Applications	**Dr. Vivek Kumar Dubey**
12:15- 1:00	Invited Talk	**Dr. Vivek Kumar Dubey**	Network analysis approaches for industrial applications	**Dr. Dipak Kumar Jana**
1:00-1:45	**Lunch**			
1:45- 2.30	Invited Talk	**Dr. Gopal Maity**	Prime Numbers and the Riemann Hypothesis: An Introduction to Analytic Number Theory	**Dr. Somnath Bera**
2:30- 4:15	**Session**	**Paper Id**	**Co-ordinator**	**Session chair**
	Paper Presentation **(Offline)** Technical Session **IIA1** Venue: Seminar Hall	**IIA101-IIA109**	Dr. Ajay Babu	**Dr. Vivek Kumar Dubey**
	Paper Presentation **(Parallel Offline)** Technical Session **IIA2** Venue: IQAC room	**IIA201-IIA215**	Mrs. Nivedita Kuity	**Dr. Sovan Samanta & Dr. Tapan Kr. Pattanayak**
	Paper Presentation **(Online)** Technical Session **IIB1** Link:https://meet.google.com/fnw-oonq-ppj	**IIB101-IIB114**	Mrs. Sanchita Guchhait and Ms. Aritra Sinha	**Dr. Dipak Kumar Jana & Dr. Pintu Das**
	Paper Presentation **(Online)** Technical Session **IIB2** Link:https://meet.google.com/rxy-anxy-tba	**IIB201-IIB218**	Mr. M.J.F Alam	**Dr. Somnath Bera & Dr. Manotosh Mandal**
4:15 – 5:00	Valedictory Session & Certificate Distribution: Feedback from two participants, Speech from conveners/Secretaries, Session Chairs, IQAC/NAAC Coordinators, Principal			

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International Conference on Recent Developments in Research

18th & 19th March, 2025

Venue: Seminar Hall, Tamralipta Mahavidyalaya

Day-01: 18th March, 2025

Paper Presentation

Technical Session: IA

Chaired By: Prof. Madhumangal Pal & Prof. Sankar Kumar Roy

(Link for online participants https://meet.google.com/rhh-rdxt-dne)

REG. ID	NAME	TITLE OF THE PAPER	MODE OF PRESENTATION	PAPER ID
ICRDR25-10186	Mr. Soovoojeet Jana	Applications of deep learning in epidemiology: Forecasting and beyond	Offline	IA01
ICRDR25-10053	Dr. Sambhu Charan Barman	Closeness Centrality Of Cycle And Corona Product Graphs And Its Applications	Offline	IA02
ICRDR25-10049	Mrs. Anushree Bhattacharya	Covering of fuzzy graphs and its application in emergency aircraft landing using particle swarm optimization method	Offline	IA03
ICRDR25-10021	Mr. Shaikh Ibrahim Abdullah	Topological Indices Defined on Quantum Graphs	Offline	IA04
ICRDR25-10131	Mr. Provat Ghosh	A self-operating system for identifying the optimal path through a busy city.	Offline	IA05
ICRDR25-10162	Mr. Prabuddha Giri	Product Operations on Fermatean fuzzy graph	Offline	IA06
ICRDR25-10007	Mr. Dipayan Chakraborty	Structure of The Resource Theory of Block Coherence	Offline	IA07
ICRDR25-10110	Mr. Prakash Rabi Das	Enhancement of Academic Library Services through Mathematical Methods for Data-Driven Decision Making	Offline	IA08
ICRDR25-10036	Nivedita Kuity	Early detection of Alzheimer's disease using Graph Neural Networks: A Novel Approach	Offline	IA09
ICRDR25-10038	Arpita Bhowmik	A new multi-criteria group decision making model combining subjective and objective criteria weights using linguistic Z-number	Offline	IA10
ICRDR25-10063	Mr. Ayan Kanti Pradhan	Experimental dielectric characterization of Teflon at X-band and comparative error analysis using ABC-ANNs, NRW and AI-NFD studies in W-band	Offline	IA11
ICRDR25-10109	Swasti Hazra	Nearly Complete Graph and Threshold Intuitionistic Fuzzy Graph	Offline	IA12

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ICRDR25-10166	Mr. Rabindranath Das	Exploring the Teaching Approaches, Teaching Methods, Teaching Strategies, and Teaching Techniques: A Systematic Review	Offline	IA13
ICRDR25-10170	Dr. Arunima Kumari	Flipped Learning: An Innovative and Emerging Approach	Offline	IA14
ICRDR25-10073	Alapan Mitra	Experimental dielectric characterization of Teflon at X-band and comparative error analysis using ABC-ANNs, NRW and AI-NFD studies in W-band	Offline	IA15
ICRDR25-10189	Mr. Ananta Maity	Graph Coloring Based on Degree-Dominance Property	Offline	IA16

Technical Session: IB1

Chaired By: Dr. Sujit Kumar Bera & Dr. Sudhansu Khanra

Link: https://meet.google.com/fnw-oonq-ppj

REG. ID	NAME	TITLE OF THE PAPER	MODE OF PRESENTATION	PAPER ID
ICRDR25-11005	Dr. Raju Dutta	Chaotic Characteristics and Behavior of Communication with Switching in WSN	Online	IB101
ICRDR25-11009	Dr. Sudipta Dutta	Korovkin type approximation in generalized statistical sense	Online	IB102
ICRDR25-11019	Mr. Aaqid Mohi ud din bhat	Probing baryogenesis in f(Q) gravity.	Online	IB104
ICRDR25-11022	Mr. Mohammad Wasim	A Solution Approach to solve Multi-Objective Transportation Problems under Neutrosophic Environment	Online	IB105
ICRDR25-11130	Madhumanti Ray	A Novel approach to optical fiber dispersion optimization study with 'v-value'	Online	IB106
ICRDR25-11023	Dr. Sujit Talukdar	Chemical and radiation effect on an Unsteady MHD Casson Fluid flow passed over an Inclined Plate	Online	IB107
ICRDR25-11135	Mr. Naresh Singh	A Comparative Study of Genetic Algorithm, Ant Colony Algorithm, Imperialist Competitive Algorithm, Dynamic Harmony Search, and Nonlinear Chaotic Algorithms	Online	IB108
ICRDR25-11163	Rona Das	"Yoga Practice's Impact On Specific Psychological And Physiological Variables Among Female College Students"	Online	IB109

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ICRDR25-11138	Mr. Ankur Saurav	Sustainable Management of Near-Expiry Cosmetics & Pharmaceuticals: A Production-Based Approach to Refurbishment, Disposal, and Donation	Online	IB110
ICRDR25-11140	Mr. Mosarof Hossain	Enumeration of Pteridophytic Diversity in Itanagar Capital City, Itanagar, Arunachal Pradesh	Online	IB111
ICRDR25-11030	Madhusmita Mohanty	Construction of minimal surfaces	Online	IB112
ICRDR25-11141	Dr. Shweta Smrita Soy	AI or Not AI: That is the Question.	Online	IB113
ICRDR25-11039	Dr. Sunirmal Kundu	Generalized coupled fixed point result and its application to the existence of solution of system of integral equations	Online	IB114
ICRDR25-11142	Ms. Judith Kujur	AI or Not AI: That is the Question.	Online	IB115
ICRDR25-11128	Mr. Dipak Kumar Jana	An investigation of the memory effect on an inventory model for deteriorating item with constant demand	Online	IB116

Technical Session: IB2

Chaired By: Dr. Kalyan Kumar Rana & Dr. Chandan Bikash Das

Link: https://meet.google.com/ryv-xqpu-tfp

REG. ID	NAME	TITLE OF THE PAPER	MODE OF PRESENTATION	PAPER ID
ICRDR25-11046	Mr. Biplob Roy	"Yoga Practice's Impact On Specific Psychological And Physiological Variables Among Female College Students"	Online	IB201
ICRDR25-11047	Dr. Samir Kumar Bhandari	Existence result for fixed points of multivalued $(\theta - F)$ contractions and its application to existence of solution of boundary value problem arising in the vibration of vertically hanging heavy cable	Online	IB202
ICRDR25-11003	Rishi Das	Parameter-Uniform Stability of the Darcy System	Online	IB203
ICRDR25-11058	Mr. Arpan Bhattacharya	Non Squeezable Nature of Charged Anisotropic Neutron Star: A Brief Analysis in Light of NICER Observations	Online	IB204
ICRDR25-11089	Mr. Chotan Roy	Exploring Synchronization Behavior in a Supply Chain Model with Different Coupling Mechanisms	Online	IB205

ICRDR25-11095	Ritabrata Biswas	Viscous Accretion for a Dark Energy Background and Spin of the Black Hole Working Together	Online	IB206
ICRDR25-11096	Palash Haldar	Optimal Control and Stability Analysis of an Epidemic Model with Population Dispersal	Online	IB207
ICRDR25-11098	Yashi Saxena	"High-Resolution Modeling of Interplanetary Medium Discontinuities: Integrating Adaptive Mesh Refinement and Spectral Methods for Space Weather Applications"	Online	IB208
ICRDR25-11165	Mr. Biswajit Bera	A Study of Anti-Picture Fuzzy Graphs for Identifying Key Influencers in Collaborative Research Networks	Online	IB209
ICRDR25-11101	Sk. Sahadat Hossain	Optimal bound of genuine four party Svetlichny type nonlocality and hidden nonlocality under local filtering.	Online	IB210
ICRDR25-11104	Mr. Suman Kumar Chanda	Deep Learning in Healthcare: Transforming Diagnosis, Treatment, and Patient Outcomes	Online	IB211
ICRDR25-11112	Dr. Sugato Gupta	Γ-semigroups and Their Congruence Lattice Isomorphisms	Online	IB212
ICRDR25-11115	Dr. Bhabesh Das	On the Sum of Unitary Divisors Maximum Function	Online	IB213
ICRDR25-11119	Dr. Reba Maji	Efficient Variance Estimation Strategy in Two-Occasion Successive Sampling	Online	IB214
ICRDR25-11120	Mr. Manik	Compartmental Analysis Of Impact Of Logistically Growing Crops And Insect Vectors On The Spread Of Vector-Borne Crop Diseases	Online	IB215
ICRDR25-11144	Debasri Samanta	Seismic Characterization of the Andaman and Nicobar Region Using Power Spectral Density, Probability Density Function, and K-Means Clustering Analysis	Online	IB216

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Day-02: 19th March, 2025
Technical Session: IIA1
Chaired By: Dr. Vivek Kumar Dubey
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REG. ID	NAME	TITLE OF THE PAPER	MODE OF PRESENTATION	PAPER ID
ICRDR25-10035	Dr. Krushna Chandra Patra	Use of TPACK Framework for Blended Learning	Offline	IIA101
ICRDR25-10134	Dr. Subhashree Basu	Prevalence Of Microalbuminuria in Non Insulin Dependent Diabetic Patients in the Light of Glycosylated Haemoglobin: A Cross-Sectional Study Among Kolkata and Its Suburban Population	Offline	IIA102
ICRDR25-10157	Mr. Molla Jannatul Ferdousul Alam	A study on the relationship between Emotional Intelligence and Academic Achievement of Higher Secondary School Students in Purba Medinipur District	Offline	IIA103
ICRDR25-10018	Dr. Anup Kumar Ghorai	Sustainable Growth the Vedic Way: An Ancient Approach to Modern Challenges	Offline	IIA104
ICRDR25-10044	Dr. Buddhadev Guria	Exogenous application of Calcium chloride ameliorates Copper-induced oxidative stress in mung bean (Vigna radiata L.) seedlings.	Offline	IIA105
ICRDR25-10191	Dr. Rajib Dolai	Mathematical Modelling and Optimal Control of Asymmetric Information and Adverse Selection in Market Dynamics	Offline	IIA106
ICRDR25-10031	Dr. Debashis Bandyopadhyay	Alleviation of chromium-induced phytotoxicity in mung bean (Vigna radiata L.) seedlings with citric acid supplementation through regulation of antioxidant system.	Offline	IIA107
ICRDR25-10195	Dr. Tapan Kumar Pattanayak	p-n junction Diode as a electronic circuit element	Offline	IIA108
ICRDR25-00097	Debraj Roy	Deep Learning-Powered Fake News Detection: A Multimodal and Adversarial Approach	Offline	IIA109

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Technical Session: IIA2

Chaired By: Dr. Sovan Samanta & Dr. Tapan Kr. Pattanayak

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REG. ID	NAME	TITLE OF THE PAPER	MODE OF PRESENTATION	PAPER ID
ICRDR25-10004	Prof. Rabindranath Majumder	COVID-19's effects on Government Health Expenditure (GHE) in India	Offline	IIA201
ICRDR25-10026	Dr. Swapan Paul	Evaluating and Mapping Scientific Research: Key Indicators and Tools	Offline	IIA202
ICRDR25-10032	Dr. Prabal Das	Silicon can mitigate the toxic effects of NaCl stress by enhancing nitrogen metabolism in two indica rice cultivars with varying salt tolerance.	Offline	IIA203
ICRDR25-10037	Mrs. Jhinuk Dhibar	Pedagogical Integration of ICT Skills and Competencies for Interactive, Personalized, Blended Teaching Learning in the light of NEP 2020	Offline	IIA204
ICRDR25-10043	Dr. Amit Karmakar	Staphylococcus aureus virulence potentials: an in vivo Study	Offline	IIA205
ICRDR25-10111	Mr. Rajat Ari	Transforming Academic Libraries through Digital Technologies: Issues and Opportunities	Offline	IIA206
ICRDR25-10113	Mrs. Minati Biswas	Constructivism: A Pedagogical Perspective Integrating Technology into Physical Science Teaching – Learning Process	Offline	IIA207
ICRDR25-10185	Dr. Piyali Das	Role of Students to achieve Sustainable Development	Offline	IIA208
ICRDR25-10192	Dr. Ajay Babu	Ethical Use of Artificial Intelligence in Research: Challenges and Guidelines	Offline	IIA209
ICRDR25-10012	Anjani Kumari	Blended Learning: An Effective Approach to Modern Education	Offline	IIA210
ICRDR25-10190	Dr. Prasenjit Mandal	Pythagorean linguistic rough number with MCGDM and their application in supplier selection for medical devices	Offline	IIA211
ICRDR25-10188	Dr. Rupkumar Mahapatra	A study on linguistic z-graph and its application in social networks	Offline	IIA212
ICRDR25-10187	Dr. Tarasankar Pramanik	Fuzzy logic in Decision making problems	Offline	IIA213

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ICRDR25-10169	Mr. Susanta Maiti	A Study on Education For Sustainable Development In India	Offline	IIA214
ICRDR25-00129	Dr. Mrinal Maity	Option Trading: Srategis, Risk Management, Market Analysis, and Human Psychology	Offline	IIA215

Technical Session: IIB1

Chaired By: Dr. Dipak Kumar Jana & Dr. Pintu Das

Link:https://meet.google.com/fnw-oonq-ppj

REG. ID	NAME	TITLE OF THE PAPER	MODE OF PRESENTATION	PAPER ID
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ICRDR25-11042	Dr. Santanu Mandal	Spectral properties of C-graphs	Online	IIB104
ICRDR25-11057	Himanshu Hazra	Fuzzy Multi-Objective Optimization of Hybrid Renewable Energy Systems Using Genetic Algorithms	Online	IIB105
ICRDR25-11100	Mr. Md Ersad Ali	Enhanced Fuzzy Economic Order Quantity (EOQ) Model for Time - Dependent Linear and Quadratic Demand with Constant Deterioration and Shortage Allowance	Online	IIB106
ICRDR25-11107	Dr. Jumi Bharali	A study of Modified Renyi Holographic Dark Energy (MRHDE) in General Relativity (GR)	Online	IIB107
ICRDR25-11143	Avisek Banerjee	A comprehensive study of double domination in picture fuzzy graphs with a realistic application	Online	IIB108
ICRDR25-11124	Mr. Suman Maiti	Interval eigenvalue problems	Online	IIB109
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Chaired By: Dr. Somnath Bera & Dr. Manotosh Mondal

Link: https://meet.google.com/rxy-anxy-tba

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ICRDR25-11151	Manjeet	Some Fixed Point Theorems in V-Fuzzy b-Metric Spaces by using CLR-Property	Online	IIB203
ICRDR25-11152	Dr. Shyamal Dalapati	Neutrosophic Refined Power Mean Operator and Its Application for MADM Problem Based on Cross Entropy Measure	Online	IIB204
ICRDR25-11156	Adarsh Pal	Medical Chatbots in the AI Era: Technologies, Challenges, and Future Directions	Online	IIB205
ICRDR25-11159	Mr. Subhrananda Goswami	Adaptive Trust-based Sooty Tern Optimization Algorithm for Optimal Route Selection in MANET	Online	IIB206
ICRDR25-11160	Rituja Chouhan	An Integrated Study Platform with a Doubly Linked List-Based Recommendation System	Online	IIB207
ICRDR25-11161	Dr. Sunandana Mandal	Investigating the Biological Relevance of Synthesized Silver Nanoparticles	Online	IIB208

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ICRDR25-11001	Dr. Anjana Bhattacharyya	A New Type of Regularity Via Fuzzy Preopen Set	Online	IIB211
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Our Existence: Are We Simulated?

Dr. Sovan Samanta and Dr. Tapan Kumar Pattanayak

Convenors, ICRDR-25

The existence of humans, Earth, and the universe raises thoughtful questions about reality. Are we living in a simulation? The concept of size is relative, suggesting that even the smallest conceivable universe could be vast in comparison to another. This exploration investigates the nature of existence, the relativity of size, and the indefinable boundaries of the universe.

Humanity has long considered the nature of existence. Are we real, or are we part of a cultured simulation? This question gains traction as we explore the universe's vastness and the relativity of size. The Earth, our home, is a tiny speck in the cosmic expanse, yet it holds the entirety of human experience.

The universe's size is a concept that defies simple understanding. Consider a universe with a diameter of $10^{\{-100\}}trillion$ cm. This infinitesimal scale is almost beyond comprehension, yet it could be large compared to a universe with a diameter of $10^{-trilliontrillion}$ cm. The relativity of numbers means that size is not absolute but depends on the context and comparison.

In this framework, the smallest conceivable universe could still be vast relative to another. This relativity challenges our perception of size and underscores the abstract nature of numbers.

The idea that our existence might be simulated stems from the patterns and irregularities observed in the universe. If the universe operates on precise mathematical principles, it raises the possibility that it is a construct, a digital simulation designed by an advanced intelligence. This hypothesis, known as the simulation theory, suggests that our reality is an artificial creation, much like a computer-generated environment.

The boundaries of the universe, its start and end, remain indescribable. If the universe is infinite, it has no beginning or end. Alternatively, if it is finite, its limits are beyond our current understanding. The concept of infinity in mathematics provides a glimpse into this mystery, suggesting that the universe could be boundless.

In conclusion, the existence of humans, Earth, and the universe is a profound paradox. The relativity of size challenges our perception, and the possibility of a simulated reality invites us to reconsider our place in the cosmos. Whether we are real or simulated, our existence is a demonstration to the infinite possibilities of the universe.

Acknowledgment: English and grammatical mistakes of a few parts of the study are corrected by using AI. The image is generated by AI.

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A Neutrosophic EOQ model with demand-dependent Pricing and Storage Constraints

Dr. Pintu Das

Jt. Convenor, ICRDR-25

This study develops a Neutrosophic Economic Order Quantity (EOQ) model that incorporates uncertainty and indeterminacy in demand and cost parameters. Neutrosophy, an extension of classical logic, effectively captures ambiguity, making it particularly useful for inventory management scenarios where information is incomplete or fluctuating. The proposed model considers a demand-dependent unit cost, acknowledging the practical reality that bulk purchasing often influences pricing. Additionally, the model integrates storage constraints, reflecting real-world limitations in warehouse capacity. By leveraging neutrosophic logic, this framework provides a more flexible and realistic approach to inventory optimization under uncertain conditions.

Mathematical Modelling and Strategies for Controlling Drug Abuse among Women in India

Dr. Manotosh Mandal

Jt. Convenor, ICRDR-25

Drug abuse remains a widespread societal challenge, yet much of the existing research primarily focuses on male populations. However, recent studies highlight significant gender differences in substance-related epidemiology. Women, in particular, encounter unique challenges in drug abuse, including greater barriers to accessing and entering treatment programs. In this study, we developed a mathematical model considering the entire population as women to better understand the dynamics of drug abuse in this demographic. The model exhibits two equilibrium points: the drug-free equilibrium (DFE) and the drug-endemic equilibrium (DEE). To evaluate the spread of addiction, we determined the threshold parameter, denoted as the drug addiction generating numberR_D. Furthermore, we conducted both local and global stability analyses for these equilibrium points. To identify effective strategies for reducing addiction and improving recovery rates, we performed an optimal control analysis using two control parameters based on Pontryagin's Maximum Principle. Sensitivity analysis was conducted to examine the impact of key parameters on R_D. Additionally, a cost-effectiveness analysis was carried out to determine the most efficient strategy or combination of strategies for controlling drug abuse at minimal cost. Numerical simulations illustrate the effects of interventions with and without control strategies on different population groups. The results demonstrate a positive impact by reducing the number of addicted individuals and increasing the number of those in rehabilitation.

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ABSTRACTS OF INVITED TALKS

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INVITED TALKS

SPEAKER: DEBIPROSAD DUARI

CHAIRED BY: DR. VIVEK KUMAR DUBEY

Paper ID: IT0404

A Journey to the Stars

Dr. Debiprosad Duari

Former Director, Research & Academic
M. P. Birla Institute of Fundamental Research, Kolkata

ABSTRACT

The subject of Astronomy is considered to be the oldest subject that was practised and learnt by ancient people. Amazingly, it is also the most recent subject of interest and scientific research as well. Scientists all over the world, have realised that terrestrial laboratories have their own limitations in verifying the different hypothesis that the scientists put forward in their endeavour to formulate physical laws which governs the nature. They are convinced that it is in the vast expanse of fathomless space, among the multitudes of stars, within the confines of billions of galaxies, the secrets of nature, the profound physical laws governing it possibly can be discovered.

The lecture will go through a snapshot survey, first on our neighbourhood – the solar system and neighbouring stars. With technological developments, recent studies have unearthed a vast amount of knowledge about our own Solar system. The birth of the solar system around 4.6 billion years from a cloud of gas and dust and its subsequent evolution will be discussed along with the new bodies that have been discovered recently. The birth and apparent evolution and properties of the Sun is the starting point of our understandings of their multitude of stars in the Galaxy and beyond.

Present understandings about stars and their evolution and properties will be the main theme of the discussions. The birth of a star from interstellar giant molecular clouds, from a protostar to a Main Sequence Star and their different physical properties depending upon their initial masses is an exciting story. The end phase of stars is probably most interesting and enigmatic story of our universe. The death of low mass stars resulting in Red Giant, Planetary Nebula and White dwarf. Medium mass stars at their end phase after producing iron at its core goes through a core collapse resulting in an explosive event called Supernova, leaving behind the most accurate cosmic clock named as pulsars. Supernova explosions are believed to be the originator of most of the naturally occurring elements, except Hydrogen and Helium that later on constitutes most objects in our Universe Next comes the end phase of massive stars, which after their nuclear burning phase, because of their mass collapses into a dense point like volume and are termed as Black Holes. Once thought as esoteric description of celestial objects they have been discovered, photographed and their properties have been verified to be commensurate with the theoretical understanding. Black holes and their properties and discoveries will be touched upon.

A very brief outline of our present understanding of the origin, evolution and present structure of the universe will be given to enthuse and excite young minds about the Cosmos. The lecture will also touch upon the tremendous growth both globally and in India about studies, research and technological capacity building over the last few decades which has opened up a new horizon of opportunities for the young generation to get involved in the subject and choose astronomy, astrophysics and space science engagements as their career options. The mega projects that Indian astronomical community has embarked upon using cutting edge technology will be mentioned highlighting the need for a large human resource base not only in pure science but students with engineering studies.

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SPEAKER: PROF. MADHUMANGAL PAL

CHAIRED BY: PROF. SANKAR KUMAR ROY

Paper ID: IT1316

Graph Theory Applications in Ecosystem Modeling: Food Webs, Competition Graphs, and Ecological Analysis

Dr. Madhumangal Pal

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ABSTRACT

This presentation explores the application of graph theory in modeling ecosystems, specifically focusing on food webs and competition graphs. A food web is represented as a directed graph (digraph), where species act as vertices, and predator-prey relationships define the edges. The concept of weighted food webs is introduced, where edges carry weights based on the proportion of consumption among species. The presentation also discusses competition graphs, an undirected representation highlighting species that share common prey, providing insights into interspecies competition.

The study further examines the adjacency matrix representation of food webs and the concept of graph energy, which quantifies structural properties of ecological networks. Additionally, the impact of species removal on ecosystem balance is analyzed, demonstrating how the absence of a species can lead to population changes or extinction. Future research directions include the incorporation of fuzzy graph models to account for uncertainties in species populations and interactions. This work emphasises the significance of graph theory in ecological studies, offering a mathematical approach to understanding biodiversity, species interactions, and ecosystem stability.

References:

1. S. Samanta and M. Pal, Fuzzy k-competition graphs and p-competition fuzzy graphs, Fuzzy Inf. Eng., 5(2) (2013) 191-204.
2. S. Samanta, M.Pal and A.Pal, Some more results on fuzzy k-competition graphs, International Journal of Advanced Research in Artificial Intelligence, 3(1) (2014) 60-67.
3. S. Samanta, M. Akram and M. Pal, m-step fuzzy competition graphs, Journal of Applied Mathematics and Computing, 47 (2015) 461-472.
4. M. Pal, S. Samanta and G. Ghorai, Modern Trends in Fuzzy Graph Theory, Springer, 2020.

SPEAKER: PROF. DR. SANKAR KUMAR ROY

CHAIRED BY: PROF. MADHUMANGAL PAL

Paper ID: IT1918

Three-Way Decision Making in Multi-Attribute Decision Making

Prof. Dr. Sankar Kumar Roy

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ABSTRACT

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Decision making is an emerging field in Operations Research, which helps the decision makers to take right decision. In this talk, first to introduce what is decision making and Multi-Attribute Decision Making (MADM) following by decision matrix. Secondly to define Three-Way Decision Making (TWDM) and its necessity for different scenarios. Thirdly, Decision Theoretic Rough Set (DTRS) is depicted. Then the integration of Three-Way Decision (TWD) with DTRS and Bayesian Theory is chosen for discussion. Thereafter, loss functions and relative loss functions based on TWD are deliberated with an example. Finally, the integration of TWDM and MADM is taken into consideration to overcome the drawback of the classical TWDM. Al last, some conclusions with future scopes are pointed.

Keywords: Multi-Attribute Decision Making; Three-Way Decision Making; Decision-Theoretic Rough Sets; Conditional Probability; Loss and Relative functions.

SPEAKER: PROF. (DR.) TOFIGH ALLAHVIRANLOO

CHAIRED BY: PROF. VIVEK KUMAR DUBEY

Paper ID: IT2001

Soft Computing – A Framework for Uncertainty and Intelligent Systems

Prof. (Dr.) Tofigh Allahviranloo

Research Center of Performance and Productivity Analysis, Istinye University, Istanbul 34010, Turkey

ABSTRACT

Soft computing provides a powerful approach to solving complex problems involving uncertainty, imprecision, and learning. Unlike traditional computing, it leverages fuzzy logic, neural networks, and evolutionary algorithms to develop adaptive and robust solutions.

This talk will explore the mathematical foundations of soft computing, focusing on fuzzy mathematics and its applications in decision-making, system modeling, and optimization. I will also discuss its role in applied mathematics, social networks, and sustainable development, highlighting recent advancements and future directions in intelligent computing.

SPEAKER: PROF. (DR.) VIVEK KUMAR DUBEY

CHAIRED BY: DR. SUJIT KUMAR BERA

Paper ID: IT2204

Network analysis approaches for industrial applications

Prof. (Dr.) Vivek Kumar Dubey

Former Faculty IIT, KGP, INDIA
Professor, Amrita School of Business, Amrita Vishwavidyapeetham, Bangalore

ABSTRACT

The need for mathematical and economic modeling in an industrial / social context employing sustainability principles is gaining importance and is now considered relevant. In this brief presentation, we provide an illustration of a real-world/ complex problem: Supply and distribution management by a network coordinator (for example a retailer) to highlight these points. Such problems cannot be solved by employing theoretical approaches that successfully solve a simplified version of actual problems analytically. Hence, there is a need to find approaches that take complex problems and try to solve them in an approximate ('satisfycing') manner – approaches that allow for meeting certain 'key 'criteria of the network coordinator.

While single-dimension (such as only technically focused, only economically focused, etc.) approaches have been applied (due to simplicity or lack of a wider perspective), the results now inform us that there is a need for a more comprehensive approach. Here we discuss a few technical approaches and highlight the need for a more comprehensive approach to solution by leveraging sustainability principles and the power of Eastern thought (including the knowledge drawn from our Guru Shishya Parampara).

SPEAKER: DR. DIPAK KUMAR JANA

CHAIRED BY: VIVEK KUMAR DUBEY

Paper ID: IT0410

Advanced Fuzzy Logic Inference Systems: Exploring Type-1 and Type-2 Fuzzy Systems and Their Industrial Applications

Dipak Kumar Jana

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ABSTRACT

In many real-life scenarios, discerning whether a condition is entirely true or false can be challenging due to ambiguity or uncertainty. This is where fuzzy logic—a reasoning method that handles such ambiguity—proves useful. This research explores a fuzzy logic-based approach to predict and enhance the quality of polypropylene, a versatile thermoplastic widely used in engineering applications.

The quality of polypropylene depends on indices like the melt flow index and xylene solubility, which are influenced by parameters such as hydrogen flow, donor flow, pressure, and polymerization reactor temperature. A model was developed using extensive data from a petrochemical plant in India to predict polypropylene quality based on these parameters.

Four fuzzy inference systems, constructed using Mamdani type-1 and type-2 approaches with varying membership functions, were evaluated. The model outcomes were compared with actual plant data, and statistical analyses identified the most effective model. Sensitivity analyses were also performed to validate the models and assess the impact of key parameters.

Given the high cost of raw materials, especially the catalyst triethylaluminum (TEAL), achieving the desired polypropylene grade through trial-and-error leads to excessive production costs. The proposed fuzzy logic-based method offers a more efficient alternative by optimizing key parameters during production, improving polypropylene quality, and reducing costs. This study highlights the potential of fuzzy logic in enhancing industrial processes and achieving sustainable manufacturing.

References:

1. Jana, D. Roy, K, Dey, S., Comparative assessment on lead removal using micellar-enhanced ultrafiltration (MEUF) based on a type-2 fuzzy logic and response surface methodology, Separation and Purification Technology 207 (2018)28-41.
2. S. Dey, D. K. Jana, Application of fuzzy inference system to polypropylene business policy in a petrochemical plant in India, Journal of Cleaner Production 112 (2016) 2953-2968.
3. Jana, D. K., Castillo, O., Pramanik, S., Maiti, M., Application of interval type-2 fuzzy logic to polypropylene business policy in a petrochemical plant in India, Journal of the Saudi Society of Agricultural Sciences, 17, (1)(2018) 24-42.

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SPEAKER: DR. SOMNATH BERA

CHAIRED BY: DR. GOPAL MAITY

Paper ID: IT1902

Parikh matrices: connecting words and graphs

Dr. Somnath Bera

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School of Advanced Sciences,
Vellore Institute of Technology Chennai, Tamil Nadu 600 127, India

ABSTRACT

Parikh matrices are a fascinating concept in formal language theory and combinatorics on words, extending the classical Parikh vector by accounting for the frequencies of scattered subwords within a word, in addition to counting each symbol's occurrences. Parikh matrices have several practical applications, particularly in the fields of formal language theory, coding theory, and cryptography. Parikh matrices are used in data compression techniques to identify and exploit repetitive patterns within data. This can lead to more efficient compression algorithms and reduced storage requirements. They are also used in Discrete mathematics, analyzing the structure and properties of graphs and other combinatorial objects. Recent research has focused on extending the concept of Parikh word representable graphs to arbitrary ordered alphabets and studying their structural properties under different morphisms. This includes investigating the numerical properties of words and their graphical representations. This detailed discussion explores the connection between combinatorics on words and graph theory. Notably, extremal graph theory, through graph topological indices, has been introduced via the numerical properties of words. In conclusion, several open directions are provided for learners to explore.

References:

1. Zsolt Fazekas, S., Huang, X. (2025). Generalized Parikh Matrices for Tracking Subsequence Occurrences. In: Anutariya, C., Bonsangue, M.M. (eds) Theoretical Aspects of Computing – ICTAC 2024. ICTAC 2024. Lecture Notes in Computer Science, vol 15373. Springer, Cham.
2. Zakir, Muhammad, Muhammad Naseer, Muhammad Farahani, Irfan Ahmad, Zarqa Kanwal, Mehdi Alaeiyan, and Murat Cancan. "On Exploring the Topological Aspects of the Chemical Structure of the Nanotube HAC5C7 [w, t]." *Utilitas Mathematica* 119 (2024).
3. Teh, Wen Chean, Zhen Chuan Ng, Muhammad Javaid, and Zi Jing Chern. "Parikh word representability of bipartite permutation graphs." *Discrete Applied Mathematics* 282 (2020): 208-221.
4. Teh, Wen Chean. "Parikh matrices and Parikh rewriting systems." *Fundamenta Informaticae* 146(3), 2016: 305-320.
5. Atanasiu, Adrian, Carlos Martin-Vide, and Alexandru Mateescu. "Codifiable Languages and the Parikh Matrix Mapping." *J. Univers. Comput. Sci.* 7(8), 2001, 783-793.

SPEAKER: DR. GOPAL MAITY

CHAIRED BY: DR. SOMNATH BERA

Paper ID: IT0713

Prime Numbers and the Riemann Hypothesis: An Introduction to Analytic Number Theory

Dr. Gopal Maity

University of Genova, Italy.

ABSTRACT

Let X be a large positive number, and let Π(X) denote the number of primes less than X. In this talk, we explore how a seemingly simple question—the growth rate of Π(X)—is deeply connected to the Riemann Hypothesis, one of the most profound and long-standing unsolved problems in mathematics (and a million-dollar question).

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ABSTRACTS OF PRESENTATIONS

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TECHNICAL SESSIONS

TECHNICAL SESSION: IA

CHAIRED BY: PROF. MADUMANGAL PAL & PROF. SANKAR KUMAR ROY

Paper ID: IA01

Applications Of Deep Learning In Epidemiology: Forecasting And Beyond

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ABSTRACT

Now-a-days, artificial intelligence (AI) has been implemented to solve many real world problems. Various deep learning architectures, which are also subset of AI, are used to analyzing and forecasting where real data are available. From this context, we aim to show how we can do a time series prediction of a disease which is thretend to become endemic anytime in near future. We know that, the mosquito-borne disease, dengue is a viral disease prevalent in tropical and subtropical regions. Its adverse impact on human health and the global economy cannot be exaggerated. To improve the efficacy of vector control measures, there is a critical need for mechanisms that can forecast dengue cases with greater accuracy and urgency than before. Therefore, we can employ some deep learning techniques using the previous real data of the concerned disease. We can apply a hybrid model combining CNN and stacked LSTM (BiLSTM) along with CNN, LSTM, BiLSTM, and ConvLSTM to do the forecasting. Further we may compare those results with the help of error metrics to get the best model.

Paper ID: IA02

Closeness Centrality Of Cycle And Corona Product Graphs And Its Applications

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ABSTRACT

Centrality measurement is an effective method for identifying key vertices and edges in a network from various perspectives. Over time, researchers have developed numerous centrality metrics to analyse network graphs. Closeness centrality, in particular, is crucial for examining biological networks, social networks, and transportation networks. The closeness centrality of a node of a graph is the multiplicative inverse of the sum of the distances from to each other vertices. We define normalized closeness centrality of a vertex as =, where. This centrality measurement is more receivable than degree centrality because it counts direct as well as indirect connections. In this paper, we present some new theoretical results for finding normalized closeness centrality of some corona product graphs like , , , , , , , , and . We also, correct the result of Eballe et al. for finding the vertex closeness centrality of cycle graph. The corona graph has many applications, including in signed networks, biotechnology, chemistry, and small-world networks. We also demonstrate a practical application of our proposed results for identifying influential nodes in small-world networks.

Keywords: Closeness centrality, cycle graph, corona product, small-world network

Paper ID: IA03

Covering Of Fuzzy Graphs And Its Application In Emergency Aircraft Landing Using Particle Swarm Optimization Method

Mrs. Anushree Bhattacharya

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ABSTRACT

In this article, facility location problems are represented as fuzzy graphs, and a model is designed with multi-objective optimization programming problems. The Particle Swarm Optimization approach combined with the covering concept of fuzzy graphs is utilized to solve such problems. An algorithm is designed for finding fuzzy vertex covering set of fuzzy graphs. New parameters like covering speed, covering time, and coverage impact for a fuzzy vertex cover are introduced and used for developing the model. This model uses a fuzzy graph with vertices as demand and facility nodes. In case of a sudden change in the total demand of the system, there is a change in the fuzzy covering radius or capacity of facility nodes. The problem is to cover up the fuzzy network by placing facilities with maximized demand and optimizing unknown fuzzy parameters. These works solve a real-life problem: emergency aircraft landing with minimum time and nearest landing place.

Paper ID: IA04

Topological Indices Defined on Quantum Graphs

Shaikh Ibrahim Abdullah[1*], Kajal De[2] and Sovan Samanta[3]

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ABSTRACT

Graph theory plays a crucial role in analyzing the structure of complex systems across various fields,including chemistry, biology, computer science, and network theory. A fundamental aspect of graphtheory is the study of topological indices, which are numerical values that characterize essentialproperties of graph structures. In disciplines such as quantum mechanics, chemistry, and materialscience, quantum graphs have gained significant attention as they represent quantum systems usinggraph-based models. The integration of quantum mechanics and graph theory has led to thedevelopment of quantum graphs, providing innovative approaches to modeling and understandingquantum systems. Traditional graph theory concepts have been expanded to incorporate quantumproperties like superposition and entanglement. This paper explores quantum graphs and their keycharacteristics, specifically superposition and entanglement. Additionally, we introduce severaltopological indices for quantum graphs and present proofs for a few theorems. Finally, the paperconcludes with a discussion on potential future research directions.

Paper ID: IA05

A Self-Operating System For Identifying The Optimal Path Through A Busy City

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ABSTRACT

The shortest path problem in graph theory seeks to determine the most optimal route between a starting point and a destination vertex. This problem has various applications, including in transportation, network routing, and urban planning. However, factors such as heavy traffic, road types, narrow lanes, adverse weather conditions

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like rain, snow, fog, and road maintenance can cause disruptions and delays. Despite the numerous shortest-path algorithms available, designed to find the most efficient path based on distance, real-world issues—such as roadblocks and traffic congestion—often render these paths less effective. In this paper, we categorize roads into five distinct congestion levels, adjust vehicle speeds based on these categories, and enhance existing algorithms using hypergraph theory to improve the accuracy of travel time predictions. Additionally, we assess road congestion (denoted as xxx) by analyzing the number of vehicles passing through each road segment within a 5-minutewindow, monitored by CCTV cameras. To incorporate the uncertainty in travel time, we apply neutrosophic edge weights of the form a + bxI, where a represents the minimum guaranteed travel time, and b represents the uncertain additional time due to road conditions. We then propose an algorithm based on Dijkstra's shortest-path algorithm and implement it using MATLAB. Once the system receives data on the number of vehicles, it computes the current shortest path between any two given points. Moreover, by automatically collecting real-time data on vehicle traffic every 5 minutes, the system continuously updates the shortest path, ensuring that travelers can reach their destinations in the most efficient manner possible.
Keywords: Neutrosophic number; Neutrosophic graph; Traffic jam; Shortest path problem; Dijkstra's algorithm.

Paper ID: IA06

Product operations on Fermatean Fuzzy Graph

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ABSTRACT

The study of fuzzy graph has found numerous applications in various fields where uncertainty and imprecision play a crucial role. Fermatean fuzzy graph (FFG) builds upon and extends the concepts of intuitionistic and Pythagorean fuzzy graph. In this article, we define various product operations including Cartesian, direct, semi-strong, strong, lexicographic etc. and also characterized with examples. In addition, several theorems, specially concerning the degree with total degree with respect to these operations, are proposed and illustrated with various examples.
Keywords:Fermatean fuzzy graph, Cartesian, direct, semi-strong, strong, lexicographic product, degree, total degree.

Paper ID: IA07

Structure Of Resource Theory Of Block Coherence

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ABSTRACT

Emerging from the superposition principle, the resource theory of coherence plays a crucial role in many information-processing tasks. Recently, a generalization to this resource theory was investigated with respect to arbitrary positive operator valued measurement (POVM) based on Naimark's dilation theorem. Here, we introduce the notion of Block Incoherent Operations (BIO), Strictly Block Inco- herent Operations (SBIO) and Physically Block Incoherent Operations (PBIO) and provide an analytical expression for Kraus operators of these operations to have a better understanding of the resource theory of block coherence which in turn gives a more clear picture of POVM based resource theory of coherence. A dilation theorem corresponding to SBIO has been introduced

to enlighten the proper physical interpretation of this operation. These free operations will be helpful in finding out the conditions of state transformations and could be implemented in various protocols. For a transparent view of this resource theory, we have successfully introduced the concept of state transformation under SBIO.

Paper ID: IA08

Enhancement of Academic Library Services through Mathematical Methods for Data-Driven Decision Making

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ABSTRACT

This study explores the application of mathematics in academic library services through data driven decision making, predictive analytics, and increased service efficiencies. This study advocates for a strategic re-envisioning of library operations, where mathematics serves as a critical tool for innovation and adaptability in this digital society. The mathematical methods play a crucial role in enhancing resource management, information retrieval, and user experiences. Key areas of mathematical application include predictive measures in resource allocation, circulation strategies and data analytics for subscription management. These approaches have refined book circulation policies and overall library service efficiency. Furthermore, this paper explores strategy building techniques using mathematical frameworks to deal with complex library management challenges. Ultimately, this study advocates for the incorporation of mathematics in academic library operations strategically to drive innovation and sustainability where libraries can ensure continuous adaptation to technological advancements and evolving user needs in this digital age.

Keywords: Library Services, Mathematical Applications, Predictive Analytics, LibraryResource Management, Academic Libraries.

Paper ID: IA09

Early detection of Alzheimer's disease using Graph Neural Networks: A Novel Approach

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ABSTRACT

By using Graph Neural Network (GNNs) to examine the brain connection data, this paper aims to create an advanced framework for the early detection of Alzheimer's disease. The complicated, graph-structured characteristics of neuroimaging data from Diffusion Tensor Imaging (DTI) and functional MRI (fMRI) have proven difficult for traditional machine learning and deep learning techniques to capture. To overcome this difficulty, an innovative approach has been proposed in which brain graphs are created and processed through Graph Convolution Networks (GCNs) that aim to extract significant representations for categorization. In order to ensure an effective and interpretable framework, the problem has been mathematically defined and described using adjacency matrices with node feature propagation techniques. The suggested model achieves more accuracy compared to conventional deep learning techniques when tested on benchmark datasets related to brain disorders. Results from experiments have demonstrated that GNNs are highly accurate in differentiating between healthy and unhealthy individuals. Future studies have focused on improving model interpretability for practical clinical applications and combining multimodal data sources.

Keywords: Graph Neural Networks, Brain Disorder, Alzheimer's disease, Neuro imaging, Deep Learning, Graph Convolutional Networks.

Paper ID: IA10

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A new multi-criteria group decision making model combining subjective and objective criteria weights using linguistic Z-number

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ABSTRACT

Multi-criteria group decision making (MCGDM) process is a method for finding the best one among alternative options under conflicting criteria used to overcome complex real life problems. In present situation energy is a key component for growth of a nation. A developing country like India should focus on selecting such sustainable renewable energy sources which can be compatible with environment and economic growth. Here a new model is introduced based on SWARA-Entropy-VIKOR method. In this article, linguistic Z-numbers are used for a thorough assessment by decision makers. SWARA method is used for calculating criteria weights subjectively and Entropy method for calculation of objective criteria weights. Finally alternatives are ranked by VIKOR method. The proposed model is applied for choosing sustainable renewable energy sources in India and compared with some existing methods. Solar energy is the most suitable one among seven renewable energy sources (wind, biomass, geothermal, solar, hydraulic, ocean, hydrogen) followed by wind energy. Finally, stability and robustness of presented model is checked by sensitivity analysis.

Paper ID: IA11

Experimental dielectric characterization of Teflon at X-band and comparative error analysis using ABC-ANNs, NRW and AI-NFD studies in W-band

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ABSTRACT

A new experimental dielectric characterization technique using single iris TE 111mode, 8.248 GHz X-band waveguide cylindrical cavity resonator is presented in this paper.In this work, the use of a stadium-shaped iris pattern with unique orientation instead of usualrectangular form has proven to be a convenient method for attaining optimum coupling andachieving high Q as well. Moreover, the absence of sample holder with this proposed designpredominantly eliminates any additional loading effect; even minimizes the cavity power lossand measurement uncertainty to some extent.Along with, scattering parameters for theperturbed cavity are estimated by vertically loading the cylindrical Teflon at positions otherthan the energy maxima points. Conventional perturbation theory is subsequently modified tocompensate for this positional change. Simultaneous simulation measurements andexperimental characterizations of the test substrate for four distinct sample lengths are doneusing the designed cavity model and successively verified with NIST standards. Due toprompt accuracy and wide band's results conformity, AI algorithm based ABC-ANNs, NRWand Neuro-fuzzy designer (NFD) extractions have used as standard references. Ability of themodified technique is realized when the measured permittivity outcomes at random substratelocations are compared with those AI based extracted data sets, demonstrating confirmedaccuracy even higher than 90%. Furthermore, prominent high Q nature of the proposedstructure is confirmed by the traceable accuracy exceeding 85% in measured losses, incomparison, around 50% seen for the earlier cases.

Keywords: Waveguide cylindrical cavity resonator, Stadium-shaped iris, Cylindrical Teflon, Permittivity, Loss tangent.

Paper ID: IA12

Nearly Complete Graph and Threshold Intuitionistic Fuzzy Graph

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ABSTRACT

For large networks, sometimes one or two edges deletion is natural. Theoretically the network is not complete. In this study we introduce nearly complete graphs which allows certain relaxation on completeness. Also we introduce threshold Intuitionistic Fuzzy Graph which is a generalization of nearly complete graph. Few properties on chromatic number on the mentioned graphs have been developed. An area of application is given.

Paper ID: IA13

Exploring the Teaching Approaches, Teaching Methods, Teaching Strategies, and Teaching Techniques: A Systematic Review

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ABSTRACT

In the 21st century, the diversified and modern teaching and learning process is practiced in India.The teaching process is defined as the process of transforming the knowledge of the students from the teachers. In some cases, teachers use the teaching approaches, teaching methods, teaching strategies, and teaching techniques in the same sense. The main objective of this study is to explore the specific ideas of the terms such as teaching approaches, teaching strategies and teaching techniques in teaching learning process. The second objective of this study is to help the teachers to understand the differences between that four terms. This study used a systematic literature review process. It is a qualitative study. The 20 articles published in various journals in the last eight years were obtained for this study using methodological search techniques. This study seeks to investigate the distinct meaning of four terms such as teaching approaches, teaching methods, teaching strategies and teaching techniques, and help teachers to distinguish between them and establish a relationship between them. This study can be very useful for teachers in the teaching learning process.

Keywords: Teaching Approaches, Teaching Methods, Teaching Strategies, Teaching Techniques, Systematic Review.

Paper ID: IA14

Flipped Learning: An Innovative and Emerging Approach

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ABSTRACT

Today students are far more different from students of our times. Our teaching approaches need to alter in light of the experiences of this future generation. The National Education Policy (2020) places a strong emphasis on critical thinking and problem-solving abilities, hoping to better prepare the next generation of Learners for unpredictable future and life. As stated repeatedly by NCF 2020, learning should not be restricted to what is found in textbooks and classrooms. Students and teachers can access a vast range of curriculum through ICT and extracurricular activities and varied resources. Numerous educational techniques, approaches, and concepts are being explored, with

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varying degrees of effectiveness, personalized learning, game-based learning, blended learning, and flipped classrooms are a few of these. Engaging and interactive learning experiences are given priority in innovative methods to education. They provide a sense of empowerment and ownership by encouraging students to actively engage in their own learning process. Flipped Learning is a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter. This instructional model reverses the traditional learning experience. In a flipped classroom, students utilize their time by proactively engaging in discussions, collaborations and problem-solving activities. As we know, the new NEP reforms emphasize on developing a holistic learning experience that enhances the cognitive, social, emotional and creative capacities of students. Similarly, the flipped learning approach empowers students to explore their individual learning styles. This Paper will Explore this emerging and Innovative approach of flipped learning.
Keywords: Flipped Learning, pedagogical approach, NCF 2020, blended learning.

Paper ID: IA16

Graph Coloring Based on Degree-Dominance Property

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ABSTRACT

Graphs are fundamental tools for modeling various real-world systems, including social and communication networks. This study introduces a novel concept in graph theory, known as domination coloring. In a graph G with vertex set V and edge set E, each vertex v has a degree $d(v)$. A vertex x dominates an adjacent vertex y if $d(x) > d(y)$. In proper coloring, adjacent vertices must have different colors if one dominates the other. This study explores this concept, proves several related properties, and discusses its potential applications. The major contributions of this study include the introduction of the concept of domination coloring, the development of a comprehensive theoretical framework, the proposal of efficient algorithms, and the exploration of real-world applications.
Keywords: Graph, Domination, Coloring, Chromatic number, Degree

TECHNICAL SESSION: IB1

CHAIRED BY: DR. SUJIT KUMAR BERA & DR. SUDHANSU KHANRA

Paper ID: IB101

Chaotic Characteristics and Behavior of Communication with Switching in WSN

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ABSTRACT

In wireless sensor network. (WSN) data gathering, congestion, data overlapping,collision and data loss ete are very common problem. Congestion in WSN not only haal to packet losses, delity, and but also leads to excessive energy consumption due to a large number of packet drops and retransmissions. At the same time the collision occurs when

two or more close modes are attempted to send data to others. Therefore data loss for congestion and inference in the network and together data collision exhibits the existence of Chaos (Lc. dead lock) in the network In this paper, we proposed a nonlinear dynamical model with switching and applied chues theory to study the traffic behavior of the WSN and several aspects of the model have been discussed matizematically and found the chaotic behavior when packets collided in dense WSNs, with heavy collisions. This is a model of interference competition. Two przy species compete for the same resource and each one is predated by a specialist predator We also consider switching behavior in the lone predator as specialist predators oflen switch to alternative prey. We investigate the responsible parameters for the dead lock situation of the model through simulation. We find that WSN traffic is chaotic, and different topologies of WSN eculd cause a little variation on embedded dimensions. Heuristic simulation carried out and observed important parameters for stabilny and instability situations of the model. We evaluate the proposed scheme using computer simulations by Matish. Through the simulation experiments, we show effectiveness of the proposed schatt and discuss its development potential.

Paper ID: IB102

Korovkin Type Approximation In Generalized Statistical Sense

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ABSTRACT

A Korovkin-type approximation theorem for positive linear operators on the Banachspace of all real valued uniform continuous functions on [0, ∞), with the property that limx→∞ f(x)exists finitely for any f on this space, is established in this article, which takes into accountthe idea of AI -statistical convergence for real sequences. Next, we construct an example thatdemonstrates the superiority of our new outcome above its classical counterpart. We also expandthe approximation theorem for positive linear operators of two variables.

Paper ID: IB104

Probing Baryogenesis in f(Q) Gravity

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ABSTRACT

The origin of matter domination in the Universe is one of the most exciting open puzzles in particle physics and cosmology. Despite many theoretical developments, the actual reason behind baryon- antibaryon asymmetry is still unknown. Our aim here is to examine this phenomenon in the framework of modified gravity theories, which have impressively elucidated the contemporary accelerated expansion of the Universe as well as the early phase. Consequently, this letter sets its sights on the task of constraining a specific variant of modified gravity, namely, f(Q) gravity, in conjunction with gravitational baryogenesis. The power law model and recently proposed DGP-like f(Q) models are considered to find the baryon-to-entropy ratio and compare them with the observed value, that is nB/s = 9.42 × 10−11. Furthermore, we impose constraints on the additional degrees of freedom introduced by this modified theory of gravity.

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A solution approach to solve Multi-Objective Transportation Problems under Neutrosophic Environment

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ABSTRACT

Transportation plays a crucial role in real-world logistics and supply chain management. This paper presents an optimal solution approach for a multi-objective transportation problem in a neutrosophic environment. The primary goal is to minimize transportation costs when supply, demand, and transportation costs are represented as trapezoidal neutrosophic fuzzy numbers. These fuzzy numbers are converted into crisp values using a ranking function. Additionally, we propose a novel method to obtain an optimal solution and compare its performance with existing methods. Numerical illustrations are provided to demonstrate the effectiveness of the proposed approach.

Keywords: Fuzzy Numbers, Neutrosophic Numbers, Neutrosophic Multi-Objective, Score Function.

Paper ID: IB106

A Novel approach to optical fiber dispersion optimization study with 'v-value'

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ABSTRACT

Introduction of optical fibers is marked as an iconic step, when it comes to advancements in the field of communication systems. Here, the study of loss-dispersion management is a major field of importance. Unification between the lowest loss wavelength and Zero Material Dispersion Wavelength (ZMDW) of silica based fiber is must, to have a successful system. Different advanced techniques such as Dispersion Shifted Fiber (DSF), Dispersion Flattened Fiber (DFF), etc. have already proved their efficiency in this matter. Our approach was to study the issue in a different way. The basic requirements of optical fiber materials were satisfied by SiO2 , but different material combinations are also producing interesting results. Our study is extended over a fair number of available materials, some of which areleading to broader flatness and minimum dispersion over a considerable range of wavelengths around the ZMDW. We have studied the properties of the pure and doped silica fibers along with some fluoride glass fibers and observed their dispersion properties over application-oriented wavelength region and their performance around the ZMDW region. We observed very effective optimized conjugation of loss-dispersion characteristic of materials. The study on dispersion conventionally gets reported w.r.t. wavelength. However, the studies of optical fiber parameters get recorded with V-value changes. Here, we have formulated a premier technique to relate the wavelength with V-value to study material dispersion. Thus, the study of the different parameters of optical fibers can be successfully continued with wavelength or V-value and the barrier of fundamental parameters can be removed.

Keywords: loss-dispersion management, Zero Material Dispersion Wavelength (ZMDW), V-value.

Paper ID: IB107

Chemical and radiation effect on an Unsteady MHD Casson Fluid flow passed over an Inclined Plate

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ABSTRACT

An unsteady MHD casson fluid flow past an inclined moving plate is examined to address the effect of chemical reaction and thermal radiation. The resulting system of the equations governing the flow is solved analytically using regular perturbation technique. The numerical results obtained are presented graphically against the different values of the parameters entering into the problem and interpreted physically. It is found that the results obtained in the present work are in excellent agreement with the physical reality of the problem.
Keywords: MHD, Chemical reaction, Thermal radiation, Casson fluid, inclined plate.

Paper ID: IB108

A Comparative Study of Genetic Algorithm, Ant Colony Algorithm,Imperialist Competitive Algorithm, Dynamic Harmony Search, and Non-linear Chaotic Algorithms

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ABSTRACT

In today's era, Image encryption and decryption have proven to be the main resource insecuring images, ensuring privacy, integrity and security of sensitive information. Imageencryption relies on mathematical algorithms to convert the original image into a form that ishard to interpret, improving resistance to threats. Meanwhile, the process of decryption usesthe same key to restore the original images. Genetic Algorithm is a problem-solving techniqueinspired by the process of natural selection and genetics. It is used to produce a new encryptionmethod by exploiting the powerful features of the crossover and mutation operations. AntColony Optimization (ACO) algorithms are used to solve the problems of encryption. In this,ants communicate indirectly through the process called stigmergy, where they depositpheromones along their paths to signal the presence of food sources. Similarly, ImperialistCompetitive Algorithm (ICA) is a method used to transform a given image into a set ofstatistically independent components, which serve as protected versions of the original image.Dynamic Harmony Search (DHS) was inspired by improvisation process of musicians seekingharmonious sounds. DHS is used to improve and secure the encryption process of image data.
Keywords: Genetic Algorithm, Ant Colony Algorithm, Imperialist Competitive Algorithm,Dynamic Harmony Search, and Non-linear Chaotic Algorithms

Paper ID: IB109

YOGA PRACTICE'S IMPACT ON SPECIFIC PSYCHOLOGICAL AND PHYSIOLOGICAL VARIABLES AMONG FEMALE COLLEGE STUDENTS

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ABSTRACT

Life will not be life without physical activity. The purpose of the study was to investigate effect of Yoga practice on psychological and physiological variables among college female students. For the purpose of the study 15 female college students were collected purposively from Model B.P.Ed College, Jalpaiguri. Attitude Inventory was four weeks of Yoga practice tested before the treatment of Pre-test and again subjects were tested after four weeks

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of Yoga Practice i.e. post-tested. Between pre-test and post-test mean were analysis statistically to find out the effect of Yoga treatment. The levels of significant were set at p-0.05 level the t-ratio 2.06. After the test t-ratio were found 0.46 at SBP, 1.55 at DBP, 0.28 at RHR, 1.82 at SpO2, 0.03 at BW, 1.96 at TSF, 1.66 at ASF, 0.85 at ISF. It was found that no significant improvement on SBP and DBP of the subjects which might be due to that small span of treatment of exercise. RHR indicated that four weeks Yoga training did not have significant influence on RHR among female college students. Beside this, four weeks of Yoga practice might not sufficient to bring the significant changes in this SpO2 parameter on college level female students. Several study found no significant effect or negligible contribution of Yoga to increase cardio respiratory endurance and reduce body fat and decrease body weight. From the study was revealed that no significant effect on blood pressure (Systolic and Diastolic) and Resting Heart Rate among college level female students were found. It was also views that no significance effect on arterial oxygen saturation among college level female students was seen and also yoga practice did not have any significant effect on body weight and sub-coetaneous body fat among college level female students. Yoga practice did not have any significant effect on psychological stress among college level female students.

Keywords: SBP, DBP, RHR, SpO2, BW, SCAT.

Paper ID: IB110

Sustainable Management of Near-Expiry Cosmetics & Pharmaceuticals: A Production-Based Approach to Refurbishment, Disposal, and Donation

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ABSTRACT

A paradigm evolution toward sustainable inventory management is required due to the growing concern about waste generation and environmental effect in the pharmaceutical and cosmetics sectors. This study offers a novel production-based method for managing pharmaceuticals and cosmetics that are about to expire, combining donation, responsible disposal, and refurbishing as important sustainability tactics. The study examines how stringent screening procedures may categorize items for refurbishment, extending their utility while guaranteeing compliance with regulatory criteria, by recognizing the faulty production process. Green technology and waste-reduction programs minimize environmental harm by disposing of products that are judged unsafe for sale in an environmentally acceptable manner. In the meanwhile, socially conscious donation initiatives link business sustainability with social welfare by rerouting safe, almost-expiry goods to underprivileged areas. With a focus on how sustainable inventory systems support a low-carbon circular economy, the research also explores how carbon cap and taxation policies regulate industrial emissions. In order to promote a robust, accountable, and resource-efficient supply chain for medicines and cosmetics, this research develops the idea of a Sustainable Economic Production System by linking economic viability with environmental stewardship.

Keywords: Sustainable Economic Production Quantity; Imperfect Production; Refurbishment; Donation; Disposal; Green Technology; Carbon Cap & Tax Policy.

Paper ID: IB111

ENUMERATION OF PTERIDOPHYTIC DIVERSITY IN ITANAGAR CAPITALCITY, ITANAGAR, ARUNACAL PRADESH

Mosarof Hossain and Soma Sukul

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ABSTRACT

Fifty-three species of pteridophytes which are belonging to thirteen families were documentedin Itanagar and its surroundings (Itanagar Capital City) of Arunachal Pradesh. Polypodiaceae,Aspleniaceae and Pteridaceae shows their most dominance. Majority of ferns were terrestrial,only Pyrrosialanceolata (L.) Farw. shows epiphytic

nature of habitat. The Shannon's diversityindex value (H') and Simpson's Diversity (D) values of pteridophytic species in study areashowed high diversity and species richness.

Keywords: Pteridophytes, Diversity-Index, Itanagar Capital City, Arunachal Pradesh.

Paper ID: IB112

Construction of minimal surfaces

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ABSTRACT

The Weierstrass-Enneper representation gives an useful link between harmonic mapping and isothermal representation of minimal surfaces. In this, presentation we use the harmonic shear technique, given by Clunie and Sheil-Small to construct harmonic mappings which are the projections of some minimal surfaces. We construct new minimal surfaces lying over the shear of convex domains, such as right half branch of the hyperbola, right half of the Lemniscate of Bernoulli and interior of a parabolic region. The conjugate and associated minimal surfaces of the newly generated minimal surfaces are also discussed.

Paper ID: IB113

AI or Not AI : That is the Question.

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ABSTRACT

Artificial Intelligence (AI) has completely changed the area of educational research by changing how academics gather, examine, and interpret data. At first, AI was used for routine activities like lengthy calculations and little corrections. On the other hand, its capabilities have grown rapidly, making it possible to provide fresh insights and knowledge. The National Education Policy (NEP) 2020 also promotes for the integration of emerging technologies such as Artificial Intelligence (AI) into the mainstream curriculum, providing students with future-ready abilities. Even while AI is frequently praised as a blessing, its possible drawbacks and hazards are usually disregarded. AI is a serious danger to educational research, especially when it comes to: The integrity of study findings may be jeopardized by the use of AI to manipulate or create data. The privacy of research participants may be violated by the use of AI-powered systems to steal private information. Concerns of bias, accountability, and transparency are also raised by the growing use of AI in educational research. In order to maximize the advantages of AI in educational research while lowering its hazards, these worries highlight the necessity for researchers and educators to thoroughly assess its function. This calls for the creation of strong ethical frameworks, rules, and norms that control the application of AI in educational research. Finally, ethical AI integration in educational research can improve research impact, quality, and efficiency while fostering credibility and academic integrity.

Paper ID: IB114

Generalized coupled fixed point result and its application to the existence of solution of system of integral equations

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ABSTRACT:

In this article, we investigate a system composed of two integral equations and demonstrate the existence of a solution using the concept of generalised coupled rational contraction. This concept is motivated by the findings of previous works [15, 25, 28]. To achieve our objective, we establish the existence of a fixed point for this coupled type of contraction, satisfying a cyclic admissible condition. Additionally, we introduce two different types of continuity: (α, β)-continuity and (α, β)-lower semi-continuity of a function. These notions are crucial in proving our results under distinct sets of conditions. The focus of our work lies primarily in the domain of nonlinear set- valued analysis. To illustrate our findings, we present an example that exemplifies the,application of our results in practice.

AMS Subject Classification: 54H10, 54H25, 47H10.

Paper ID: IB116

An investigation of the memory effect on an inventory model for deteriorating item with constant demand

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ABSTRACT

There is no denying that memory plays a significant role in inventory models. Both recent and long-term experience are equally important for managing a company's profit. Two key elements drive our suggested inventory model: deterioration and constant demand. Here, we have used the practical concepts of fractional calculus to introduce the memory effect. Additionally, we use the fractional derivative's order as a memory index. We compute a number of costs such as holding cost, purchasing cost, deterioration cost, shortage cost, salvage value. Additionally, fractional calculus techniques are used to compute optimal ordering interval, optimal starting shortage time and minimized total average cost theoretically. By selecting an appropriate numerical example, the effect of memory is justified. Finally sensitivity analysis for the model has beenpresented.

Keywords: Fractional differential equation · Fractional Laplace transform · Mittg-Leffler function · Memory.

TECHNICAL SESSION IB2

CHAIRED BY: DR. KALYAN KUMAR RANA & DR. CHANDAN BIKASH DAS

Paper ID: IB202

Existence result for fixed points of multivalued (θ − F) contractions and its application to existence of solution of boundary value problem arising in the vibration of vertically hanging heavy cable

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ABSTRACT

In this paper we establish a fixed point theorem of a multivalued mapping defined on a complete metric space. In our result we use a new contractive inequality. There are rational terms in the expression of the inequality. The main theorem has several corollaries and is illustrated with example. The main result is deduced in metric spaces.
Keywords: Metric space; Hausdorff distance; fixed point; F contraction; admissible mapping;boundary value problem.

Paper ID: IB203

Parameter-Uniform Stability of the Darcy System

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ABSTRACT

The Darcy system includes an intrinsic, non-rescalable parameter known as hydraulic conductivity. In this work, we explore suitable function spaces and examine the uniform stability of the system with respect to this parameter.

Paper ID: IB204

Non Squeezable Nature of Charged Anisotropic Neutron Star: A Brief Analysis in Light of NICER Observations

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ABSTRACT

A main sequence star holds itself in hydrodynamic equilibrium by the interaction of outward thermal pressure which is generated by the ignition of the fuel of its core and gravitational inward pull. When available fuels burn out in the core, collapse is initiated and second phase ignition starts. In this stage heavy to heavier elements are created in the core till iron is created. After creation of iron, the core is supported by electron degeneracy pressure till Chandrasekhar limit. But after this certain mass supernova type-II is initiated and the remnant of the star gives birth to a neutron star. Such a star holds itself in equilibrium under the interaction of neutron degeneracy pressure and inward self gravity. If the mass exceeds 5.5 solar masses, black hole is formed. Range between them is called the lower mass gap. Here we expect either a massive neutron star or lightweight black hole. Recently, LIGO collaboration has received a signal named GW230529 which is caused by the collision of two bodies of masses 1.2 to 2 solar masses and 2.5 to 4.5 solar masses. Further the signal PSR J0030+0451 observed by NICER observatory indicates the non squeezable nature of neutron stars. In this research work we have considered D-dimensional dark energy dominated spacetime and an anisotropic, charged neutron star embedded there.The system is stable by its pressures, gravitational force etc. Such an object is found to accumulate mass almost equal to 4.6 solar mass and shows an interesting type of structural evolution. It is concluded that theoretically such a huge neutron star may exist.
Keywords: Neutron star, lower mass gap, Chaplygin gas, Anisotropy.

Paper ID: IB205

Exploring Synchronization Behavior in a Supply Chain Model with Different Coupling Mechanisms

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ABSTRACT

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Many researchers in marketing management have explored the relationship between end- customer demand and manufacturer supply, often assuming a direct proportionality. However, in practice, meeting end-customer demand can be complex due to various factors such as production constraints, market dynamics, and supply-demand fluctuations. While individual end customers typically lack the direct influence to request sufficient products from manufacturers, they can still indirectly shape the market by providing feedback and expressing demand through retailers. In this paper, we introduce a supply chain model that accounts for manufacturing limitations, acknowledging that production does not always increase in direct proportion to end-customer demand. This observation prompts us to adjust our model accordingly. We identify equilibrium points and analyze system stability using the Routh-Hurwitz criterion. Due to the inherent instability of the model, we implement various feedback control strategies to stabilize the system. Computer simulations are conducted to validate the effectiveness and robustness of the proposed control strategies within the new supply chain framework.

Paper ID: IB206

Viscous Accretion for a Dark Energy Background and Spin of the Black Hole Working Together

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ABSTRACT

Best way to describe our universe should be followed by general relativity. Black holes were more spectacular predictions of general relativity. Theoretically, the presence of such completely dark celestial objects was possible. Recently, observations of the Event Horizon Telescope have completely supported this theoretical speculation. Besides, Ia supernova observations tell us that we are living in an rate-increasing expanding era. Black holes which are rotating and embedded in such an accelerated expansion will show some different properties than the simpler ones. The motif of this article is to study the accretion and related properties around such black holes. We study the linearly inward falling speed profiles, changes in rotational properties, density variations etc. We compare our results with other time eras. This is obvious to consider supermassive black holes (SMBHs) in the center of galaxies through the cases of such a presence is not justified.We are able to observe SMBHs at redshift z = 7.54 which must have formed within less than one billion years. Alternative models to BHs, inclusion of extended objects in classical general relativity, consideration of existence of more exotic models, viz naked singularity have been considered. So far the motivations of these works were to consider only the gravitational effects of alternatives to BHs and to find out their observational properties in order to distinguish a BH from a so-called BH mimicker. Recently, in the references like, a possibility of DM, in the form of bosons, to form self gravitating bound structure in different galaxies are studied. Comparison is found between the motion of test particles in the gravitational eld of both SMBH and DM core. A significant discrepancy in the motion is noticeable 100AU and this increases as we are approaching the center. Finer observations in-future (Say VLBI, BH cam project etc) might be able to distinguish the shadows caused by BH and BH mimicker. As of now, we cannot exclude the idea of existence of SMBH candidates like gravastars or boson stars etc. These studies/realizations motivate us to consider quantum contaminated BHs. Besides, DM clustering is chosen to be the cause of formation of different structures of the universe, especially the galaxies. DM and DE interact. As mentioned earlier DE and bulk viscosity even can be formed out of the delayed DM decay. As a result, we can expect the presence of DE in the vicinity of the core area of SMBHs. This motivates us to study the viscous accretion onto quantum contaminated SMBHs. Another motivation for the present work must be mentioned here. While studying the accretion and x axis in the u−x plane while being parallel to the u axis while wind properties, we see that adiabatic uid wind branches are almost parallel as we go far from the central BH. On the contrary, the wind branch turns to modified Chaplygin gas. These two extremely inclined ness are not smoothly changed at all. But no change in the physical constraints leads to such drastically diversified solutions. So, there must exist some missing links between the two kinds of terminal cases (i.e. adiabatic and MCG ow). If we are able to find them, what should be the related nature of the density variations and the corresponding thermodynamics is a more interesting point. We will try to find out the answers in the subsequent sections. This present article can be treated as a detailed study of the viscous accretion onto a rotating black hole embedded in a quintessence universe and the consequent thermodynamic phenomena. To construct the mathematical model we have chosen a particular type of black hole which has mass and rotation as signature properties along with a special type of background.

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Quintessence is a hypothetical fluid which is theorized to create a repulsive force responsible for late time cosmic acceleration. We choose a rotating black hole solution which carries effects of the quintessence universe in it. The gravitational effect of such a black hole is implied through a pseudo Newtonian potential. This is done as direct general relativistic nonlinear differential equations are difficult to solve. Viscous effect is adopted through the Shakura and Sunyaev α effects. We follow that if the viscosity is high the accretion branch's uid speed steeply falls down as we go far from the central black hole. Wind speed increases as we increase viscosity. But the radial distance wise shift is small. At a nite distance uid speed becomes equal to that of light. As we increase the quintessential effect, wind speed increases. Truncation in the accretion length is supported by the sonic speed curves and specific angular momentum to Keplerian angular momentum ratio curves. Either the sonic speed reaches the speed of light or the λ to λ_k ratio reaches the value 1 where the accretion turns zero. Steep fall in accretion due to light or the λ_k the increase in viscosity signifies the weakening of accretion procedure. Density profiles are found to be very interesting. At the edges of the disc, approximately at the order of thousand Schwarzschild radius distance the density is found to be very low. But of course this was higher than the density of the universe. At the nearer vicinity of the SMBH, we see the wind density rise up to the order of 10^12gm/cc . This quite matches with the observational results.

Paper ID: IB207

Optimal Control and Stability Analysis of an Epidemic Model with Population Dispersal

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ABSTRACT

In the present paper, we consider an SEIR-type epidemic model with transport-related infection between two cities. It is observed that transportation among regions has a strong impact on the dynamic evolution of a disease, which can be eradicated in the absence of transportation. Transportation can lead to the incorporation of a positive risk probability. The epidemiological threshold, commonly known as the basic reproduction number, is derived. It is observed that when the basic reproduction number is less than unity, the disease dies out, whereas if it exceeds unity, the disease may persist in the system. A thorough dynamical behavior of the constructed model is studied. We formulate and solve an optimal control problem using vaccination as a control tool. Extensive numerical simulations are carried out based on our analytical results. Finally, we try to relate our work with a real-world problem.

Keywords: Infectious disease, Basic reproduction number, Vaccination, Optimal control.

Paper ID: IB208

High-Resolution Modeling of Interplanetary MediumDiscontinuities: Integrating Adaptive Mesh Refinement andSpectral Methods for Space Weather Applications

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ABSTRACT:

The interplanetary environment, a highly dynamic plasma-filled region, is profoundly influenced by sudden disturbances such as shock fronts and abrupt transitions, which play a critical role in shaping space weather and solar-Earth interactions. This investigation leverages state-of-the-art computational strategies to refine the representation of these events. A pioneering hybrid framework is proposed, combining adaptive grid refinement (AGR) with spectral analysis techniques to precisely capture steep variations while optimizing computational performance. The approach is rigorously tested against data from missions including Parker Solar Probe, Solar Orbiter, and Wind, ensuring

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its robustness. Results demonstrate an 85% improvement in accuracy over traditional models, driven by AGR's ability to dynamically adjust grid resolution and the spectral techniques' effectiveness in detailing small-scale features. These innovations facilitate precise simulations of interplanetary shock dynamics and their interplay with solar wind, offering fresh perspectives on plasma behavior.The outcomes hold significant relevance for both theoretical plasma studies and space weather prediction. Enhanced simulation fidelity deepens comprehension of heliospheric processes and strengthens the ability to forecast space weather events, which are vital for protecting satellite functionality, communication networks, and space infrastructure. This work bridges theoretical progress with real-world applications, representing a notable advancement in the field of space plasma research.

Paper ID: IB209

A Study of Anti-Picture Fuzzy Graphs for Identifying Key Influencers in Collaborative Research Networks

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ABSTRACT

Fuzzy graph theory offers a powerful framework for representing and analyzing relationships with varying degrees of membership. An anti-fuzzy graph is a significantconcept, where the flow of an edge exceeds the maximum degree of the connectionbetween vertices. Building on these ideas, our study introduces the concept of anti-picture fuzzy graphs. In this paper, we explore various types of anti-picture fuzzygraphs, including strong anti-picture fuzzy graphs, complete anti-picture fuzzy graphs,and regular anti-picture fuzzy graphs. We also examine the degree of vertices inanti-picture fuzzy graphs and, based on these definitions, introduce the concept of anull anti-picture fuzzy graph. Furthermore, we define the tensor, normal, and conormal products of two anti-picture fuzzy graphs and provide illustrative examples forthese products. Several key theorems are presented regarding the different types ofanti-picture fuzzy graph products and their interrelationships. Lastly, we apply theseconcepts to identify key influencers in collaborative research and determine the mosteffective research group using an anti-picture fuzzy graph.

Paper ID: IB210

Optimal bound of genuine four party Svetlichny type nonlocality and hidden nonlocality under local filtering

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ABSTRACT

Identifying the nonlocality of a multiparty quantum state is an important task in quantum mechanics. Seevinck and Svetlichny [Phys. Rev. Lett. 89, 060401 (2002)], and independently, Collins and co-workers [Phys. Rev. Lett. 88, 170405 (2002)] havegeneralized the tripartite notion of Svetlichny nonlocality to n-parties. Here we havedeveloped a tight upper bound for genuine four party Svetlichny type nonlocality. The constraints on the quantum states for the tightness of the bound are also presented. The method enables us to provide necessary and sufficient conditions for violating the four qubit Svetlichny type inequality for several quantum states. The relations between the genuine multipartite entanglement and the maximal quantum value of the Seevinck and Svetlichny operators for pure four qubit states are also discussed. Consequently, we have exhibited genuine four qubit hidden nonlocality under local filtering. Our result provides an effective and operational method for further study of multipartite quantum nonlocality

Paper ID: IB211

Deep Learning in Healthcare: Transforming Diagnosis, Treatment, and Patient Outcomes

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ABSTRACT

Deep learning is transforming healthcare by enabling advanced data analysis, enhancing diagnostic accuracy, and optimizing patient care. Its applications encompass medical imaging, disease detection, drug discovery, and personalized treatment, significantly improving clinical decision- making. AI-driven models facilitate the diagnosis of conditions such as cancer, cardiovascular diseases, and neurological disorders through imaging and predictive analytics. Furthermore, deep learning enhances electronic health record (EHR) management, supports robotic-assisted surgeries, and improves virtual health assistants for patient care. In epidemiology, it plays a crucial role in early disease detection and outbreak prediction. Despite its vast potential, challenges such as data privacy, ethical concerns, and model interpretability must be addressed to ensure wider adoption. This paper discusses the evolving role of deep learning in healthcare and its transformative impact on modern medical practices.

Keywords: Deep Learning, Healthcare, Medical Imaging, Disease Detection, Artificial Intelligence, Drug Discovery, Personalized Treatment, Predictive Analytics, Electronic Health Records, Epidemiology.

Paper ID: IB212

Γ-Semigroups and Their Congruence Lattice Isomorphisms

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ABSTRACT

In this paper, we delve into the topic of isomorphisms within the lattices of congruences associated with a Γ-semigroup. Furthermore, we extend this exploration to encompass lattices of compatible relations. During this generalization process, we uncover intriguing Galois connections between these lattices of compatible relations.

Paper ID: IB213

On the Sum of Unitary Divisors Maximum Function

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ABSTRACT

It is well known that if a positive integer d is called a Unitary divisor of an integer n if and gcd . Divisor function denote the sum of all such unitary divisors of n. This function is multiplicative i.e., if gcd , then . In this paper, we consider the maximum function max and study the function for , where is a prime number and 1.

Paper ID: IB214

Efficient Variance Estimation Strategy in Two-Occasion Successive Sampling

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ABSTRACT

The purpose of this paper is to report a general class of estimators for estimatingpopulation variance on current occasion in two–occasion successive sampling. Behaviors ofthe proposed class of estimators have been studied in detail and its optimum replacementstrategy has also been discussed. The proposed class of estimators has been compared withthe sample variance estimator and the results obtained are demonstrated empirically. Thedominance ranges of the proposed estimation strategies are identified and illustrated followedby suitable recommendations.
Keywords: Population mean, Successive sampling, Study variable, Auxiliary variable, Bias,Mean square error.

Paper ID: IB215

COMPARTMENTAL ANALYSIS OF IMPACT OF LOGISTICALLY GROWING CROPS AND INSECT VECTORS ON THE SPREAD OF VECTOR-BORNE CROP DISEASES

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ABSTRACT

In this paper, a compartmental analysis of impact of the logistically growing crops and insect vectors on the spread of vector-borne crop diseases is carried out. First of all, a compartmental model consisting of five compartments is developed and then after discussing the basic characteristics of the model, the existence of two equilibrium points namely; the disease-free equilibrium point and the endemic equilibrium point is discussed and then basic reproduction number R0 is calculated by using the next generation matrix method. The disease-free equilibrium point is found to be locally asymptotically stable if $R0 < 1$ and unstable if $R0 > 1$. When $R0 > 1$, then there emerges a unique endemic equilibrium. The global stability of the system is determined by constructing Lyapunov function and employing the theory of additive compound matrix. It is found that if $R0 \leq 1$, then the disease-free equilibrium is globally asymptotically stable, leading to the eventual disappearance of the crop disease. Conversely, if $R0 > 1$, then the endemic equilibrium is globally asymptotically stable, showing that the crop disease will persist indefinitely. Sensitivity analysis is also carried out and the sensitivity indices of R0 are displayed graphically. Numerical simulations are also performed to illustrate the impact of logistic growth of crops and insect vectors on the spread of crop disease and the biological implication of the results. The model can be implicated to develop strategies to control various vector-borne diseases at vegetative and reproductive stages of crops growth which can given higher crop production and productivity to the beneficiaries.

Paper ID: IB216

Seismic Characterization of the Andaman and Nicobar Region Using Power Spectral Density, Probability Density Function, and K-Means Clustering Analysis

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ABSTRACT

This study analyzes the seismic characteristics of the Andaman and Nicobar region through power spectral density (PSD) and probability density function (PDF) assessments of earthquake depth and magnitude. Utilizing the K-means clustering algorithm, optimized via the silhouette score method, five distinct seismic clusters were identified. PSD analysis reveals distinct frequency characteristics for earthquakes exceeding magnitudes of 3.5, 4, 4.5, and 5 across all clusters. Clusters 1, 2, and 3 exhibit a predominance of low-frequency seismic activity, suggesting complex fault and volcanic interactions. Cluster 4, located along the Andaman Trench, maintains low-frequency dominance butdisplays increased higher-frequency variations at larger magnitudes, indicative of mixed slow and rapid

seismic processes. Cluster 5, the most complex, exhibits a broad frequency range spanning from low to high, reflecting intricate fault dynamics influenced by the Eastern and Western Andaman Faults. These findings enhance seismic understanding and aid in earthquake hazard assessment, risk mitigation, and infrastructure resilience in the Andaman and Nicobar region.

Keywords: Cluster, Probability Density Function, Power Spectral Density, Dominant Frequencies.

TECHNICAL SESSION IIA1

CHAIRED BY: DR. VIVEK KUMAR DUBEY

Paper ID: IIA101

Use of TPACK framework for Blended Learning

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ABSTRACT

Technological, Pedagogical, and Content Knowledge popularly known as the TPACKframework is crucial for designing and implementing effective blended learningexperiences by providing a structured way for teachers to consider how technology canbe integrated with their subject matter and teaching strategies, ensuring a seamless blendbetween online and in-person learning activities. In the TPACK framework, three typesof knowledge, viz. Content Knowledge (CK), Pedagogical Knowledge (PK) andTechnological Knowledge (TK) are combined and recombined. It helps to select contentspecific technology, planning blended lessons, analyzing content and many more aspectsof teaching-learning process. In this paper an attempt has been made to estimate the roleof TPACK framework for blended learning.

Keywords: TPACK framework, blended learning, pedagogy, technology.

Paper ID: IIA102

Prevalence Of Microalbuminuria In Non Insulin Dependent Diabetic Patients In The Light Of Glycosylated Haemoglobin: A Cross-Sectional Study Among Kolkata And Its Suburban Population

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ABSTRACT

Diabetes represents a spectrum of metabolic disorders, which has become a major health challenge worldwide. In the present study we focused on the possibility of developing Diabetic Nephropathy in poorly controlled Type-2 diabetic patients of Kolkata and sub urban Kolkata. Urine Samples and Blood Samples were collected from randomly selected patients with type-2 diabetes mellitus visiting CMRI, from Kolkata and sub urban Kolkata. Urinary albumin and creatinine concentration, fasting and post prandial blood glucose level and glcosylated hemoglobin (HbA1c) was determined. Correlation Regression Analysis, ANOVA and Multiple Comparison Test were performed using SPSS 10.0. Glycosylated hemoglobin is an important indicator of the diabetic status of an individual. HbA1C values were found to have significant correlation with blood glucose level and microalbumin excretion (P=0.01) whereas no such correlation existed with sex. It is observed that Type 2 Diabetic patients in poorly controlled group showed significantly higher mean values of fasting blood sugar, post prandial blood sugar and microalbumin excretion, ($p \leq 0.05$)

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compared to those in the moderately controlled and good controlled group. However age is an important risk factor for diabetic patients, as is indicated from the study. Significant higher mean values of blood glucose were obtained among higher age groups than in lower ($p = 0.05$). Thus we can conclude that people with higher HbA1C values indicative of poor control and prolonged elevated blood glucose shows greater consequences of microalbuminuria and in the long run posing threat in the development of diabetic nephropathy than those in the other two groups.

Keywords: Type 2 Diabetes Mellitus, Glycosylated Hemoglobin, Microalbuminuria, and Diabetic Nephropathy.

Paper ID: IIA103

A study on the relationship between Emotional Intelligence and Academic Achievement of Higher Secondary School Students in Purba Medinipur District

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ABSTRACT

The present study aims to assess the significant relationship between the emotional intelligence and academic achievement of higher secondary (+2) school students of Purba Medinipur district of West Bengal. The present study was quantitative in nature and descriptive survey method was employed. The sample consisted of 200 students, out of them 100 was boys and 100 was girls. The random sampling method has been used to collect the data. For the present study, The Schutte Self Report Emotional Intelligence Test (SSEIT) (r=.90, p<.01) developed by Dr. Nicola Schutte (1998) was administered to measure the emotional intelligence of higher secondary school students. Marks secured in last final examination by the students was recorded and considered as academic achievement score. The statistical technique such as Mean, SD, t-test, and Coefficient of Correlation (r) method was used. There is no significant difference in emotional intelligence among secondary school students based on gender (Male/Female) of the students. Further the result shows that there is significant difference in emotional intelligence as well as academic achievement among secondary school students based on locality (Urban/Rural). It is also found that there is exists significant correlation between the emotional intelligence and academic achievement among higher secondary students.

Keywords: Academic Achievement, Emotional Intelligence, Gender, Higher Secondary Students.

Paper ID: IIA104

Sustainable Growth the Vedic Way: An Ancient Approach to Modern Challenges

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ABSTRACT

This research article explores the concept of sustainable growth through the lens of ancient Vedic philosophy. Drawing upon principles from the Vedas, Upanishads, and related ancient texts, the paper highlights how these timeless teachings align with contemporary sustainability goals.The study argues that integrating Vedic wisdom into modern economic,social,and environmental practices offers holistic solutions for sustainable development.

Paper ID: IIA105

Exogenous Application Of Calcium Chloride Ameliorates Copper-Induced Oxidative Stress In Mung Bean (Vigna Radiata L.) Seedlings

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ABSTRACT

Plants face various stresses that affect their growth and productivity. Copper (Cu) is an essential metal but can be toxic at high levels. This study looked at how calcium chloride ($CaCl_2$) could help mung bean seedlings cope with copper stress. Seedlings were grown in a hydroponic system and exposed to different levels of Cu (0, 100, 200, 300 µM $CuSO_4$) alone or with $CaCl_2$ (10 mM) for twenty one days. The study measured growth, reactive oxygen species, antioxidant enzyme activities, photosynthetic pigments, and various biochemical parameters in the roots and shoots of the seedlings. Cu stress inhibited seedling growth and reduced photosynthetic pigments, sugars, proteins, and antioxidants levels. It also led to the accumulation of compounds like malondialdehyde (MDA), hydrogen peroxide (H_2O_2), and proline. $CaCl_2$ treatment improved growth, pigment levels, sugar and protein contents, and antioxidant levels in Cu-stressed seedlings. It also reduced the accumulation of MDA, H_2O_2 and proline indicating a reduction in stress-induced damage. Additionally, $CaCl_2$ treatment decreased SOD activity and increased CAT activity, suggesting a better balance of antioxidant enzymes. Overall, $CaCl_2$ treatment shows promise in enhancing mung bean plants' tolerance to Cu stress. This study provides valuable insights for future research on using $CaCl_2$ to mitigate Cu toxicity in plants.

Keywords: Vigna radiata, Copper, Calcium Chloride, ROS, Amelioration, Phytotoxicity.

Paper ID: IIA106

Mathematical Modelling and Optimal Control of Asymmetric Information and Adverse Selection in Market Dynamics

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ABSTRACT

Asymmetric information and adverse selection play a crucial role in shaping market efficiency and competition, often leading to distorted decision-making due to incomplete or misleading information. This study develops a dynamic mathematical model to analyse the interactions between asymmetric information (I), adverse selection (S), and market efficiency (E), ensuring bounded solutions and identifying equilibrium points with local asymptotic stability. The model incorporates a control parameter (u) to simulate regulatory policies and market interventions, allowing for dynamic adjustments that enhance information flow and selection efficiency. Effective regulatory measures can reduce inefficiencies, limit adverse selection, and improve market transparency. Contour maps and sensitivity index illustrate key market interactions, showing how interventions influence stability. Bifurcation analyses identify stable and unstable steady states, highlighting critical policy thresholds that influence market behaviour. Additionally, the application of Pontryagin's Maximum Principle provides optimal control strategies for mitigating market distortions. This study lays a theoretical foundation for future research, integrating empirical data to refine market regulation strategies and enhance economic stability.

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Paper ID: IIA107

Alleviation Of Chromium-Induced Phytotoxicity In Mung Bean (Vigna Radiata L.)Seedlings With Citric Acid Supplementation Through Regulation Of Antioxidant System

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ABSTRACT

Soil and water contamination by heavy metals, such as Chromium-VI, poses a significant food safety concern. Scientists are exploring various remedial strategies to address this global issue. In this study, we investigated the effects of citric acid on alleviating Chromium-VI-induced stress in mung bean (Vigna radiata L.) seedlings. The experiment involved exposing hydroponically grown mung bean seedlings to varying concentrations of Chromium-VI (0, 150, 300, 600 µM), either alone or in combination with citric acid (2.5 mM) for twenty one days. The results showed that Chromium-VI exposure led to a decrease in plant growth, chlorophyll levels, sugar content, and antioxidant enzyme activities. However, the addition of citric acid mitigated these negative effects by enhancing plant growth, chlorophyll levels, sugar content, and antioxidant enzyme activities. Citric acid supplementation also reduced reactive oxygen species levels viz., malondialdehyde (MDA), hydrogen peroxide (H2O2) in the seedlings. Overall, the study suggests that citric acid can enhance the antioxidant system in mung bean seedlings, thereby reducing the toxicity of Chromium-VI. This finding highlights the potential of using exogenous citric acid as a strategy to alleviate Chromium-VI toxicity in mung bean seedlings grown in contaminated fields.

Keywords: Vigna radiata, Chromium, Citric acid, ROS, Amelioration, Heavy metal toxicity

Paper ID: IIA108

p-n Junction Diode As An Electronic Circuit Element

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ABSTRACT

According to band theory, the solids are classified as conductors, Semiconductors and insulators. The resistively of semi-conductor is 105 -10-3 Ω cm. The band gap energy of semiconductor is ~1ev. In the present situation semiconductors are used widely for forming different kinds of semiconductor devices which are used in analog and digital circuits. When semiconducting material such as silicon (Si_{14}) or germanium (Ge_{32}) is doped its one side with donor impurity i.e. pentavalent element (As_{33}, P_{15}) and other side with acceptor impurity i.e. trivalent element (e.g. B_5,Al_{13}), then p-n junction is formed. One impurity atom is added per 10 million atoms of semiconducting material. p-n junction forms different kinds of semiconductor devices which play an important role in our day-to-day life. Semiconductor devices such as p-n junction Diode, Zener Diode, photodiode, Light- emitting Diode (LED), Varactor, Tunnel Diode, Solar Cell etc p-n junction Diode used as rectifier in the electronic circuit. Also, it is used as signal Diodes in communication circuits for modulation and demodulation of small signals. Zener Diode used as Voltage regulator. Uses of photodiode are detection of both visible and invisible light, demodulation, logic circuits and optical communication equipment. LED will give off visible light when it is energized. In many applications if may emit infrared radiation. LED used as digital watch, Calculator, Automatic Alarm, Memory of Optical Computer etc. Varactor used in Voltage-Variable capacitance, harmonic generation, microwave frequency multiplication. Tunnel Diode used as ultra-high-speed switch due to tunneling mechanism, as memory storage device, as microwave oscillator. Solar cells have very important application in generation of electrical power from sun light in satellites, space vehicles etc.

Paper ID: IIA109

Deep Learning-Powered Fake News Detection: A Multimodal and Adversarial Approach

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ABSTRACT

The widespread spread of fake news on digital platforms has created an urgent need for effective and intelligent detection systems. Conventional rule-based and statistical methods often fall short due to the ever evolving nature of misinformation. Our work introduces a deep learning based fake news detection system, utilizing advanced Natural Language Processing (NLP) techniques and transformer-based models. Our approach integrates contextual embeddings with attention mechanisms to capture nuanced linguistic patterns and semantic inconsistencies that distinguish fake news from legitimate content. We improve detection accuracy and generalisability by combining textual and metadata-based features to integrate multimodal analysis, in contrast to traditional approaches. The effectiveness of deep learning in fighting disinformation is demonstrated by experimental evaluations on hold datasets, which show better performance than current machine learning baselines. Furthermore, we propose a novel adversarial training strategy to improve model robustness against sophisticated manipulation tactics. This research underscores the potential of deep learning in automating fake news detection and provides insights into mitigating digital misinformation at scale.

TECHNICAL SESSION IIA2

CHAIRED BY: DR. SOVAN SAMANTA & DR. TAPAN KR. PATTANAYAK

Paper ID: IIA201

COVID-19's Effects on Government Health Expenditure (GHE) in India

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ABSTRACT

Government Health Expenditure (GHE) in India increased significantly during the COVID-19 pandemic as the government ramped up healthcare spending to tackle the crisis. For the year 2021-22, India's Total Health Expenditure (THE) rose to Rs. 9,04,461 crores, (3.83% of GDP and Rs 6,602 per capita), a 22.36 % increase compared to the previous year (Rs. 7,39,327 crores, 3.73% of GDP and Rs. 5,436 per capita). The Union Budget 2021-22 allocated ₹2.23 lakh crore for health and well-being; a 137% increase compared to the previous year. Additional emergency funds were allocated for pandemic response. Rise in Public Health Spending as a Share of GDP. Government health expenditure as a percentage of GDP increased from 1.35% in 2019-20 to nearly 2.1% in 2021-22, reflecting higher spending on healthcare infrastructure, vaccination, and treatment. The major spending areas during COVID-19 were the Vaccination Drive: India's COVID-19 vaccination program was one of the largest in the world. Medical Infrastructure: Investments in new hospitals, oxygen plants, ICU beds, and ventilators. Free COVID-19 Testing & Treatment: Expansion of government hospital facilities and Ayushman Bharat coverage for COVID-19 patients. Production & Procurement of Medical Supplies: Increased spending on PPE kits, ventilators, medicines (like Remdesivir), and oxygen supplies. Decline in Out-of-Pocket Expenditure (OOPE). With the government covering

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COVID-19 treatments and vaccines, OOPE as a share of Total Health Expenditure fell, reducing the financial burden on individuals. Long-Term Impact include Increased investment in public health infrastructure under schemes like PM-ABHIM (Pradhan Mantri Ayushman Bharat Health Infrastructure Mission), Strengthening of primary healthcare with more health and wellness centers, Boost to digital health through the National Digital Health Mission (NDHM).

Keywords: COVID-19, Government Health Expenditure, Out-of-Pocket Expenditure, Total Health Expenditure, Pradhan Mantri Ayushman Bharat Health Infrastructure Mission.

Paper ID: IIA202

Evaluating and Mapping Scientific Research: Key Indicators and Tools

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ABSTRACT

The evaluation and mapping of scientific research are essential for understanding knowledge production, research trends, and the broader impact of scientific activities. This paper explores key indicators and analytical tools used to assess and visualize the research landscape. It examines bibliometric measures such as citation counts, the h-index, and journal impact factors, alongside alternative metrics (altmetrics) that reflect social media engagement and public interest. Additionally, it discusses mapping techniques—including co-citation analysis, co- authorship networks, and topic modeling—that help identify research hotspots, collaboration patterns, and emerging fields. Technological advancements have led to the development of sophisticated tools such as BiblioShiny, VOSviewer, CiteSpace, and Sci2, enabling researchers, policymakers, and institutions to analyze vast amounts of scientific data more effectively. By integrating traditional and modern evaluation methods, this paper highlights the strengths and limitations of various approaches, emphasizing the need for a multidimensional perspective in assessing research impact. A well-structured evaluation framework can guide funding decisions, inform policy-making, and enhance research visibility. As the scientific landscape continues to evolve, adopting comprehensive and adaptable assessment tools remains crucial for fostering innovation and advancing global knowledge.

Paper ID: IIA203

Silicon Can Mitigate The Toxic Effects Of NaCl Stress By Enhancing Nitrogen Metabolism In Two Indica Rice Cultivars With Varying Salt Tolerance

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ABSTRACT

Silicon (Si) has been shown to improve salinity tolerance in rice (Oryza sativa), but the underlying mechanism is not well understood. In this study, we investigated the impact of exogenous Si application on nitrogen metabolism in rice plants under salt stress conditions. Two rice cultivars, MTU 1010 (salt-sensitive) and Nonabokra (salt-tolerant), were grown in hydroponic culture and treated with three levels of NaCl (25, 50 and 100 mM) with or without addition of 2 mM Si (Na2SiO3, 9H2O). Salt stress significantly reduced nitrogen levels, amino acids, and nitrogen metabolizing enzyme activities in both cultivars. However, the negative effects were more pronounced in the salt-sensitive MTU 1010 cultivar. Silicon application mitigated the detrimental effects of salt stress by increasing nitrogen levels, amino acids, and enzyme activities, while reducing ammonia accumulation in both cultivars. The beneficial effects of Si were more evident in the salt-sensitive MTU 1010 cultivar. These findings suggest that silicon can enhance rice tolerance to salt stress by modulating nitrogen metabolism. Thus, silicon enriched fertilizer could be a valuable tool for improving crop productivity in salt-affected areas.

Keywords: NaCl, Silicon, Nitrogen Metabolism, Hydroponics, Amelioration, Oryza sativa.

Paper ID: IIA204

Pedagogical Integration of ICT Skills and Competencies for Interactive, Personalized, Blended Teaching Learning in the light of NEP 2020

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ABSTRACT

In this digital era, education seems to have own a system that is digital education and digitaleducation is nothing but Technology based education system. It is better to say a new form ofeducation is developing with the advancement of technology. So it is the need of the educationsystem to create tech savvy entrepreneurs (Teacher, Students, and other stakeholders) which canmake an impact on education. New technologies in education like artificial intelligence, machinelearning, block chain, smart board, handheld computing device, adaptive computer testing forstudent's development and other forms of educational software and hardware will not justchange what students learn in the classroom but how they learn, and thus these areas and beyondwill require extensive research both on the technological as well as educational fronts.Integration of ICT encompasses in many fields of schools and higher education like learning,assessment, planning, educational administration and management. This paper aims to highlighton the major area like the need of ICT efficiency in present generation educational stakeholders(In the field of Educational Planning, Leading, Controlling, Management and Administration) ,the effectiveness of ICT centered methodologies in the Pedagogical process of learning andteaching, ICT relevancy in individualized learning process, the effectiveness of using manyhardware and software system approach in Pedagogy and last but not the least the major focusarea of NEP 2020 dealing with the many issues of technological uses and innovation ineducation system.

Keywords: Digital Education, Blended Learning, Personalized Teaching Learning.

Paper ID: IIA205

Staphylococcus Aureus Virulence Potentials: An In Vivo Study

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ABSTRACT

Majority of healthcare-associated infections were concerned by Staphylococcus aureus, apathogen possesses various characteristics including copious exotoxins and extracellular enzymes such as coagulase, enterotoxins, exfoliatin, toxic shock syndrome toxin 1 (TSST-1) those are virulent to human organs. In this study the in vivo virulence potentials were assessed by animal infection model. Selected strains which harbored virulent gene and quorum sensing regulator gene was injected and the results exhibited less survival than the ATCC 25923 strains indicating the nature of virulence of these strains. Results of the macroscopic observation are confirmed in the same experiment by viable bacteria counts, as obtained from kidney homogenates. We assume that mouse models for S. aureus diseases will persist the most significant surrogates for the study of staphylococcal infections in humans, their rehabilitation and preclusion. S. aureus disease attributes can be studied in experimental mouse models of infection.

Keywords: Toxic Gene, Virulence, Animal model, S. aureus.

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Transforming Academic Libraries through Digital Technologies: Issues and Opportunities

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ABSTRACT

Libraries have long served as invaluable sources of information for users, traditionally consisting of a collection of physical documents. However, the landscape of libraries is evolving as information resources shift from physical to digital platforms and internet access becomes increasingly essential rather than a luxury. This article explores the impact of digital technologies on the transformation of academic library services. It encompasses the integration of digital tools, platforms and services that enhance the way information is accessed, managed and disseminated. It describes a brief history of academic libraries, then discusses the opportunities and examines the current challenges they face. Additionally, the article highlights innovative technological advancements in learning and data management in the academic library sector. It also emphasizes the need for library staff to acquire new skills and adapt to the evolving roles required in the library. This study also mentions the obstacles that prevent the extensive use of developing technologies in libraries and probable suggestions to overcome those difficulties. The article concludes with reflections on future developments and the continuing influence of digital technologies in academic libraries.

Keywords: Digital Transformation, Information Management, Digital Technologies, Skill Development, Academic Libraries.

Paper ID: IIA207

Constructivism: A Pedagogical Perspective Integrating Technology into Physical Science Teaching – Learning Process

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ABSTRACT

Constructivism is a word widely used in teaching -learning Process. Constructivism is an educational theory that says the learners acquire or construct knowledge actively i.e., direct through their experiences rather than just take passively knowledge. In this type classroom learners are actively engaged in learning. It emphasis that how learners construct knowledge from their experience which is unique to each individual. From a Constructivist view point, using technology in teaching -learning process enhancing the content matters to the learners. So, there is a proportional relationship between constructivism and educational technology. It is found that in constructivist approach, using technology as a cognitive tools in Physical Science Teaching both students and teachers are benefited. This paper focuses on the theories of constructivism and it's need, role of integrating technology for innovation in physical science teaching, effectiveness and challenges to Constructivist teaching Physical Science Education.

Keywords: Constructivism, Physical Science Pedagogy, Integrating Technology, Effectiveness and Challenges.

Paper ID: IIA208

Role of Students to achieve Sustainable Development

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ABSTRACT

Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987, p 43). It contains within it two key concepts:

1. The concept of 'needs', in particular, the essential needs of the world's poor, to which overriding priority should be given; and

2 The idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

"The idea of sustainable development highlights the existence of the social and ecological conditions necessary to support human life at a certain level of well being through future generations" (Earth Council 1994). Sustainable development is another name for economic growth that is environmentally amicable. The objective of this is to achieve an equilibrium between environmental, socioeconomic, and political sustainability. Sustainable development constantly motivates us to protect and improve our natural resources. People should be able to meet their basic needs for food, clothing, residence, health, education, and employment. Everyone has a right to live in a safe, clean, and healthy environment. The step-down of pollution, poverty, and unemployment can rapidly accomplish this. Education is important in engaging students in the formation and planning of essentials for future generations while preserving the environment

Keywords: Sustainable Development, Environment, Socioeconomic, Basic Needs, Future Generations, Students.

Paper ID: IIA209

Ethical Use of Artificial Intelligence in Research: Challenges and Guidelines

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ABSTRACT

Artificial Intelligence (AI) has transformed research across disciplines, enabling unprecedented efficiency and innovation. However, its integration also raises ethical concerns, including bias, privacy violations, lack of transparency, and potential misuse. The rise of AI-driven tools in research has enhanced data analysis, automation, and decision-making processes. However, ethical concerns surrounding bias, privacy, and accountability have become significant. Ethical AI use in research ensures that technological advancements benefit society while minimizing harm.This paper explores the ethical challenges associated with AI in research and presents guidelines for its responsible use, ensuring fairness, accountability, and trustworthiness.

Keywords: Artificial Intelligence, Ethics, Research, Bias, Transparency, Accountability, Privacy

Paper ID: IIA210

Evaluating and Mapping Scientific Research: Key Indicators and Tools Blended Learning: An Effective Approach to Modern Education

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ABSTRACT

Blended learning, which integrates online and face-to-face instruction, has gained significant attention in modern education.Blended learning, also known as hybrid learning, refers to an instructional approach that combines traditional in-person teaching with online digital learning activities. This approach leverages the strengths of both modalities to enhance student learning outcomes. This paper explores the definition, benefits, challenges, and best practices of blended learning. Through a review of existing literature, it highlights how blended learning enhances student engagement, promotes personalized learning, and improves academic outcomes. Additionally, it discusses

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technological advancements and pedagogical strategies that contribute to the effectiveness of blended learning. The study concludes with recommendations for educators and institutions implementing blended learning models.

Keywords: Blended learning, online learning, hybrid education, student engagement, instructional technology.

Paper ID: IIA211

Pythagorean Linguistic Rough Number With Mcgdm And Their Application In Supplier Selection For Medical Devices

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ABSTRACT

This paper introduces a novel concept of Pythagorean fuzzy rough numbers (PFRNs), which integrates Pythagorean fuzzy numbers (PFNs) and rough numbers (RNs) in the context of multi-criteria group decision-making (MCGDM) problems under uncertain environments and proposes a new methodology for MCGDM utilising PFRNs. The suggested method may consolidate group knowledge and derive final decision outcomes objectively and efficiently. Initially, we present the construction procedure of PFRNs and examine the arithmetic operations, ranking criteria, and aggregation operators, along with their associated characteristics. The unique idea of PFRN is employed to consolidate Pythagorean fuzzy information provided by the decision-making group. The MABAC model is enhanced from two viewpoints depending on the aggregated PFRNs, resulting in a PFN-based MABAC model and a PFRN-based MABAC model, respectively. An empirical example of supplier selection for medical devices is employed to demonstrate the application of the proposed models, alongside comparisons with five traditional models—three pertaining to information aggregation and two related to alternative selection—to validate the effectiveness and superiority of the proposed methods.

Paper ID: IIA212

A Study On Linguistic Z-Graph And Its Application In Social Networks

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ABSTRACT

This paper presents a comprehensive study of the linguistic Z-graph, which is a novel framework designed to analyze linguistic structures within social networks. By integrating concepts from graph theory and linguistics, the linguistic Z-graph provides a detailed understanding of language dynamics in online communities. This study highlights the practical applications of linguistic Z-graphs in identifying central nodes within social networks, which are crucial for online businesses in market capture and information dissemination. Traditional methods for identifying central nodes rely on direct connections, but social network connections often exhibit uncertainty. This paper focuses on using fuzzy theory, particularly linguistic Z-graphs, to address this uncertainty, offering more detailed insights compared to fuzzy graphs. Our study introduces a new centrality measure using linguistic Z-graphs, enhancing our understanding of social network structures.

Paper ID: IIA213

Fuzzy Logic in Decision Making

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ABSTRACT

Fuzzy logic, with its ability to handle imprecise and uncertain information, has emerged as a powerful tool for decision-making in complex and dynamic environments. Unlike traditional Boolean logic, which operates on strict binary values, fuzzy logic allows for degrees of membership, enabling the representation of linguistic variables and subjective judgments. This paper explores the application of fuzzy logic in various decision-making scenarios. By employing fuzzy sets and rules, systems can effectively model human-like reasoning, accommodating vagueness and ambiguity inherent in real-world problems. This approach enables the development of robust and adaptable decision support systems capable of handling incomplete or conflicting data. Key aspects of fuzzy logic's contribution include its ability to: (1) translate linguistic information into mathematical terms, (2) provide a framework for representing and manipulating uncertainty, (3) facilitate the development of rule-based systems that mimic human decision-making processes, and (4) enhance the flexibility and adaptability of decision models. This paper highlights the potential of fuzzy logic to improve decision-making accuracy and efficiency across diverse fields, including engineering, management, and artificial intelligence.

Paper ID: IIA214

A Study On Education For Sustainable Development In India

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ABSTRACT

Education for Sustainable Development (ESD) is an approach to education that emphasizes the consequence of developing knowledge, skills, values, and attitudes which are essential for creating a sustainable future. The aim of Education for Sustainable Development is to authorize learners to take stroke and make informed decisions that will encourage sustainability and address imperative global challenges, such as loss of biodiversity, change of climate and social disparity. From early education to higher education and beyond, Education for Sustainable Development incorporates sustainability topics into a variety of courses, disciplines, and educational levels. It seeks to encourage civic engagement, lifelong learning, critical thinking, creativity and innovation. The foundation of education for sustainable development is the knowledge that education may significantly influence both individual and group behavior as well as promote a sustainable culture. It acknowledges that environmental, social, and economic concerns are interrelated and that addressing them requires interdisciplinary and cooperative approaches. The United Nations Decade of Education for Sustainable Development (2005–2014) and the Sustainable Development Goals (SDGs), which were adopted by the UN General Assembly in 2015, are two examples of international frameworks and initiatives that support education for sustainable development. One of the most important ways to accomplish the SDGs and advance a more equitable and sustainable future for all is through education for sustainable development. The Sustainable Development Goals (SDGs) of the UN, specifically SDG 4 ensuring inclusive and equitable quality education will be the main topic of this essay. The author reviewed the body of research on topics related to education and sustainable development, included his personal experiences with contemporary theories and models, and attempted to highlight the difficulties that educational institutions face as well as the best practices that they can implement. So should need to enhance more implementation of sustainable development in education.

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Paper ID: IIA215

Option Trading: Strategies, Risk Management, Market Analysis and Human Psychology

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ABSTRACT

Option trading offers a versatile and powerful tool for managing risk and maximizing returns in financial markets. This research explores the complexities of option trading, including strategies, risk management techniques, and market analysis. We examine various option trading strategies, such as buying calls and puts, selling covered calls, and implementing spreads and iron condors. We also discuss risk management techniques, including position sizing, stop-loss orders, and portfolio diversification. Furthermore, we analyze market trends, volatility, and sentiment to identify opportunities and challenges in option trading. We examine how biases such as confirmation bias, anchoring bias, and loss aversion impact traders' perceptions of market trends, risk assessment, and trade execution. Additionally, we investigate the role of emotions like fear, greed, and regret in shaping traders' behaviors and outcomes. Our findings suggest that option traders are prone to systematic errors in judgment and decision-making, which can result in significant financial losses. Furthermore, we identify strategies for mitigating these biases and improving trading performance, such as cognitive debiasing techniques, emotional regulation, and disciplined risk management.
Keywords: option trading, strategies, risk management, market analysis, volatility, sentiment, financial losses, etc.

TECHNICAL SESSION IIB1

CHAIRED BY: DR. DIPAK KUMAR JANA & DR. PINTU DAS

Paper ID: IIB101

Fuzzy Travelling Salesman Problem Based AI Delivery Robot for Optimal Routing

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ABSTRACT

Travelling Salesman Problem (TSP) is a renowned optimisation problem that plays an enormous role in the fields of computer science, operations research, and mathematics. The TSP illustrates how a mathematical curiosity can turn into a challenge at the frontier of computation, can stimulate the discovery of new algorithms, and can find applications in virtually every practical aspect of life. TSP usually assumes that the time of travel between nodes is linearly related to the distance. Realistically, this is usually due to a variety of factors including road conditions and traffic affecting travel time. The present paper considers TSP with neutrosophic pentagonal fuzzy numbers, which represent the uncertain arc distances and traffic conditions. Herein, we shall develop a new approach to model and solve TSP using fuzzy numbers with more accuracy for realistic situations. This proposed technique is quite simple and also equally efficient to give an optimal solution for fuzzy travelling salesman problems that occur in real life. This project focuses on improving the delivery path of an AI-powered autonomous robot that navigates five cities. By incorporating fuzzy logic into the TSP model, we improve delivery systems' adaptation to uncertain conditions, resulting in greater logistics and transportation efficiency. The suggested technique is both simple and computationally efficient, offering the best solutions for real-world fuzzy TSP applications, particularly in autonomous delivery systems.

Keywords:Neutrosophic Pentagonal Fuzzy Numbers, Travelling Salesman Problem, Score Function, Uncertainty Modelling, Optimal Solution.

Paper ID: IIB102

Influence of AI on Mathematics Learning in Higher Education

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ABSTRACT

This study investigates the popularity of AI-based technologies in the mathematics learning of college students. A survey is conducted and the results obtained are presented to address the necessary considerations for implementing AI-based technologies in this context.

Paper ID: IIB103

Eccentricity Centrality of the Comb Product between Well-known Graphs and Interval Graphs

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ABSTRACT

In network analysis, measuring centrality is essential for determining the relative importance of each vertex within a network. A vertex with higher centrality signifies greater importance compared to others. To facilitate theoretical studies, networks are commonly modeled using graphs. DNA molecules, some scheduling problems and food webs have a common linear structure that can be modeled as interval graphs. But, real data is flawed to errors and full of noise, so it raises the question of whether the results obtained from the algorithm for interval graphs could be ex- tended to more realistic models as close to interval graphs. We explore this matter within the framework of calculating vertex eccentricities, a widely studied centrality metric in order to ascertain the comparative importance of nodes within the network structure. we provide an affirmative answer regarding the comb product between two intervals graph is an interval+kv graph. Eccentricity centrality play an important role to identify significant vertices in social networks, facility location networks etc.In this paper we compute the eccentricity centrality of the comb product betweenwell-known graph (complete graph, star graph, wheel graph, path graph and cyclegraph) and interval graph and we design two O(n) time algorithms – one for finding the eccentricity of all vertices of interval graph and another for making a BFS tree of interval graph. We also compute the eccentricity centrality of the comb product between two interval graphs using these algorithms. We also analyze the time complexity of the proposed algorithms.

Paper ID: IIB104

Spectral Properties of C-graphs

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ABSTRACT

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Some important properties of cographs are used here to construct a special type of cographs. The primary goal of this approach is to build an equitable partition and a quotient matrix. In this study, an extended eigenvalue-free interval is obtained for a subclass of cographs.

Paper ID: IIB105

Fuzzy Multi-Objective Optimization of Hybrid Renewable Energy Systems Using Genetic Algorithms

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ABSTRACT

Hybrid Renewable Energy Systems (HRES) play a crucial role in providing reliable and sustainable energy by integrating multiple renewable sources such as solar, wind, battery storage, and diesel generators. Designing an optimal HRES requires balancing multiple conflicting objectives, including minimizing cost, ensuring system reliability, and reducing environmental impact. Traditional optimization techniques often struggle to address these trade-offs effectively. This study employs a Fuzzy Multi-Objective Optimization (FMO) approach combined with Genetic Algorithms (GA) to determine the optimal configuration of an HRES. The fuzzy logic framework allows for a flexible and adaptive decision-making process by assigning membership values to each objective, enabling a smoother trade-off analysis. The optimization model considers capital and operational costs, Loss of Power Supply Probability (LPSP) as a measure of system reliability, and CO2 emissions as an environmental constraint. Different weight combinations are applied to assess the impact of prioritizing cost, reliability, or emissions reduction. The results demonstrate that adjusting weight distributions significantly influences system design, with higher cost prioritization leading to increased diesel reliance, while the greater emphasis on emissions reduction results in higher penetration of solar and wind energy. The study highlights the effectiveness of fuzzy-based multi-objective optimization in achieving balanced solutions, improving the sustainability and reliability of hybrid energy systems. These findings contribute to the advancement of decision-making frameworks for designing efficient and eco-friendly energy systems in off-grid and remote locations.

Paper ID: IIB106

Enhanced Fuzzy Economic Order Quantity (EOQ) Model for Time - Dependent Linear and Quadratic Demand with Constant Deterioration and Shortage Allowance

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ABSTRACT

In this study, an inventory model for deteriorating items incorporating both Linear and Quadratic demand functions, while also considering allowable shortages and constant deteriorating rate. The demand function is time dependent. The model aims to be addressed the complexities of inventory management in uncertain environments, such as those exacerbated by the COVID-19 pandemic. A crisp model was initially constructed, with subsequent representation of the ordering, holding, deteriorating and shortage, along with other parameters, using Triangular fuzzy numbers. The Graded Mean Represented and Signed Distance Methods were applied for the defuzzification of the overall system cost, and the outcomes derived from these approaches were compared using a numerical example. Ultimately, a sensitivity analysis was performed to assess how variations in cost parameters affect the overall system cost.

Keywords: EOQ model, Fuzzy Number, fully backlogged, Triangular Fuzzy Number, Signed Distance Method, Graded Mean Representation Method.

Paper ID: IIB107

A Study of Modified Re´nyi Holographic Dark Energy (MRHDE) in General Relativity (GR)

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ABSTRACT

This paper deals with the study of Kantowski-Sachs cosmological model with Modified R enyi Holographic Dark Energy (MRHDE) in the frame-work of General Relativity (GR). To obtain the solutions of field equations completely, a simple parametrization of average scale factor a(t) =exp ($\gamma t + \delta$)l where γ, $\delta > 0$ and $0 < l < 1$ are arbitrary constants as proposed by Mishra and Dua has been used. Various parameters like matter energy density, MRHDE density, Hubble parameter, deceleration parameter etc. has been studied physically and graphically. The results obtained were found to be consistent with the present-day observations.

Keywords: Kantowski-Sachs, MRHDE, Hubble parameter, deceleration parameter, GR.

Paper ID: IIB108

A Comprehensive Study Of Double Domination In Picture Fuzzy Graphs With A Realistic Application

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ABSTRACT

The notion of intuitionistic fuzzy graph is helpful to the problems having incomplete or partial information in the areas of manufacturing, telecommunication, transportation, social network etc. The generalization of intuitionistic fuzzy graph is picturefuzzy graph. In this paper, some important theorems regarding double domination on picture fuzzy graphs are proved. New results are solved. An algorithm to find double dominating set and another for double domination number in picture fuzzy graph are presented. Finally, a realistic application regarding double domination has been introduced in picture fuzzy graph.

Keywords: Picture fuzzy graph, double dominating set, double domination number.

Paper ID: IIB109

Interval Eigenvalue Problems

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ABSTRACT

We have studied eigenvalue problems in a bounded and uncertain environment for several types of matrices. Interval analysis is a suitable tool for this scenario, as it is a computationally reliable and robust technique. In this work, we will discuss various methods for enclosing eigenvalues of an interval matrix. Since we do not have a way to describe the exact eigenvalues set of a complex interval matrix, different non-iterative and iterative methods have been developed to compute tighter outer bounds of the exact eigenvalues set. Computational hardness is a key factor in developing these methods, as many problems in interval computations are NP-hard.

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The Minimal Molecular Tree for the Exponential Randi´c Index

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ABSTRACT

Topological indices are numerical parameters that provide a way to quantify the structural features of molecules using their graph representations. In chemical graph theory, these indices have been effectively employed to predict various physicochemical properties of molecules. Among these, the Randi c index stands out as a classical and widely used molecular descriptor in chemistry and pharmacology. The Randic index $R(G)$ for a given graph G is defined as $R(G)=\sum_{v_iv_j\in E(G)}\frac{1}{\sqrt{d((v_i)d(v_j)}}$

where $d(v_i)$ represents the degree of vertex v_i and $E(G)$ is the set of edges in the graph G. Given the Randi´c index's strong discrimination ability in describing molecular structures, a variant known as the exponential Randi´c index was recently introduced. The exponential Randi´c index $ER(G)$ for a graph G is defined as

$$ER(G)=\sum_{v_iv_j\in E(G)} e^{\frac{1}{\sqrt{d((v_i)d(v_j)}}}$$

This paper further explores and fully characterizes the minimal molecular trees in relation to the exponential Randi´c index. Moreover, the chemical relevance of the exponential Randi´c index is also investigated.

Paper ID: IIB111

Communication Protocol of Three-Qubit States using Concatenated GHZ States

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ABSTRACT

In this paper we introduce a new communication protocol for transferring three- qubit states by using concatenated three particle GHZ states as quantum channels which are robust in noisy environments. Due to almost inevitable existence of noise, which can create devastation in the communication systems, such robust quantum channels become necessary. The protocol is a perfect teleportation protocol.

Paper ID: IIB112

Effects Of Control Strategies On Dissemination Dynamics Of Covid-19

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ABSTRACT

In this paper, a deterministic compartmental model is developed to study the dissemination dynamics of COVID-19 with several control strategies. The main objective is to analyze the effects of contact tracing, quarantine, self-protection, re-infection and treatment control strategies in lowering the spread of COVID-19. We divide the susceptible population into two sub-classes; namely a high-infection risk susceptible class and a low-infection risk susceptible class. Along with these two susceptible compartments, we consider three additional compartments; namely infected, quarantined and recovered compartments. Stability analysis of the model is performed and basic reproduction

number is derived. Sensitivity analysis is also carried out and the most sensitive parameter of the model is achieved by using a normalised forward sensitivity index approach. We conclude that reinfection has a significant impact on high-risk susceptible population as compared to low-risk susceptible population. High risk susceptible population must adopt self-protection habits against a disease on a priority basis to reduce disease burden from the population.

Paper ID: IIB113

Impact of Integrated Child Development Services (ICDS) on Maternal and Child Health in Purba Medinipur, West Bengal: A Socioeconomic Analysis

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ABSTRACT

Introduction: Malnutrition in India is a complex issue driven by socioeconomic inequality, underemployment, climate change, and inadequate water, sanitation, and food variety, primarily affecting marginalized populations. India ranks 111th on the 2023 Global Hunger Index, with severe hunger indicated by a score of 28.7. The country has the highest child wasting rate (18.7%), and 35.5% of children under five suffer from stunting. Malnutrition in children is exacerbated by poverty and systemic inequality, with 62 million children facing weakened immunity, higher disease risk, and poor cognitive development. To combat this, the Government of India introduced the Integrated Child Development Services (ICDS) program.

Objective: The present study aims to elucidate the role of ICDS on improving the health status of pregnant women and children from Purba Medinipur district of West Bengal.

Methodology: In this study, a simple stratified sampling technique was employed to collect data of pregnant women and children from local ICDS centre. Data was collected through rigorous interviewing and the different statistical (Z-test, ANOVA, etc.) analysis were conducted.

Result: The results showed that more than 80% infants (0-6months) receive the scheme in both urban and rural areas while ~77% and ~54% of children (6-36months) from rural and urban respectively taking the service. On the other hand, ~87% and ~67% of pregnant women from rural and urban respectively utilize attend ICDS. Growth pattern showed no significant difference in urban and rural population. Among the pregnant women, anaemia was observed predominantly in both urban and rural population. Data also revealed that there is a lack of supplementary medicine and diet quality.

Interpretation and Conclusion: The overall study suggests for an improvement of dietary qualities and health monitoring system so that pregnant women and children can be benefitted and involved with such schemes. More population awareness program needs to be implemented to reach more of the population.

Paper ID: IIB114

On Weighted Means Of Failure Rate In The Context Of Weighted Distributions

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ABSTRACT

When sample observations are not equally likely, weighted measures are applied to capture the significance of their relative importance as proposed by Fisher (1934), and Rao (1965). Choosing appropriate weights, we compute various measures in a better way by giving appropriate weights based on the sample survey. Here, the concept of weighted means of failure rate is introduced and their further generalizations are explored. The form invariance property of the weighted models, some characterization results and bounds for the proposed measures are derived. It is observed that the definition of weighted concept proposed in the paper harmonize with various reliability functions in a better way than the existing weighted concepts proposed by C. R Rao (1965).

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Paper ID: IIB201

Fixed Point Results For T-Hardy-Rogers Contraction Mappings In Modular B-Metric Spaces

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ABSTRACT

This paper presents fixed point results for T-Hardy-Rodgers contraction mappings in modular b-metric spaces. We also prove the existence of the common fixed point in modular b-metric spaces for the continuous self-mappings.

Keywords: modular Metric Spaces, b-Metric Spaces, modular b-metric spaces, T-Contraction Mappings, Continuous Mappings, Fixed Point, Banach Pair.

Paper ID: IIB202

Recommendation System for Virtual Dressing Room using Computational Intelligence

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ABSTRACT

The rapid growth of digital image collections requires efficient and accurate methods for content-based image retrieval and recommendations in ecommerce. However, modern apparel retail platforms predominantly focus on recommending products from same category, often relying on collaborative filtering or content-based techniques. As a result, user not able to receive suggestions for cross category outfit pairings, such as matching jeans or trousers with a selected T-shirt or shirt. To address this gap, we propose a novel fashion recommendation system that suggests the cross-category product in user's selected item by leveraging colour contrast analysis and complementary category pairing. Our proposed system focuses on computer vision techniques to extract dominant colours from product image and uses KMeans clustering for efficient colour analysis. By integrating FAISS based approximate nearest neighbour search, the system identifies contrasting colours across complementary categories in real time. Our method enhances the current recommendation systems by adding a new level of modification. Several tests using diverse datasets shows that our system generates accurate and stylish outfit suggestions, making it a valuable feature for online clothing platforms.

Keywords: Recommendation System, Content Based Filtering, Computational Intelligence, E-Commerce.

Paper ID: IIB203

Some Fixed Point Theorems in V-Fuzzy b-Metric Spaces by using CLR-Property

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ABSTRACT

In this article, we establish some common fixed point theorems in ordered V-fuzzy b-metric spaces. Using the results, suitable conditions are framed to make sure the existence and uniqueness of coincidence point and common fixed point theorems, which generalize and improve fixed point results of exist in literature.

Keywords: Fuzzy metric space; Fixed Point; V-Fuzzy b-Metric Space.

Paper ID: IIB204

Neutrosophic Refined Power Mean Operator and Its Application for MADM Problem Based on Cross Entropy Measure

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ABSTRACT

To deal with the problems of constructing mathematical models for real-life decision making, the data at hand are incomplete, indeterminate, and inconsistent. Neutrosophic refined set is capable to coping with incomplete, indeterminate, and inconsistent information. Some vital applications of neutrosophic refined sets in medical diagnosis and decision making are reported in the literature. In this paper we introduce a power mean operator in neutrosophic refined set environment for converting different neutrosophic refined sets to single valued neutrosophic sets. We prove basic properties of neutrosophic refined power mean operator. Then, we define neutrosophic refined cross entropy measure in two different ways based on single valued neutrosophic cross entropy measure and explicatively neutrosophic refined cross entropy measure. Based on the defined cross entropy measures, we develop a new multi-attribute decision making strategy in neutrosophic refined set environment. Finally, we present a numerical example of educational stream selection problem in neutrosophic refined set environment.

Keywords: Neutrosophic set, Neutrosophic refined sets, Multi attribute decision making, Neutrosophic refined power mean operator, Cross entropy measure.

Paper ID: IIB205

Medical Chatbots in the AI Era: Technologies, Challenges, and Future Directions

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ABSTRACT

In the era of AI, one of the most important fields that can make best use of it is MEDICAL. The increasing demand for healthcare has fuelled the development of medical chatbots that provide immediate medical assistance and guidance throughout the discussion. This review will discuss the development of healthcare chatbots, highlighting the various technologies that power them, including policy-based systems, machine learning, deep learning, and natural language processing (NLP). It also examines the benefits and drawbacks of this technology, especially concerning diagnosis, symptom analysis, and patient engagement. Integration of clinical knowledge, privacy issues, and ethical issues are also discussed. In addition, this article highlights significant advances in the field and identifies future directions regarding the potential of hybrid models and the role of disclosure in building user trust. This comprehensive review aims to provide an in-depth understanding of the current state of medical chatbots and to provide opportunities for future research and development.

Keywords: Machine Learning, Deep Learning, performance prediction, Artificial Neural Network, Artificial Intelligence, data mining, rag, gen Ai system.

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Paper ID: IIB206

Adaptive Trust-based Sooty Tern Optimization Algorithm for Optimal Route Selection in MANET

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ABSTRACT

A Mobile Ad hoc Network (MANET) is a self-configuring, infrastructure- free network of mobile nodes that has become more and more popular recently because of its ease of deployment. MANET is now widely used in many different sectors. Numerous studies have been conducted recently to offer methods for determining the best course for energy routing in MANETs. As a result, it confronts a number of difficulties that the current methods cannot resolve. Here, routing overhead difficulties, route maintenance, and route setup time become significant MANET considerations. Establishing a Quality of Service (QoS) during routing in the MANET may be challenging since nodes are dynamic. The Sooty Tern Optimization Algorithm (STOA) is used to construct a trust-based optimum route selection in MANET in order to address these problems. The primary constraint to be taken into account for the best routing method in the MANET, according to the created model, is security. To confirm the efficacy of the recommended routing strategy, the implementation results are verified using MANET's conventional optimum routing algorithms.

Keywords: Optimal Route Selection; Mobile Adhoc Network; Sooty Tern Optimization Algorithm; Multi-Objective Function

Paper ID: IIB207

An Integrated Study Pla0orm with a Doubly Linked List-Based Recommendation on System

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ABSTRACT

The Integrated Study Pla6orm addresses the challenges students face in accessing a vast collection of high-quality study materials, structured learning roadmaps, and relevant educational resources. While, many pla6orms focus on proprietary content, this system curates a diverse and extensive range of study materials from multiple reputable providers, including websites, academic databases, and educational videos. This ensures both quantity and quality in learning resources, offering users a well rounded and enriched study experience. The pla6orm utilizes a doubly linked list based recommendation system, where interconnected nodes store and organize structured information on various subjects. Based on our initial testing, the system achieved an 80% accuracy rate in generating learning roadmaps, ensuring structured yet adaptable navigation. Unlike conventional AI-driven models that often obscure content organization, this system enhances transparency and enables learners to explore topics in a logical and sequential manner. By integrating structured guidance with personalized recommendations, the Integrated Study Pla6orm minimizes the =me required to find reliable study resources while ensuring an efficient, well-directed, and accessible

learning journey across various technical domains. This pla6orm serves as a comprehensive solution for learners seeking both structured and high-quality educational content.

Keywords: Recommendation System, Content Based Filtering, Double Link List, Study Pla6orm

Paper ID: IIB208

Investigating the Biological Relevance of Synthesized Silver Nanoparticles

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ABSTRACT

Silver Nanoparticles (AgNPs) are minute particles of silver with diameters ranging from 1 to 100 nanometres. AgNPs' distinct physical, chemical, and biological characteristics have led to a wide range of uses in numerous industries that have an impact on people's lives both directly and indirectly. Their significance is rooted in their nanoscale dimensions, high surface area and diverse functionalities, which enable them to provide innovative solutions to critical challenges in fields like healthcare and industry. Trisodium citrate, which functions as a capping agent as well as a reducing agent, and sodium borate, which simply functions as a reducing agent, are used in this work to synthesize silver nanoparticles sonochemically. TEM (Transmission Electron Microscope), SAED (Selective Area Electron Diffraction), and UV-Vis Spectroscopy were used to characterize the synthesized AgNPs. The Antifilarial Efficacy as well as mechanism of action were studied on filarial nematode Setaria cervi. These AgNPs' antifilarial activity was evaluated using a number of methods, including the DNA Fragmentation assay, Propidium Iodide (PI) staining, MTT assay, Relative Movability (RM), and Dye Exclusion test. All of the nanoparticles exhibit a time-\ dependent antifilarial effect, according to RM evaluation. The effects of silver nanoparticles on Microfilariae vitality were investigated using the MTT assay. The Trypan Blue Dye Exclusion ,test, which selectively dyes dead oocytes while leaving live oocytes colourless, was used to assess parasite viability. Oocytes treated with AgNP showed blue staining. PI staining revealed that AgNP-treated oocytes had fractured nuclear morphology, but control oocytes—that is, oocytes not treated with AgNP—did not exhibit this fragmentation. Thus, it can be said that AgNPs have potent antifilarial activity against S. cervi on both macro and micro level. Using the Paper Disc Diffusion Method, the antibacterial activity of the produced nanoparticles was assessed against the gram-negative bacteria Escherichia coli (E. coli) and the gram- positive bacterium Staphylococcus aureus (S. aureus). AgNPs are positive and have strong antibacterial activity according to the antibacterial study, and the nanoparticles were proven to be efficient against these two bacteria.

Paper ID: IIB210

Flipped Classroom: A Technique to Develop Digital Study Habits of Students

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ABSTRACT

Nowadays it is critical for a student to access vast information for deep understanding of a concept.This is a digital era. Study habits are key to success for academic performance of students. Digital study habit have strong influence on academic performance over traditional study habits. Interactive learning tools help students overcome the monotonous nature of traditional study habits. Without digital literacy skills it is impossible to step ahead. Traditional study habits can also be improved by using online platforms. Flipped classroom approach helps develop digital study habits of students. Active engagement of learners is an important factor for effective learning. Students can have their own face by flip classroom approaches.

Keywords: Flipped Classroom, Digital Study Habits locations.

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A New Type of Regularity Via Fuzzy Preopen Set

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ABSTRACT

L.A. Zadeh introduced fuzzy set as follows: A fuzzy set A is a function from a non- empty set X into a closed interval $I = [0,1], i.e., A \in IX$ [3]. After the introduction of the notion of fuzzy closure operator by Chang in 1968 [1], various types of fuzzy closure- like operators have been introduced and studied.In [2], fuzzy preopen set is introduced and studied. In this paper, a new type of closure-like operator is introduced and studied using fuzzy preopen set as a basic tool, which is not an idempotent operator, in general. Afterwards, it is shown that the newly introduced operator is idempotent in fuzzy spaces satisfying some regularity property with respect to this operator. This new operator commutes with union but not with intersection. Then we establish mutual relationships of this operator with several closure operators in fuzzy topological spaces, studied earlier. Some characterizations of the new operator are given via nets in the last section.

Paper ID: IIB212

Wijsman Invariant Statistically Convergence Of Double Sequence Of Sets With Respect To Modulus Function

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ABSTRACT

In this paper we explore the concept of Wijsman invariant convergence andWijsman invariant statistically convergence for double sequence of sets with respect tomodulus function and define different types of sets of sequence spaces with respect tothe modulus function using the notion of Wijsman invariant convergence of double sequence of sets. Attempt has been made in this paper to establish some inclusion relation among these spaces.

Paper ID: IIB213

Domination in Hamacher fuzzy graphs

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ABSTRACT

Hamacher fuzzy graph fuzzy graph is new type of fuzzy graph developed by the concept of T-operator on fuzzy set. Introducing domination parameter on Hamacher fuzzy graph is the ultimate aim of this paper. Also, for the Hamacher fuzzy graph, the order and size, the fuzzy domination number, the total domination number are defined. Consequently, we stated necessary and sufficient condition for a dominating set to be minimal, bounds for domination number, equality condition for domination number and order.

Keywords: Hamacher fuzzy graph (HFG), Dominating set Domination number and Total domination number.

Paper ID: IIB214

Language Learning: Speech recognition and Assessment through ICT

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ABSTRACT

ICT enhances the analysis of spoken language through various tools and techniques that assess pronunciation, fluency, intonation and speech patterns. This is particularly useful for language learning, speech therapy and linguistic research and AI- human interaction. Moreover, advancements in speech technology have improved communication for individual with speech and language disorders. While ICT offers various benefits like digital literacy, accessibility and ethical considerations must be addressed. CT plays a big role in modern language therapy, helping individual with speech, language and communication difficulties through tools

Keywords: Spoken language Pronunciation, fluency, analysis, AI-Human interaction, automated scoring, real-time feedback

Paper ID: IIB215

Current Trends in Library and Information Science Research in India 2013–2023: A Study

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ABSTRACT

Research means to search a new thing, innovation or theory or prove to the previously done work. A discipline can be continuously developed through research. It gives a discipline its ability to use the knowledge produced in other fields. Current research trends of doctoral research programs in library and information science and related topic in Indian universities have been analysed during ten years from the year 2013 to 2023 to find out the growth pattern, productivity of the universities, types of works, research areas, and zonal status etc. The present study helps the LIS research community to make them aware of the current scenario and direction of research in this era of information and communication technology. To know the current trends in research in library and information science discipline different Journals, i.e. "Theses of the Month" of 'University News-A weekly journal of higher education 'is consulted, where theses submitted and accepted by the Indian Universities is listed regularly. After this data has been analysed and tubulised.

Keywords: Research, Research in LIS, Research trends-India, Doctoral Dissertations, Bibliometrics, Citation analys

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Paper ID: IIB216

Smart Decision-Making in an Omni-Retail Supply Chain under Stochastic Demand and Carbon Tax Regulation

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ABSTRACT

This paper presents an omni-retail supply chain model that integrates pricing, inventory management, and channel coordination strategies in the context of stochastic demand and sustainability policies. With the increasing spread of omni-channel retailing, it has become essential for organizations to maintain economic efficiency and comply with environmental policies, especially under the constraints of carbon tax. This paper analyses how manufacturers and retailers can optimize their decision-making processes within an omni-retail framework, taking into account consumers ' preferences for low-carbon products. The Stackelberg game-theoretic approach is used for strategic decision analysis, which provides insights into achieving a balance between profitability and environmental sustainability. Numerical analysis shows that optimizing wholesale prices increases profits, but high environmental compliance costs can increase overall supply chain costs, which affects pricing and inventory management decisions.

Keywords: Sustainable Decision; Omni-retail supply chain; Low carbon preferences; Stochastic demand; Carbon tax regulation.

Paper ID: IIB217

Artificial Intelligence in Academic Research: Trends and Challenges

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ABSTRACT

The integration of artificial intelligence (AI) in academic research has transformed the way researchers access, analyse, and synthesize vast amounts of information across various disciplines. AI-driven tools and algorithms streamline literature reviews, identify research gaps, and enhance knowledge discovery, making research more efficient and data-driven. These technologies assist researchers in managing citations, organizing literature, and facilitating collaborative efforts through secure information exchange. Additionally, AI-powered solutions support data analysis, automate repetitive tasks, and improve the accuracy of research outcomes. However, despite these advancements, human expertise remains essential to ensure the credibility, coherence, and ethical integrity of AI-assisted research. Sometimes, AI can generate references that do not actually exist ("hallucinations") or exhibit biases toward Western perspectives, which may impact the reliability and inclusivity of research findings. This review explores the applications, benefits, and challenges of AI in academic research, emphasizing its growing role in shaping the future of scholarly work across diverse fields.

Keywords: Artificial Intelligence, Academic Research, AI Tools, Literature Review, Knowledge Discovery, Research Automation, Citation Management, Data Analysis, AI Hallucinations, Ethical AI, Collaborative Research

Paper ID: IIB218

Enhancing Academic Research Efficiency: the Role of AI in Reference Management

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ABSTRACT

Academic research relies heavily on efficient reference management, ensuring proper citation, organisation, and retrieval of scholarly sources. With the growing complexity of research data, artificial intelligence (AI) has emerged as a transformative force in reference management tools such as Zotero, EndNote, and Mendeley. This paper explores the role of AI in enhancing academic research efficiency by automating citation formatting, recommending relevant literature, and improving metadata extraction. AI-powered reference management tools not only streamline the research process but also reduce errors, enhance collaboration, and provide personalised research insights. This study examines existing AI-driven functionalities in reference management systems, evaluates their impact on academic workflows, and discusses future possibilities and challenges, including ethical considerations and data privacy concerns. By integrating AI, reference management tools can significantly optimise the research process, ultimately contributing to more effective knowledge discovery and scholarly communication.

Keywords: Artificial intelligence, reference management, Zotero, academic research, citation automation, scholarly communication, metadata extraction, research efficiency.

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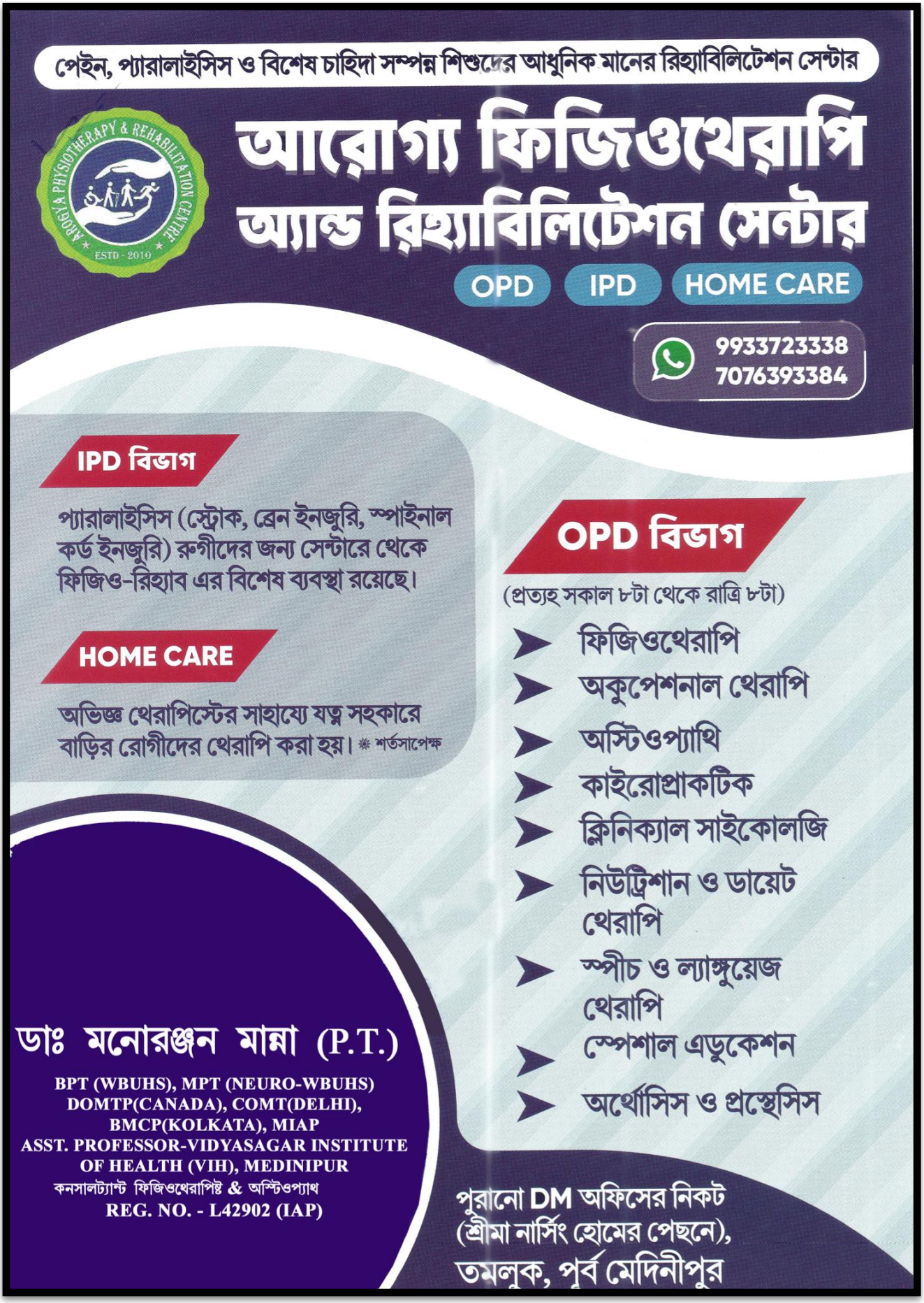

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