INTERNATIONAL MEET ON 'COMPUTATIONAL MATHEMATICS AND APPLICATIONS' & 52nd ANNUAL CONFERENCE OF ODISHA MATHEMATICAL SOCIETY (OMS)

(SILVER JUBILEE YEAR, IMA)

11th & 12th January 2025

IMCMA-2025



Souvenir

ଗଣିତ ଓ ପ୍ରୟୋଗ ପ୍ରତିଷ୍ଠାନ

Institute of Mathematics and Applications

(Science & Technology Department, Govt. of Odisha)

Andharua, Bhubaneswar - 751029



ABOUT IMA

The Institute of Mathematics and Applications (IMA) was established by the Government of Odisha in the year 1999, vide the Resolution of the Government of Odisha, Science and Technology Department letter no. 368-ST-I (SC)-159/98 dated 31st May 1999. This premier institute is well known for its unique teaching, research and training activities. The vision of IMA is to generate, disseminate, and preserve knowledge in mathematical science and related discipline and to use this knowledge for promoting welfare of the people. The aim of the institute is to strive for excellence and spread the culture of mathematical competence at all levels of the society. Its serene environment and beautiful campus atmosphere provide a perfect setting for a professionally rewarding educational experience. The students are nurtured by competent teachers and the institute's progress is monitored by a body of renowned academicians. After completing the course, the students of this institute prefer to build their career in academics and industries. Alumni of this institute are found to be absorbed in different national institute of repute like IISC, IITs, IIMs, IMSc, ISI, CMI, TIFR, IISERS, NITs, ISM, Central/State and distinguished foreign Universities including IT and Finance Sectors.



Prof. Shankar Prasad Mishra



Prof. Bamacharan Das



Dr. Ramanath Mohanty



Prof. Brajabandhoo Misra



Prof. Ghanashyam Samal



Prof. Tribikram Pati



INTERNATIONAL MEET ON 'COMPUTATIONAL MATHEMATICS AND APPLICATIONS' & 52nd ANNUAL CONFERENCE OF ODISHA MATHEMATICAL SOCIETY (OMS)

(SILVER JUBILEE YEAR, IMA)

Date : 11.01.2025 & 12.01.2025

Organized by

Institute of Mathematics and Applications

Andharua, Bhubaneswar - 751029

ରଘୁବର ଦାସ
ପୂର୍ବତନ ରାଜ୍ୟପାଳ, ଓଡିଶା
रघुवर दास
पूर्व राज्यपाल, ओड़िशा
Raghubar Das
Ex-Governor, Odisha

सत्यमेव जयते
Government of India

ରାଜ ଭବନ
ଭୁବନେଶ୍ୱର-୭୫୧୦୦୮
राज भवन
भुबनेश्वर-७५१००८
RAJ BHAVAN
BHUBANESWAR-751008

December 06, 2024



MESSAGE

I am glad to know that an International Meet on Computational Mathematics and Applications & 52nd Annual Conference of Odisha Mathematical Society (OMS) is to be held at Institute of Mathematics and Applications, Bhubaneswar on January 11-12, 2025. A souvenir is also being brought out on the occasion.

In today's rapidly evolving world, Computational Mathematics serves as a powerful tool for solving complex problems in science, engineering, technology, and beyond. Conferences such as this provide an excellent platform for experts, researchers, and students to share knowledge, foster collaborations, and explore emerging trends and applications in Mathematics. It is heartening that the Odisha Mathematical Society has consistently contributed to the growth and promotion of Mathematical Sciences, nurturing talent and encouraging a deeper appreciation for the subject.

I extend my best wishes to the organisers, members of OMS and distinguished delegates. I believe that this event would serve as a catalyst for further advancements in the field of Mathematics and its applications, benefiting both academia and society.

I wish the occasion and publication all success.

(Raghubar Das)

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MOHAN CHARAN MAJHI
CHIEF MINISTER, ODISHA

सत्यमेव जयते
Government of India

LOKASEVA BHAVAN
BHUBANESWAR



MESSAGE

I am glad to know that the Institute of Mathematics and Applications, Bhubaneswar is celebrating the 52nd annual conference of Odisha Mathematical Society and organising an international meet on 'Computational Mathematics and Applications' on January 11-12, 2025 and bringing out a souvenir in commemoration.

Mathematics is the roots of all sciences. As India strives to become a developed country by 2047, we need to excel in science and technology for which proficiency in Mathematics is essential. In this context, the endeavour of IMA and OMAS is appreciated. I hope the conference will discuss on latest developments in mathematics and encourage students to pursue higher research on the subject.

I wish the Conference all success.

(MOHAN CHARAN MAJHI)

Phone : | Office : 0674-2531100, 2531500, 2535100 (Fax)

SHRI KRUSHNA CHANDRA PATRA
MINISTER
Food Supplies & Consumer Welfare,
Science & Technology

Phone | Phone : (0674) 2536975
EPABX : 2322182
Mobile No. :

D.O. No. ...../MFSCWS&T.

BHUBANESWAR
Date 04/01/2025



Message

I am glad to know that Computational Mathematics and Applications & 52nd Annual Conference of OMS will be held at Institute of Mathematics and Applications, Bhubaneswar from January 11-12, 2025. A souvenir will be also brought out to commemorate the occasion.

It is said that Mathematics is the queen of all sciences. Its applications aim at uncovering the nature of physical reality. It is an indispensable tool to solve all the intriguing problems of all calculations. The applications of mathematics always augur positive vibrant impact on young minds.

I hope, this international conference and meet will yield new ideas and insights for participants, students, researchers and faculties.

I congratulate the organisers and participants on the occasion and wish the conference and release of souvenir all success.

(Krushna Chandra Patra)

ଶ୍ରୀ ପୃଥ୍ୱୀରାଜ ହରିଚନ୍ଦନ
ମନ୍ତ୍ରୀ
ଆଇନ, ପୂର୍ତ୍ତ, ଅବକାରୀ
ଓଡ଼ିଶା

ଓଡ଼ିଶା ସରକାର

ଦୂରଭାଷ | କାର୍ଯ୍ୟାଳୟ : ୦୬୭୪-୨୫୩୧୫୨୫
ଇ.ପି.ଏ.ବି.ଏକ୍ସ. : ୩୦୭୭

ପତ୍ର ସଂଖ୍ୟା...../ମଆପୂଅ

ଭୁବନେଶ୍ୱର
ତାରିଖ...03.01.2025..



ବାର୍ତ୍ତା

ଓଡିଶା ଗଣିତ ସଂସଦର ୫୨ ତମ ବାର୍ଷିକ ସମ୍ମିଳନୀ ୨୦୨୫ ଜାନୁଆରୀ ୧୧ ଓ ୧୨ ତାରିଖରେ ଗଣିତ ଓ ପ୍ରୟୋଗ ପ୍ରତିଷ୍ଠାନରେ ପାଳିତ ହେଉଥିବା ଏବଂ ଏହି ଅବସରରେ ଏକ ସ୍ମରଣିକ ପ୍ରକାଶ ପାଉଥିବା ଜାଣି ମୁଁ ବିଶେଷ ଆନନ୍ଦିତ।

ଛାତ୍ରଛାତ୍ରୀଙ୍କ ଜୀବନରେ ଗଣିତ ଓ ପ୍ରୟୋଗ ର ଗୁରୁତ୍ୱପୂର୍ଣ୍ଣ ଭୂମିକା ରହିଛି। ଗଣିତକୁ ବ୍ୟବହାର କରି ବିଦ୍ୟାର୍ଥୀମାନେ ଅନେକ ସ୍ଥାନରେ ପ୍ରତିଷ୍ଠିତ ହୋଇପାରିଛନ୍ତି। ଗଣିତ ଓ ପ୍ରୟୋଗ ପ୍ରତିଷ୍ଠାନ ଦୀର୍ଘବର୍ଷ ଧରି ଏହି ବିଷୟ ଉପରେ ଶିକ୍ଷାଦାନ ସହ ଗବେଷଣା କ୍ଷେତ୍ରରେ କାର୍ଯ୍ୟକରି ଅନେକ ପ୍ରଶଂସା ସାଉଁଟି ପାରିଛି। ଓଡିଶା ଗଣିତ ସଂସଦ ପକ୍ଷରୁ ବାର୍ଷିକ ସମ୍ମିଳନୀ ଆୟୋଜନ ଏବଂ ସ୍ମରଣିକ ପ୍ରକାଶନ ଗଣିତ ବିଷୟରେ ବହୁ ନୂଆ ତଥ୍ୟ ପ୍ରଦାନ ସହ ଛାତ୍ରଛାତ୍ରୀଙ୍କୁ ଅଧିକ ଜ୍ଞାନ ପ୍ରଦାନରେ ପ୍ରକୃଷ୍ଟ ମଞ୍ଚ ସାବ୍ୟସ୍ତ ହେବ।

ମୁଁ ଏହି ଅବସରେ ଗଣିତ ଓ ପ୍ରୟୋଗ ପ୍ରତିଷ୍ଠାନର ସମସ୍ତ କର୍ମକର୍ତ୍ତାଙ୍କୁ ଶୁଭେଚ୍ଛା ଓ ଅଭିନନ୍ଦନ ଜଣାଇବା ସହ ସ୍ମରଣିକ ପ୍ରକାଶନର ସର୍ବ ସଫଳତା କାମନା କରୁଛି।

(ପୃଥ୍ୱୀରାଜ ହରିଚନ୍ଦନ)

Smt. Chithra Arumugam, IAS
Principal Secretary

Science & Technology Deptt.
Kharvel Bhawan, Bhubaneswar
Pin - 751001
Ph.: 0674-2536772



MESSAGE

I am glad to know that the Institute of Mathematics and Applications is organizing the International meet on Computational Mathematics and Applications & 52nd Annual conference of OMS during 11-12 January 2025 and bringing out a souvenir.

It is a matter of pride for Institute of Mathematics and Applications, Bhubaneswar to organize 52nd Annual Conference of OMS. The International meet holds immense importance and I am sure the deliberations would be enriched with the views, experiences and research ideas shared by leading researchers, and research scholars of the country.

(Chithra Arumugam)

Dt.01.01.2025



Pramod Kumar Das
President,
Odisha Mathematical Society(OMS)

Message

It is heartening that the Institute of Mathematics and Applications (IMA), Andharua, Bhubaneswar has volunteered for organizing the 52nd Annual General Body meeting of the Odisha Mathematical Society (OMS) along with an International meet on "Computational Mathematics and Applications" at its Campus during January 11-12, 2025. I am sure that the students, researchers and mathematicians participating in the conference will endeavor to make it a memorable one.

The idea of establishing a Mathematics Institute was conceived by the founding members of the OMS for the over all development of Mathematics at all levels in our state. In the meantime, the Institute has successfully celebrated its Silver Jubilee recently with its various accomplishments.

On behalf of the members of the Executive Body, I congratulate the Director, his colleagues and students for not only inviting the OMS but also working very hard to make it a grand success.

(Pramod Kumar Das)



Gadadhar Misra
Chairman, Governing Council
Institute of Mathematics and Applications

Message

I am very happy to learn that an International Meet on Computational Mathematics and Applications and the 52nd Annual Conference of the Odisha Mathematical Society is going to take place during January 11 – 12, 2025 at the Institute of Mathematics and Applications, Bhubaneswar.

I am aware that a symbiotic relationship between the Odisha Mathematical Society and the Institute of Mathematics and Applications has been the key to the progress of both these institutions. They have served to ensure that the excitement of doing mathematics is not lost on aspiring young minds as well as practicing researchers and the public at large. I am confident that the vision and the shared dream of these two institutions will continue to strengthen mathematics research and education.

I wish the Organizers of the International Meet and the 52nd meeting of the OMS the very best in the conduct of this very important event at the start of 2025.

(Gadadhar Misra)



Prof. Jasobanta Jena
Director, Institute of Mathematics and Applications

Message

On behalf of the Institute of Mathematics and Applications (IMA) family, I am thankful to the Executive Body Members of the Odisha Mathematical Society (OMS) for entrusting IMA for organizing International Conference on Computational Mathematics and Applications and 52th Annual Conference of Odisha Mathematical Society.

I am grateful to the Invited Speakers and the Delegates from reputed Organizations of the country and from abroad for their participation in the conference. I am confident that the Conference will provide an excellent opportunity for all via meaningful interactions and exchange of ideas.

I extend my best wishes to the members of the Organizing Committee, Staff and Students of IMA, who are trying their best to make the visit and stay of our guests at IMA memorable and make the Conference a grand success.

(Jasobanta Jena)



Dr. Trailokya Panigrahi
Institute of Mathematics and Applications
Andharua, Bhubaneswar, Odisha, 751029

Message

This year Institute of Mathematics and Applications is going to organize 52nd Annual Conference of Odisha Mathematical Society (OMS) along with the Internation Meet on "Computational Mathematics and Applications" during 11-12 January 2025. I am sure that this conference will help the researchers, academician and experts from industries to exchange the ideas on mathematics and its application to the various fields.

Around twentyone renowned mathematician and scientists from industries across the globe will deliver their talk. I extend my heartfelt gratitude to them for accepting invitation to deliver the talk on such occasion.

I am thankful to Shri Mohan Charan Majhi, Hon'ble chief minister of Odisha for his good wishes towards the success of such conference. It is my privilege to extend my sincere thanks to Shri Krushna Chandra Patra, Hon'ble minister, Science & Technology, Govt. of Odisha and Shri Prithviraj Harichandan, Hon'ble minister of Law, Works and Excise, Govt. of Odisha for their encouragement words towards the success of the conference. I extend thanks to Smt. Chithra Arumugam , Principal Secretary to Govt., Science and Technology Dept, Govt. of Odisha for her constant support to organize such conference. I am thankful to Shri Pramod Kumar Das, President, Odisha Mathematical Society for his guidance and support to conduct such conference. I express my gratitude to our director Prof. Jasobanta Jena for his constantly guidance and support in every step to make this conference a memorable one.

Last but no the least my extend my sincere thanks to all the members of OMS executives, faculties and staffs of IMA, researcher scholars and students volunteer of IMA for their help and active participation to make this conference a grand success.

Trailokya Panigrahi

(Trailokya Panigrahi)
Organizing Secretary

ORGANIZING COMMITTEE

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Hon'ble Cabinet Minister, Science & Technology
Govt. of Odisha

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Smt. Chithra Arumugam, IAS
Principal Secretary
Science & Technology Department, Govt. of Odisha

Organizing Chairman
Prof. Jasobanta Jena
Director, Institute of Mathematics and Applications Bhubaneswar

Organizing Secretary
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Institute of Mathematics and Applications Bhubaneswar

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Associate Prof, IMA, BBSR

Dr. Sudhakar Sahoo
Associate Prof, IMA, BBSR

Prof. (Dr.) Prayag Prasad Mishra
Prof., Silicon University, BBSR

Prof. Nilamber Biswal
Ex-Reader, Kamala Nehru College, BBSR

Dr. Mrutyunjay Das
Associate Prof, KIIT University

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(Institute of Mathematics and Applications)

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Principal Secretary
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Utkal University, Bhubaneswar: Member.

Senior Most Professor of Mathematics
Sambalpur University: Member.

Senior Most Professor of Mathematics
Berhampur University: Member.

Director
Institute of Physics, Bhubaneswar: Member.

Prof. Satish Chand
School of Computer and Systems Sciences,
Jawaharlal Nehru University, New Delhi: Member.

President
Odisha Mathematical Society, Bhubaneswar: Member.

Prof. R. Balasubramanian
Former Director, Institute of Mathematical Sciences, Chennai: Member.

Professor Sudhakar Panda
Ex-Director, NISER, Bhubaneswar: Member.

Professor GD Veerapa Gowda
TIFR Centre for Applicable Mathematics, Bengaluru: Member.

Director
Institute of Mathematics and Applications, Bhubaneswar: Member Secretary.

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STUDENT VOLUNTEERS IMA				
ANCHORING	T.HALL MANAGEMENT	REGISTRATION & HELP DESK	SOUND & MUSIC	CAMERA
Saban(T. Pati hall) Cristina(T. Pati hall) Eureka(Cultural) Abhinandan(Cultural) Usha(Cultural) Subhadra(Cultural)	Subhasmita Subrat Aakash Punya	Bivek Subhasmita(j) Eureka Suhadra Prakuti	Pradyumna Satya	Aakash
Web -maintenance	Accommodation Hospitality & Transportation	Welcome (Inaugural & valedictory)	Certificate writing	Decoration & seating
Subrat Satya Pradyumna	Bivek(Head) Subhasmita(j) Punya Kanisk Shreesum Jibanjyoti Tushar Prakruti Subhra Mauli Subhadra Stihti	Subhasmita Subhasmita(j) Prakruti Subhra Mauli Subhadra Stihti	Shiba Prasad Subhasmita	Bivek(Head) Punya Kanisk Shreesum Jibanjyoti Tushar

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ORISSA MATHEMATICAL SOCIETY (OMS)
Regd. No.7203/202 of 1973-74
Government of Odisha

Annual Report for 2024-2025

52nd ANNUAL CONFERENCE OF ODISHA MATHEMATICAL SOCIETY
&
INTERNATIONAL MEET ON 'COMPUTATIONAL MATHEMATICS AND APPLICATIONS'

at
INSTITUTE OF MATHEMATICS AND APPLICATIONS, ANDHARUA, BHUBANESWAR, ODISHA, INDIA -751029

11-12, JANUARY 2025

Dr. Sabyasachi Pani
General Secretary, OMS

Hon'ble distinguished guests on the dias. My revered teachers, Esteemed delegates, invitees, dignitaries, printing & electronics media personnel, security and police personnel, members of Organising Committee and Advisory Committee, members of Odisha Mathematical Society (OMS); faculties and staff members of Institute of Mathematics and Application, other supporting organisations who have helped directly or indirectly for the success of this programme, students, ladies and gentlemen;

At the outset, I congratulate and welcome all of you for your kind presence and sparing your valuable time in this auspicious occasion of the Fifty Second.

Annual Conference of the Odisha Mathematical Society. This International Meet and the program is to encourage the students and teachers for their progress in research and academic pursuits for a better cause of the society.

I thank, especially the Director of IMA, for readily accepting our request and inviting Odisha Mathematical Society to host its 52rd Annual Conference with the International Meet on Computational Mathematics and Application.

Sir, Odisha Mathematical Society (OMS) came into existence on the auspicious day of Ganesh Chaturthi, 11th September 1972. This was germinated out of the minds of eminent mathematicians; Late Prof. Ramanath Mohanty, Late Prof. Bama Charan Das, Late Prof. Brajabandhu Mishra, Late Prof. Shankar Prasad Mishra, Late Prof. Siba Prasad Mishra, Late Professor Tribikram Pati, late Prof. Ram Shankar Rath and many more.

It has been delivering its responsibilities by the continuous and whole hearted, holistic efforts by its senior members like, Prof. Gokulananda Das, Prof. Ram Narayan Mohapatra, Prof. Sudarsan Nanda, Prof. Sudarsan Padhy, Prof Nalini Kanta Chaudhury and many others. OMS is a registered society having Regd No.7203/202 of 1973-1974 with its Head Quarters at P. G. Department of Mathematics, Utkal University, Vani Vihar, Bhubaneswar-751004.

Aims and Objectives of OMS:

(i) To promote and inculcate research in Mathematics;
(ii) To render suggestions for curriculum reforms in Mathematics from school level to university level;
(iii) To organize annual conferences and symposia;
(iv) To publish journal periodically on research and teaching of mathematics;
(v) To publish a bilingual periodical in Oriya and English language to popularize the subject;
(vi) To encourage and discover talents in mathematics and award prizes and certificates;
(vii) To felicitate persons having outstanding contributions for research and teaching in mathematics;

The 1st Annual Conference of OMS was held on 20-21 January 1973 at P. G. Department of Mathematics, Utkal University, Vani-Vihar, Bhubaneswar. Late Prof. Ramanath Mohanty (EX-Vice-chancellor of Utkal University) was the President, Late Prof. Shankar Prasad Mishra was the General Secretary, Late

Prof. Ghanashyam Samal was the vice-president, Prof. Ram Shankar Rath was the Treasurer. In its journey now the 52nd Annual conference is Organized here at IMA. By the efforts of the members of OMS, Institute of Mathematics and Applications is established. The growth of IMA to be one of the leading organization to popularize and pursue research in mathematics will be very satisfying for the members of OMS.

Odisha Mathematical Society (OMS) is a registered body for lovers of mathematics. Any person having interest in mathematics can become a member of OMS by paying membership fee. There are more than 900 life members as on 11. 01. 2025.

The following programmes/ activities are taken by OMS:

SL No	Event with Description
1.	**Strengthening Institute of Mathematics and Applications (IMA):** Now IMA is in its path of growth by getting its Regular Director, Registrar, Finance officer and running with 2 Associate Professors and 2 Assistant Professors. Out of 7 sanction post 2 Prof 1 Asst Prof lying vacant at present. The Institute of Mathematics and its applications is achieving its objective and purpose of expanding Research and Academy in good pace. IMA will maintain its academic excellence by recruiting best faculties initiating theme-based research activities. With UGC norm, fellowship is being and will be provided to newly recruited research scholars as sanctioned by Dept. of Science and Technology Govt. of Odisha. IMA has got Nodal centre of research program from Utkal University since 2022. At present 12 research scholars working there for their PhD degree. IMA is conducting JMO, SMO, RMO, INMO and other training programme both for student and teacher.
2.	OMS is actively involved in the developments of the matters related to Mathematics: Like 1. Strengthening Mathematics Departments of Colleges and Universities of Odisha. 2. Strengthening schools with mathematics teachers up to Higher Secondary Level in Odisha. 3. Conducting Mathematics Olympiad Training Programme. 4. Curriculum reformation for school, college and universities.
5.	Release of Printing Materials by Chief Guest (i) Release of Souvenir

	(ii) Release of book: Abhinav Ganita Bichitra (to popularize mathematics) (iii) Release of Journal of OMS Vol. 42
6.	**Prof. Bama Charan Das prize for best Graduate** in +3/B.Sc /B.A Mathematics (Honours) (instituted by **Mrs. Punnyaprava Das W/O late Prof. B. C. Das**): **Miss Sanjita Biswal** is the winner of this award. She passed graduation in mathematics (Honours) from S.V.M. Autonomous college, Jagatsinghpur in the academic year 2023-24 and continuing 1st year M. Sc in P. G. Dept. of Mathematics, Utkal University, Vanivihar, Bhubaneswar.
7.	**The Felicitation of Eminent teachers** (i) Prof. Kailash Misra, (North Carolina State University, USA) (ii) Mr. Sanatan Sahoo (Retired from Govt. College, Odisha) (iii) Mr. Bhagabata Pradhan (Retired School Teacher, Odisha)
8.	**The Keynote Speaker:** Prof. Chitta Baral Arizona State University, USA, Title: The Mathematics behind ChatGPT **We have 20 number of Invited Talks. Some of speakers are as follows:** 1. Prof. R N Mohapatra, Central University, Florida. 2. Prof. G D Veerapa Gowda, TIFR Centre for Applicable Mathematics Bengaluru 3. Prof. Trilochan Sahoo, Professor, IIT Kharagpur 4. Prof. Swadesh Kumar Sahoo, IIT Indore 5. Prof. Ratikant Behera, Dept. of Mathematics, Indian Institute of Science, Bangalore 6. Prof. Subash Chandra Martha, IIT Ropar 7. Prof. Jajati Keshari Sahoo, BITS Pilani Goa Campus 8. Prof. K R Raghavan, Professor of Mathematics, Krea University 9. Prof. Arindama Singh, IIT Madras 10. Prof. Chandal Nahak, IIT Kharagpur 11. Prof. Prasant Kumar Ray, Sambalpur University 12. Prof Seshadev Padhi, BIT Mesra, Ranchi
9.	**Memorial Lectures:** There will be four memorial lectures in the name of following eminent mathematicians (i) Prof. Bama Charan Das memorial lecture by Prof Ram Narayan Mohapatra, USA. (ii) Prof. Ramanath Mohanty memorial lecture by Prof. G. Das.

	(iii) Prof. Shankar Prasad Mishra memorial lecture by Prof: **Prof. G. D. Veerappa Gowda,** TIFR Centre for Applicable Mathematics Bengaluru (iv) Prof. MinaKetan Das memorial lecture by Prof. Gadadhar Misra
10.	**More than 65 abstracts have been received for Presentation.** **Prizes/Awards for paper presentation:** 1. **Professor Ghanashyam Samal best paper presentation award** (for UG/PG/M.Phil/M.Tech students) instituted by Professor Purna Chandra Das, Ex-Professor of Mathematics, IIT Kanpur 2. **Professor Ghanshyam Samal best paper presentation award** (for Ph.D/Research Scholar) instituted by Dr. Hadibandhu Pattanayak in the memory of his father late Sri Kamapal Pattanayak 3. **Professor Tribikram Pati best presentation award** (for post Doctoral Students/faculties below 35 years of age) instituted by Professor Gopal Krishna Panda of NIT Rourkela in the memory of his father late Sri Satyananda Panda.
11.	**Programme to Popularise Mathematics:** (i) Publication of quarterly magazine Abhinav Ganita Bichitra (bilingual in English and Odia) for Popularization of Mathematics having ISSN : 2231-4067 (ii) Publication of Mathematics Research Journal since 1981 named as "Journal of Odisha Mathematical Society" (JOMS) having ISSN: 0975 - 2323 (iii) Training to students for Mathematics Olympiad Examinations to search talents for Indian National Mathematics Olympiad (INMO), International Mathematics Olympiad (IMO): The Mathematical Olympiad Programme in India is organized by the Homi Bhabha Centre for Science Education (HBCSE) on behalf of the National Board for Higher Mathematics (NBHM) of the Department of Atomic Energy (DAE), Government of India. Apart from the International Mathematical Olympiad (IMO), in which India has been participating since 1989, it has also started participating in two more international Olympiad events: the European Girls' Mathematical Olympiad (EGMO) and Asia Pacific Mathematics Olympiad (APMO) . The following programs are taken by OMS and IMA. JMO (Junior Mathematics Olympiad) Examination (for vi, vii, viii students), PRMO (Pre Regional Mathematics Olympiad) Examination (for viii, ix, x, xi, xii students). This PRMO is introduced in 2018. Class XII students are included. RMO (Regional Mathematics Olympiad) Examination (for viii, ix, x, xi, xii students), INMO training camp.

SMO (Senior Mathematics Olympiad) Examination (for 2nd and 3rd year of BA/B.Sc/ +3 (Sc/Arts)/B.Sc of NISER with mathematics as a core subject /B.Tech students of IIT, NIT , Engineering Colleges and Universities of Odisha) to guide for M.Tech/P.G studies.

To institute Prizes for Olympiad, donations 4 lakhs has been received.
Two prizes for both Boys Junior and Senior also Two prizes for both Girls Junior and Senior. Donations are given by Prof M K Mohanty 2 lakhs for Boys and Rs 2 Lakhs by Mrs. Lita Nayak for girls.

1. **Support for hosting the National Conference along with 52nd OMS Annual Conference:**

Members of OMS are very much thankful to the organisations/Publishers for encouraging us to conduct such programme by their support.

Specially I on behalf of the OMS extends thanks to the Director of IMA for his whole hearted in time support to hold the Conference.

2. **The General Body meeting of OMS:**
   The general body meeting of OMS is held to discuss the affairs of OMS. The annual income and expenditure is presented. Election is held for office Bearers of OMS. This year is the election year.

3. **Message for next Conference:**
   The two days programme of the conference will be closed by valedictory function giving new message for the future programme of OMS.

Once again, I thank you all for your kind cooperation.

Bande Utkal Janani
Jai Hind

Inaugural Programme

Date : 11th January 2025

10:20AM	:	Invited/Distinguished Guests get seated
10:25AM	:	Lighting of Lamp with Chanting of Shloka
10:30AM	:	Flower Bouquet to dignitaries on the dais-
10:35AM	:	Opening Song
10:40AM	:	Welcome address by the Director, IMA
10:50AM	:	Annual Report by General Secretary of OMS
11:00AM	:	Release of Souvenir
11:05: AM	:	Release of Journal of OMS
11:10AM	:	Awards and Felicitation to Teachers, Students and Guests
11:15AM	:	Address by the Chief Speaker
11:25AM	:	Address by the Guest of Honour
11:35AM	:	Address by the Guest of Honour
11:45AM	:	Address by the Chief Guest
11:55AM	:	Address by President of OMS
12:05AM	:	Vote of Thanks by Organizing Secretary of Conference

International Meet on "Computational Mathematics and Applications"
&
52nd Annual Conference of Odisha Mathematical Society (OMS)
(Silver Jubilee Year, IMA)
January 11-12, 2025
INSTITUTE OF MATHEMATICS AND APPLICATIONS
BHUBANESWAR, ODISHA
Details of Technical Programme/Sessions

Day 1: 11th January, 2025

Sl No.	Time	T. Pati Hall Name of Rapporteurs: Dr. Sudhakar Sahoo Dr. Prayag Prasad Mishra Miss. Christina Sahoo Mr. Bivek Kumar Behera	Hall No. 1 & 2 Name of Rapporteurs: Dr. Pinakadhar Baliarsingh Dr. Chita Ranajn Mallick Mr. Shiba Prasad Dhal Miss Subhasmita Maharana
1	8:00-9:00AM	Registration & Breakfast (Corridor in front of T. Pati Hall)	
2	9:00-9:40	Talk: Prof. Bama Charan Das Memorial Lecture (Online) Speaker: Prof. R. N. Mohapatra Dept. of Mathematics, University of Central Florida, Orlando, USA Title: Smoothing Technics for the Heavy Ball click this link: Method with Applications in Machine Learning https://meet.google.com/vuu-cypg-eqt Otherwise, to join by phone, dial +1 724-491-2147 and enter this PIN: 909 026 491#	
3	09.40-10-20	Talk: Key Note Speaker Speaker: Prof. Chitta Baral Arizona State University, USA Title: The Mathematics behind ChatGPT	
4	10.20-12.10	Inaugural Program Venue: T. Pati Hall	
5	12.10-12.20	Tea Break	
6	12:20-1:00	Talk: Prof. Shankar Prasad Mishra Memorial Lecture Speaker: Prof. G. D. Veerappa Gowda TIFR Centre for Applicable Mathematics Bengaluru-560065 Title: Application of Hamilton-Jacobi Equations in Shape from Shading.	

7	1.00-1:40	Talk: Prof. Ramanath Mohanty Memorial Lecture Speaker: Prof. G. Das, Ex-Vice Chancellor, Utkal University, Odisha Title: Nothing Created Everything	
8	1:40-2.30	Lunch	
9	2:30-3:00	Talk: Invited Talk Speaker: Prof. Trilochan Sahoo, Dept. of Ocean Engineering and Naval Architecture, IIT Kharagpur, India Title: Integral equations and allied methods for wave interaction with coastal structures supplemented through physical model tests - an overview	Talk: Invited Talk Speaker: Prof. Swadesh Kumar Sahoo Dept. of Mathematics, IIT Indore, India Title: A Dirichlet problem and infinite product representation of sine function
10	3:00-3:30	Talk: Invited Talk Speaker: Prof. Subash Chandra Martha Dept. of Mathematics, IIT Ropar, India Title: Mathematical Techniques for Solving Some Problems of Water Wave Interaction with Barrier over Arbitrary Bottom Topography	Talk: Invited Talk Speaker: Prof. Prasanta Kumar Ray Dept. of Mathematics, Sambalpur University, Sambalpur Title: Multiplicative dependency on higher order recurrences
11	3:00-4:00	Talk: Invited Talk Speaker: Prof. Satish Chand School of Computer & Systems Sciences, Jawaharlal Nehru University, New Delhi Title: Roots of unity and applications	Talk: Invited Talk Speaker: Prof. K. R. Raghavan, Professor of Mathematics, School of Interwoven Arts and Sciences, Krea University Title: On the Saturation Property for Multiplication of Symmetric Polynomials
12	4:00-4:10	Tea Break	

13	4:10-4:40	Talk: Invited Talk Speaker: Prof. Arindama Singh Dept. of Mathematics, IIT Madras Title: Eigenpair computation of Large Matrices		Talk: Invited Talk Speaker: Prof. C. Nahak, Department of Mathematics IIT Kharagpur Title: Riemann Integral Revisited
14	4:40-5:10	Talk: Invited Talk Speaker: Prof. J. K. Sahoo Dept of Mathematics, BITS, Pilani, K K Birla Goa Campus, Goa. Title: Splitting based iterative methods for solving tensor equations A X = B under M-product		Talk: Invited Talk Speaker: Prof. Seshadev Padhi Dept. of Mathematics, Birla Institute of Technology Mesra, Ranchi-835215, India Title: Lyapunov-type inequalities for fractional differential equations
15	5:10-6:30	Paper Presentation-I Judges: 1)Prof. Pramod Kumar Das 2) Prof. M . K. Mahanti	Paper Presentation-II Judges: 1)Prof. Sabyasachi Pani 2)Prof. Prasant Kumar Ray	Paper Presentation-III Judges: 1)Prof. A. K. Ojha 2)Prof. Seshadev Padhi
16	6:30- 8:30	Cultural Program Venue: In front of Administrative Block		
17	8:30-9:30	Dinner New Hostel Canteen		

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INSTITUTE OF MATHEMATICS AND APPLICATIONS
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Details of Technical Programme/Sessions

Day 2: 12th January, 2025

Sl No.	Time	T. Pati Hall Name of Rapporteurs: Dr. Sudhakar Sahoo Dr. Prayag Prasad Mishra 3) Miss. Christina Sahoo 4) Mr. Bivek Kumar Behera	Hall No. 1 Name of Rapporteurs: 1) Dr. Pinakadhar Baliarsingh Dr. Chita Ranajn Mallick Mr. Shiba Prasad Dhal Miss Subhasmita Maharana
1	8:00-9:00AM	Registration & Breakfast (Corridor in front of T. Pati Hall)	
2	9:00-10:40	Paper Presentation-IV Judges: 1)Prof. Pramod Kumar Das 2) Prof. M . K. Mahanti	Paper Presentation-V Judges: 1)Prof. Sabyasachi Pani 2)Prof. Prasant Kumar Ray Paper Presentation-VI Judges: 1)Prof. A. K. Ojha 2)Prof. Seshadev Padhi
3	10:40-11:20	Talk: Prof. Minaketan Das Memorial Lecture Speaker: Prof. Gadadhar Misra Indian Statistical Institute, Bangalore and Indian Institute of Technology, Gandhinagar Title: Euler's product formula and the Ramanujan	
4	11:20-11:30	Tea Break	
5	11:30-12:00	Talk: Invited Talk Speaker: Prof. Ratikanta Behera, Dept. of Computational and Data Sciences, Indian Institute of Science, Bangalore, India Title: Wavelet-Based Physics-Informed Neural Networks	Talk: Invited Talk Speaker: Prof. R. Balasubramanian, Ex-Professor, Institute of Math. Science, Chennai Title: Sum free sets

6	12:00-12:30	Talk: Invited Talk Speaker: Prof. Ranjan Kumar Mohanty Dept. of Mathematics, South Asian University, New Delhi Title: High Resolution Compact Approximation for NS Equations of Motion in terms of Velocity-Stream Function Interpretation	Talk: Invited Talk Speaker: Prof. Sk. Safique Ahmad, Dept. of Mathematics, IIT, Indore Title: L-structure least squares solutions of generalized reduced biquaternion matrix equations and their applications in inverse eigenvalue problems
7	12:30-1:00	Talk: Invited Talk Speaker: Dr. Bigyani Das, NOAA, SMCD, United State Title: Application of Computational Mathematics in Sciences	Talk: Invited Talk Speaker: Dr. Rajendra Kumar Jenamani Scientist G and Head, National Weather Forecasting Centre, IMD,New Delhi Title:Reducing impact of Weather and Climate Extremes - Role of new observing systems, HPC, Numerical Weather Prediction (NWP), AI/ML and Big data in Multi-Hazard Early Warning System
8	1:00-2:00	Lunch Break	
9	2:00-3:00	Symposium on Syllabus of School/UG/PG courses Chairman: Prof. S. Padhy	
10	3:00-3:30	General Body Meeting of OMS, election to various post of OMS executives	
11	3:30-4:30	Valedictory function, Prize distribution for the best paper presentation	
12	4:30-5:30	Refreshment	



Articles

JEWELS OF LIFE

Dr. Hadibandhu Pattanayak

The most dangerous one letter word is **'I'**, avoid it.

The most welcome two letter word is **'WE'**, follow it.

The most poisonous three letter word is **'EGO'**, try to kill it.

Don't kill the animals, but kill the **'Animality'** within you.

The most desired four letter word is **'LOVE'**, try to adore it.

The most precious five letter word is **'SMILE'**, try to practise it.

Smile costs nothing but shows positive attitude.

The other desirable five letter word in **'TRUTH'**, try to chant it.

The most enviable Six letter word is **'WISDOM'**, try to attain it.

The most sought-after Seven letter word is **'SUCCESS'**,try to achieve it.

Success is a journey, not an end in itself. It is a manner of travel from one station to other.

The other Seven letter words and **'SADHANA'** and **'SERVICE'**,

try to treat them as the mantra of life.

The most alaraming eight letter word is **'JEALOUSY'**, try to maintain

distance from it.

The most striking nine letter word is **'KNOWLEDGE"**, try to acquire it.

The other noble nine letter word is **'SACRIFICE'**, try to maintain it.

The ultimate treasures are the ten letter words, viz PERFECTION,

FRIENDSHIP, DISCIPLINE, COMMITMENT, CONFIDENCE, COMPETENCE'.

ଶୁଭ ସାତ

ପ୍ରଫେସର ଡଃ. ସ୍ମୃତି ମହାନ୍ତି

ସାତ ଅଟେ ଏକ ମୌଳିକ ସଂଖ୍ୟା
ଚତୁର୍ଥେ ହେଉଛି ସ୍ଥାନ ଏହାର ,
ରବି,ସୋମ,ମଙ୍ଗଳ,ବୁଧ,ଗୁରୁ,ଶୁକ୍ର,ଶନି
ସପ୍ତାହରେ ଅଛି ଏଇ ସାତୋଟି ବାର । ୧ ।

ବା , ଘ, ନି, ଶ, ହ, ନା, ଲା
ଇନ୍ଦ୍ର ଧନୁର ସାତୋଟି ରଙ୍ଗ ,
ବରଷା ପରେ ନୀଳ ଆକାଶରେ
ସାଜି ହୋଇଥାଏ ଧନୁର ଅଙ୍ଗ । ୨ ।

ସା, ରେ, ଗା, ମା, ପା, ଧା, ନି
ସାତ ସୁରେ ବନ୍ଧା ଏ ଜୀବନ,
ଏଇ ସାତ ସୁର ବିନା
ହୁଏ ନାହିଁ ସଙ୍ଗୀତ ସାଧନ । ୩ ।

ପୃଥିବୀ ପୃଷ୍ଠରେ ସାଗର ଘେରାରେ
ଅଛି ସପ୍ତ ମହାଦେଶ,
ସପ୍ତ ମହାଦେଶେ 'ଏସିଆ', ଅନନ୍ୟ
'ଭାରତେ' ଆମର ବାସ । ୪ ।

ହିନ୍ଦୁ ଧର୍ମେ ଆମ ଶୁଭ ସଂଖ୍ୟା ସାତ
କଳସେ ବସାଉ ସାତ ପତୁରିଆ ଡାଳ,
ବିବାହ ବ୍ରତରେ ସାତ ନାରୀ ଲୋଡା
କରିବା ପାଇଁ କି ଶୁଭକାମ । ୫ ।

ବିବାହ ବେଦୀରେ ବୁଲନ୍ତି ସାତ ଥର
ବର ସହିତ କନିଆଁ ,
ଜୀବନ ଯୁଦ୍ଧରେ ଜୟୀ ହେବା ପାଇଁ
ଉଭୟେ କରନ୍ତି ସାତ ପ୍ରତିଜ୍ଞା । ୬ ।

ଗାୟତ୍ରୀ, ବ୍ରିହତି , ଉଶ୍ନିହ
ଜଗତି,ତ୍ରିସ୍ଟୁଭ, ଅନୁସ୍ଟୁଭ,ପଂକ୍ତି ,
ସୂର୍ଯ୍ୟ ରଥର ଏମାନେ ହେଲେ
ସାତଟି ଘୋଡା ସାତ ସାରଥି । ୭ ।

କ୍ରତୁ,ପୁଲହ,ପୁଲସ୍ତ,ଅତ୍ରି, ଅଙ୍ଗିରା
ବଶିଷ୍ଠ, ମରିଚ ସାତୋଟି ତାରା,
ପ୍ରଶ୍ନ ଚିହ୍ନ ସମ ଆକାଶେ ଦିଶଇ
'ସପ୍ତର୍ଷି ମଣ୍ଡଳ' ନାମେ ପରା । ୮ ।

ପୁଲହ ରୁ କ୍ରତୁ ସିଧା ଗାର ଟାଣିଲେ
ଉତରେ ଛୁଏଁ ଉଜ୍ଜଳ ଧ୍ରୁବ ତାରା
'ସପ୍ତର୍ଷି ମଣ୍ଡଳ'ର ଅନ୍ୟ ନାମ
'ବଡ ଭଲ୍ଲୁକ ' ପରା । ୯ ।

ସାତ ସାଧବଙ୍କ ଗୋଟିଏ ଭଉଣୀ
ନାମ ତାର 'ତଅପୋଇ'
ଭାଉଜେ ଦେଲେ କଷ୍ଟ ସାନକୁ ଲୁଚାଇ
ବିଦେଶେ ଗଲେ ଯେବେ ଭାଇ ବଣିଜ ପାଇଁ । ୧୦ ।

ଫେରି ଦେଖିଲେ ଭଉଣୀ ଅବସ୍ଥା
ଭାଉଜଙ୍କୁ ଦେଲେ ଅନେକ ଶାସ୍ତି ,
ସେଇଦିନୁଁ ଭାଇପାଇଁ ଭଉଣୀ
ଖୁଦୁରୁକୁଣୀ ଓଷା ଯେ ପାଳନ୍ତି । ୧୧ ।

ସାତ କାଣ୍ଡ ରାମାୟଣ
ବାଲ୍ମୀକି ରଚିଲେ
ତ୍ୟାଗର ପ୍ରତୀକ କରି
ସୀତା ଓ ରାମଙ୍କୁ ରଖିଲେ । ୧୨ ।

MAGIC OF SMILE

Dr. Hadibadhu Pattanayak

Smile - Smile continue to smile
Let the world smile with you
Smile solves all problems
proclaims not me but thou
Smile keeps the heart clean
It brings glamour in the
face like sunshine
Smile fills the heart with
Love and compassion
It converts all negativities
to positive action
Smile makes the body disease free
to go for spiritual invocation
Smile removes all stress and strain
It also cools the brain
Smile is the most precious
priceless jewel of life
It provides all good qualities
to thrive and survive
Smile costs nothing but shows
positive attitude
A Smiling personality is appreciated
by all with gratitude
Smile is the symbol of nobility and purity
It connects the body, mind and soul
to the community
Smile motivates for service above self
to derive self satisfaction
Smile encourages giving
without expectation.
Smile gives perpetual happiness
that leads to peace and salvation
Smile Smile teach us silence
That dispels problems and bestows
fragrance, Smile keeps the mind
free from anxieties and tension
It promotes silent Action,
ensures balances and regulates
thought and emotion
Smile and silence keeps the
mind stable for Yoga
and Meditation.
Smile makes one free
from anger, fear and danger
Smile invokes truth
nonviolence love and cheer
Smile - Smile
Smile makes the life blossom
and reflects the greatness of
humanity This is the magic of
Smile in reality.



ଗଣିତ ପ୍ରତିଷ୍ଠାନ ଓ ପ୍ରୟୋଗ ଜନ୍ମ ଅନ୍ତରାଳେ

ପ୍ରଫେସର ଗୋକୁଳାନନ୍ଦ ଦାସ

Odisha Mathematical Society (OMS) ଅର୍ଥାତ ଓଡିଶା ଗଣିତ ସଂସଦର ବାର୍ଷିକ ଅଧିବେଶନରେ ଓଡିଶାରେ ଗଣିତ ପ୍ରତିଷ୍ଠାନଟିଏ ପ୍ରତିଷ୍ଠା କରିବା ନିମନ୍ତେ ପ୍ରସ୍ତାବ ଆଗତ ଓ ଗୃହିତ ହୋଇଥିଲା । କ୍ରମାଗତ ଭାବେ ଅନେକ ବାର୍ଷିକ ଅଧିବେଶନରେ ଆଲୋଚନା ପର୍ଯ୍ୟାଲୋଚନା ସତ୍ତ୍ୱେ ଏହାର ପ୍ରତିଷ୍ଠା ଦିଗରେ ଅହେତୁକ ବିଳମ୍ବ ହୋଇଚାଲିଥିଲା । କିନ୍ତୁ ଯେଉଁ ସମୟରେ ପ୍ରଫେସର ତ୍ରିବିକ୍ରମ ପତି ଗଣିତ ସଂସଦର ସଭାପତି ରୂପେ ଦାୟିତ୍ୱ ଗ୍ରହଣ କଲେ ସେହି ସମୟରେ ଜ୍ୟୋତି ବିହାର ପରିତ୍ୟାଗ କରି ବାଣୀବିହାର କ୍ୟାମ୍ପସ ସ୍ଥିତ ଏ-୩ କ୍ୱାଟରରେ ମୁଁ ଅବସ୍ଥାନ କରୁଥାଏ । ପ୍ରଫେସର ପତି ଆଲାହାବାଦରୁ ଆସି ମୋ ଏ-୩ ବାସଭବନରେ ଅବସ୍ଥାନ କରନ୍ତି । ଏହି ଅବସରରେ ପ୍ରଫେସର ଶିବ ପ୍ରସାଦ ମିଶ୍ର, ଡକ୍ଟର ପତିଙ୍କୁ ସାକ୍ଷାତ କରିବା ପାଇଁ ଆସନ୍ତି । ଆମ ତିନିଜଣଙ୍କ ମଧ୍ୟରେ ଦୀର୍ଘ ସମୟ ଧରି ଅନେକ ଆଳାପ ଆଲୋଚନା ହୁଏ, ଯାହାର ମୁଖ୍ୟ ଉଦ୍ଦେଶ୍ୟ ଓଡିଶାରେ ଗଣିତ ପ୍ରତିଷ୍ଠାନର ପ୍ରତିଷ୍ଠା । ଗଣିତ ପ୍ରତିଷ୍ଠାନର ସ୍ଥାପନା ଉଦ୍ଦେଶ୍ୟରେ ଏକ ମେମୋରାଣ୍ଡମ୍ ପ୍ରସ୍ତୁତ ହେଲା । ପ୍ରକାଶ ଥାଉ କି ମୋର ଦୁଇ ପୂଜ୍ୟ ଗୁରୁ ଏହାକୁ ପ୍ରସ୍ତୁତ କରିବାରେ ମୁଖ୍ୟ ଭୂମିକା ଗ୍ରହଣ କରିଥିଲେ, ଯେଉଁଥିରେ ମୋର ଅବଦାନ ନିମିତ୍ତ ମାତ୍ର ।

ସେହି ସମୟରେ ପ୍ରବାଦ ପୁରୁଷ ଶ୍ରୀଯୁକ୍ତ ବିଜୁ ପଟ୍ଟନାୟକ ଓଡିଶାର ମୁଖ୍ୟମନ୍ତ୍ରୀ ଓ ପ୍ୟାରିମୋହନ ମହାପାତ୍ର ତାଙ୍କର ବ୍ୟକ୍ତିଗତ ସଚିବ । ବିଜୁବାବୁଙ୍କ ନିମନ୍ତେ ଉଦ୍ଦିଷ୍ଟ ପ୍ରକୋଷ୍ଠରେ ମିଟିଂ ଅନୁଷ୍ଠିତ ହେଲା । ସେହି ମିଟିଂରେ ମୁଖ୍ୟମନ୍ତ୍ରୀଙ୍କ ସହିତ ମୁଁ, ମୋର ଦୁଇ ଗୁରୁ ଡକ୍ଟର ପତି ଓ ଡକ୍ଟର ମିଶ୍ର ତଥା ତତ୍କାଳିନ ସାଇନ୍ସ ଆଣ୍ଡ ଟେକ୍ନୋଲୋଜି ସେକ୍ରେଟାରୀ ସୁବାସ ପାଣି, ଏଜୁକେସନ ସେକ୍ରେଟାରୀ ଅଭୟ ରଥ ଉପସ୍ଥିତ ଥିଲୁ।

ଅନେକ ବିଚାର ବିମର୍ଷ ପରେ ଏହି ଗୁରୁତ୍ୱପୂର୍ଣ୍ଣ ମିଟିଂରେ ଗଣିତ ପ୍ରତିଷ୍ଠାନ ଓ ପ୍ରୟୋଗ ସ୍ଥାପନ ନିମନ୍ତେ ନିଷ୍ପତ୍ତି ଗ୍ରହଣ କରାଗଲା । ୧୯୯୮ ମସିହାରେ ଗଣିତ ସଂସଦର ବାର୍ଷିକ ଅଧିବେଶନ ବାଣୀବିହାର ଅଡିଟୋରିୟମରେ ଅନୁଷ୍ଠିତ ହୋଇଥିଲା । ପୂର୍ବ ଯୋଜନା ଅନୁଯାୟୀ ମୁଖ୍ୟମନ୍ତ୍ରୀ ଶ୍ରୀଯୁକ୍ତ ବିଜୁ ପଟ୍ଟନାୟକ ସେହି ଅଧିବେଶନକୁ ଉଦ୍‌ଘାଟନ କରି ଓଡିଶାରେ ଗଣିତ ପ୍ରତିଷ୍ଠାନର ପ୍ରତିଷ୍ଠା ହେବାର ଶୁଭ ସୂଚନା ସହିତ ଦୃଢ ପ୍ରତିଶୃତି ଦେବାର ପ୍ରସ୍ତାବ ଥିଲା ।

କିନ୍ତୁ ଗଣିତରେ ଅଗଣିତ ଶିକ୍ଷକ ଶିକ୍ଷୟତ୍ରୀ ତଥା ଛାତ୍ର-ଛାତ୍ରୀଙ୍କର ଦୁର୍ଭାଗ୍ୟ ଯେ ମ୍ୟୁନସିପାଲଟି ନିର୍ବାଚନ ହେତୁ ଶୀଯୁକ୍ତ ବିଜୁ ପଟ୍ଟନାୟକ ଆସି ପାରିଲେ ନାହିଁ । ସବୁ କଳ୍ପନା ଜଳ୍ପନା ଶୂନ୍ୟରେ ମିଳାଇ ଗଲା ବର୍ଷା ପାଣିର ବୁଦ୍‌ବୁଦ୍ ପରି । ସେହି ଅଧିବେଶନରେ ମୋର ସ୍ୱରଚିତ କବିତା “ଗଣିତ ରାଣୀ” ମୁକ୍ତିଲାଭ କରିବାର ଯୋଜନା ଥିଲା । କବିତାଟି ପ୍ରାରମ୍ଭିକ ସଂଙ୍ଗୀତରେ ରୂପ ନେଇଥିଲା କିନ୍ତୁ ପ୍ରତିଷ୍ଠାନ ପ୍ରତିଷ୍ଠାର ସୁନ୍ଦର ଅବସରଟି ଅନିଶ୍ଚିତତା ଭିତରେ ରହିଗଲା । ସୁନ୍ଦର ସୁଲଳିତ କଣ୍ଠରୁ ଝରି ପଡୁଥିଲା ‘ସଂଗୀତ ରାଣୀ ମୋ ସଂଗୀତ ରାଣୀ’ ।

ଭାବିଥିଲି ଗଣିତ ପ୍ରତିଷ୍ଠାନର ଶୁଭ ଉନ୍ମୋଚନର ପ୍ରତିଶୃତି ସହିତ ମୋ କବିତା ‘ଗଣିତ ରାଣୀ’ର ଉନ୍ମୋଚନ ହେବ କିନ୍ତୁ ବିଧିର ବିଧାନ ହୁଏତ ଅନ୍ୟପ୍ରକାର ଥିଲା । ସମସ୍ତଙ୍କର କଳ୍ପନାର ତାଜ୍‌କୁ ମୁହୂର୍ତ୍ତକରେ ଧୂଳିସାତ୍ କରିଦେଲା ବିଜୁ ବାବୁଙ୍କ ଅନୁପସ୍ଥିତି ।

୧୯୯୮ ମସିହା ଅକ୍ଟୋବର ୯ ତାରିଖ । ହଠାତ୍ ମୋତେ ଚକିତ କରି ବାଣୀବିହାର କୁଳପତି ରୂପେ ମୋର ନିଯୁକ୍ତି ପତ୍ର ରାଜ୍ୟପାଳଙ୍କ ନିକଟରୁ ମୋତେ ପ୍ରାପ୍ତ ହେଲା । ମେ’ମାସରେ ମୋର ଅବସର ପରେ ଧର୍ମବିହାର ସ୍ଥିତ ହାଉସିଂବୋର୍ଡର ଅଧାଗଢା ଘରକୁ ସାମାନ୍ୟ ଚଳିବା ପରି ସଜାଡି ଆସିବା ଅବସରରେ ରାଜ୍ୟପାଳଙ୍କ ପ୍ରଦତ୍ତ ନିଯୁକ୍ତିପତ୍ରକୁ ଏକ ଚ୍ୟାଲେଞ୍ଜ ଭାବେ ଗ୍ରହଣ କଲି । ପ୍ୟାକ୍ ହୋଇଥିବା ସମସ୍ତ ଆସବାବପତ୍ର ଧର୍ମବିହାର ପରିବର୍ତ୍ତେ ବାଣୀବିହାର ସ୍ଥିତ କୁଳପତି କୋଠିକୁ ସ୍ଥାନାନ୍ତରିତ ହେଲା ।

ଦେଶ, ବିଦେଶର ଅନେକ ଲୋଭନୀୟ ଆକର୍ଷଣର ମୋହକୁ ପରିତ୍ୟାଗ କରି ଓଡିଶାର ଅଗଣିତ ଛାତ୍ରଛାତ୍ରୀଙ୍କର ଗଣିତରେ ଶିକ୍ଷାଗତ ଉନ୍ନତି କଳ୍ପେ ଓଡିଶା ଫେରି ଆସିଥିଲି । ଶେଷକୁ ନିୟତିର ଚକ୍ରାନ୍ତରେ ମୋର ପ୍ରିୟ ଜ୍ୟୋତି ବିହାର ପରିତ୍ୟାଗ କରି ବାଣୀବିହାରରେ ଯୋଗ ଦେଲି । ଶିକ୍ଷକ ଜୀବନରୁ ଅବ୍ୟାହତି ନେଇ ନିଜସ୍ୱ ସମୟକୁ ନିଜ ଶୈଳୀରେ ଉପଯୋଗ କରି ଗଣିତ ଓ ସାହିତ୍ୟ ସାଧନାରେ ନିଜକୁ ହଜାଇ ଦେବାର ପରିକଳ୍ପନା ସମୟରେ ରାଜ୍ୟପାଳଙ୍କ ନିକଟରୁ ଆସିଥିବା ଏହି ନିଯୁକ୍ତି ପତ୍ର ମୋର ଆଗାମୀ ଜୀବନଧାରାକୁ ବଦଳାଇ ଦେଲା ।

ସେହି ସମୟରେ ଶ୍ରୀଯୁକ୍ତ ଜାନକୀବଲ୍ଲଭ ପଟ୍ଟନାୟକ ଓଡିଶାର ମୁଖ୍ୟମନ୍ତ୍ରୀ । ବିଜୁ ପଟ୍ଟନାୟକଙ୍କ ପରେ ଜାନକୀବାବୁଙ୍କ ହସ୍ତରେ ଓଡିଶାର ଭାଗ୍ୟଡୋରୀ । ସମସ୍ତଙ୍କର ଆଶା ଥିଲା ସୁସାହିତ୍ୟିକ ଜାନକୀବାବୁ ନିଶ୍ଚୟ ଗଣିତ ଅନୁଷ୍ଠାନଟିର ସ୍ଥାପନା ନିମନ୍ତେ ଯତ୍ନଶୀଳ ହୋଇ ଏହାର ଉଦ୍‌ଘାଟନ କରିବେ । କିନ୍ତୁ ହାୟ ! ତାଙ୍କର ଘୋଷଣାରେ ସମସ୍ତେ ହତ ଚକିତ । କୌଣସି କାରଣରୁ ସେ ଘୋଷଣା କଲେ ଯେ ଜନ୍ମ ପୂର୍ବରୁ ଅନୁଷ୍ଠାନଟି ସରକାରୀ ଫାଇଲ୍ ତଳେ ଚାପି ହୋଇଗଲା । ଏହି ଘଟଣାଟି ଓଡିଶା ଅଗଣିତ ଗଣୀତ ପ୍ରେମୀଙ୍କୁ ଅସହ୍ୟ ଯନ୍ତ୍ରଣା ଦେଲା । ସମସ୍ତ ବାଧାବିଘ୍ନକୁ ଅତିକ୍ରମ କରି ହୋଇଆସୁଥିବା କାର୍ଯ୍ୟଟି ଅଚାନକ ବନ୍ଦ ହୋଇଯିବ ଫଳରେ ସମସ୍ତଙ୍କ ମନରେ ନୈରାଶ୍ୟବାଦ ସୃଷ୍ଟି ହେବା ସ୍ୱାଭାବିକ । ଶିକ୍ଷାପ୍ରେମୀ ଜାନକୀବାବୁଙ୍କ ଏତାଦୃଶ ନିଷ୍ପତ୍ତିରେ ଗଣିତ ସଂସଦ ହତବାକ୍ ।

ଇଚ୍ଛାବସରରେ ଜାନକୀବାବୁଙ୍କ କାର୍ଯ୍ୟକାଳ ସମାପ୍ତ ହୋଇ ଶ୍ରୀଯୁକ୍ତ ଗିରିଧର ଗମାଙ୍ଗୋ ମୁଖ୍ୟମନ୍ତ୍ରୀ ପଦରେ ଅଧିଷ୍ଠିତ ହେବା ପରେ ପରେ ସମୟ ଅନୁକୂଳ ଅନୁଭବ କରି ଫାଇଲ୍‌ଟିକୁ ସ୍ତୂପୀକୃତ ଫାଇଲ୍‌ଗଦା ତଳୁ ଉଦ୍ଧାର କରି ମୁଖ୍ୟମନ୍ତ୍ରୀଙ୍କ ଗୋଚରାର୍ଥେ ତାଙ୍କ ଟେବୁଲ୍‌ରେ ଅବସ୍ଥାପିତ କଲେ । ୧୯୯୯ ମସିହାରେ ମୁଖ୍ୟମନ୍ତ୍ରୀ ଗଣିତ ପ୍ରତିଷ୍ଠାନର ଜନ୍ମ ସମ୍ବନ୍ଧରେ ନିର୍ଦ୍ଦେଶନାମା ଘୋଷଣା କଲେ । ମୁଖ୍ୟମନ୍ତ୍ରୀଙ୍କ ଦପ୍ତରରୁ ଉତ୍କଳ ବିଶ୍ୱବିଦ୍ୟାଳୟକୁ ଏହି ଶୁଭ ସମାଚାର ପ୍ରେରିତ ହୋଇଥିଲା ପତ୍ର ମାଧ୍ୟମରେ । ଶହ ଶହ ଶଙ୍ଖଧ୍ୱନୀ ସତେକି ଓଡିଶାର ପୁରପଲ୍ଲୀର କୋଣ ଅନୁକୋଣରେ ନିନାଦିତ । ସେ ମଧୁର ଅନୁଭବ ଅବର୍ଣ୍ଣନୀୟ । ଉତ୍କଣ୍ଠିତ ଅପେକ୍ଷାରତ ଗଣିତ ସଂସଦ ଆନନ୍ଦର ଆତିଶଯ୍ୟାରେ ମୁଖରିତ ।

ଉତ୍କଳ ବିଶ୍ୱବିଦ୍ୟାଳୟର କୌଣସି ଏକ ସମସ୍ୟାନେଇ ଚିଫ୍ ସେକ୍ରେଟାରୀ ସୁଧାଂଶୁ ମିଶ୍ରଙ୍କ ନିକଟକୁ ଯାଇଥିବା ସମୟରେ ମୋତେ ଅଭିନନ୍ଦନ ଜଣାଇ ସେ ପ୍ରଶ୍ନ କଲେ ଆପଣଙ୍କର ବହୁ ପ୍ରତିକ୍ଷିତ ସପ୍ନ ସାକାର ହେବା ପରିପ୍ରେକ୍ଷିରେ ଅଜସ୍ର ଅଭିନନ୍ଦନ । ଏବେ କୁହନ୍ତୁ ଆପଣଙ୍କର ସପ୍ନର ଗଣିତ ଅନୁଷ୍ଠାନର ଭାବୀ ନିର୍ଦ୍ଦେଶକ ଭାବେ କେଉଁ ବ୍ୟକ୍ତି ଯୋଗ୍ୟ ବିବେଚିତ ହେବେ । କାଳବିଳମ୍ବ ନକରି ତତ୍‌କ୍ଷଣାତ୍ ସ୍ୱତଃପ୍ରବୃତ୍ତ ଭାବେ ମୋ ମୁଖରୁ ବାହାରିଗଲା- ସାଧ୍ୟନ-ଡକ୍ଟର ସାଧ୍ୟନ ପଟ୍ଟନାୟକ । ବିନା ଦ୍ୱିରୁକ୍ତିରେ ସେ ଫାଇଲ୍ ଉପରେ ସାଧ୍ୟନର ନାମ ତତ୍‌କ୍ଷଣାତ୍ ଲେଖିଦେଲେ ।

ଏହି ପ୍ରସଙ୍ଗରେ ଅନେକ ସ୍ୱର ଉତ୍ତୋଳନ ହୋଇଥିଲା ଯେ ବିନା ସାକ୍ଷାତକାରରେ ନିର୍ଦ୍ଦେଶକ ନିଯୁକ୍ତି ଉଚିତ ହେଲା ନାହିଁ । ଶୁଭ ଦିନରେ ମେ' ୨୭, ୧୯୯୯ ପ୍ଲାନେଟାରିୟମ ପରିସରରେ ମୁଖ୍ୟମନ୍ତ୍ରୀ ଶ୍ରୀଯୁକ୍ତ ଗିରିଧର ଗମାଙ୍ଗୋ, ଗୃହମନ୍ତ୍ରୀ ପ୍ରସାଦ ହରିଚନ୍ଦନ, ଡକ୍ଟର ଶିବପ୍ରସାଦ ମିଶ୍ର, ଡକ୍ଟର ମଦନମୋହନ ନନ୍ଦଙ୍କ ଗହଣରେ ଆମ ଗଣିତ ସଂସଦର ଅନେକ ବ୍ୟକ୍ତିଙ୍କ ଉପସ୍ଥିତରେ ଗଣିତ ପ୍ରତିଷ୍ଠାନର ଉପଦେଷ୍ଟା ଅର୍ଥାତ୍ ଚେୟାରମ୍ୟାନ୍ ପଦବୀରେ ଅବସ୍ଥାପିତ କରାଯାଇଥିଲା

ଗଣିତ ପ୍ରତିଷ୍ଠାନ ଓ ପ୍ରୟୋଗ

ପ୍ରଥମ ଚେୟାରମ୍ୟାନ୍ ପ୍ରଫେସର ଡକ୍ଟର ତ୍ରିବିକ୍ରମ ପତି, ପ୍ରଥମ ନିର୍ଦ୍ଦେଶକ ଡକ୍ଟର ସାଧ୍ୟନ ପଟ୍ଟନାୟକ, ପ୍ରଥମ OSD ଡକ୍ଟର ଚନ୍ଦ୍ର ମହାପାତ୍ର ।

ପ୍ଲାନେଟୋରିୟମ ଉପର ମହଲାରେ ଗଣିତ ପ୍ରତିଷ୍ଠାନର ଭିତ୍ତି ସ୍ଥାପନ ।

ଏହା ପୂର୍ବରୁ ଅର୍ଥାତ ଗଣିତ ପ୍ରତିଷ୍ଠାନର ଜନ୍ମ ସମ୍ବନ୍ଧିୟ ପତ୍ର ମୋର ହସ୍ତଗତ ହେବା ମାତ୍ରେ ଆନନ୍ଦକୁ ରୋକି ନପାରି ସାଧ୍ୟନକୁ ସାଙ୍ଗେ ସାଙ୍ଗେ ଫୋନ୍ ଲଗାଇଲି । ସାଧ୍ୟନ ପରିବର୍ତ୍ତେ ସୁମିତ୍ରା ଫୋନ୍ ଧରିଲା ଓ ସାଧ୍ୟନ ଘରେ ନଥିବାର ସୂଚନା ଦେଲା । ଅତ୍ୟନ୍ତ ଅନନ୍ଦରେ ଶୁଭ ସୂଚନାଟି ସୁମିତ୍ରାକୁ ନଦେଇ ରହିପାରିଲି ନାହିଁ । କିନ୍ତୁ ଏକଥା ମଧ୍ୟ କହିଥିଲି ପ୍ରକାଶ୍ୟ ତଥା ଆନୁଷ୍ଠାନିକ ଭାବେ ଘୋଷଣା ନ ହେବା ପର୍ଯ୍ୟନ୍ତ ଏହି ସମ୍ବାଦଟି ବାହାରକୁ ଆସିବା ଅନୁଚିତ । ସୁମିତ୍ରା ମୋର ଛାତ୍ରୀ । ମୋର ଅନୁଭବକୁ ସେ ନିଶ୍ଚୟ ଭାବେ ବୁଝି ପାରିଥିବ ଏହି ବିଶ୍ୱାସ ନେଇରହିଲି । ସେହି ସମୟରେ ସାଧ୍ୟନ ସମ୍ବଲପୁର ବିଶ୍ୱବିଦ୍ୟାଳୟର ଗଣିତ ବିଭାଗରେ କାର୍ଯ୍ୟରତ ।

କୁଳପତି ଦାୟିତ୍ୱ ତୁଲାଇବା ସଙ୍ଗେ ସଙ୍ଗେ ଗଣିତ ପ୍ରତିଷ୍ଠାନ ସହିତ ମଧ୍ୟ ଖୁବ ନିବିଡ ଭାବରେ ଜଡିତ ଥିଲି । କୁଳପତି କୋଠିରେ ଥିବା ସମୟରେ କୌଣସି ଅପ୍ରାକୃତିକ ଘଟଣାକୁ କେନ୍ଦ୍ରକରି ମୋର ବ୍ୟକ୍ତିଗତ କାର୍‌ରେ ଗୁଣ୍ଡାମାନେ ଅଗ୍ନିସଂଯୋଗ କରି ଭସ୍ମିଭୂତ କରି ଦେଇଥିଲେ । ୨୦୦୧ରେ ମୋର କୁଳପତି ପଦରୁ ଅବସର । ୨୦୦୧ ଅକ୍ଟୋବର ୯ ତାରିଖରେ ଅବସରର ଦିନକ ପୂର୍ବରୁ ଅର୍ଥାତ ୮ ତାରିଖରେ ମୋର ନିଜସ୍ୱ ଆସବାବପତ୍ର ମଧ୍ୟ ଧର୍ମବିହାର ସ୍ଥିତ ଅବ୍ୟବସ୍ଥିତ ଘରକୁ ଅପସାରିତ କରି ଶାନ୍ତିରେ ନିଶ୍ୱାସ ମାରିଲି ।

୧୯୯୮ ଅକ୍ଟୋବର ୯ ତାରିଖରେ କୁଳପତି ଆସନରେ ଅଧିଷ୍ଠିତ ହେବା ପୂର୍ବରୁ ପୁରୀ ଯାଇ ଶ୍ରୀଜଗନ୍ନାଥଙ୍କୁ ଦର୍ଶନ କରି ବିଶ୍ୱବିଦ୍ୟାଳୟର ଉନ୍ନତି କଳ୍ପେ ଯାହା ମୋ'ଦ୍ୱାରା ସମ୍ଭବ ନିଶ୍ଚୟ କରିବାର କ୍ଷମତା ପ୍ରଦାନର ବରଭିକ୍ଷା କରି ଏକ ବିରାଟ ଦାୟିତ୍ୱ ଗ୍ରହଣ କରିଥିଲି ଏବଂ ଅକ୍ଟୋବର ୮ ତାରିଖରେ ମୋ ନିଜସ୍ୱ ବାସଭବନରୁ ବାଣୀବିହାର ଯାଇ ଶେଷଦିନର ଅଫିସ୍ କାର୍ଯ୍ୟ ଶେଷକରି ପୁରୀ ଯାଇ ଶ୍ରୀଜଗନ୍ନାଥଙ୍କୁ ଦର୍ଶନ କରି ଦାୟିତ୍ୱ ଅବ୍ୟାହତି ନେବାର କୃତଜ୍ଞତା ଜ୍ଞାପନ କରି ଧର୍ମବିହାର ଘରକୁ ଫେରିଲି । ଦୀର୍ଘ ତିନି ବର୍ଷର ଗୁରୁ ଦାୟିତ୍ୱ ଅନେକ ବାଦାନୁବାଦ ଓ ଯନ୍ତ୍ରଣାମୟ ପରିସ୍ଥିତି ମଧ୍ୟ ଦେଇ ନିଭାଇବାକୁ ପଡିଥିଲା । ଭୁଲ, ଠିକ୍‌ର ହିସାବ ନିକାଶ ପ୍ରଭୁ ଚକାଡୋଳଙ୍କ ଉପରେ ନ୍ୟସ୍ତ କରି ନିଶ୍ଚିନ୍ତରେ ଅବସର ଜୀବନ ବିତାଇବାର ସଂକଳ୍ପ ନେଲି ।

କିନ୍ତୁ ନିଶ୍ଚିନ୍ତ କେଉଁଠି ?

ଏହା ମଧ୍ୟରେ ଗଣିତ ପ୍ରତିଷ୍ଠାନ ପ୍ଲାନେଟୋରିୟମରୁ ଆଚାର୍ଯ୍ୟବିହାର ନିକଟସ୍ଥ ପାଣିଟାଙ୍କି ନିକଟ କ୍ୱାଟରରୁ ଶହିଦନଗର ସ୍ଥିତ ସୂର୍ଯ୍ୟକିରଣ ବିଲଡିଂ ଦେଇ ଅନ୍ଧାରୁଆର ନିଜସ୍ୱ ଗୃହାଙ୍ଗନରେ ପାଦ ଥାପିବାର ସମୟ ଆସିଗଲା । ଗାଡି ନଥିବାରୁ ଅଟୋରେ ଯାଇ ଗଣିତ ପ୍ରତିଷ୍ଠାନରେ ଗବେଷଣାରେ ବ୍ୟସ୍ତ ରହୁଥିଲି ମୋର ଗବେଷଣା ଛାତ୍ରଛାତୀଙ୍କ ସହ । ଖୁବ କଷ୍ଟରେ ଯିବା ଆସିବା କରିବାକୁ ହେଉଥିଲା । କିନ୍ତୁ ଅନୁଷ୍ଠାନର ମୋହ ସବୁ କଷ୍ଟକୁ ନିମିଷକରେ ଭୁଲାଇ ଦେଉଥିଲା ।

କାଳକ୍ରମେ ଡକ୍ଟର ବନମାଳୀ ମିଶ୍ର, ଡକ୍ଟର ପୁର୍ଣ୍ଣଚନ୍ଦ୍ର ଦାସ, ଡକ୍ଟର ମହେନ୍ଦ୍ରନାଥ ମିଶ୍ର, ଡକ୍ଟର ନରହରି ପାଢୀ ଇତ୍ୟାଦି ଅନେକ ଗଣିତ ଅଧ୍ୟାପକ ଅନୁଷ୍ଠାନ ସହ ଯୋଡି ହୋଇ ଏହାକୁ ଗରିମାମୟ କରି ତୋଳିଥିଲେ ।

ପ୍ଲାନେଟୋରିୟମରେ ସାଧ୍ୟନ ନିର୍ଦ୍ଦେଶକ ଥିବା ସମୟରେ ସମ୍ବଲପୁର ବିଶ୍ୱବିଦ୍ୟାଳୟରୁ ୨୦୦୦ ମସିହାରେ ଅବସର ନେଇଥିଲା । ସେହିସମୟରେ ଚନ୍ଦ୍ର ନିର୍ଦ୍ଦେଶକର ଦାୟିତ୍ୱ ତୁଲାଇଥିଲା । ସାଧ୍ୟନର କାର୍ଯ୍ୟକାଳ ବାରମ୍ବାର ବୃଦ୍ଧିହୋଇ ସେ ନିର୍ଦ୍ଦେଶକ ଦାୟିତ୍ୱରେ ରହିଥିଲା ନୂତନ ନିର୍ଦ୍ଦେଶକ ନିଯୁକ୍ତି ହେବା ପର୍ଯ୍ୟନ୍ତ ।

ଏହା ମଧ୍ୟରେ ଟାଟା କମ୍ପାନୀ ସହାୟତାରେ ଅନ୍ଧାରୁଆର ଗଣିତ ପ୍ରତିଷ୍ଠାନ ନିଜର ନବନିର୍ମିତ ଗୃହାଙ୍ଗନରେ ପାଦ ରଖିବା ପୂର୍ବରୁ ଡକ୍ଟର ପତିଙ୍କର ସ୍ୱର୍ଗବାସ ହୋଇ ଯାଇଥିଲା । ନବନିର୍ମିତ ବିଲିଡିଂ ଉଦ୍‌ଘାଟନ ଉତ୍ସବରେ କିନ୍ତୁ ଡକ୍ଟର ଶିବପ୍ରସାଦ ମିଶ୍ର ଯୋଗ ଦେଇଥିଲେ । ଅତ୍ୟନ୍ତ ଦୁଃଖ ତଥା ପରିତାପର ବିଷୟ ଏହି ଅନୁଷ୍ଠାନର ଶୁଭଚିନ୍ତକ ତଥା ମୁକ୍ତିଲାଭକର ନିଃସାର୍ଥପର ଯୋଦ୍ଧା ତ୍ରିବିକ୍ରମ ପତି ଜୀବିତାବସ୍ଥାରେ ମାତ୍ର ଥରଟିଏ ଏହାର ଅଗଣାରେ ପାଦ ରଖିବାର ସୁଯୋଗ ପାଇଲେ ନାହିଁ ।ଏପରିକି ଏହି ଅନୁଷ୍ଠାନଟି ଡକ୍ଟର ପତିଙ୍କ ନାମରେ ନାମିତ ହେବାର ପ୍ରସ୍ତାବଟି ମଧ୍ୟ କାଟ ଖାଇଗଲା ।

ଡକ୍ଟର ପତି ୬ବର୍ଷ କାଳ ଅନୁଷ୍ଠାନଟିର ଚେୟାରମ୍ୟାନ ଥିଲେ । ତପ୍‌ରେ ଏହି ଦାୟିତ୍ୱ ମୋ ଉପରେ ନ୍ୟସ୍ତ ହୋଇଥିଲା । ଗୋଟିଏ କିମ୍ବା ଦୁଇଟି ମିଟିଂ ପରେ ଆଉ କୌଣସି ମିଟିଂ ମୋ ଅଧକ୍ଷତାରେ ଡକାଯାଇନଥିଲା ଏବଂ ମୋତେ ଚକିତ କରି ତିନିବର୍ଷ ଅବଧି ଏହି ଦାୟିତ୍ୱ ସତ୍ତ୍ୱେ ମାତ୍ର କିଛି ସମୟ ଅନ୍ତରାଳରେ ମୋ ପରିବର୍ତ୍ତେ ପ୍ରଫେସର ରଘୁନାଥନଙ୍କୁ ନିଯୁକ୍ତି କରାଯାଇଥିଲା ।

ଅନେକ ଅହେତୁକ କାରଣରୁ ଅନୁଷ୍ଠାନରୁ ନିଜକୁ ଦୂରେଇ ନେଲି । ୨୦୦୯ରେ ଅନୁଷ୍ଠାନର ନୂତନ ନିର୍ଦ୍ଦେଶକ ରୂପେ ଡକ୍ଟର ସୁଦର୍ଶନ ପାଢୀ ନିଯୁକ୍ତି ହେଲେ ଏବଂ ସାଧିନ ଅବସର ନେଲା । ତପ୍‌ରେ ଡକ୍ଟର ଅକ୍ଷୟ ମିଶ୍ର ଏବଂ ଅଧୁନା ଡକ୍ଟର ଯଶୋବନ୍ତ ଜେନା ନିର୍ଦ୍ଦେଶକ ଦାୟିତ୍ୱରେ ଅଛନ୍ତି ।

ଦିନେ ହଠାତ୍ ସମସ୍ତଙ୍କୁ ଚକିତ କରି ଶୁଣିବାକୁ ମିଳିଲା ଯେ ଗଣିତ ପ୍ରତିଷ୍ଠାନକୁ ISI କଲିକତା ହସ୍ତରେ ଟେକି ଦେବାକୁ ମସୁଧା ଚାଲିଛି । ହୃଦୟ ମଧ୍ୟରେ ଆଗ୍ନେୟଗିରିର ବିସ୍ଫୋରଣ । ବୟସରେ ମୋର ପରମପୁଜ୍ୟ ଦୁଇଗୁରୁଙ୍କର ଅଦମ୍ୟ ପ୍ରଚେଷ୍ଟାରେ ଅବସ୍ଥାପିତ ହୋଇଥିବା ଶିଶୁ ଅନୁଷ୍ଠାନଟି ତା'ର ଯୌବନରେ ପାଦ ଦେବା ପୂର୍ବରୁ ପୋଷ୍ୟ ଅନୁଷ୍ଠାନ ରୂପେ ଅନ୍ୟ ହସ୍ତରେ ପ୍ରଦାନ କରିବାର ରୁଦ୍ଧା ରୁଦ୍ଧା ଯନ୍ତ୍ରଣାରେ ମନ ଖିନ୍‌ଭିନ୍ ହୋଇଗଲା । କେବଳ ମୋର ନୁହେଁ ସମଗ୍ର ଗଣିତ ସଂସଦର ।

ମାନସ ପଟ୍ଟରେ ଉଙ୍କି ମାରିଲା ଅତୀତର ଅନେକ ଘଟଣା । ପ୍ରଚଣ୍ଡ ଗୌଦ୍ର ତାପକୁ ଭ୍ରୁକ୍ଷେପ ନକରି ମୋ ଦୁଇଗୁରୁଙ୍କ ସହ ସେକ୍ରେଟାରିଏଟରେ ଘୂରି ବୁଲିବା ଦୃଶ୍ୟ । ଯା' ନିକଟକୁ ତା'ନିକଟ, ତା'ନିକଟରୁ ଆଉ ତାହା ନିକଟ ଦୌଡି ଦୌଡି ଆଲୋଚନା କରିକରି ଶେଷରେ ଓଡିଶାକୁ ମିଳିଥିବା ଅମୂଲ୍ୟ ସମ୍ପଦର ରକ୍ଷଣାବେକ୍ଷଣ ନକରି ପାରିବା ହେତୁ ଅନ୍ୟ ହସ୍ତରେ ସମର୍ପଣ କରିଦେବାର ଗ୍ଲାନିର ହୃଦୟ ଗୁରୁଗୁରୁ ହୋଇ ପୋଡି ଉଠୁଥିଲା । ମେ', ଜୁନ୍‌ର ମୁଣ୍ଡଫଟା ଖରାରେ ମୋତେ ସଙ୍ଗରେ ଧରି ମୋର ଦୁଇ ଗୁରୁ ସେକ୍ରେଟାରିଏଟକୁ ବାରମ୍ବାର ଦୌଡି ଏହି ଐତିହାସିକ ଅନୁଷ୍ଠାନ ଗଠନ କରିବାରେ ସଫଳ ହେବା କିଛି କମ୍ କଥା ନଥିଲା । ଏ ପ୍ରକାର ହୀନ ଚକ୍ରାନ୍ତ, ଗଣିତ ସଂସଦକୁ କ୍ଷୁବ୍ଧ କରିଦେଲା । ଏହାକୁ ସହ୍ୟ କରିନପାରି ଏହା ବିରୋଧରେ ଶତ ଶତ ଅଧ୍ୟାପକ ଅଧ୍ୟାପିକା ସ୍ୱର ଉତ୍ତୋଳନ କଲେ ।

କରୁଣାମୟ ପ୍ରଭୁ ଜଗନ୍ନାଥଙ୍କ ଅପାର କରୁଣାରୁ ଗଣିତ ପ୍ରତିଷ୍ଠାନ ନବଜୀବନ ଲାଭ କରି ଅନ୍ଧାରୁଆ ସ୍ଥିତ ତା'ନିଜସ ପରିସରରେ ସଗର୍ବେ ମଥାଟେକି ଦଣ୍ଡାୟମାନ । ଅଧୁନା ଏହାର ନିର୍ଦ୍ଦେଶକ ଡକ୍ଟର ଯଶୋବନ୍ତ ଜେନା । ପାଠ୍ୟକ୍ରମ ସହ ଅନ୍ୟାନ୍ୟ ଉପାଦେୟ କାର୍ଯ୍ୟକ୍ରମ ଯଥା : କ୍ରୀଡା, ଡ୍ରାମା, ସଂଗୀତ ଓ ବିଭିନ୍ନ ଚିତ୍ତବିନୋଦନ ମାଧ୍ୟମରେ ଶିକ୍ଷାର୍ଥୀମାନଙ୍କର ପ୍ରତିଭା ପ୍ରଦର୍ଶନର ପ୍ରଶସ୍ତ କ୍ଷେତ୍ର ସୃଷ୍ଟି କରାଯାଇଛି । ଅଧ୍ୟାପନା ନିମନ୍ତେ ଅଧ୍ୟାପକ ନିଯୁକ୍ତିକୁ ସରକାର ସମ୍ମତି ପ୍ରଦାନ କରିଛନ୍ତି । ହରାଭରା ଅନୁଷ୍ଠାନଟି ପ୍ରାନବନ୍ତ ଚଳଚଞ୍ଚଳ । ଅନ୍ଧାରୁଆର ଅନ୍ଧାର ଦୂରକରି ଓଡିଶା ତଥା ଅଗଣିତ ଓଡିଆଙ୍କର ଅସ୍ମିତା ରୂପେ ନିଜ ଗାରିମାରେ ଗୌରବମୟ ଅନୁଷ୍ଠାନଟି ସଦର୍ପେ ଦଣ୍ଡାୟମାନ ।



Memorial Talks

IMCMA@_MT1: Prof. Bama Charan Das Memorial Lecture

Smoothing Technics for the Heavy Ball Method with Applications in Machine Learning

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ABSTRACT

First-order optimization is at the heart of most training algorithms in Machine Learning. Thanks to back-propagation, neural networks have achieved considerable success over the past few years, in natural language processing, image processing, and reinforced learning. However, training complex state-of-the-art architectures remains difficult due to the highly non-smooth and non-convex nature of their loss functions. Stochastic gradient descent and it's variants have shown surprisingly good performance in many practical scenarios. But these algorithms don't do well for non-smooth or non-convex objectives. One of the main reasons is that the computation of the (sub)gradients and convergence analysis essentially rely on the sum-rule in smooth or convex settings. Unfortunately, this sum rule does not hold in general in the non-convex settings when the standard Clarke's subdifferential is used. In many deep-learning studies, the failure of the sum rule is ignored. In practice, they try to circumvent the theoretical problem by modeling their method through simple smooth or convex dynamics. This practice can create additional spurious stationary points that are not Clarke's critical points. To overcome this difficulty, we introduce an inertial second-order dynamical system, which is obtained by approximating the nonsmoothed functions by a class of smooth functions. By studying the asymptotic behavior of the algorithm generated by this dynamical system, we prove that each trajectory converges to the Clarke's critical points under some appropriate conditions on the smoothing parameters.

IMCMA@_MT2: Prof. Shankar Prasad Mishra Memorial Lecture

Applications of Hamilton-Jacobi equations in Shape from Shading

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ABSTRACT

Hamilton-Jacobi equation have wide applications in numerous fields of science such as classical mechanics and geometrical optics in physics. In this talk we emphasis upon both theoretical and numerical perspectives for the first order non-linear Hamilton-Jacobi equations especially focussing on the application in the shape from shading i.e., to recover the shape of 3-dimensional object from 2-dimensional informations.

IMCMA@_MT3: Prof. Ramnath Mohanty Memorial Lecture

Nothing Created Everything

G. Das
Ex-Vice Chancellor, Utkal University

IMCMA@_MT4: Prof. Minaketan Das Memorial Lecture

Euler's product formula and the Ramanujan sum

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ABSTRACT

We will discuss the product formula of Euler, namely,

$$\prod_{p\ s\ p}\left(\frac{1}{1-\frac{1}{p^s}}\right)=\sum_{n=1}^{\infty}\frac{1}{n^s}$$

and the mysterious claim of Ramanujan below

$$1+2+3+4+\cdots=-\frac{1}{12}.$$



Invited Talks

CMA@_IT1: Key-Note Speaker

The Mathematics behind ChatGPT

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ABSTRACT

ChatGPT and its successors build up on large language models by having a supervised fine tuning module followed by a preference optimization module. In this talk I will discuss the various types pf Math involved in the building of ChatGPT and its successors.

IMCMA@_IT2

Integral equations and allied methods for wave interaction with coastal structuressupplemented through physical model tests - an overview

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ABSTRACT

In the latter half of the 20th century, following World War II, human activities in coastal regions surged significantly due to increased tourism, residential development, and commercial projects. These activities have subjected coastal zones and waterways to heightened stress. The rapid growth in international commerce further intensified the demands placed on ports and harbors, critical infrastructures for global trade. Compounding these pressures, natural disasters such as cyclones, tsunamis, storm surges, and sea-level rise due to global warming have profoundly impacted coastal towns. The culmination of these factors has often resulted in loss of life, property damage, and the destruction of various infrastructures, including those specifically designed for coastal protection.

In this context, the interaction of surface gravity waves with floating or submerged structures plays a vital role in ensuring the sustainability of maritime activities. An additional significant aspect of these physical processes is the influence of seabed topography, which interacts dynamically with waves and structures, leading to various complex phenomena. These processes encompass reflection, trapping, scattering, shoaling, refraction, diffraction, wave breaking, Bragg reflection, wave-wave interaction, friction, and large-scale vortex shedding. Understanding these phenomena is crucial for developing resilient coastal engineering solutions.

Before the 1980s, analytical and semi-analytical methods were the primary tools for analyzingthese interactions. However, the limitations of these methods—particularly their inability toaddress intricate geometries and seabed undulations—constrained their applicability. Physical model tests, though insightful, were similarly limited due to their reliance on scaledrepresentations and high resource demands. Consequently, there was a pressing need foradvanced numerical techniques to address complex issues such as structural porosity, variable configurations, and seabed irregularities.This presentation will provide an overview of various coastal engineering activities and explore challenges associated with wave-structure interactions. We will discuss the evolution and applications

of semi-analytic and numerical techniques, including the boundary integralequation method, eigenfunction expansion method, least square approximation, variationalcalculus, matrix transfer method, and mild-slope approximation, in addressing wave-structure interaction problems. These methods have been instrumental in overcoming the limitations of earlier approaches, enabling a more comprehensive understanding of the dynamic interplay between waves, structures, and the seabed. Additionally, numerical models will be validated and supplemented with physical model test results in certain scenarios to enhance their reliability. Lastly, we will highlight ongoing research initiatives to advance the field of coastal engineering further to meet future challenges effectively.

IMCMA@_IT3

A Dirichlet problem and infinite product representation of sine function

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ABSTRACT

Euler's product formula for the complex sine function is well-known. In 2008, a new formula for the real sine function was derived from the literature as an application of solutions to a Dirichlet problem for an infinite strip. Green's function by the method of images played an important role in this, which is the main focus of this talk.

IMCMA@_IT4

Mathematical Techniques for Solving Some Problems of Water Wave Interaction with Barrier over Arbitrary Bottom Topography

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ABSTRACT

Mixed boundary value problems occur in a natural way while modelling many problems of engineering, especially in water wave mechanics. While understanding the applications of such boundary value problems is of immense value to engineers, determining their solutions by utilizing the most appropriate analytical or numerical method is a concern for applied mathematicians. In this talk, first, the eigenfunction expansion method, along with the least square method, will be discussed to solve wave interaction with thin rigid barrier ina finite depth of water. Next, the coupled eigenfunction expansion–boundary element method for wave scattering by thick vertical barrier over an arbitrary seabed will be discussed.

IMCMA@_IT5

Multiplicative dependency on higher order recurrences

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ABSTRACT

A collection of non-zero complex numbers $v_1, v_2, \dots, v_t$ are said to be multiplicative dependent if there exist integers $k_1, k_2, \dots, k_t$ not all of them are zeros, such that the following multiplicative relation holds:

$$\prod_{i=1}^{t} v_i^{k_i} = 1.$$

Otherwise, they are referred to as multiplicatively independent. A $v = (v_1, v_2, \dots, v_t)$ is called multiplicative dependent if all its coordinates are non-zero and exhibit multiplicative dependence. However, if any one of the coordinates v_i of v equals zero, the vector is considered neither multiplicatively dependent nor independent (Although it's worth noting that for a vector of the form (0, 2, 4), $0^0.2^2.4^{-1} = 1$ holds).

In recent years, researchers have explored multiplicative relations among the terms of second-order and higher-order recurrence sequences involving more than two terms. For example, Luca and Ziegler [2] examined multiplicative relations in general binary recurrence sequences. They addressed the Diophantine equation

$$\prod_{i=1}^{t}(u_{n_i})^{x_i} = 1 \qquad (0.1)$$

where xi and k are fixed, and u_{n_i} are terms from the same binary recurrent sequence. They showed that this equation has finitely many non-negative integer solutions. Ruiz and Luca [4] extended this work by allowing x_i to vary and considering u_{n_i} from different binary recurrence sequences. They proved that the equation also has finitely many effectively computable non-negative integer solutions in this case. However, equivalent results for higher-order recurrences remain largely unresolved, although similar findings have been established for certain specific sequences, such as k-generalized Fibonacci and Tribonacci sequences (See [1], [3])

In this talk, we will show that there are finitely many multiplicatively dependent vectors with coordinates drawn from non-degenerate linear recurrence sequences defined by recurrence relations of the form

$$u_n^{(i)} = \begin{cases} 0 & if\ 1-s \le n < 0 \\ 1 & if\ n = 0 \\ c_1^{(i)}u_{n-1}^{(i)} + c_2^{(i)}u_{n-2}^{(i)} + \cdots + c_s^{(i)}u_{n-s}^{(i)} & if\ n \ge 1 \end{cases} \qquad (0.2)$$

where the positive integral coefficients $c_j^{(i)}$ satisfy $c_1^{(i)} > 1 + c_2^{(i)} + \cdots c_s^{(i)}$ or $c_1^{(i)} \ge c_2^{(i)} \ge \cdots \ge c_s^{(i)}$ with $c_1^{(i)} \ge 4$ in both cases.

These conditions ensure that the characteristic polynomial.

$$x^s - c_1^{(i)}x^{s-1} - c_2^{(i)}x^{s-2} - \cdots - c_s^{(i)}$$

is a Pisot polynomial. A Pisot polynomial is defined as a polynomial with integer coefficients in which all roots, except the largest in absolute value, lie within the unit circle in the complex plane. This property is key to establishing the finiteness of multiplicatively dependent vectors in these sequences.

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IMCMA@_IT6

Sumfree sets

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ABSTRACT

Let G be an abelian group, written additively. A finite subset A of G is called sumfree if the equation x+y=z has no solutions with x,y,z in A . After recalling some preliminary results, we concentrate on finite abelian groups. A finite abelian group is said to be of type 3 if the order of the group n is not divisible by 3 and not divisible by any prime of the form 3m +2. We shall mainly concentrate on type 3 groups and explain how this leads naturally to some problems in group theory.

IMCMA@_IT7

On the Saturation Property for Multiplication of Symmetric Polynomials

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ABSTRACT

Consider symmetric polynomials in a fixed number n of variables (with real coefficients). They form a real vector space, a basis for which is most naturally parametrized by partitions with at most n parts. While there are many different bases for the space of symmetric polynomials, the one consisting of Schur polynomials is the most celebrated and interesting: let s_l denote the Schur polynomial associated to a partition l with at most n parts. Given two Schur polynomials s_l and s_l, they can be multiplied to form another symmetric polynomial which can then be written as a linear combination of Schur polynomials: $s_l\, s_m$ = sum over p of $c_{l,m,p}\, s_p$, where p runs over all partitions with at most N parts and $c_{l,m,p}$ are scalars (all but finitely many of which are zero). The coefficients $c_{l,m,p}$, which turn out to be non-negative integers, are called the Littlewood-Richardson (LR) coefficients. They have important geometric and representation theoretic interpretations. "Saturation" is the name given to a certain property of LR coefficients, which was established by Knutson-Tao. In this talk which is addressed to a general mathematical audience, we will see what saturation means.

We will also touch upon some recent research about saturation properties of certain generalized

IMCMA@_IT8

Riemann Integral Revisited

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ABSTRACT

It is well know that the Riemann integral is not adequate for Mathematical Analysis, since there are many functions that are not Riemann-integrable, and since the integrals does not possess sufficiently strong convergence theorems. To correct these deficiencies, Lebesgue developed his integral which is the integral of the present century, and his integral has become the "official "integral in mathematics, statistics and of engineering research. However, there are also difficulties with the Lebesgue integral:

There exist functions f that are differentiable at every point, but such that their derivatives f' are not Lebesgue integrable. Thus an added hypothesis is necessary to validate the formula.

$\int_a^b f' = f(b) - f(a)$ (1)

As one consequences, theorems justifying the substitution formula

$$\int_{\phi(a)}^{\phi(b)} f = \int_a^b (f o \phi)\, \phi'$$

become unnecessarily complicated.

Some improper integrals, such as the important Dirichlet integral $\int_0^\infty \frac{\sin x}{x}\, dx$ do not exist as Lebesgue integrals (since $|x^{-1} \sin x|$ is not Lebesgue integrable).

A considerable amount of measure theory is needed before the Lebesgue integral can be defined.

Is it time now to replace/discard the Lebesgue integrals of the prime integral? We should replace it with a general form of the Riemann integral that-surprisingly enough is more general than the Lebesgue integral and corrects the above difficulties. This generalization was discovered by Jaroslav Kurzweiland and Ralph Henstock [4] around 1960, but some reason it has not become well known. The Henstock-Kurzweil integral was introduced in 1957-1962 by Ralph Henstock [4] and independently by Jarslav Kurzweil. The H-K integral encompasses the integrals of Newton, Riemann -Lebesgue as well as its improper integrals.

Also known as the generalized Riemann Integral or the complete Riemann Integral, the H-K integral has good convergence and functional analytic properties. More over, its definition can be easily extended to functions defined on unbounded intervals and Banach-space valued. The main feature of the non-absolute H-K integral is the fact that functions with not only many discontinuities, but also highly oscillating can be integrable in Henstiock-Kurzweil sense. For example, the function f defined on [0, 1] given by $f(t) = F'(t)$, where

$F(t) = t^2 \sin\left(\frac{1}{t^2}\right)$ on (0,1]

= 0

is H-K integrable (but not Lebesgue nor Riemann integrable).

H-K definition is "Riemann-like" but its power is a "Super-Lebesgue". It is our view that we should not try to teach proofs to beginning calculus students, but that we should equip

them with theorems to apply. Somewhat later, serious undergraduate students should be expected to understand appropriate proofs. We believe that most our undergraduate are not ready to study the Lebesgue integral, but that they are capable of mastering (somewhat stripped-down) version of the generalized Riemann integral.

IMCMA@_IT9

Reducing impact of Weather and Climate Extremes -Role of new observing systems, HPC, Numerical Weather Prediction (NWP), AI/ML and Big data in Multi-Hazard Early Warning System

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ABSTRACT

Under the global warming and climate change Scenarios, extreme weather and climate related hazards are new normal across the globe and India has been facing similar trend. Due to its high population combined with unique socio-economic infrastructures and geo-physical settings, the country is under constant threat to almost all types of severe Weather and Climate related disasters round the year. India with a very long coastline, tropical cyclone (TC) remains as top one in the order, in terms of both severity and multiple types of associated hazards. Main reasons behind are very high socio-economic vulnerability of coastal region and shallow bathymetry. In Summer, most parts of India remained highly vulnerable for heat related hazard. Localized severe thunderstorms and their associated hazards like lightnings, squally winds, heavy rains are also breaking records with their severity, cloud to ground lightning becoming more fatal and frequent, due to which it has been impacting severely across most parts especially eastern India covering Odisha.
National meteorological Services have been focusing on improving the observational capability since very older period from 1850s. During early years, they were mainly using statistical, pattern and synoptic based checklist and methodology. But with invention of computer and development of numerical methodology, researchers made the first successful NWP with barotropic potential vorticity equations (Lewis Fry Richardson, 2007). With the advancements in both computer power and technology, over the last 60 years, there has been continuous improvement in NWP. Also, observational capability increased exponentially with development of new cost effective sensors, platforms and development in the satellite and radar based technology. To analyse these data and to run this sophisticated NWP models, procurement and operationalization of high end High performance computing(HPC) upto 10-30 PTF, by major countries remain key focus for improving weather and climate services. Today, with availability high resolution data of all atmospheric parameters using Satellite, radar, Aircraft, AWS, ARG, UA Sounding etc and their assimilation using state of art HPC, Currently NWP models are capable to provide guidance of severe weather upto 4 weeks lead time with intensity and areas of likely at 5-7 days in advance. With AI/ML and availability of Big data from these sources, AI/ML based techniques are the new attempts to fill the gap. Due to such progress, in recent 2020s, on one side, AI/ML techniques have been trained on NWP girded longer period historical pressure, wind, temp, Humidity, clouds, and precipitation data and then producing forecast

upto 10 days in sufficient granularly. GraphCast is a weather forecasting system based on machine learning and Graph Neural Networks (GNNs), which are a particularly useful architecture for processing spatially structured data. GraphCast makes forecasts at the high resolution of 0.25 degrees longitude/latitude (28km x 28km at the equator). However, all these data and products create a big data and are available at different platforms/web-based systems making task of a Service provider further complex due to limitation of human visualization and considering such large data to reach in to any meaningful inference especially to provide location and intensity based guidance and warnings of various severe weather events with timing and intensity of occurrences. Currently, attempts are made for hazard and impacts modelling to provide Impact based forecast and Risk based warnings to various seers for various Sectorial application. In the present study, each component of early warning systems and decision making process have been discussed. Recently, IMD has developed in-house WEB-based GIS Forecasting work stations supported with state of art DSS having provisions to analyze and visualize all real time META BIG data available from all sources e.g. Surface, Upper air, remote sensing like RADAR, Satellite etc and also can be overlaid with various NWP model products and Historical data, exposure layer, past vulnerability of various weather hazards and imapcts upto district and city levels, their risk matrix at same spatial scale, which a forecaster can visualize and analysed for easy interpretation before issuing appropriate Weather advisories and weather warnings supported with various colour coded(Green, yellow, orange, red) impact based warnings and suggested actions.

IMCMA@_IT10

L-structure least squares solutions of generalized reduced biquaternion matrix equations and their applications in inverse eigenvalue problems

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ABSTRACT

This talk presents a framework for computing the structure-constrained least squares solutions to the generalized reduced biquaternion matrix equations (*RBMEs*). The investigation focuses on three matrix equations: a linear matrix equation with multiple unknown L-structures, a linear matrix equation with one unknown L-structure, and the general coupled linear matrix equations with one unknown L-structure. Our approach leverages the complex representation of reduced biquaternion matrices. To showcase the versatility of the developed framework, we utilize it to find structure-constrained solutions for complex and real matrix equations, broadening its applicability to various inverse problems. Specifically, we explore its utility in addressing partially described inverse eigenvalue problems (*PDIEPs*) and generalized *PDIEPs*. Our study concludes with numerical examples

IMCMA@_IT11

Lyapunov-type inequalities for fractional differential equations

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ABSTRACT

Over more than a century, numerous Lyapunov-type inequalities have been derived, taking into account their applications in various areas, such as eigenvalue problems, stability theory, oscillation theory, and the estimation of intervals of disconjugacy. The paper by Lyapunov in 1907 is considered the first work in this direction. Significant advancements and further generalizations of Lyapunov inequalities have been obtained in recent decades, especially with the development of fractional differential equations. In this talk, I will present two recent results on fractional differential equations. The first result pertains to a fractional differential equation involving the Caputo derivative and Riemann–Stieltjes integral boundary conditions. We have divided the Greens function of this problem into two parts and their upper bounds are obtained separately in order to obtain our results. The classical celebrated result of Lyapunov has become a consequence of our result. In the second result, we establish three distinct Lyapunov-type inequalities for a higher-order Caputo fractional differential equation under identical boundary conditions. This marks the first instance of such an approach in the literature. Our findings significantly extend and complement certain existing results, offering a broader perspective on this topic.

IMCMA@_IT12

Wavelet-Based Physics-Informed Neural Networks

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ABSTRACT

Physics-informed neural networks (PINNs) are a class of deep learning models that utilize physics in the form of differential equations to address complex problems, including ones that may involve limited data availability. However, tackling solutions of differential equations with rapid oscillations, steep gradients, or singular behaviour becomes challenging for PINNs. Considering these challenges, we discuss an efficient wavelet-based PINNs (W-PINNs) model to address such a class of differential equations. Here, we represent the solution in wavelet space using a family of compactly supported wavelets. Our design architecture allows the training process to search for a solution within wavelet space, making the process faster and more accurate. The proposed model significantly improves with traditional PINNs and recently developed wavelet-based PINNs. The efficiency and accuracy of the proposed neural network model are demonstrated in various 1D and 2D test problems.

IMCMA@_IT12

ROOTS OF UNITY AND APPLICATIONS

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ABSTRACT

The roots of Unity may be considered as the collection of uniformly distributed points on the circumference of a unit circle. These points form a cyclic group. Arranging these points and their powers appropriately leads to the Fourier Transform or Fourier Analysis. The Fourier Transform is used in many applications such as mobile communication, noise removal, creating artificial sounds, finding the distance of an object, compression, etc. Fourier analysis uses the complex exponential functions $\{e^{ikx}\}, k = 0, \pm 1, \pm 2, \ldots$ Taking only real parts of these exponentials is called Discrete Cosine Transform, which is the basis for jpg or jpeg. Another important application of roots of Unity is develop primitive polynomials, which are generally called cyclotomic polynomials. These polynomials are an integral part of every digital device that is primarily used for storing the data in ordkker to detect the errors. This talk will be regarding the applications of roots of Unity.

IMCMA@_IT14

Eigenpair computation of Large Matrices

Arindama Singh
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ABSTRACT

We consider many problems tackled in data science that lead to extracting relevant information from given data. It is observed that the relevant and dominant information contained in data requires computation of singular values, singular vectors, and eigenvalues and eigenvectors of associated matrices. We discuss modern numerical methods to compute eigenvalues and eigenvectors of large matrices.

IMCMA@_IT15

High Resolution Compact Approximation for NS Equations of Motion in terms of Velocity-Stream Function Interpretation

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ABSTRACT

We will discuss fourth-order compact numerical approximations for the solution of biharmonic equations with nonlinear third derivative terms subject to the boundary

conditions of first kind. The proposed technique will then be exercised to solve Navier-Stokes (NS) equations of motion in terms of velocity-stream function formulation and the lid-driven square cavity problem. We will also discuss compact numerical approximations for the estimates of vorticity function. Numerical results will be presented to demonstrate the usefulness of the suggested numerical methods.

IMCMA@_IT16

Application of Computational Mathematics in Sciences

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ABSTRACT

In this talk I will present the application of computational mathematics in sciences in general and particularly in biomedical engineering and remote sensing in. The application of computational mathematics is widely visible from the historical times. During World War II, it was computational mathematical analysis that was conducted in Bletchley Park, England which helped in winning the war by the British. My recent visit to Bletchley Park opened my eyes to the sophistication in mathematical thinking and mathematical computing intelligence that were applied to understand the movements and psychology of the enemy and thus win the war against them. I have worked in the fields of biomedical engineering and remote sensing and have directly observed the application of computational mathematics in our daily lives. In biomedical engineering, mathematical modeling is used to understand the mechanics and dynamics that are integral parts of human activity and physical wellbeing. Equations were formulated and computational methods were applied to get the desired output. I will give one such example of application in microcirculation, where blood can be described as a Non-Newtonian fluid. The constitutive equation of blood is solved with the continuity equation, momentum equation, and the energy equation for the better understanding of the mechanism of red blood cell aggregation effects on oxygen transfer.

The second topic I will discuss is the application of mathematical modeling in remote sensing and algorithm integration for Joint Polar Satellite Systems (JPSS). JPSS is a joint project between NASA and NOAA to gather global measurements of atmospheric, terrestrial and oceanic conditions. This is achieved through algorithms for both Sensor Data Records (SDR) and Environmental Data Records (EDR). I will present the activities on testing, troubleshooting and integrating changes to SDR and EDR algorithms using Algorithm Development Library (ADL). The work starts with thinking logically, writing equations, verifying the relationship of dependent and independent factors with small experiments and finally applying computational programming methods for large scale computation and observe its application. Weather prediction is one such field in which the application of computational mathematics is huge.

IMCMA@_IT17

Generalized Drazin combined with inner inverse

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ABSTRACT

We introduces new classes of generalized inverse for square matrices named GD1, GD2 inverse, and the respective duals, called 1GD and 2GD inverse. In addition, we discuss a few characterizations and representations of these inverses. The explicit expression of these inverses have been established via core-nilpotent decomposition. Further, we introduce a binary relation for GD1 inverse and GD1 inverse along with a few properties derived.



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ABSTRACTS

IMCMA@_PP1

EXPECTED NUMBER OF ROOTS OF RANDOM ORTHOGONAL POLYNOMIALS

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ABSTRACT

This paper provides number of zeros of a class of orthogonal polynomial which is a sequence of mutually independent, normally distributed random variables with mean zero and variance unity then the average number of zeros of the random orthogonal polynomial is asymptotic to $\sqrt{n/3}$.

IMCMA@_PP2

Study of Two-Phase Flow

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ABSTRACT

AIM- The chapter presents the momentum boundary layer two phase flow and heat transfer of incompressible fluid with special attention to electrification of particles over stretching sheets.

Expected Hypothesis: The effect of various parameters such as the Prandtl number, Eckert Number, Grashoff number, variable viscosity parameter, heat generation/absorption parameter and volume fraction on velocity and temperature profiles are to be considered.

Methodology/Approach- Governing partial differential equations (PDEs)of both phases to be generated, then Similarity transformations are used to reduce the PDEs to a set of non-linear ordinary differential equations. The shooting technique is to be implemented to convert the boundary value problem into an initial value problem. Runge-Kutta 4th order method will be used to solve the problem.

Expected Discussion: The numerical outcomes are to be observed. Graphical representation of the output to be illustrated in tables and graphs. Also, the Nusselt and skin friction coefficient are to be computed.

Practical implications-Flows due to a continuously moving surface are encountered in various engineering applications viz: the polymer processing unit of a chemical engineering plant, annealing of copper wires, glass fibre and drawing of plastic films. The heat transfer characteristics is important in the application of industrial processes involved with high temperature regimes.

Social implications-These areas have potential contributions in the industrial sector, which plays an important role towards the progress of the society. Its good knowledge will help to design pertinent equipment.

Novelty- The study involves the electrification of particle-particle interactions that is different from the investigation by other researchers so far. Thus, the investigation done in this paper is original and new in the area of inclined stretching sheet problems.

Keywords-Heat-Mass Transfer, shooting technique, Stretching sheet, electrification of particles, boundary layer. Skin Friction, Nusselt number.

IMCMA@_PP3

Splicing On One Dimensional Cellular Automata

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ABSTRACT

This study highlights the innovative use of splicing-inspired techniques in one-dimensional elementary cellular automata (CAs). Splicing, originally a genetic algorithm crossover operator, adapts methods from DNA splicing to form piecewise linear CAs. By concatenating rule slices determined by the state of the center cell, spliced rules emulate the biological process of recombination, creating enhanced cyclic spaces for classification.
It delves into the mechanics of splicing, which organizes next-state tables into state-specific blocks and merges them, analogous to genetic splicing. The study demonstrates that splicing preserves critical distributional properties of linear rules, such as symmetry and compactness, while progressively reducing the maximum distance to target rules. This approach shows potential for constructing effective nonlinear approximations, offering a promising tool for refining genetic search processes in CA rule space. We have studied the concept of splicing of 1-D 2 states CA rule,generalized the concept and studied the algebra over the space of spliced rule.

IMCMA@_PP4

HOW MANY NUMBER OF LEVEL CROSSINGS OF A RANDOM ALGEBRAIC POLYNOMIAL

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ABSTRACT

The number of level crossings of a random algebraic polynomial with real coefficients is obtained. It is supposed that the coefficients are in dependent random variables identically distributed with expectation value zero, the variance and the third absolute moment being finite and non-zero.

IMCMA@_PP5

PERMUTATIONS,COMBINATIONS & PROBABILITY

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ABSTRACT

This paper studies the concepts of permutations, combinations, and probability, which are important tools in mathematics and everyday problem-solving. Permutations focus on arranging items in different orders, while combinations deal with selecting items without considering the order. These ideas help solve many real-world problems, like planning tasks or organizing data.

Probability connects with these concepts to measure the chances of events happening. The paper explains topics like conditional probability, Bayes' theorem, Total Probability and different ways to calculate probabilities. Examples and case studies show how these ideas are used in fields like data science, finance, and game design.

Finally, the paper explores new ways to solve problems faster and suggests how these concepts can be applied to areas like artificial intelligence and quantum computing in the future.

IMCMA@_PP6

NEW SOLUTION GENERATING ALGORITHM FOR ISOTROPIC STATIC EINSTEIN-GAUSS-BONNET METRICS

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ABSTRACT

The static isotropic gravitational eld equation, governing the geometry and dynamics of stellar structure, is considered in Einstein-Gauss-Bonnet (EGB) gravity. This is a nonlinear Abelian differential equation which generalizes the simpler general relativistic pressure isotropy condition. A gravitational potential decomposition is postulated in order to generate new exact solutions from known solutions. The conditions for a successful integration are examined. Remarkably we generate a new exact solution to the Abelian equation from the well known Schwarzschild interior seed metric. The metric potentials are given in terms of elementary functions. A physical analysis of the model is performed in five and six spacetime dimensions. It is shown that the six-dimensional case is physically more reasonable and is consistent with the conditions restricting the physics of realistic stars.

IMCMA@_PP7

DYNAMICAL ANALYSIS OF AN INTERACTING TWO-FLUID MODEL IN PARTICLE CREATION MECHANISM

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ABSTRACT

The present work studies an interacting two-fluid cosmological model in the context of particle creation mechanism. A spatially flat Friedmann-Lemaitre-RobertsonWalker (FLRW) metric is taken for the background universe. Here, the universe is taken to be an open thermodynamical model where the particle is created irreversibly and consequently, the creation pressure comes into the energy-momentum tensor of the material content. The particle creation rate is assumed to have a linear relationship with the Hubble parameter. The created particle is considered to be pressureless dark matter.
First, we shall study a single fluid model and find no phase transition in the cosmic phase.
Next, we shall investigate a two-fluid cosmological model with the help of dynamical systems analysis where the second fluid is taken as a perfect fluid with non-linear equation of state parameter. The dynamical study indicates that there will exist late-time attractor but, the model could not provide a complete cosmic scenario. Finally, an interacting Umami chaplygin gas is studied in the context of particle creation. From the dynamical analysis, we obtain a sequence of critical points that achieves a unified cosmic evolution of the universe starting from early inflation (represented by source point), which is followed by a decelerated intermediate phase (described by saddle solution), and finally goes through the late-time dark energy dominated universe (represented by stable point). Finally, a non-singular bouncing behavior of the universe is also investigated for this model numerically.

IMCMA@_PP8

DEVELOPING A MATHEMATICAL FRAMEWORK FOR MODELING AND ANALYZING ADVANCED PERSISTENT THREATS (APTS) USING GRAPH THEORY

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ABSTRACT

Advanced Persistent Threats (APTs) are sophisticated cyber-attacks that evade detection and persist in a network for an extended period. Existing methods for modelling and analysing APTs are limited, and a more comprehensive and mathematical approach is needed. This research aims to develop a mathematical framework using graph theory to model and analyse APTs. The framework will represent APTs as graphs, where nodes and edges represent entities and relationships. Graph theory concepts, such as node centrality, community detection, and shortest paths, will be applied to analyse the APT graph. The framework will enable the identification of key entities, detection of anomalies, and prediction future attacks. The research will contribute to developing more effective APT detection and mitigation strategies.

IMCMA@_PP9

SPINOR ALGEBRA OF K-BALANCING AND K-LUCAS-BALANCING NUMBERS

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ABSTRACT

In this article, we introduce and study a spinor algebra of k-balancing numbers referred to as the k-balancing and k-Lucas-balancing spinors. First, we give k-balancing quaternions and their some algebraic properties. Then we introduce a spinor family of k-balancing numbers by defining a linear and injective correspondence between k-balancing and k-Lucasbalancing quaternions to spinors. Here, we give various algebraic properties of this spinor such as the Binet form, Catalans identity, docagne identity, generating and exponential generating functions, etc. Moreover, we obtain various partial sum formulae for these sequences in closed form and also give matrix representations.

IMCMA@_PP10

INCLUSION PROPERTIES OF P-VALENT FUNCTION ASSOCIATED WITH PASCAL DISTRIBUTION FUNCTION USING SUBORDINATION

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ABSTRACT

In this work, by means of convolution we define a differential operator on an open unit disk $\Delta := \{z \in C : |z| < 1\}$ by making use of Pascal distribution function. This operator is adopted to introduce new subclasses of p-valent functions through the principle of differential subordination. We investigate some interesting inclusion properties of the defined class.

IMCMA@_PP11

Dynamics of epidemic in space and time: analysis of SIR model through MATLAB

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ABSTRACT

This research employs a MATLAB-based Space-Time SIR Model to provide a comprehensive framework for understanding the intricacies of infectious disease dynamics. By exploring the interplay between geographic spread and the progression of epidemics over time, this study sheds light on the critical roles of transmission and recovery rates, as well as spatial dispersion patterns. Utilizing visualizations and in-depth parameter analysis, this investigation reveals the complex pathways of disease transmission and highlights the significant impact of various factors on epidemic progression

Furthermore, this study introduces a groundbreaking treatment-based compartmental model, which provides a more detailed understanding of disease management by categorizing the population into distinct treatment stages. This innovative approach yields a more refined perspective on disease control strategies. By combining Space-Time analysis with treatment phase considerations, this research offers a vital tool for healthcare decision-makers.

This study has several ambitious goals, including the development of a sophisticated compartmental model to predict the spread of infectious diseases, as well as the design of effective quarantine and isolation protocols. Additionally, the research aims to identify strategies to boost immunity and prepare for sudden outbreaks. Utilizing advanced modeling and simulation techniques in MATLAB, this study provides a comprehensive framework for proactive measures and intervention strategies.

IMCMA@_PP12

Medical Imaging and AI- Future of Medical World

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ABSTRACT

Medical imaging plays a pivotal role in healthcare, enabling the visualization of internal body structures for diagnosis, treatment planning, and disease monitoring. Modalities like X-ray, CT, MRI, PET, and ultrasound generate vast amounts of data, which can be challenging for clinicians to interpret efficiently. Artificial Intelligence (AI), particularly machine learning and deep learning, has emerged as a transformative tool to enhance medical imaging processes. AI algorithms can automate image classification, anomaly detection, segmentation, and disease localization with remarkable accuracy.

Convolutional Neural Networks (CNNs) are widely used for detecting abnormalities such as tumours, fractures, or lesions, while models like U-Net excel in pixel-level segmentation. AI-powered tools reduce radiologists' workload by prioritizing critical cases, improving diagnostic speed, and providing quantitative insights through radiomics. Additionally, AI enables noise reduction, super-resolution imaging, and reconstruction of high-quality images from low-dose data, enhancing both safety and efficiency. By integrating imaging data with clinical information, AI supports personalized medicine and predictive analysis, improving patient outcomes. Challenges remain, including data privacy, model explainability, and regulatory hurdles. However, the synergy of medical imaging and AI holds immense potential to revolutionize healthcare by enabling faster, accurate, and cost-effective diagnostics.

IMCMA@_PP13

Finer Domain Discretization for the Heat Transfer Analysis of Falkner Skan Flows Using the Discrete Green's Function Method

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ABSTRACT

The momentum and thermal boundary layers are described by a set of coupled nonlinear partial differential equations (PDEs). Through the application of similarity solutions, these equations are transformed into a system of coupled ordinary differential equations (ODEs), which are highly nonlinear in nature. To solve these equations numerically, we employ a decomposition method that reduces them into a system of linear ODEs. This framework is applied across Falkner-Skan flow temperature profiles to construct heat transfer models over discretized elements and to generate the Discrete Green Function (DGF) matrix.
The thermal boundary layer behavior is analyzed under two distinct boundary conditions, with diagonal elements of the DGF matrix derived using the thermal temperature equation coupled with similarity solutions. The numerical approach adopted for computing the heat transfer vector leverages the DGF methodology, popularized by John Eaton, to enhance predictive accuracy for conjugate heat transfer systems. Our work extends this framework by determining the non-dimensional G matrix for a discretized domain with up to five elements, offering insights into laminar boundary layer dynamics and heat transfer phenomena.

IMCMA@_PP14

A study on the convergence and stability analysis of the numerical solution of Stochastic Differential Equation.

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ABSTRACT

A Stochastic Differential Equation (SDE) is a differential equation in which one or more of the terms is a stochastic process, resulting in a solution which is also a stochastic process. Typically, SDEs contain a variable that represents random white noise calculated as the derivative of Brownian motion or the Wiener process. Like ordinary differential equation, it is not always possible to find the analytical solution for an SDE. Therefore, to study the random behaviour of the solution, numerical methods like Euler-Maruyuma and Milstein numerical method are used. The stochastic differential equation represents the physical phenomena with random diffusion effects. The accuracy of the solution using above two numerical method over a finite time range [0, T] is studied using the concept of convergence. Also, the long-term behaviour of the solution when the time is very large ($T \to \infty$), is studied using the stability analysis and the region of stabilities are represented in the form of graphs.

IMCMA@_PP15

Compactness of sequence spaces via difference operators

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ABSTRACT

In the present work, we discuss certain measure of non-compactness over various sequence spaces. Further, we study Schauder basis for difference sequence spaces. As an application, we characterize certain compact matrix operators over generalized difference sequence spaces via Hausdorff measure of non-compactness.

IMCMA@_PP16

A new Laguerre wavelet-based method for solving Fredholm integral equation with weakly singular logarithmic kernel

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ABSTRACT

A wavelet-based collocation scheme has been introduced for solving the linear and nonlinear Fredholm integral equations as well as the system of linear Fredholm integral equations with weakly singular logarithmic kernel. The proposed linear and nonlinear Fredholm integral equations reduce to systems of linear and nonlinear algebraic equations by utilizing the functions, approximated with respect to the Laguerre wavelets. Furthermore, the error estimation and the convergence analysis of the presented method have been discussed. Moreover, the numerical results of the several experiments have also been presented in both graphical and tabular form to describe the accuracy and efficiency of the approached method, and also, to determine the validity of the presented scheme, the approximate solutions and absolute error values are compared with the results obtained by other existing approaches.

IMCMA@_PP17

Restriction theorem for the Fourier-Dunkl transform and its applications to Strichartz inequalities

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ABSTRACT

We define the Fourier-Dunkl transform, which generalizes the Fourier transform. We study the following Strichartz's restriction problem: For a given surface S embadded in $R^n \times R^d$ with $n + d \geq 2$, for what values of $1 \leq p < 2$, do we have

$$\left(\int_S |\widehat{f}(\xi,\zeta)|^2 h_\kappa^2(\xi) d\sigma(\xi,\zeta)\right)^{\frac{1}{2}} \leq C\|f\|_{L^p_\kappa(\mathbb{R}^d\times\mathbb{R}^n)},$$

where f_b is the Fourier-Dunkl transform of f. In particular, we prove Strichartz's restriction theorem for the Fourier-Dunkl transform for certain surfaces, namely, cone, paraboloid, sphere, and hyperboloid and its generalisation to the family of orthonormal functions. Finally, as an application of these restriction theorems, we establish versions of Strichartz estimates for orthonormal families of initial data associated with Schrodinger propagator, wave propagator and Klein-Gordon propagator for the case of the Dunkl Lapla-¨ cian. This restriction theorem generalizes the Stein-Tomas and Strichartz's restrictions theorems in the special cases.

IMCMA@_PP18

On the theory of approximations on netrosophic soft rough lattice

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ABSTRACT

Classical mathematical methods are not always effective for solving complex problems in economics, engineering, environmental science, and social science due to the presence of various uncertainties in these fields. While Probability theory, Fuzzy set theory, Rough set theory and other mathematical frameworks are widely recognized and frequently applied to handle uncertainty. Rough set theory is a sophisticated and progressive theory was developed by Professor Z. Pawlak in 1982 to address imprecise, ambiguity, and vague problems in both academic and real-world contexts. In 1999, soft set theory was introduced by Molodtsov as a mathematical tool for dealing with uncertainty. A new mathematical model named neutrosophic set is due to F. Smarandache(1999). It is the study about the origin, nature and scope of neutralities as well as their interactions with different additional spectra. Neutrosophic sets have a significant role for clustering, segmentation and classification in numerous medical image processing applications. The lattice structure appeared in the middle of 19th century in the form of Boolean algebra due to George Boole in 1854. Boolean algebra deals with operations on logical values and binary variables 0 and 1. In 1930s the general development of lattice theory was due to G. Birkhoff.

The purpose of the article is to expand the scope of rough set, soft set, neutrosophic set and lattice theory to address the far more complex problems arising in day-to-day life by introducing broadly soft rough lattice and neutrosophic lattice in a new form. Further, the concept of neutrosophic soft rough lattice is introduced establishing some real life examples to verify the properties of neutrosophic soft rough lattice.

IMCMA@_PP19

Linear Algebra in Quantum State Representation and Quantum Gates

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ABSTRACT

Quantum computing represents a significant shift in the landscape of computation, leveraging the principles of quantum mechanics to perform tasks that would be infeasible for classical computers. Central to this emerging field is linear algebra, which provides the foundation for describing quantum states, quantum gates, and their transformations. Quantum states are represented as vectors in a complex Hilbert space, while quantum gates are modelled as unitary matrices that operate on these state vectors. These mathematical concepts not only offer the theoretical framework for quantum computing but also underpin key quantum algorithms such as Grover's algorithm for unsorted database search and Shor's algorithm for integer factorization. The goal of this research is to explore the role of linear algebra in quantum computing, focusing on how it helps describe the behaviour of quantum systems. By understanding how quantum gates manipulate quantum states and analysing the mathematical principles behind algorithms like Grover's and Shor's, this paper aims to bridge the gap between theoretical linear algebra and practical quantum computing applications. Through simulations and analysis, we will demonstrate how these principles translate into real-world quantum computational problems.

IMCMA@_PP20

Tikhonov Regularization for the Inverse Hemivariational Inequalities

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ABSTRACT

We propose the study of **inverse variational-hemivariational inequality problems (IVHIP)** and its Tikhonov regularization theory. Our work establishes existence results for both the IVHIP and its regularized formulations. Additionally, we explore key properties of the regularized solution set, including no emptiness, boundedness, and asymptotic behaviour. Furthermore, our analysis extends to proving existence results for regularized solutions under unbounded constraints, utilizing coercivity conditions.

IMCMA@_PP21

Exploring Anisotropic Compact Stars in Barber's Second Self-Creation Theory

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ABSTRACT

In this paper, we construct static anisotropic compact star models based on Einstein field equations using Baber's second self-creation theory with the embedding class one approach. We consider a specific form of the metric function ν to solve the Einstein field equations for anisotropic matter distributions. The anisotropic models provide a representation of realistic compact objects such as SAX J1808.4-3658 (SS1), Her X-1, Vela X-12, PSR J1614-2230, and Cen X-3. We discuss our results in detail for the compact star Her X-1 on the ground of physical properties such as pressure, density, velocity of sound, energy conditions, the Tolman Oppenheimer-Volkoff (TOV) equation, and redshift. Additionally, we examine the stability of the models and compare their characteristics, including central density, central pressure, compactness, and surface redshift, with observational data of realistic compact objects. This work highlights the influence of Barber's second self-creation theory on the modelling of compact stars and its potential to provide deeper insights into their physical behaviour and structural properties.

IMCMA@_PP22

ABSTRACT ON STOCHASTIC PROCESSES AND ITS APPLICATIONS

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ABSTRACT

This paper explores the concept of stochastic processes, with a focus on Markov chains and their application in the PageRank algorithm. A stochastic process is a collection of random variables indexed at time or space, used to model systems that evolve unpredictably over time. The Stochastic processes are fundamental in fields such as finance, physics and biology, where systems are subject to random influences. Markov chains are a specific type of stochastic process in which the future state of the system depends solely on its present state, adhering to the memoryless property. This property makes Markov chains particularly useful in modelling systems such as queues, decision-making processes, and genetic evolution. The PageRank algorithm developed by Google, is an application of Markov chains in the realm of web search. It assigns a rank to each webpage based on its link structure, where the probability of reaching a page through random web surfing is used to determine its importance. This algorithm efficiently leverages the transition matrix of a Markov chain to compute rankings, demonstrating the power of stochastic processes in practical, real-world applications. The connection between these topics illustrates the widespread utility of probabilistic models in solving complex problems across various domains. Here in this paper the PageRank algorithm is implemented using Python.

IMCMA@_PP23

Generalized Drazin combined with inner inverse

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ABSTRACT

We introduces new classes of generalized inverse for square matrices named GD1, GD2 inverse, and the respective duals, called 1GD and 2GD inverse. In addition, we discuss a few characterizations and representations of these inverses. The explicit expression of these inverses has been established via core-nilpotent decomposition. Further, we introduce a binary relation for GD1 inverse and GD1 inverse along with a few properties derived.

IMCMA@_PP24

Sharp coefficient estimates for certain subclass of univalent functions related to four leaf shaped domain

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ABSTRACT

In the propose work, we introduce a subclass of univalent functions associated with subordination to a four-leaf function. We examine several key properties of this class, including sharp bounds for initial coefficients and the behaviour of various functionals, such as the Fekete-Szeg¨o functional. We also explore the determinants of interest Hankel, Toeplitz, and Vandermonde determinants within the context of this function class, focusing on coefficients modulo differences. These results provide new insights into the geometric function theory and advance our understanding of the structural properties of analytic univalent functions.

IMCMA@_PP25

LEHMER PROPERTY FOR SOME INTEGER SEQUENCES

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ABSTRACT

Let $\phi(n)$ be the Euler's totient function of the positive integer n. We know that $\phi(n) = n - 1$ if and only if n is prime. Lehmer conjectured that if $\phi(n) = n - 1$ then n is prime. In other words, there is no composite integer satisfies this property. Until now no counterexample to this conjecture or either a proof has been found. A counterexample of Lehmer's conjecture is called a Lehmer number or a number with Lehmer property. Some researchers tried to study the properties of Lehmer numbers. For a positive integer m we define $\omega(m)$ to be the number of distinct prime divisors of m, Lehmer proved that if m is a Lehmer number, then $\omega(m) \geq 7$. Some other researchers improved that bound, it was proved that $\omega(m) \geq 14$, and the bound was improved to be 15. Recently, researchers are trying to prove that there are no numbers with the Lehmer property in specific integer sequences like the sequences of Fibonacci and Lucas numbers

In this note, we prove that there is no number with the Lehmer property in the sequences of Jacobsthal or Jacobsthal-Lucas numbers, the Balancing and Balancing-Lucas numbers.

IMCMA@_PP26

AN ADAPTIVE GENERALIZED QUATRIC QUADRATURE BASED CORDIAL SYSTEM

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ABSTRACT

A quadrature rule blended with four quadrature rules is developed. The four rules are Modified Clenshaw Curties Quadrature rule (precision-5), Gauss Legendre 3-point Quadrature rule (precision -5), Gauss Legendre 3-point Quadrature rule (precision -5), Gauss Legendre 4-point Quadrature rule (precision -7), Konrod Extension, of Lobatto 4-point Rule (Precision-9). We have mixed the above four rules and got a mixed quadrature rule. After getting the result, we have used it in Analytic function and the result analysis is done.

IMCMA@_PP27

A generalized Erd´elyi-Kober type fractional derivative and fractional integration

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ABSTRACT

This paper deals with new definition of fractional derivative and integration of Erdélyi-Kober type. In this context we find particular and general solutions of fractional order differential and integral equations involving new definition with kernel $K^{\alpha}_{(1,0,\gamma)}(t,x)$. Using Laplace transform, we reduce integral or differential equations of fractional order to integer order, and the solutions of the integer order differential equations are obtained by using inverse Laplace transform. Some examples are so given in support to the results, derived.

IMCMA@_PP28

A comparative assessment of TOPSIS and aggregation operators of an interval-valued neutrosophic fuzzy supple sets

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ABSTRACT

The correlation coefficient (CORCOE) between two variables plays an impor- tant factor. Moreover, the information from the collection of discourse is also a factor in how accurately the correlation is assessed. So, this paper approaches interval-valued neutrosophic fuzzy supple sets (IVNFSSs), expansion of neutrosophic fuzzy supple sets (NFSSs), which are applied in the decision-making process to represent inadequate estimation, vagueness and fear. Neutrosophic fuzzy supple sets consider three separate types of data, including membership degree: truth, indeterminacy and falsity. The conception and uniqueness of the correspondence coefficient and its biased values are presented in this work by using TOPSIS technique. Also created decision-making process under the con- sideration of some operators such as interval-valued neutrosophic fuzzy supple weighted standard (IVNFSWS) and interval-valued neutrosophic fuzzy supple weighted numerical (IVNFSWN) operators. The applicability of this method has described in a simple numerical example. Finally, compare the results of three alternatives of TOPSIS method, IVNFSWS operator and IVNFSWN op- erator, and found that proposed TOPSIS method is better efficient than the others as the closeness coefficient values is closer to fuzzy values '1' and also the ranking order of each alternative are same.
IMCMA@_PP29

Functional properties of certain subclass of analytic functions associated with Cardioid domain

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ABSTRACT

In this work, we define a new subclass of univalent functions as the ratio of convex and starlike functions subordinate to a cardioid domain. We derive sharp initial coefficient bounds, Fekete-Szegö inequality and determine exact bounds for the Hankel determinant of various orders. Additionally, we verify Zalcman inequality for specific values and analyse the Krushkal inequality. These results contribute to the understanding of extremal problems in Geometric Function Theory and provide new insights into the structural properties of this subclass.
IMCMA@_PP30

A Novel Approach for Constructing Minimal Spanning Tree using Weight-Based Edge Selection

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ABSTRACT

This paper presents a new algorithm for finding the minimal spanning tree (MST) in a graph by focusing on selecting edges with the least weight. Unlike traditional methods such as Kruskal's and Prim's algorithms, this approach simplifies the process of choosing edges while avoiding cycles in the tree. The algorithm is designed to work efficiently on both sparse and dense graphs, using straightforward steps to ensure ease of implementation. Testing shows that this method reliably produces a minimal spanning tree with improved speed and scalability. The proposed algorithm is suitable for various applications, such as network design and optimization tasks.

IMCMA@_PP31

SPECIFIC PROPERTIES OF GENERALIZED CLASS OF ANALYTIC FUNCTIONS DEFINE THROUGH SUBORDINATION

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ABSTRACT

The purpose of the present paper is to introduce a new subclass of analytic G_{sech}^{α} defined in the open unit disk $D:=\{z\in C:|z|<1\}$ based on subordination. These subclasses are defined by taking into account the linear combination of starlike function and convex function with respect to symmetric points associated with secant hyperbolic functions. We investigate upper bounds of some initial coefficients, Hankel determinant of order two and three. Further, we determine bounds for logarithmic coefficient, inverse coefficient, logarithmic coefficients of inverse functions and the bounds of modulo difference of two consecutive logarithmic coefficients of inverse functions are also obtained. These results play a significant role in advancing the study of coefficient problems in Geometric Function Theory.

IMCMA@_PP32

Leonardo numbers of the form $(x^a \pm 1)(x^b \pm 1)$

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ABSTRACT

The Leonardo sequence $\{Le_n\}_{n\geq 0}$ are introduced by Catarino and Borges, is a recurrent sequence of integers that is related to the Fibonacci and Lucas sequences. It is the sequence A001595 in the OEIS satisfying the recurrence relation
$Le_n = Le_{n-1} + Le_{n-2} + 1$, for $n \geq 2$, with initials $Le_0 = Le_1 = 1$. The first few terms of this sequence are
1, 1, 3, 5, 9, 15, 25, 41, 67, 109, 177, 287, 465, 753, **1219, 1973,** 3193, 5167, 8361, . . .

A Fermat number is a number of the form $2^n + 1$ obtained by putting $n = 1$ in a Fermat polynomial, the first few of which are 3, 5, 9, 17, 33, $\cdots$. A Mersenne number is a number of the form $2^n - 1$, where n is a positive integer. The first few Mersenne numbers are 1, 3, 7, 15, 31, $\cdots$. Over years, Fermat and Mersene numbers have been investigated by a number of authors from various points of view, for example, More recently, Bachabi and Togb'e found Padovan and Perrin number that are products of two Fermat numbers. The same author determined Padovan and Perrin numbers which are product of two Fermats numbers and Narayana numbers that are products of two Mersene and Fermat numbers.
In recent years, there are several papers concerning Diophantine equations involving the Leonardo se- quence. Tripathy and Patel searched for all Leonardo numbers in the k-generalized Fibonacci sequence. Subsequently, Bensella and Behloul searched for common terms of Leonardo and Jacobsthal numbers. Mo- tivated by the above works, it is natural to ask if Leonardo numbers can be expressed as the product of Mersenne and Fermat numbers. Therefore, we can determine all Leonardo numbers, which are the products of $(2^a \pm 1)(2^b \pm 1)$. The aim of our work is to generalized the equation replacing 2 by x and considering the range of x from 2 to 200. More Precisely, we study the Diophantine equation
$Le_n = (x^a \pm 1)(x^b \pm 1)$
Where $\{Le_n\}$ be an nth Leonardo number, (n, x, a, b) are positive integers and determine the explicit upper bounds for n. We also completely solve this equation in positive integers (n, x, a, b) with $1 \leq a \leq b$ and $2 \leq x \leq 200$.

IMCMA@_PP33

ON CERTAIN UNIVALENT POLYHARMONIC MAPPINGS

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ABSTRACT

For a positive integer p, a polyharmonic or in particular p-harmonic mapping F, defined in the open unit disc $\mathbb{D} := \{z \in \mathbb{C} : |z| < 1\}$ is a $2p$-times continuously differentiable function in $\mathbb{D}$, which is a solution to p-harmonic equation $\Delta^p F := \Delta(\Delta^{p-1}F) = 0$. Here, Δ denotes the Laplacian operator. The notion of polyharmonic mappings is generalised from the harmonic mappings. In this talk, we discuss various geometric aspects of some well-known families of polyharmonic mappings due to Li et al. [1]. The sufficient conditions on coefficient for which a univalent polyharmonic mapping is starlike or convex are established. Moreover, the bounds on arc length and Bloch constant are obtained.

IMCMA@_PP34

Rayleigh–Taylor instability in a vertical channel filled with porous medium

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ABSTRACT

Thermal gradients are accompanied in many ecosystems, including undersea hot springs and hydrothermal vents, by changes in the concentration of chemical compounds carried to the seawater, hence causing the so-called double-diffusive, mixed convection. A vertical channel filled with a porous media saturated with seawater is studied to investigate the physical possibilities in such systems. The movement within the sediment-laden channel is driven by two buoyancy forces and an external pressure gradient, akin to the conditions in a vent with an upward flow orientation. The fluid flow has been represented by an extended Darcy model, and the mechanisms of flow instability have been analyzed numerically. The linear stability study is conducted over a broad spectrum of Darcy numbers (Da = 10^{-5}-10^{-8}). It shows that the instability of the fluid is due to acceleration of denser fluid from the top, known as Rayleigh–Taylor instability. Based on the permeability, for any solute Rayleigh number (Ra_C), there exist a minimum value of Reynolds number (Re), below which R–T type of instability appeared.

IMCMA@_PP35

On perfect powers as sums or differences of two k-generalized Pell numbers

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ABSTRACT

The Pell sequence $\{P_n\}_{n \geq 0}$ is the binary recurrence sequence given by

$$P_{n+2} = 2P_{n+1} + P_n \text{ for } n \geq 0,$$

with the initial terms $P_0 = 0$ and $P_1 = 1$. Let $k \geq 2$ be an integer. We consider a generalization of the Pell sequence known as the k-generalized Pell sequence, $\{P_n^{(k)}\}_{n \geq (k-2)}$, is given by the recurrence

$$P_n^{(k)} = 2P_{n-1}^{(k)} + P_{n-2}^{(k)} + \cdots + P_{n-k}^{(k)} \text{ for all } n \geq 2,$$

with the initial terms $P_{-(k-2)}^{(k)} = P_{-(k-3)}^{(k)} = \cdots = P_0^{(k)} = 0$ and $P_1^{(k)} = 1$. We shall refer to $P_n^{(k)}$ as the nth k-generalized Pell number. We see that this generalization is a family of sequences, with each new choice of k producing a unique sequence. For example, if k = 2, we get $P_n^{(2)} = P_n$, the nth Pell number. Pethő (Coll. Math. Soc. J. Bolyai 60 (1991), 561–568) found all perfect powers in the Pell sequence, where he solved $P_n = y^s$. Later, Aboudja et al. (Period. Math. Hung., 82 (2021), 11–15) extended the work of Pethő by considering two Pell numbers and studied the Diophantine equation $P_n \pm P_m = y^s$ for $s \geq 2$. Following that, Şiar et al. (Math. Bohem. 148(4), (2023), 507–518) solved the Diophantine equation $P_n^{(k)} = y^m$ in positive integers n, m with y, $k \geq 2$ for $2 \leq y \leq 1000$.

In this study, we have extended the above works and searched for perfect powers, which are sums or differences of two k-generalized Pell numbers. More explicitly, we have studied the Diophantine equation

$$P_n^{(k)} \pm P_m^{(k)} = y^a,$$

in positive integers n, m, k and a with $y \geq 2$, $k \geq 3$ and $1 \leq m \leq n$ with $2 \leq y \leq 200$. To prove our result, we have used a few times a Baker-type lower bound for non-zero linear forms in logarithms of algebraic numbers and a version of the Baker-Davenport reduction method to reduce the large bound.

IMCMA@_PP36

Statistical Investigation of Heat Transfer in MHD Laminar 3D Hybrid Nanofluid Flow with Hall Current and Enhanced Diffusion Models

Chandrakanta Parida

ABSTRACT

This work explores the influence of the Cattaneo-Christov flux framework on Marangoni convection in a three-dimensional flow of hybrid nanofluids, incorporating Hall current effects and subjected to an oscillating magnetic flux over a stretching surface. By integrating thermal and solutal relaxation times, the Cattaneo-Christov double diffusion model generalizes classical Fick's and Fourier's laws, enabling a robust analysis of heat and mass transport in hybrid nanofluids. The hybrid nanofluid, $MWCNT$ & Al_2O_3 is modeled by suspending nanoparticles in a base fluid i.e. water to investigate the enhanced thermal performance. The transformed governing equations are solved using the numerical bvp4c technique, which provides critical dependencies of flow, temperature, and concentration fields. Statistical analysis of heat transfer performance, focusing on the Nusselt number, is conducted to quantify the impact of key parameters on thermal behavior.. Hybrid nanofluids show a better heat transfer property compared to the conventional nanofluids as revealed by a comparison study. Hence, this research is helpful in optimizing heat exchanger design, designing microfluidic cooling systems, and devising new thermal management systems for emerging technologies.

IMCMA@_PP37

Numerical Investigation of Magnetic Field and Taylor Column Effects on Forced Convection in Rotating Flows

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ABSTRACT

This paper presents numerical computations aimed at investigating the heat transfer characteristics of forced convective flow past a sphere in a rotating fluid, subjected to an aligned magnetic field in the direction of fluid flow. The study examines various values of the Taylor number (Ta), interaction parameter (N), and Prandtl number (Pr). The Navier-Stokes equations, expressed in terms of stream function (ψ), vorticity (ω), and angular velocity (Ω), along with the energy equation, are solved using the Higher Order Compact Scheme (HOCS) in spherical polar coordinates. The results, including the drag coefficient, isothermal contours, and graphs of the mean Nusselt number, are presented and discussed for various parameter configurations.

IMCMA@_PP38

A fuzzy solution approach to multi-objective fully triangular fuzzy optimization problem

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ABSTRACT

Numerous optimization problems comprise uncertain data in practical circumstances and such uncertainty can be suitably addressed using the concept of fuzzy logic. This paper proposes a computationally efficient solution methodology to generate a set of fuzzy nondominated solutions of a fully fuzzy multi-objective linear programming problem, which incorporates all its parameters and decision variables expressed in form of triangular fuzzy numbers. The fuzzy parameters associated with the objective functions are transformed into interval forms by utilizing the fuzzy-cuts, which subsequently generates the equivalent interval valued objective functions. The concept of centroid of triangular fuzzy numbers derives the deterministic form of the constraints. Furthermore, the scalarization process of weighting sum approach and certain concepts of interval analysis are used to generate the fuzzy non-dominated solutions from which the compromise solution can be determined based on the corresponding real valued expressions of fuzzy optimal objective values resulted due to the ranking function. Three numerical problems and one practical problem are solved for illustration and validation of the proposed approach. The computational results are also discussed as compared to some existing methods.

IMCMA@_PP39

Possibility Of Charged Traversable Wormholes In Lyra Manifold

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ABSTRACT

This paper presents numerical computations aimed at investigating the heat transfer characteristics of forced convective flow past a sphere in a rotating fluid, subjected to an aligned magnetic field in the direction of fluid flow. The study examines various values of the Taylor number (Ta), interaction parameter (N), and Prandtl number (Pr). The Navier-Stokes equations, expressed in terms of stream function (ψ), vorticity (ω), and angular velocity (Ω), along with the energy equation, are solved using the Higher Order Compact Scheme (HOCS) in spherical polar coordinates. The results, including the drag coefficient, isothermal contours, and graphs of the mean Nusselt number, are presented and discussed for various parameter configurations.

IMCMA@_PP38

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ABSTRACT

Numerous optimization problems comprise uncertain data in practical circumstances and such uncertainty can be suitably addressed using the concept of fuzzy logic. This paper proposes a computationally efficient solution methodology to generate a set of fuzzy nondominated solutions of a fully fuzzy multi-objective linear programming problem, which incorporates all its parameters and decision variables expressed in form of triangular fuzzy numbers. The fuzzy parameters associated with the objective functions are transformed into interval forms by utilizing the fuzzy-cuts, which subsequently generates the equivalent interval valued objective functions. The concept of centroid of triangular fuzzy numbers derives the deterministic form of the constraints. Furthermore, the scalarization process of weighting sum approach and certain concepts of interval analysis are used to generate the fuzzy non-dominated solutions from which the compromise solution can be determined based on the corresponding real valued expressions of fuzzy optimal objective values resulted due to the ranking function. Three numerical problems and one practical problem are solved for illustration and validation of the proposed approach. The computational results are also discussed as compared to some existing methods.

IMCMA@_PP39

Possibility Of Charged Traversable Wormholes In Lyra Manifold

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ABSTRACT

This work investigates traversable wormhole solutions in the Lyra manifold in the presence of an electric charge. We employ two different types of shape functions and a constant redshift function (thus, the tidal force of our wormhole solution is zero) to derive the solutions. The matter content consisting of an anisotropic fluid and an energy-momentum tensor with charge together. We consider the equation of state (EoS) to obtain exact wormhole solutions that meet all energy conditions (ECs), including null, weak, strong, and dominated energy conditions. Subsequently, we study the behaviors of anisotropic parameters, gauge functions, and the fundamental properties of wormholes. Furthermore, we use the Tolman-Oppenheimer-Vokloff (TOV) equation to analyze the stability of the wormhole solution and find that the solution meets the equilibrium condition. Therefore, we conclude that viable and stable charged traversable wormhole solutions exist in the Lyra manifold in presence of non-exotic matter.

IMCMA@_PP40

I. Exploring the Concepts Behind Mathematics

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ABSTRACT

This paper describes why mathematics is so amazing and how finite subsets and infinite subsets are related. Also series sum method is applied for some series and fail in which case. Again how limit concept plays important role in problems and why analysis is necessary in mathematics. Also how Reiman sum series is applicable for finding areas but fails for calculating perimeter. Also a brief description on mathematical fallacy. Also discusses the series sum method, its application for some series, and its limitations in certain cases. The role of the concept of limits in solving problems is highlighted, as well as the necessity of analysis in mathematics. Additionally, it explores how the Riemann sum is applicable for finding areas but fails in calculating the perimeter. Finally, a brief description of mathematical fallacies is provided.

IMCMA@_PP41

Modelling Reliability Driven Software Release Strategy Considering Testing Effort with Fault Detection and Correction Processes: A Control Theoretic Approach

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ABSTRACT

In this paper, we have introduced a software reliability growth model (SRGM) that integrates a Weibull testing effort function (TEF) within the software fault detection process (FDP) and fault correction process (FCP), effectively capturing the intricacies of software testing. Leveraging the least squared estimation method, we estimated both model parameters and the TEF, leading to a notably improved fit with the dataset and enhancing our comprehension of software reliability dynamics. Our approach also involved employing a reliability-based method to identify the optimal time for software release, further reinforcing the robustness of our model. Subsequently, we devised an optimal control model to minimize testing efforts throughout the software development life cycle. This work provides a comprehensive methodological framework for computing the total cost while ensuring debugging costs follow a learning curve pattern. Through numerical simulations involving hypothetical values and the Weibull TEF, we observed that once the software achieves the desired reliability for release, subsequent costs gradually decline to zero. In essence, both testing and future costs converge to zero post-release, reducing instantaneous expenses.

IMCMA@_PP42

EFFECT OF THERMAL RADIATION AND CHEMICAL REACTION ON FLUID FLOW IN A VERTICAL PIPE FILLED WITH POROUS MEDIUM

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ABSTRACT

A computational study has been carried out to study the effect of thermal radiation and chemical reaction on fluid flow in a vertical pipe filled with porous medium. The fluid flow is governed by continuity, momentum, energy and concentration equations. The similarity transformations have been used to convert the PDEs into ODEs and spectral collocation method used to solve the ODEs numerically. The effects of nondimensional parameters on velocity, temperature and concentration have been presented graphically. The findings demonstrate that with radiation effect fluid velocity and temperature increases. On varying Darcy value in between 10^{-3} to 10^{-6} with radiation effect getting the point of inflection faster as compared to irradiative flow which leads to instability in fluid flow. Same results have been seen for a variation of Prandel number in between 0.7 to 1.6. The concentration profile reduced gradually by enhancing the values of Schmidt number and chemical reaction parameter.

IMCMA@_PP43

On deferred statistical convergence of order β for fractional difference sequence

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ABSTRACT

In the present work, we introduce the idea of deferred-statistical convergence of order β using fractional difference operator $\Delta^{a,b,c}$ for the sequence of real numbers. Some results on limits of deferred-statistical convergence of order β of difference sequences have been established. Also, certain relations between this convergence and the strongly deferred-summability for the fractional difference sequences real numbers have been discussed.

IMCMA@_PP44

ON THE CONVERGENCE OF CHEBYSHEV METHODS FOR SOLVING NON LINEAR EQUATION IN BANACH SPACE FREE OF DERIVATIVES

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ABSTRACT

Our research is being conducted with the intention of investigating the semilocal convergence of augmented Chebyshev algorithms for the purpose of solving nonlinear equations in Banach Fspaces. We introduced a notion known as the limited convergence domain in order to broaden the application of Chebyshev-type techniques. When compared to the criteria that were used in earlier investigations, our convergence criteria are less stringent.However, in contrast to the conclusions that Hernandez and Salanova discovered regarding the Chebyshev approach, these methods do not display a second derivative, and their R-order of convergence is further improved. Because of this, the scope of the procedure's application has been expanded. The findings of theoretical calculations are validated by means of numerical examples. When compared to the well-known algorithms that are already in existence and use information that is comparable, it has been found that the results achieved are superior in terms of accuracy and the number of repetitions.

IMCMA@_PP45

Buoyancy driven mixed convective flow in a vertical pipe

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ABSTRACT

This paper reports on the fully developed hydromagnetic mixed convection flow in a heated vertical pipe under a transverse magnetic field with the internal heating. The buoyancy force and the external pressure gradient cause movement in the pipe. Numerical solutions for coupled differential equations have been obtained using the Chebyshev spectral-collocation approach. The impact of Hartmann Number(M) and heat source parameter(Q) on velocity as well as temperature profile has been analyzed. The velocity profile contains points of inflection at near of the wall in case of Hartmann number. This may cause the instability of the flow. However, the maximum magnitude of the temperature increases on increasing the value of heat source (Q) in the temperature profile. Furthermore, it is demonstrated that under the limiting conditions the present numerical results are in good agreement with the available benchmark solutions.

IMCMA@_PP46

Certain Properties for the new Subclass of Analytic Functions Based on Subordination

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ABSTRACT

In this study, we propose a novel subclass of univalent analytic functions, constructed by associating it with a cosh-exponential rational function, which is expressed as the ratio of convex and starlike functions. For this class, we derive sharp upper bounds for the initial coefficients, as well as for the inverse coefficients of functions within the defined class. Additionally, we obtain upper bounds for the Hankel determinant of various orders. The logarithmic coefficients and Hankel determinants of different orders for functions in the class are also determined. Furthermore, we verify the validity of the conjectures formulated by Zalcman and Krushkal using the results established in this work.

IMCMA@_PP47

Exploring Scientific Computing
Through Computational Mathematics

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ABSTRACT

Science uses experiments and theory, now it is experiments, theory and computations. The Scientific Computing (SC) aka Computational Science (SC) to understanding nature and technology is currently exploring in many fields such as physics, mechanics, geophysics, astrophysics, chemistry, biology, and most engineering disciplines. Exploration of SC is a relatively new research area due to the advances in computer resources and its powers. SC studies computing for its own intrinsic interest and develops the hardware and software tools like applied mathematics develops and studies the algorithms. SC solves systems in mathematical models by computer simulation, as opposed to the analytical methods. It addresses the critical issue of the development, analysis and application of algorithms for solving various problems in applied sciences and so on. Due to complexity the problem
solving approach in real world requires the intelligent exploration, which requires creative application of the development, analysis and application of algorithms. Inherent to both the conventional, experiment-based scientific method like newer methods - modelling and simulation with its verification and validation. According to Nicholas Maxwell (2008) argues that science offers improved knowledge – '*know-what*' – as well as technical '*know
how*'. The origin and the evolution of the human brain is a universal language is known as '*Mathematics*''. It is known as a distinguished star of a Galaxy of Sciences in the universe. The word '*Mathematics*' has been used in two distinct and different senses, i.e., one as a method used to solve the problems of quantity, space, order, etc., and the second as a set of laws or generalizations of truths that are, discovered. It is always difficult to constitute precise boundary lines as a tool of compartmentalization among disciplines. Its main idea is that something is true only if it to be true always. New foundations of mathematics are formulated based on the concept of innate programs of behaviour and thinking. According to the University of Oxford: "*Mathematics is a fundamental intellectual tool in computing, but computing is also increasingly used as a key component in mathematical problem
solving.*" Computational mathematics (CM) is the blending of computer science with applied mathematics. CM encompasses the mathematical study in the fields of science in which mathematics and computation play a central and integral role. It may be regarded as a conglomerate of processor programs, which is capable of creating algorithms and methods. As a branch of applied mathematics, computational mathematics is applicable to different fields. This paper is an explore on various scientific computing through computational mathematics with its the state-of-the-art source codes as case study.

IMCMA@_PP48

KOROVKIN-TYPE THEOREMS ON BIVARIATE FUNCTIONS VIA DEFERRED STATISTICAL CONVERGENCE.

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ABSTRACT

In this present work, we explore the application of Korovkin-type theorems to bivariate functions within the framework of deferred statistical convergence. In particular, we investigate how deferred statistical methods can be employed to establish conditions for convergence of such functions. This approach offers a generalizations of classical results and provide new insight into summability and convergence behaviours of function of two variables.

IMCMA@_PP49

Viaggiu entropy and its applications in gravitational thermodynamics

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Panihati Mahavidyalaya

ABSTRACT

S. Viaggiu introduced a new form of entropy in 2024 which is a modification of the Bekenstein-Hawking entropy. He showed that this modified form of entropy brings new insights into Cosmology. In this talk, we shall study the generalized second law by considering the dynamical apparent horizon to be endowed with the Hawking temperature and the Viaggiu entropy. We shall devote our attention to a flat FLRW universe filled with a perfect fluid having a constant equation of state. Our analysis will yield a surprising result. This result is in strong agreement with recent astronomical observations and we shall arrive at it purely by thermodynamic means.

IMCMA@_PP50

On dynamics of certain models via generalized conformable fractional derivative

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ABSTRACT

This work deals with the generalised conformable fractional derivative and certain interesting properties which are not compatible with Riemann-Liouville and Caputo fractional derivatives. The newly defined derivative is more efficient than other conformable fractional derivatives and the nonlocal fractional derivatives from time perspective. To justify the claim, we provide some direct applications, such as population growth, Newton's body cooling, heat equation and susceptible-infected-removed models.

IMCMA@_PP51

SPECTRUM AND RESOLVENT OF A MATRIX AND THEIR APPLICATIONS

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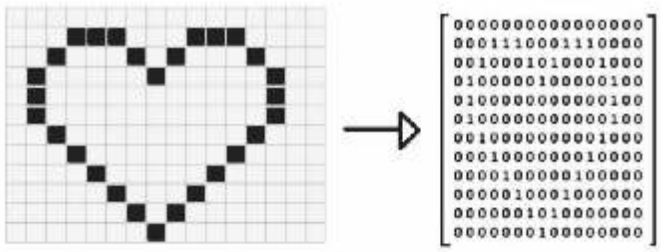
In Linear algebra and functional analysis, the spectrum and resolvent set of a matrix are fundamental concepts for understanding the matrix's behaviour as a linear operator.For a given square matrix A, the spectrum refers to the set of complex numbers λ for which $A-\lambda I$ is not invertible, where I is the identity operator . Among these, eigenvalues from a subset of the spectrum, representing values here $A-\lambda I$ has a nontrivial null space, corresponding to non–zero eigenvectors .



Understanding matrices to perform basic image processing on digital images .
In figure demonstrates binary pixel art, in which each box is being represented in t.

he correlating matrix with either a "1" or a "0". A zero means the box contains nothing (would normally appear transparent Or white), While a one indicates that the box is filled (in this case it is filled with black) .
Understanding the spectrum and resolvent set of matrix provides a comprehensive framework for studying the behaviour of matrices .

IMCMA@_PP52

(a_n, b_n) – f-statistical Convergence and Korovkin Type Approximation Theorems

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(A joint work with Prasanta Kumar Ray)

ABSTRACT

Statistical convergence is a concept in mathematical analysis that provides a way to measure the convergence of a sequence of numbers based on their statistical properties. Unlike traditional notions of convergence, which focus on the limit of individual terms in the sequence, statistical convergence considers the behavior of the sequence as a whole. More formally, a sequence of real numbers (x_n) converges statistically to a real number L if, for every $\epsilon > 0$, $\log_{n\to\infty} \frac{1}{n}\{k \le n : |x_k - L| \ge \epsilon\} = 0$. This means that the proportion of terms in the sequence that are far away from L is small in some precise sense. Statistical convergence was first introduced independently by Fast [4] and Steinhaus [6] in 1951 and has since been studied extensively in the context of various mathematical fields, including real analysis, functional analysis, probability theory, etc. Aizpuru et al. [1] generalised the concept of statistical convergence by using the density by modulli known as f-statistical convergence. Later, Bhardwaj and Dhawan [2] proved the Korovkin type theorems by using f-statistical convergence. Boyanov and Veselinov [3] also proved a Korovkin type theorem using the test functions $\{1, e^{-x}, e^{-2x}\}$ in the Banach space $C^{\check{}}[0,\infty)$, which consists of continuous functions on the interval $[0,\infty)$. This article presents the notion of (a_n, b_n)–statistical convergence using density by moduli, this indeed extends the concept of Fibonacci statistical convergence [5] which we call as (a_n, b_n) – f-statistical convergence. The primary focus of this study is to prove the Korovkin type theorem of Boyanov and Veselinov using Fibonacci (a_n, b_n) – f- statistical convergence. A connection between (a_n, b_n)-statistical convergence and (a_n, b_n)–f-statistical convergence is also established.

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IMCMA@_PP53

Cellular Automata and Longest Common Subsequence

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ABSTRACT

Efficient polynomial-time algorithms, both sequential and parallel, exist for solving the Longest Common Subsequence (LCS) problem using dynamic programming techniques. In this study, we explore the feasibility of employing Cellular Automata (CA) to address the LCS problem, focusing on the design and analysis of rule-based CA systems. Our framework incorporates Synchronous CA, Asynchronous CA and an external factor ('E'), which influences state transitions based on character matches.

By examining the constraints and limitations inherent in such CA-based approaches, we aim to determine the existence or nonexistence of CA capable of solving the LCS problem. Our findings provide insights into the theoretical and practical implications of using CA for sequence alignment and optimization problems.

IMCMA@_PP54

Numerical approach to solve nonlinear stochastic integral equations with an application to stochastic logistic models based on Walsh function

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ABSTRACT

This paper employs an efficient numerical method for approximating nonlinear stochastic integral equations utilizing the operational matrices of the Walsh function and the collocation method. The method converts the integral equation into a system of algebraic equations, facilitating the computation of an approximate solution. Error analysis of the method has been conducted, validating the efficacy of the suggested method, which yields a linear order of convergence.Couple of numerical examples are shown to demonstrate the accuracy and efficacy of the suggested method. This work also demonstrates the applicability of the method to dealing with the predator-prey model.

IMCMA@_PP55

A Novel Symmetric and authenticated Key Exchange Algorithm for the Internet of Everything

Baisakhi Upadhyaya

ABSTRACT

The Internet of Everything (IoE) integrates devices, people, processes, and data across diverse domains, necessitating robust security features such as confidentiality, integrity, authentication, and non-repudiation. This paper introduces a novel symmetric key exchange algorithm designed for the Internet of Everything (IoE), integrating the strengths of Diffie-Hellman (DH), Elliptic Curve Cryptography (ECC), and RSA to provide a robust and efficient framework for secure communication. The algorithm employs a three-layered security mechanism where DH ensures forward secrecy, ECC enhances computational efficiency, and RSA guarantees authentication. This multi-layered approach ensures resilience against various cryptographic attacks, including Man-in-the-Middle (MitM) and replay attacks, while maintaining scalability and practicality. The proposed algorithm is particularly suited for IoE applications, where high security and low computational overhead are critical for managing diverse and resource-constrained devices.

IMCMA@_PP56

Lyapunov-type Inequalties for Erdélyi-Kober Fractional Boundary Value Problems

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ABSTRACT

In this paper, we discuss problems involving Erdélyi-Kober Fractional operators. First, we derive Green's functions and their properties. Secondly, utilizing the characteristics of their Green's functions, we develop Lyapunov-type inequalities for Erdélyi-Kober fractional boundary value problems. Finally, we find the lower bound for the eigenvalue for Erde´lyi-Kober fractional boundary value problems as the application of our established results.

IMCMA@_PP57

Mathematical Model for Spreading of Computer Virus and Its Stability Analysis

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ABSTRACT

The development of technology is helpful to the modern industrial world with the use of internet technology using computer software in various sectors of our life such as education, banking sector, health, engineering and medical sciences to analyze the data by concerning and sharing information. However, this growth of internet technology has created a new type of crime called cyber crime. This sort of crime occurs when the cybercriminals install the malicious object on someone's devices without their knowledge in order to access personal information usually for financial benefit or damaging the devices. The trained intelligentsia spread the computer virus, Trojan, worms resembling the way plagues through the population. As a result of the similarities that exists between computer virus and disease infection similar for transmission from system to system. Hence based on similarities to develop a e-Epidemic model (S_T, E_T, I_T, R_T, S_A, I_A) for studying the behaviors of the nodes. To analyze the stability of the nodes in the network through the basic reproduction number. Then to simulate a model for verifying the theoretical results. This model is helpful to the system administrators for developing the antivirus software.

IMCMA@_PP58

A Fermatean Fuzzy MCDM technique for solving selection and ranking challenges

Madhusmita Behera

ABSTRACT

In the field of multi-criteria decision-making (MCDM), addressing complex selection and ranking problems is crucial, especially when dealing with real-world scenarios that are inherently uncertain and imprecise. In this study we introduce an integrated approach combining the Step-wise Weight Assessment Ratio Analysis (SWARA) method, entropy technique and Fermatean fuzzy aggregated geometric operators to address these challenges. Utilizing the strengths of Fermatean fuzzy sets and an existing score function, this approach enhances decision-making by better modelling uncertainty and capturing the vagueness inherent in real-world problems. The SWARA method is employed to determine subjective criteria weights, while the entropy method calculates objective weights, ensuring a balanced evaluation process. The Fermatean fuzzy aggregated geometric operator integrates these weights to generate robust rankings for alternatives. The proposed methodology is validated through illustrative case studies, demonstrating its efficacy and reliability in solving MCDM problems within a Fermatean fuzzy environment. This comprehensive framework provides a powerful tool for decision-makers to derive meaningful insights and make informed choices in uncertain and complex decision contexts.

IMCMA@_PP59

Construction of a Third-Order Generalized Quadrature Rule using Anti-Lobatto and Anti-Gaussian Techniques

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ABSTRACT

We propose a novel Generalized Quadrature Rule, denoted as SM_{13}, developed by combining the Anti-Lobatto 4-point rule, the Anti-Gauss 3-point rule, and the Gauss-Legendre 3-point rule using the Generalized Quadrature technique. A detailed analysis of its convergence properties has been carried out, supported by error estimates that demonstrate SM_{13}'s superior accuracy compared to its constituent rules. Theoretical findings are validated through extensive numerical testing on diverse integral problems, confirming the rule's reliability and precision. This study emphasizes the significant improvement SM_{13} offers in computational accuracy, establishing it as an effective and powerful tool for tackling numerical integration tasks with enhanced precision.

IMCMA@_PP60

An EOQ Inventory Model having Power Pattern Demand under Complete Backlogged Shortages in Crisp and Fuzzy Environments

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ABSTRACT

This study aims to develop an optimal inventory system that minimizes total inventory costs by addressing key factors such as power-pattern demand, constant deterioration, complete backlog shortages, fluctuating inventory costs, and expense-related uncertainties. To improve the model's applicability, learning effects are incorporated into both ordering and holding cost structures. A robust mathematical framework is presented to tackle the problem, offering solutions for both deterministic (crisp) and uncertain (fuzzy) scenarios. The model's effectiveness is demonstrated through numerical examples analyzed using Mathematica 13.0.1, which confirm the convexity of the total cost function. Additionally, a sensitivity analysis is performed to provide logistics managers with actionable strategies and insights for real-world decision-making.

IMCMA@_PP61

Analytic continuation of k-generalized Pell zeta function

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ABSTRACT

Let $k \geq 2$ be an integer. The k-generalized Pell sequence $\{P^{(k)}\}_{n\geq-(k-2)}$ is defined by the Recurrence

$$p_n^k = 2p_{n-1}^{(k)} + p_{n-2}^{(k)} + \cdots + p_{n-k}^{(k)} = \sum_{i=1}^{k} p_{n-i}^{(k)} \text{ for all } n\geq 2.$$

With the initials

$P_{-(K-2)}^{(K)} = P_{-(K-3)}^{(K)} = P_{-(K-4)}^{(K)} = \cdots = P_{-(0)}^{(K)} = 0$ and $= P_1^{(K)} = 1$

Here, $P_{-(n)}^{(K)}$ denotes the nth k-generalized Pell number. Note that for k=2, $P_n^{(n)} = P_n$, the nth Pell number, which is defined as $P_{n+1} = 2P_n + P_{n-1}$ for n>0 which initials $P_0 = 0$ and $P_1 = 1$. Zeta functions relating to number sequences have been studied extensively by many researchers. The analytic continuation of Fibonacci zeta function

Zeta functions relating to number sequences have been studied extensively by many researchers. The analytic continuation of Fibonacci zeta function $\zeta_F(s) = \sum_{n=1}^{\infty} \frac{1}{F_n^s}$ was studied by L. Navas in 2001, where F_n denotes n^{th} Fibonacci number. In 2013, K. Kamano explored the analytic continuation of Lucas zeta function which is the generalization of Fibonacci zeta function.

In this paper, we have introduced the k-generalized Pell zeta function which is defined as

$$\zeta_{P_n^{(k)}}(s) = \sum_{n\ 1}^{\infty} \frac{1}{(P_n^{(k)})^s}$$

and studied its analytic continuation. We derived the analytic continuation of the k-generalized Pell zeta function with a possible list of poles and their corresponding residues. The arithmetic natures of k-generalized Pell zeta function at negative integer arguments are also discussed.

IMCMA@_PP62

On Generalized Weighted Means of Failure Rate

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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.

In the present paper, 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 corroborates with various reliability functions in a better way than the existing weighted concepts proposed by C. R Rao (1965).

IMCMA@_PP63

Pizza Sales Analysis

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ABSTRACT

This report presents a comprehensive analysis of pizza sales data using SQL and Tableau. The analysis uncovers key insights into customer behavior, pizza product performance, and sales trends, leveraging over 48,000 rows of transaction-level data from 2015. SQL was used to extract, aggregate, and analyze data, identifying top-selling pizza types, peak sales periods, and customer preferences. Tableau was then employed to create interactive dashboards, providing visually compelling insights into sales trends and patterns. Strategic recommendations based on these findings aim to improve operational efficiency, enhance profitability, and optimize marketing efforts. Future work involves integrating machine learning algorithms for predictive analytics, enabling more accurate sales forecasting, customer segmentation, and enhanced decision-making.

IMCMA@_PP64

On a new difference sequence space using fractional difference operator

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ABSTRACT

In this article we introduce the sequence space $m(M, \Phi, p, u, \Delta^{\alpha})$ using an Orlicz function M along with fractional difference operator Δ^{α}. We have studied some of its topological as well as geometric properties and inclusion relation of this space.

IMCMA@_PP65

A Soft-Set Approach Optimizing Nurse-Resource Allocation In Hospitals: A Computational Framework Mitigating Burnout

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ABSTRACT

Nurse Burnout, driven by excessive workloads and inefficient resource management, adversely impacts well-being and patient outcomes. This study introduces a computational framework combining soft-set theory and linear programming to optimize nurse resource allocation, aiming to reduce burnout and enhance wellness. Using data from 60 nurses managing 180 patients across three shifts, key variables like shift hours, weekly offs, and nurse-patient ratios were modeled to develop an automated weekly roster in Python. The optimized allocation minimized workload disparities and prioritized patient care. Results showed strong correlations between workload and burnout ($r = 0.65$) and between task diversity and reduced emotional exhaustion ($r = -0.58$). Predicted job satisfaction aligned with observed scores ($R^2 = 0.89$), validating the Overall Nurse Wellness Score (ONWS). The model improved operational efficiency and nurse wellness while addressing critical resource allocation challenges. This framework demonstrates the potential of computational tools for equitable workload distribution and sustainable healthcare management. Future research should refine ONWS scoring and extend the model to diverse settings for broader applicability in healthcare management.

LIST OF CONFERENCES OF O.M.S.

S.No	Conference	Year (Dates)	Venue
52	52th	2025(11th-12th January)	Institute of Mathematics & Applications, Andharua, Bhubaneswar-751029
51	51th	2024(2nd-3rd March)	P.G. Department of Mathematics Fakir Mohan University, Vyasa Vihar, Balasore, Odisha
50	50th	2023 (21st–22nd January)	Institute of Mathematics & Applications, Andharua, Bhubaneswar-751029
49	49th	2022 (26th–27th March)	P.G. Department of Mathematics, Utkal University, Vani Vihar, Bhubaneswar-751004
48	48th	2021 (10th–11th April)	Institute of Mathematics & Applications, Andharua, Bhubaneswar-751029
47	47th	2020 (15th–16th February)	National Institute of Science and Technology, Palur Hills, Berhampur-761008
46	46th	2019 (19th–20th January)	Silicon Institute of Technology, Patia, Bhubaneswar-751024
45	45th	2018 (3rd–4th February)	Parala Maharaja Engineering College, Sitapalli, Berhampur-761003
44	44th	2017 (31st March–1st April)	Ravenshaw University, Cuttack-753003
43	43rd	2016 (16th–17th January)	Indus College of Engineering, Barkud Heights, Sundarpada, Bhubaneswar-752050
42	42nd	2015 (7th–8th February)	Vyas Nagar Autonomous College, Jajpur Road, Jajpur-755019
41	41st	2014 (4th–5th January)	KIIT University, Bhubaneswar-751024
40	40th	2012 (29th–30th December)	Sambalpur University, Jyoti Vihar, Sambalpur-768019
39	39th	2012 (4th–5th February)	Vivekananda Institute of Technology (VIVTECH), Chhatabar, Bhubaneswar-752054
38	38th	2011 (8th–9th January)	ITER, S O A University, Bhubaneswar-751030

37	37th	2010 (6th–7th February)	Indira Gandhi Institute of Technology (I.G.I.T), Sarang-759146, Dhenkanal
36	36th	2009 (7th–8th February)	Institute of Mathematics and Applications (IMA), Andharua, Bhubaneswar-751003
35	35th	2008 (2nd–3rd February)	Sailabala Women's College, Cuttack-753001
34	34th	2007 (28th–29th January)	Vyasanagar College, Jajpur Road, Jajpur-755019
33	33rd	2006 (4th–5th February)	School of Mathematical Sciences, Sambalpur University, Jyoti Vihar, Sambalpur-768019
32	32nd	2005 (5th–6th February)	National Institute of Science and Technology, Palur Hills, Berhampur-761008
31	31st	2004 (7th–8th February)	Institute of Mathematics and Applications, Bhubaneswar-751003
30	30th	2003 (22nd–23rd February)	Institute of Advanced Computer and Research, Barijhola, Rayagada-765002
29	29th	2002 (23rd–24th February)	Orissa Engineering College, Nabajyoti Vihar, Nijigarh Kurki, Bhubaneswar-752050
28	28th	2001 (27th–28th May)	Institute of Mathematics and Applications (Pathani Samanta Planetorium), Bhubaneswar
S.No	Conference	Year (Dates)	Venue
27	27th	2000 (11th–12th March)	Utkal University, Vanivihar, Bhubaneswar-751004
26	26th	1998 (24th–25th December)	S.C.S. College, Chandan Hajuri Road, Puri-752001
25	25th	1998 (23rd–25th January)	Utkal University, Vani Vihar, Bhubaneswar-751004
24	24th	1997 (8th–9th February)	Kavi Samrat Upendra Bhanja College, N.H.-59, Bhanjanagar-761126, Ganjam
23	23rd	1996 (2nd–3rd February)	Berhampur University, Bhanji Vihar, Berhampur-760007
22	22nd	1995 (3rd–4th March)	Ravenshaw College, Cuttack-753003

21	21st	1994 (27th–28th February)	Fakir Mohan College, Balasore-756019
20	20th	1993 (20th–21st February)	Salipur College, Salipur-754202, Dist.: Cuttack
19	19th	1992 (22nd–23rd February)	Utkal University, Vani Vihar, Bhubaneswar-751004
18	18th	1990 (28th–29th December)	REC, Rourkela-769008
17	17th	1990 (3rd–4th March)	Sambalpur University, Jyoti Vihar, Sambalpur-768019
16	16th	1989 (14th–15th January)	Khallikote College, Khallikote-760001
15	15th	1988 (13th–14th February)	BJB College, Kalpana Road, Bhubaneswar-751014
14	14th	1987 (1st–2nd March)	Ravenshaw College, Cuttack-753003
13	13th	1985 (23rd–24th December)	Sambalpur University, Jyoti Vihar, Sambalpur-768019
12	12th	1984 (30th–31st December)	Banki College, Banki-754008
11	11th	1984 (29th–30th January)	U.C.E., Burla-768018
10	10th	1983 (12th–13th February)	O.U.A.T., Bhubaneswar-751003
9	9th	1982 (14th–15th February)	Sambalpur University, Jyoti Vihar, Sambalpur-768019
8	8th	1981 (7th–8th March)	BJB College, Kalpana Road, Bhubaneswar-751014
7	7th	1980 (27th–28th January)	Utkal University, Vani Vihar, Bhubaneswar-751004
6	6th	1977 (19th–21st December)	Kendrapara College, Kajala, Kendrapara-754211
5	5th	1976 (21st–23rd December)	Berhampur University, Bhanji Vihar, Berhampur-760007

4	4th	1975 (20th–22nd December)	G.M. College, Sambalpur-768004
3	3rd	1974 (22nd–24th December)	Ravenshaw College, Cuttack-753003
2	2nd	1974 (20th–22nd January)	Dept. of Mathematics, REC, Rourkela-769008
1	1st	1973 (20th–21st January)	P.G. Dept. of Mathematics, Utkal University, Vanivihar, Bhubaneswar-751004

FELICITATION IN DIFFERENT CONFERENCES OF O.M.S.

52nd Annual Conference:11th -12th Jan-2025
Venue: Institute of Mathematics & Applications, Andharua, Bhubaneswar-751029
(i)Mr. Sanatan Sahoo (Retired from Govt. college, Odisha)
(ii) Mr. Bhagabat Pradhan (Retired school teacher)
(iii) Prof. Kailash Mishra (North Carolina State university USA)

51st Annual Conference: 2nd - 3rd March - 2024
Venue: Fakir Mohan University, Vyasa Vihar, Balasore, Odisha, Pin - 756020
***(i)* Mr. Dibakar Das**
(ii) Mr. Ramachnadra Nayak
(iii) Mr. Budhiraj Pradhan
(iv) Dr. Jagarnath Debata
(v) Dr. sanjay Mohanty
(vi) Mr. Nrusingh Charan nayak

50th Annual Conference: 21st and 22nd January 2023
Venue: Institute of Mathematics & Applications, Andharua, Bhubaneswar-751029
(i) Prof. Arabind Das, Retd from Ekamra College, Bhubaneswar
(ii) Prof. Prasanna Kumar Satpathy, Retd. from SCS College, Puri
(iii) Sri Ashok Pradhan, Retd School teacher of Satyabadi High School

49th Annual Conference: 26th and 27th March 2022
Venue: P.G. Department of Mathematics, Utkal University, Vani Vihar, Bhubaneswar-751004
(i) Prof. Maheswar Mishra (Retd from Govt. College)
(ii) Prof. Dayanidhi Parida (Retd. from Govt. College)
(iii) Prof. Gourang Charan Dash (Retd. from UCE, Burla)
(iv) Prof. Durga Madhab Mishra (Retd from G.M. College, Govt.)
(v) Sri Nagendra Kumar Mishra (Retd. Teacher, Pyari Mohan Academy, Cuttack)
(vi) Late Prof. Shankar Prasad Mishra (Founder General Secretary of OMS and former

Professor and Head of P.G. Department of Mathematics, Utkal University, Vani Vihar)
On the occasion of the Golden Jubilee Celebration, the following members of OMS are honoured:
(vii) Prof. Siba Prasad Mishra
(viii) Prof. Rama Sankar Rath
(ix) Prof. Gokulananda Das
(x) Late Prof. Ramanath Mohanty
(xi) Late Prof. Bama Charan Das
(xii) Late Prof. Brajabandhoo Misra
(xiii) Late Prof. Ghanashyam Samal
(xiv) Late Prof. Tribikram Pati

48th Annual Conference: 10th and 11th April 2021
Venue: Institute of Mathematics & Applications, Andharua, Bhubaneswar-751029
(i) Sri Khetrabasi Das (Retd.), Manpur Nodal U.P. School, Ali, Dist: Kendrapara
(ii) Prof. (Dr.) S. A. N. Moorthy (Retd. Kendrapara College)
(iii) Prof. Surendra Nath Mohapatra (Retd. Kendrapara College)
(iv) Prof. (Dr.) Rabindra Kumar Patnaik (Retd. He was at Pilani and Silicon Institute)

47th Annual Conference: 15th and 16th February 2020
Venue: National Institute of Science and Technology (NIST), Palur Hills, Berhampur-761008
(i) Sri Lalit Mohan Das (Retd.), H. School, G. Udayagiri, Kandhamal
(ii) Prof. (Dr.) Chandra Kishore Mohapatra (Retd.), Sambalpur University
(iii) Prof. (Dr.) Sudarsan Padhy (Retd.), Utkal University
(iv) Prof. (Dr.) Umakant Mishra (Retd.), Berhampur University

46th Annual Conference: 19th and 20th January 2019
Venue: Silicon Institute of Technology (SIT), Silicon Hills, Patia, Bhubaneswar-751024
(i) Late Sri Narayan Pati: Retired from Govt. School, Cuttack
(ii) Late Prof. Subash Chandra Jena: Retired from Govt. College, Odisha

45th Annual Conference: 3rd and 4th February 2018
Venue: Parala Maharaja Engineering College (PMEC), Sitalapalli, Berhampur-761003, Dist: Ganjam
(i) Sri Madan Mohan Samal, Retired Teacher, Jayaram High School, Kairlopatana, Kendrapara
(ii) Late Prof. (Miss) Priti Mohapatra (Utkal University)
(iii) Late Prof. Shantilata Mishra (Utkal University)
(iv) Prof. Chakradhar Das (Retired from NIT, Rourkela)
(v) Prof. Tarini Charan Panda (Retired from Berhampur University)

44th Annual Conference: 31st March and 1st April 2017
Venue: Ravenshaw University, Cuttack-753003
(i) Prof. (Mrs.) Subhadra Rath (Retd. from Berhampur University)

(ii) Late Prof. Akshaya Kumar Mohanty (Retd. from V.N. College, Jajpur Road)
(iii) Sri Umakant Mishra (Retd. School teacher from Govt. High School, Medical Campus, Berhampur)

43rd Annual Conference: 16th and 17th January 2016
Venue: Indus College of Engineering, Barakuda Heights, Bhubaneswar-752050, Khurda
(i) Sri Prafulla Chandra Samantaray (Retired school teacher), Jamapara Boys High School, Jampara, Kendrapara
(ii) Sri Shyam Sundar Panda (Retired school teacher), Prithviraj High School and DIET, Bolangir
(iii) Prof. Gopal Chandra Hotta (Retired from Govt. College, Khalikote, Ganjam)
(iv) Prof. Krutibas Dutta (Statistics) (Retired from Sambalpur University, Jyoti Vihar, Burla)

42nd Annual Conference: 7th and 8th February 2015
Venue: Vyasa Nagar Autonomous College, Jajpur Road
(i) Sri Bhikari Charan Sahu, Sri Ananta Charan Sethi (School teachers)
(ii) Prof. Narahari Parhi, Prof. Indulata Shukla, Prof. Bhagaban Patra (University/College)

41st Annual Conference: 4th and 5th January 2014
Venue: KIIT University, Bhubaneswar-24
(i) Sri Raghunath Mohapatra, Sri Parsuram Sahoo (School teachers)
(ii) Prof. Sudarsan Nanda (Retired from IIT, Kharagpur)
(iii) Prof. Trilochan Biswal (Retired from BJB College)
(iv) Late Prof. Sashikanta Mishra (Retired from BJB College)

40th Annual Conference: 29th and 30th December 2012
Venue: Sambalpur University, Jyoti Vihar, Burla
(i) Sri Pramod Kumar Mishra, Sri Prafulla Kumar Puhan, Sri Bhojraj Swain (School teachers)
(ii) Prof. Banamali Mishra, Prof. Chittaranjan Samantaray, Prof. Udaya Nath Samantaray, Prof. Purna Chandra Das (University/College teachers)

39th Annual Conference: 4th and 5th February 2012
Venue: VIVTECH, Chhatabar, Bhubaneswar-752054
(i) Sri Bankim Chandra Moharana, Sri Laxman Kumar Sahu (School teachers)
(ii) Prof. P. C. Das (Former Prof., IIT Kanpur), Prof. Dipti Rath (BU), Prof. B. B. Panda (SU)
(iii) Late Prof. Sribatsa Nanda (REC, RKL), Late Prof. Jairam Parida (REC, RKL), Late Prof. Sridhar P. Mohanty (IIT Kanpur) (University/College teachers)

38th Annual Conference: 8th and 9th January 2011 Venue: ITER, SOA University, Bhubaneswar
(i) Sri Dular Singh Nayak (School teacher)
(ii) Prof. Sri Gopal Mohanty (Statistics, Canada)
(iii) Prof. (Miss) Bhabani Rout (Ravenshaw)
(iv) Prof. Muralidhar Samal (Ravenshaw)
(v) Prof. Braja Kishore Roy (Univ/College teachers)

37th Annual Conference: 06-Feb-2010 to 07-Feb-2010 Venue: Indira Gandhi Institute of Technology, Sarang, Dhenkanal
(i) Prof. R. K. Panda
(ii) Prof. S. Pattanaik (College/Univ)
(iii) Shri Debesh Chandra Mukherjee (School teacher, Talcher)
36th Annual Conference: 07-Feb-2009 to 08-Feb-2009 Venue: Institute of Mathematics and Applications, Bhubaneswar
(i) Prof. Karamat Ali
(ii) Prof. R. S. Rath
(iii) Prof. M. N. Mishra (Statistics, Sambalpur Univ.)
(iv) Prof. J. Sarangi (Statistics, UU)
(v) Prof. B. P. Acharya
(vi) Sri Sishir Kumar Satpathy
35th Annual Conference: 02-Feb-2008 to 03-Feb-2008 Venue: Sailabala Women College, Cuttack
(i) Prof. Gokulananda Das (Retd. From Utkal University, Vani Vihar)
(ii) Shri Madan Mohan Mahanty (Retd. from BSE, Cuttack)
29th Annual Conference: 23rd and 24th February 2002 Venue: Orissa Engineering College, Bhubaneswar
(i) Prof. Jyotirmoy Sinhari (Utkal University)
25th Annual Conference: 24-Jan-1998 to 25-Jan-1998 Venue: Utkal University, Vani Vihar, Bhubaneswar
(i) Prof. Tribikram Pati (University)
(ii) Sri Brundaban Singh
24th Annual Conference: 08-Feb-1997 to 09-Feb-1997 Venue: K S U B College, Bhanjanagar
(i) Prof. N. N. Swamy
(ii) Sri Dandapani Panigrahi
(iii) Sri Gopinath Khadenga
23rd Annual Conference: 02-Mar-1996 to 03-Mar-1996 Venue: Berhampur University, Bhanj Vihar, Berhampur
(i) Prof. Nanda Kishore (Berhampur University)
(ii) Sri Debaraj Pattnaik
22nd Annual Conference: 03-Mar-1995 to 04-Mar-1995 Venue: Ravenshaw College, Cuttack
(i) Sri B. N. Ray
(ii) Prof. Siba Prasad Mishra
(iii) Sri Anirudha Mohanty
21st Annual Conference: 27-Feb-1994 to 28-Feb-1994 Venue: Fakir Mohan College, Balasore
(i) Late Prof. Minaketan Das
(ii) Smt. Sindumati Devi
(iii) Sri Sachindra Chandra Das
(iv) Late Sri Lambodar Acharya
20th Annual Conference: 20-Feb-1993 to 21-Feb-1993 Venue: Salipur College, Salipur
(i) Prof. Umakanta Mahapatra
(ii) Dr. (Mrs) Prativa Devi
(iii) Shri Bhagaban Mishra

(iv) Shri Chandra Sekhar Dalua
19th Annual Conference: 22-Feb-1992 to 23-Feb-1992 Venue: Utkal University, Vani Vihar, Bhubaneswar
(i) Prof. Ghanshyam Samal
(ii) Sri Sudhansu Sekhar Dubey
(iii) Sri Khageswar Das
18th Annual Conference: 22-Dec-1990 to 23-Dec-1990 Venue: REC, Rourkela
(i) Prof. A. K. Das (REC, RKL)
(ii) Dr. K. C. Nayak (REC, RKL)
(iii) Shri Bana Bihari Singh
17th Annual Conference: 03-Mar-1990 to 04-Mar-1990 Venue: Sambalpur University, Jyoti Vihar
(i) Prof. B. S. K. R. Somayajulu
(ii) Sri Kanhu Charan Panda
16th Annual Conference: 14-Jan-1989 to 15-Jan-1989 Venue: Khalikot College, Khalikot
(i) Prof. Madan Mohan Nanda
(ii) Shri P. V. Chalapati Rao
(iii) Shri Jugal Kishore Panigrahi
15th Annual Conference: 03-Feb-1988 to 04-Feb-1988 Venue: BJB College, Bhubaneswar
(i) Prof. Sankarshan Mohapatra
(ii) Prof. Jayanarayan Panda
(iii) Shri Padmanabha Das
14th Annual Conference: 01-Mar-1987 to 02-Mar-1987 Venue: Revenshaw College, Cuttack
(i) Prof. Sarasi Mohan Das (Principal of Stewart Science College, Cuttack)
(ii) Prof. Siba Kumar Panda (Principal of BJB College, Bhubaneswar)
(iii) Sri Pranabandhu Jena (Teacher of Bhadrak High School)
13th Annual Conference: 23-Dec-1985 to 24-Dec-1985 Venue: Sambalpur University, Jyoti Vihar
(i) Prof. Brajabandhoo Misra
(ii) Shri Indu Bhushan Dasgupta
12th Annual Conference: 30-Dec-1984 to 31-Dec-1984 Venue: Banki College, Banki
(i) Prof. Ramanath Mohanty (Founder President of OMS)
(ii) Prof. Bama Charan Das
(iii) Shri Nanda Kishore Rath (School teacher, Cuttack)

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	Dr. P Panigrahi		

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Technology, Bhubaneswar)			
Prof. Prasanta Kumar Ray (Sambalpur University, Sambalpur)	7008049709	prasantamath@suniv.ac.in	
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Dr. Ajay Kumar Singh (Ekamra College, Bhubaneswar)	8763186290	ajayakumarsingh1966@gmail.com	
Dr. Mrutyunjay Das (KIIT University, Bhubaneswar)	9437013662	mdasfma@kiit.ac.in	
Dr. Srikumar Acharya (KIIT, BBSR)	9439349755	Srikumar.kgp@gmail.com	
Dr. (Mrs) Bichitra Pani (Shailabala Women's Auto. College, Cuttack)			
Dr. Pallab Kumar Kar (GIFT, BBSR)	7978058091	Dr.pallab@gift.edu.in	
Special Invitees			
Prof. G. Das (Former V.C, U.U)	9437035121	gdas100@yahoo.com	
Prof. Sudarsan Padhy (Past Immediate Past President of OMS) (Ex-officio)	9437204666	spadhy07@gmail.com	
Prof. Chandra Kishore Mohapatra	9437661584	compact100@yahoo.com	

LIST OF PRESIDENT AND SECRETARY O.M.S. CONFERENCE

Anuul Conf.	Venue	Date	President	General Secretary	Local/Org. Secretary	Treasurer
1st	Utkal University, Vani Vihar, Bhubaneswar	20th-21st Jan- 1973	Prof. R. Mohanty	Prof. Shankar Prasad Mishra	Prof. Shankar Prasad Mishra	Prof. R.S. Rath
2nd	REC Rourkela	20th -22nd Jan- 1974	do	do	Siba P. Mishra	Do
3rd	Ravenshaw College, Cuttack	22nd -24th Dec- 1974	do	Sribatsha Nanda	M.M. Nanda	S.S. Dubey
4th	G.M. College, Sambalpur	20th -22nd Dec - 1975	Bama Charan Das	do	G. Samal	Do
5th	Berhampur University, Bhanja Vihar	21st -23rd Dec- 1976	do	Dipti Ratha	Nanda Kishore	Dayanidhi Panda

6th	Kendrapara College, Kendrapara	19th -21st Dec-1977	do	do	S.A.N. Murthy	Do
7th	Utkal University, Vani Vihar, Bhubaneswar	27th – 28th Jan - 1980	do	B.P. Acharya	Gokulanand Das	Sashi Kanta Mishra
8th	B.J.B. College Bhubaneswar	7th – 8th Mar- 1981	do	do	S.N. Sengupta	Do
9th	Sambalpur Univ. Jyoti Vihar	14th – 15th Feb - 1982	Do	R.K. Panda	S. Pattanayak	Do
10th	O.U.A.T, Bhubanesar	12th – 13th Feb- 1983	B. Mishra	Do	S. Mohanty	T. Biswal
11th	U.C.E. Burla	29th – 30th Jan 1984	do	do	G. Pradhan	Do
12th	Banki college , Banki	30th – 31st dec- 1984	do	S.C. Jena	Mj. T. Dash	Do
13th	Sambalpur Univ. Jyoti Vihar	23rd – 24th Dec-1985	G. Samal	do	S. Pattanayak	Do
14th	Ravenshaw College, Cuttack	1st – 2nd Mar- 1987	do	do	N.N. Swamy	P.K. Satpathy
15th	B.J.P. College, Bhubaneswar	13th -14th Feb-1988	do	Arabinda Das	B. Mishra	Do
16th	Khalikote College	14th – 15th Jan- 1989	do	do	Karamat All	Do
17th	Sambalpur Univ. Jyoti Vihar	3rd – 4th Mar - 1990	Nandkishore	Sudarsan Nanda	S. Pattanayak	S. Padhy
18th	REC, Rourkela	28th – 29th Dec- 1990	do	K. Dutta	Sribatsa Nanda	Do
19th	Utkal University, Vani Vihar, Bhubaneswar	22nd -23rd Feb-1992	Madan Mohan Nanda	C.R. Samantray	G. Das	Do
20th	Salipur college, Salipur	20th – 21st Feb-1993	Tribikram Pati	do	P.C. Mishra	H. Pattanayak
21st	F.M. College, Balasore	27th -28th Feb-1994	do	do	N. Basu	H. Pattanayak
22nd	Ravenshaw College, Cuttack	3rd – 4th Mar-1995	Do	Banamali Mishra	N. Tripathy	Do
23rd	Berhampur Univ. Berhampur	2nd – 3rd Feb- 1996	do	do	T.C. Panda	J. P. Debata
24th	K.S.U.B. College Bhanjnagar	8th – 9th Feb- 1997	do	U.N. Samantray	T.C. Padhi	J.P. Debata
25th	Utkal University, Vani Vihar, Bhubaneswar	23rd -25th Jan -1998	Do	do	S. Padhy	Do
26th	S.C.S College, Puri	24th – 25th Dec-1998	do	do	P.C. Panda	R. C. Dash
27th	Utkal University, Vani Vihar, Bhubaneswar	11th – 12th Mar-2000	do	S. Padhy	S. Padhy	R.C. Dash
28th	IMA, PS Planetorium	27th – 28th May- 2001	do	do	S. Pattanayak	Do
29th	OEC, Bhubaneswar	23rd -24th Feb-2002	G. Das	T.C. Panda	Gayatri Devi	Nagen Ch. Patra
30th	IACR, Rayagada	22nd – 23rd Feb-2003	do	do	B.B. Panda	Do

31st	IMA, Bhubaneswar	7th – 8th Feb-2004	S. Pattanayak	C.K. Mohapatra	C.K. Mohapatra	A.K. Ojha
32nd	NIST, Berhampur	5th -6th Feb-2005	do	do	L.S.P.K. Kar	Do
33rd	Sambalpur Univ. Jyoti Vihar	4th – 5th Feb-2006	Mahendra Nath Mishra	A.K. Ojha	Sabita Sahoo	M.K. Mahanti
34th	V.N. College, Jajpur Road	28th – 29th Jan-2007	do	do	A.K. Mohanty	Do
35th	Sailabala Women's college, Cuttack	2nd- 3rd Feb- 2008	Birendra Kumar Nayak	A. K. Mohanty	Dhiren K Dalai	Do
36th	IMA, Andharua, Bhubaneswar	7th – 8th Feb-2009	do	do	S. Pattanayak	Do
37th	Indira Gandhi Institute of Technology, Sarang	6th -7th Feb- 2010	Bishnu P achrya	H. Pattanayak	N.K. Chaudhury	Manas K Bhuyan
38th	S.O.A. Univ. ITER, Bhubaneswar	8th – 9th Jan-2011	do	do	G.C. Dash	Do
39th	VIVTECH, Chhatabar, Bhubaneswar	4th – 5th Feb-2012	Sudarsan Nanda	Jayant Ku. Dash	Trilochan Biswal	Prayag p Mishra
40th	Sambalpur Univ. Jyoti Vihar	29th – 30th Dec-2012	do	do	A. K. Tripathy	Do
41st	KIIT University, Bhubaneswar	4th -5th Jan-2014	Chandra K. Mohapatra	Minaketan Mahanti	S. Nanda	J.R. Nayak
42nd	V.N. College, Jajpur Road	7th -8th Feb- 2025	do	do	Bibekananda Jena	Do
43rd	Indus College of Engineering , Bhubaneswar	16th – 17th Jan-2016	Tarini Chandra Panda	Nalin Kanta Chaudhury	K.C. Mohanty	Do
44th	Ravenshaw University, Cuttack	31st March-1st April -17	do	do	Mrs Subarna Bhattacharjee	Do
45th	Parala Maharaja Engineering College, Berhampur	3rd -4th Feb-2018	Sudarsan Padhy	do	Dr. Chitta Ranjan Malik	Sabyasachi Pani
46th	Silicon Institute of Science and Technology, Bhubaneswar	19th -20th Jan -2019	do	do	Dr. Saroj Kumar Misra	Do
47th	National Institute of Science and Technology, Berhampur	15th -16th Feb -2020	Prof. Rama Shankar Ratha	Tushar Kanti Tripathy	Dr. Bishnukar Nayak	Do
48th	Institute of Mathematics and Applications, Bhubaneswar	10th -11th April-2021	do	do	Dr. Sudhakar Sahoo	Do
49th	P.G. Dept. of Mathematics, Utkal University, Vani Vihar, Bhubaneswar	26th – 27th Mar-2022	Prof. Nalin Kanta Chaudhury	Prof. Sabyasachi Pani	Dr. (Mrs)Anasua Nath	Dr. Trailokya Panigrahi
50th	Institute of Mathematics and Applications , Bhubaneswar	21st - 22nd Jan-2023	Prof. Nalin Kanta Chaudhury	Prof. Sabyasachi Pani	Dr. Sudhakar Sahoo	Dr. Trailokya Panigrahi
51st	Fakir Mohan University, Balasore	2nd – 3rd Mar-2024	Dr. Pramod Kumar Das	do	Dr. Amit Kumar Sarma	Dr. Trailokya Panigrahi
52nd	Institute of Mathematics and Applications , Bhubaneswar	11th -12th Jan-2025	do	do	Dr. Trailokya Panigrahi	Dr. Trailokya Panigrahi

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Institute of Mathematics and Applications

(Science & Technology Department, Govt. of Odisha)
Andharua, Bhubaneswar - 751029

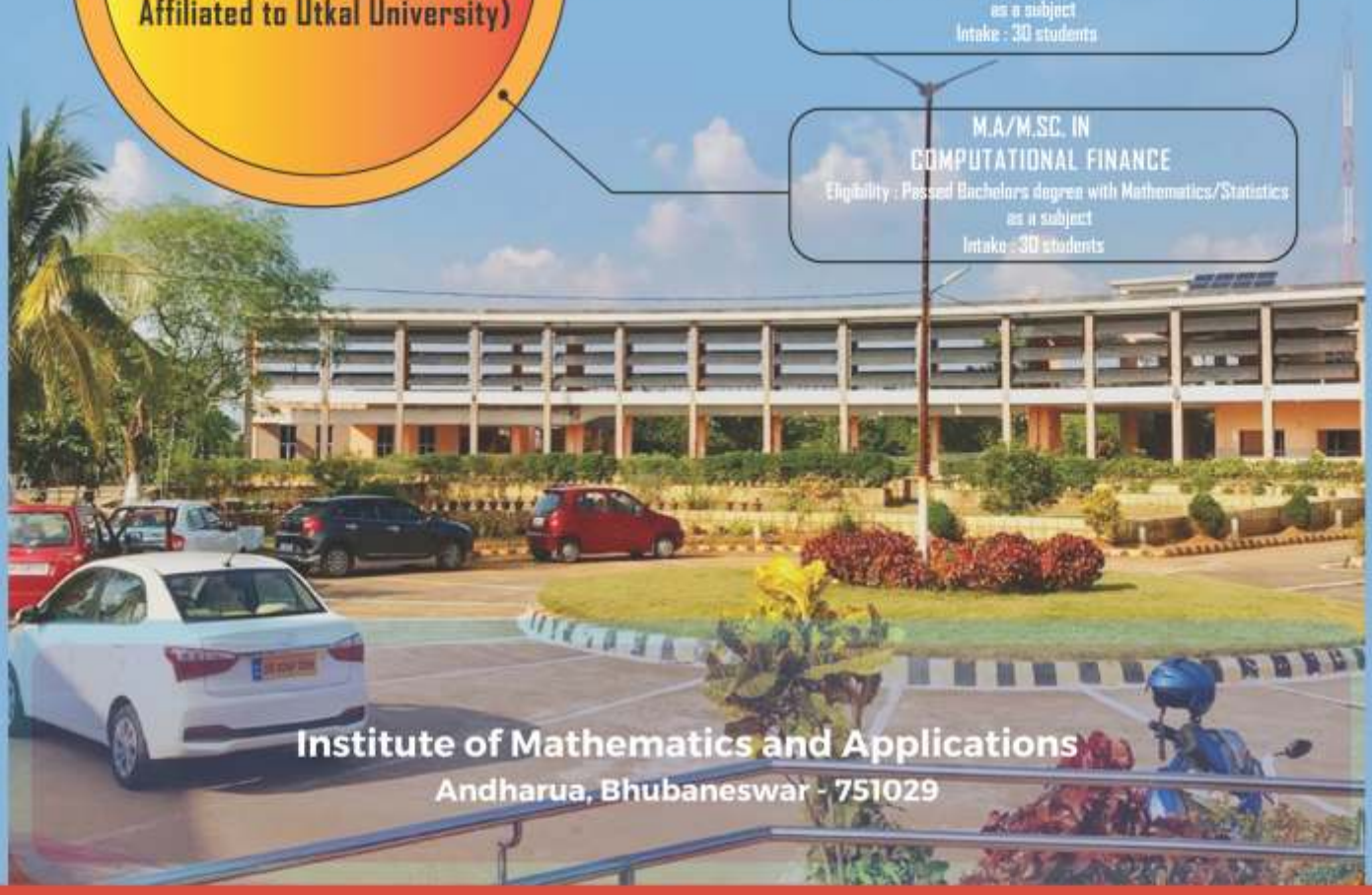
PROGRAMMES OFFERED

(Approved by Govt. of Odisha and Affiliated to Utkal University)

B.SC.(HONS) IN MATHEMATICS AND COMPUTING
Eligibility : 12th pass out with Mathematics and English as subjects
Intake : 30 students

M.A/M.SC. IN MATHEMATICS WITH DATA SCIENCE
Eligibility : Passed Bachelors degree with Mathematics/Statistics as a subject
Intake : 30 students

M.A/M.SC. IN COMPUTATIONAL FINANCE
Eligibility : Passed Bachelors degree with Mathematics/Statistics as a subject
Intake : 30 students



IMCMA-2025



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Institute of Mathematics and Applications

(Science & Technology Department, Govt. of Odisha)

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