Edition #05 February 2025

BRAHMAGANITH DGVC MATHEMATICS CLUB PRESENTS

MATHPILE

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VISION AND MISSION OF THE POST GRADUATE AND RESEARCH DEPARTMENT OF MATHEMATICS - DDGD VAISHNAV COLLEGE.

Vision:

To Promote and Support a Comprehensive, innovative and dynamic learning environment. To assist students in acquiring a conceptual understanding of the nature and structure of Mathematics, its process and applications.

Mission:

To establish an atmosphere of creative endeavour that supports interdisciplinary collaborations, innovative projects, significant research and informal discussions that mutually benefit students, faculty and community at large.

ABOUT DEPARTMENT OF MATHEMATICS

The department of Mathematics has been the first UG department at the time of inception of the college in 1964. The University of Madras upgraded the department to the postgraduate status in the year 1980. M.Phil. course was started in the year 2001. B.Sc. Mathematics with Computer Applications was started in the year 2011. The Department was given the Ph.D affiliation in the year 2022.

MESSAGE FROM THE SECRETARY

All Our dreams can come true, if we have the courage to pursue them"

- Walt Disney

Dreams may seem to be far removed from reality. They may seem impossible and improbable. But little do we realize that all of us have in us the strength, patience and the passion to fulfil our dreams. The vision and dreams of a few kind hearted philanthropists and educationists, led to the founding of this institution. The hard work and perseverance of the successive members of the management and the academicians have enabled the institution emerge as one of the much sought after colleges in the city. It is now our duty and responsibility to carry forward this dream and with steadfast faith and determination redefine the standard of excellence, strengthen the spirit of solidarity and celebrate the power of knowledge to transform the society.

With Best Wishes,
Shri Ashok Kumar Mundra.
SECRETARY.

MESSAGE FROM THE PRINCIPAL

The meaning of education has transformed greatly in todays technology driven and digitally connected world that we live in, An educator in the present times has to adopt a multi-dimensional approach having knowledge creation, confidence building and honing leadership skills at its core. While many of our students have been greatly contributing to various renowned and reputed organizations as exemplar leaders, the institution and the department also focuses on developing entrepreneurship skills among students so that they would have the courage and conviction to establish an enterprise and create a legacy. The task ahead is clearly defined-educate, enlighten and empower. As Benjamin Franklin said “An investment in Knowledge pays the best interest”.

With Best Wishes,
Capt. Dr. S. Santosh Baboo.
PRINCIPAL.

MESSAGE FROM THE HOD

The Department of Mathematics has recorded consistent improvement in its academic, research and placement performance. It offers a range of innovatively designed programs whose curricula are constantly updated to develop a deep understanding and enjoyment of Mathematics, to carry out original research, to become effective teachers and communicators and to prepare themselves for their future careers. In their curriculum, they are invigorated to take up projects and internship to supplement theoretical knowledge with practical experience. I congratulate the Editorial Board of this Newsletter who have played wonderful role in accomplishing the task in record time. Also my heartfelt congratulations to staff members and students for their fruitful effort.

With Best Wishes,

Mrs. M. Devika.

HEAD OF THE DEPARTMENT.

INVESTURE CEREMONY

The Investiture Ceremony at Dwaraka Doss Goverdhan Doss Vaishnav College, held on 26th July 2024, was a grand and inspiring occasion, on which the Staff as well as the Student Coordinators of The Brahmaganith Club were announced. The event brought both students, faculty together and distinguished guests in a celebration of leadership and commitment. The newly appointed Staff and Student Coordinators were sworn in with great enthusiasm and responsibility, pledging to serve the student body with integrity and dedication. The ceremony was highlighted by the symbolic handing over of the college's flags and badges, signifying the trust placed in the student leaders. This occasion set the tone for an impactful academic year ahead, fostering a sense of pride, unity, and service within the college community.

The event began with great enthusiasm and a sense of anticipation. The college auditorium was adorned with vibrant decorations, and the air was filled with excitement as students, faculty, and dignitaries gathered to witness this prestigious occasion. The chief guest, along with the principal, faculty members, and other notable guests, graced the event, marking the significance of the occasion. The Investiture Ceremony of 26th July 2024 was not just a formal event but a powerful reminder of the values of leadership, service, and dedication. It marked the beginning of a new chapter in the college's journey, one that would be shaped by the vision, enthusiasm, and hard work of the student leaders.

STUDENT INDUCATION PROGRAM

The student induction program serves as a gateway to a seamless transition into university life. It encompasses more than mere orientation; it is an introduction to the academic, social, and cultural environment of the new institution. Through campus tours, academic advising, social gatherings, and informational sessions, the program is structured to provide students with the necessary knowledge and resources to succeed. Ultimately, the student induction program lays the groundwork for a rewarding and successful university experience by delivering vital information, encouraging connections, and empowering students to excel academically, socially, and personally.

EVERY EXPERT WAS ONCE A BEGINNER. EMBRACE THE JOURNEY

MEMORIES FROM SIP

GETAWAYS FROM SIP

The implementation of induction programs is essential for early identification of students' support needs, which allows institutions to deliver focused assistance, such as academic advising, counseling, and tutoring. This forward-thinking approach significantly contributes to student retention and satisfaction levels.

The outcomes associated with a student induction program are varied, including academic integration, social participation, personal development, recognition of support requirements, and cultural comprehension. Collectively, these elements foster a nurturing and supportive academic environment that is vital for student success and overall well-being.

NATIONAL MATHEMATICS DAY

In India, National Mathematics Day is observed every year on December 22nd to celebrate the birth anniversary of the distinguished mathematician, Srinivasa Ramanujan. Ramanujan, who was born on December 22, 1887, is celebrated for his substantial contributions to mathematics, which are acknowledged around the world. The day features a range of activities, including student competitions organized as an intradepartmental event, aimed at promoting the significance of mathematics and stimulating interest in the subject among students and the general populace. This date serves as a reminder of Ramanujan's exceptional achievements and his lasting impact on the mathematical community.

NMD & BRAHMAGANITH

The date of December 22 serves to commemorate Ramanujan's exceptional contributions and his substantial effect on the realm of mathematics. On December 20, 2024, the National Mathematics Day celebrations were held at Dwaraka Doss Goverdhan Doss Vaishnav College, where students, teachers, and mathematics enthusiasts gathered to engage in a series of activities designed to promote the importance of mathematics in daily life and its role in shaping modern technology and science.

The event commenced with an inaugural speech by Dr. S. Dhanashekar, who emphasized the importance of mathematics in modern society. The speech focused o11n Ramanujan's groundbreaking work in number theory and his contribution to mathematical research. By honoring Srinivasa Ramanujan's legacy, the event underscored the importance of fostering curiosity and excellence in the field of mathematics for future generations.

PICTURES FROM NMD

The various activities and discussions sparked a renewed interest in mathematical studies, motivating young minds to explore the vast world of numbers and problem-solving.

INTUTIVE SEMINARS

These Intutive seminars serve a vital function in enhancing networking and building community. These gatherings present opportunities for individuals to meet with other professionals who share similar interests, develop collaborative efforts, and establish important relationships. Networking within the seminar framework not only increases one's professional connections but also fosters a nurturing environment where creativity can thrive and collaborations can flourish. hese meetings offer a valuable chance for individuals to interact with fellow professionals, create alliances, and build substantial connections.

Dr. T. AUGASTINE ARUL PRASAD

Mr. M. BALAMURALIKRISHNAN

The Significance of weekly seminars is rooted in their capacity to promote growth, collaboration, and innovation among academic and professional communities. These events function as centers for knowledge exchange, skill enhancement, networking opportunities, motivation, and ongoing education, thereby playing a crucial role in influencing individual paths and furthering collective initiatives. These gatherings serve as vital platforms for knowledge dissemination, skill acquisition, networking, motivation, and continuous education, thus significantly impacting individual development and the advancement of collective efforts.

INTUTIVE SEMINARS

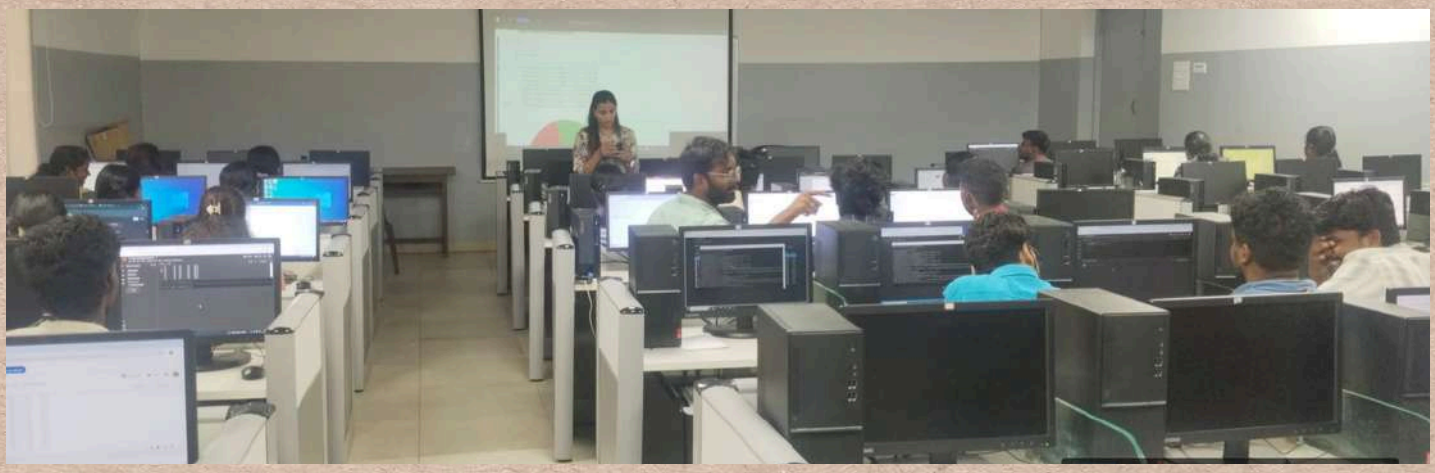
These Seminars offer valuable opportunities for learning, networking, and collaboration. The outcomes of such seminars often reflect the effectiveness of the discussions, presentations, and interactions among participants. Here are some common outcomes that typically result from seminars:

- Increased Knowledge and Awareness.
- Skill Development, Networking and Collaborations.
- Enhanced Problem-Solving Approaches and Application of Knowledge.
- Improves Communication Skills and Active Listening.
- Promotes Continued Learning.

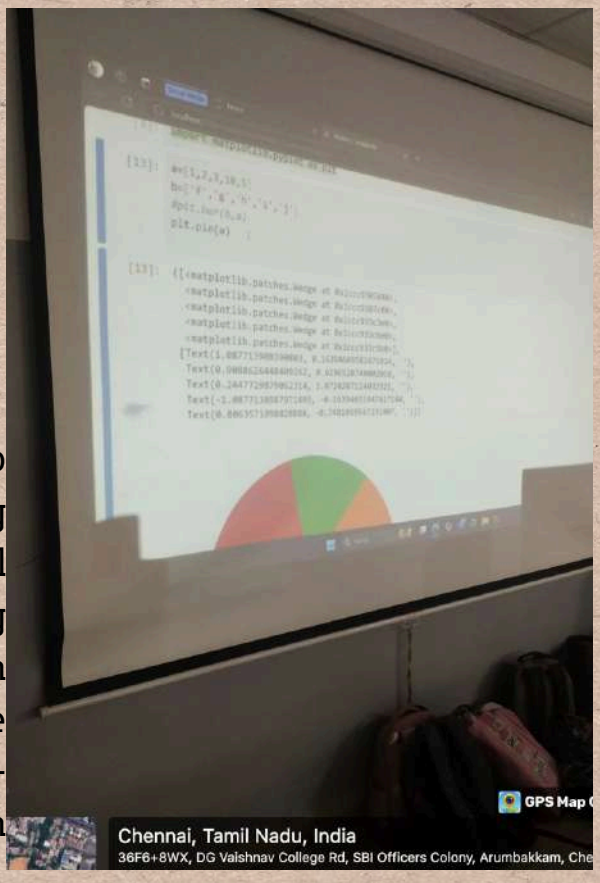
Seminars facilitate the exploration of diverse topics and viewpoints, enabling students to broaden their intellectual horizons beyond the confines of traditional classroom learning. Through exposure to new ideas and research, students enhance their knowledge base and develop a deeper appreciation for their field of study. The outcome of weekly seminars for students extends beyond mere academic achievement, encompassing intellectual stimulation, skill enhancement, and community building. These seminars plays a pivotal role in shaping well rounded and empowered individuals poised for success in academia and beyond.

VALUE ADDED COURSE

PYTHON WITH MACHINE LEARNING



A Value-Added Course (VAC) is an optional supplementary program that offers students the opportunity to enhance their skills, knowledge, or career prospects. These courses are typically skill-based, focusing on developing specific competencies that can benefit students in their academic, personal, or professional lives. Python with machine learning is a powerful combination that enables developers to build intelligent applications that can learn from data and make predictions or decisions.



Upon completing such a program, learners can expect to gain hands-on experience with popular machine learning libraries, develop skills in data preprocessing and model evaluation, and learn to build and train machine learning models. They will also understand how to work with various data types, develop projects that demonstrate their ability to apply machine learning concepts to real-world problems, and gain a solid understanding of Python programming fundamentals.

VALUE ADDED COURSE

IMAGE PROCESSING USING OPEN CV

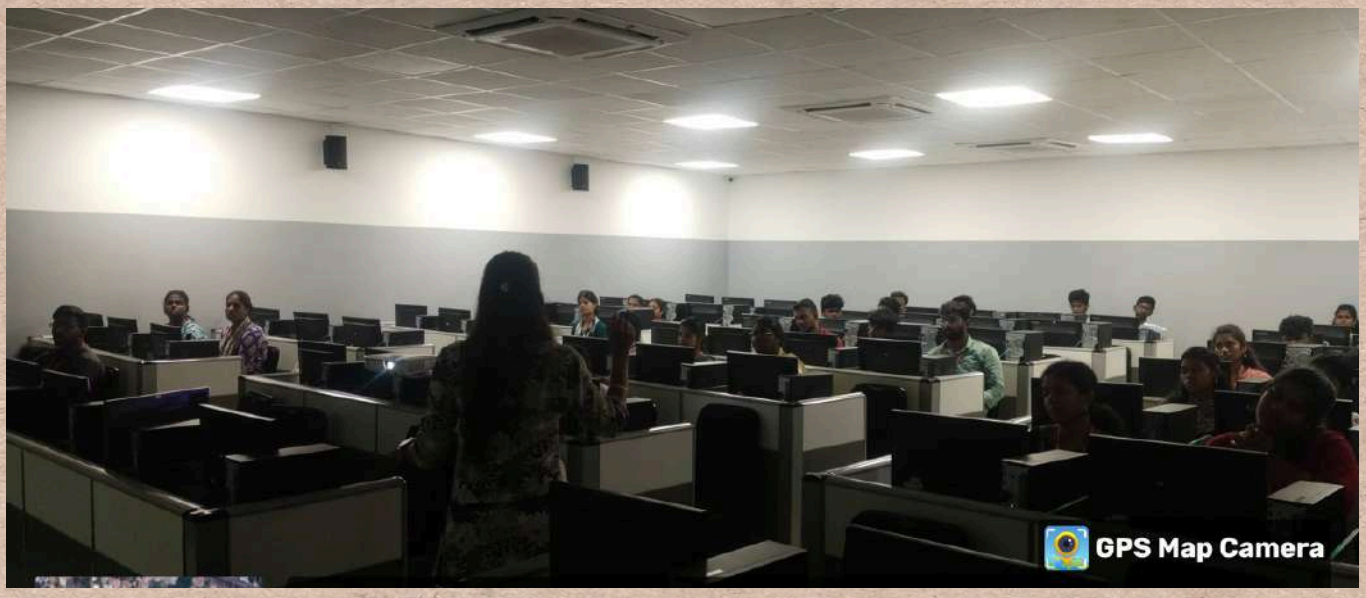


Image processing using OpenCV involves utilizing the library's extensive range of functions to manipulate and analyze images. OpenCV provides a comprehensive set of tools for image processing, including filtering, thresholding, edge detection, and feature extraction. Users can leverage OpenCV's functions to read and write images, convert between different image formats, and perform tasks such as resizing, cropping, and flipping.

Students will develop a solid understanding of image processing concepts and algorithms, and be able to apply this knowledge to a wide range of applications, including robotics, surveillance, and medical imaging.

Learners can expect to gain hands-on experience with OpenCV's extensive library of image processing functions, enabling them to read, write, and manipulate images with ease. They will develop skills in image filtering, thresholding, edge detection, and feature extraction, and learn to apply these techniques to real-world problems.

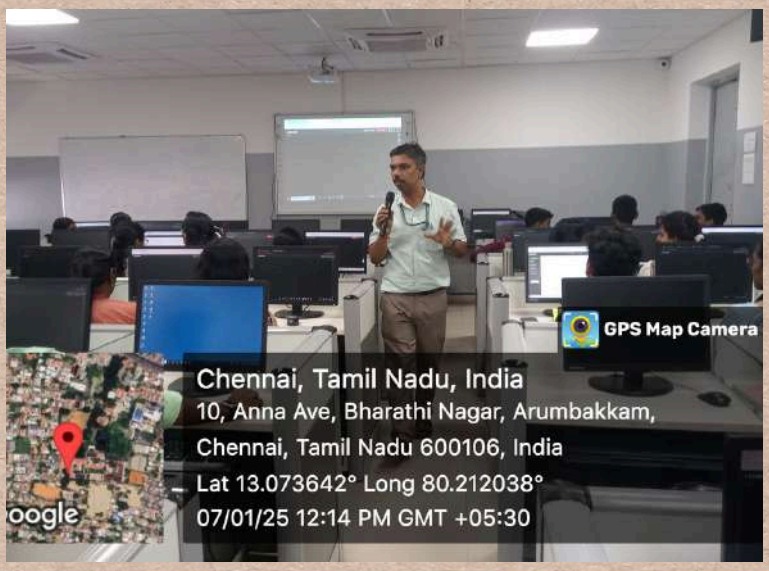
WORKSHOP ON HYPER AUTOMATION

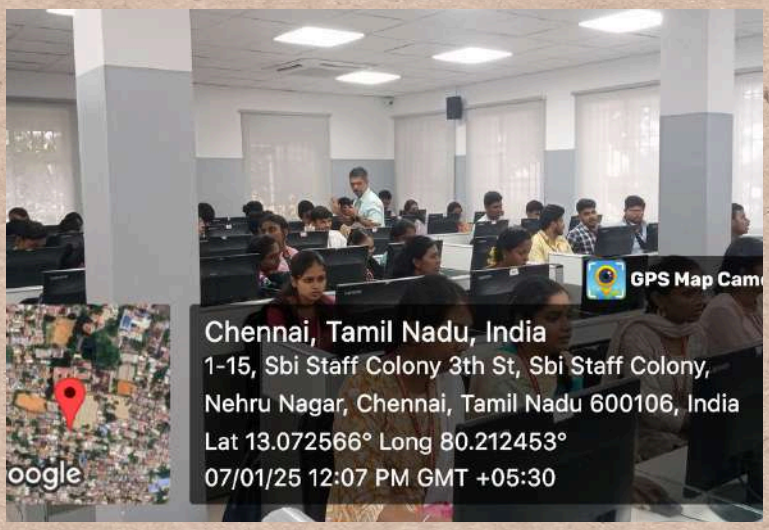
Workshops aimed at students are engaging educational sessions intended to improve multiple facets of their academic, personal, and professional growth. They foster academic excellence by enhancing research skills, critical thinking, and problem-solving abilities. Workshops also focus on personal growth, promoting emotional intelligence, mindfulness, and self-awareness. Additionally, they provide a platform for professional development, equipping students with essential skills such as communication, teamwork, and leadership. Furthermore, workshops facilitate career exploration, networking opportunities, and industry insights, ultimately preparing students for a successful transition into the workforce.

And This year we conducted two workshops, the first one was based on **"HYPER AUTOMATION"**. The guest speakers were Mr. **Khalai Chelvan**, Co-Founder and Managing Director, **Sandhata Technologies** and **Mr. Boopathy Rajendran**, MD & Global Head - Integrated Process Automation, **Sandhata Technologies** little bit of body text

WORKSHOP ON LATEX

The second workshop was based on **LATEX - A Documentation Tool** .
Our esteemed speaker,
Dr. S. Hariharan, Assistant Professor, Dwaraka Doss Goverdhan Doss Vaishnav College, Chennai





The workshop on Hyper Automation yielded numerous valuable outcomes, including a comprehensive understanding of Hyper Automation concepts, familiarity with automation tools and technologies, and hands-on experience with automation tools. Participants developed improved problem-solving and analytical skills, enhancing their career prospects and gaining a competitive edge in the job market. The workshop also facilitated networking opportunities, inspired new project ideas, and increased awareness of automation opportunities.

The LaTeX workshop empowered participants with the skills and knowledge to create professional-grade documents, equipping them with a comprehensive understanding of LaTeX fundamentals, syntax, and best practices. Attendees gained hands-on experience with LaTeX editors, learned how to structure and format documents, and explored advanced features such as bibliographies, indexes, and graphics. By the end of the workshop, participants were able to create complex documents with ease, including theses, dissertations, research papers, and presentations, thereby enhancing their academic and professional communication skill.

EVS TRIP

EVS stands for Environmental Studies or Environmental Science. It is an interdisciplinary field that focuses on the natural world and the impact of human activity on the environment. EVS aims to promote environmental awareness, education, and sustainability, encouraging individuals to adopt eco-friendly practices and contribute to a healthier planet.

Our institution arranged EVS trip for students with aim of fostering environmental awareness and stewardship among students.

This trip was planned to ARB Organic Farm, Thiruvallur and College of food and Dairy Technology, Alamathi - Koduveli

The college EVS trip yielded numerous valuable outcomes, including enhanced environmental awareness and education, practical skills and experience in fieldwork and research, and community engagement and outreach.

INDUSTRIAL VISIT

A College Industrial Visit (IV) is an educational trip that provides students with hands-on experience and exposure to real-world industrial environments. The objective of an IV is to impart practical knowledge, facilitate industry exposure, and offer networking opportunities, enabling students to understand the relevance of their academic studies to real-world industrial applications and career paths.

This year our institution arranged an industrial visit to Aavin production in Sholinganallur.

This offers numerous benefits, including exposure to real-world industrial environments, practical knowledge, and hands-on experience. It provides students with opportunities to interact with industry experts, gain insights into industrial operations and management, and understand the latest technologies and trends.

<u>This IV was arranged for Final Year PG and UG Students</u>

Students gain valuable insights into industrial operations, management, and latest technologies, bridging the gap between theoretical knowledge and practical application. Additionally, an IV fosters networking opportunities, inspires innovation and entrepreneurship, and helps students develop essential skills such as communication, teamwork, and problem-solving, ultimately making them industry-ready and enhancing their employability prospects.

STUDENTS ARTICLE

ARTICLE I:

FACTS ABOUT MATHS

* Every even number greater than 2 can be expressed as the sum of two primes (Goldbach's Conjecture).
*The Fibonacci sequence appears in nature, such as in flower petals and pinecones.
* The golden ratio is aesthetically pleasing: It appears in art and architecture.
* Tessellations tile a plane: They use repeating shapes to cover a surface.
* The Möbius strip is a one-sided surface: It has no distinct inside or outside.
* The Klein bottle is a non-orientable surface: It has no inside or outside in 3D space.
*The sum of the digits of any multiple of 9 is also a multiple of 9.
* The Euler line passes through several important points in a triangle (centroid, orthocenter, circumcenter).
* A hexagon is the most efficient shape for tiling a plane (e.g., honeycombs).
* The Platonic solids are the only five regular convex polyhedra.
* The number 1729 is the smallest taxicab number, discovered by Ramanujan.
* Negative numbers were not widely accepted until the 17th century.
* The birthday paradox shows that in a group of 23 people, there's a 50% chance that two share a birthday.
* The Riemann Hypothesis is one of the biggest unsolved problems in mathematics.
* There are infinitely many twin primes (conjectured but not yet proven).
* The Four Color Theorem states that any map can be colored with at most four colors.
* Fractals are self-repeating patterns that appear in nature.
* The Banach-Tarski paradox suggests that a sphere can be split and rearranged into two identical spheres, defying intuition.

ARTICLE 2:

Rendering Reality - Math behind 3D - Gaussian Splatting

-Arjun K T R.
(MSc. Mathematics).

Gaussians **Refined**

We are living in a time where AI and deep learning models are used to render a scene in 3D. **Gaussian Splatting** is a powerful technique in computer vision and graphics used for 3D image reconstruction. It involves projecting 2D image features (such as key points or pixel intensities) into 3D space, represented as a Gaussian distribution centered at each 3D position. These Gaussians are then combined to form a continuous 3D representation of the scene, which is particularly useful for real-time radiance field rendering, enabling photorealistic scenes from a limited number of images .

How It Works :

Traditional methods like **Photogrammetry** (analyzing multiple images take from different perspectives by photographing it from various angles) and deep learning methods like **NeRF (Neural Radiance Field)** to reconstruct 2D structures from 3D images but photogrammetry has limitations such as handling non rigid scenes, sensitive to lighting conditions and being computationally expensive. So, 3D Gaussian platting uses **splats** and is based on representing the scene as a set of points in space, known as **“Gaussians”.**

These Gaussians are similar to **drops** or **splats** in 3D space, and each one has its own unique parameters, such as **position, size, and color**. It involves calculating the **Gaussian function** for each key point or pixel in the image. This function resembles a smooth, bell-shaped curve, similar to a hill when plotted on a graph. where (x,y,z) are the coordinates of the key point or pixel, (X, Y, Z) are the coordinates in 3D space, and σ is the standard deviation controlling the spread of the Gaussian.

We then use a process called **optimization** to adjust the size and shape of the Gaussian functions so that they fit the scene as closely as possible and render new images from different viewpoints and projecting the gaussian functions to a 2D plane and blending them together to create a high-quality image of complex 3D scene with **interactive frame rates**. 3D Gaussian splatting is widely used in **virtual reality, computer graphics generation and architectural visualization**.

ARTICLE 3:

THE MATH BEHIND MAKING THE BEST DECISION

- RUBEN RAO

III B.Sc Mathematics

Imagine you're a hiring manager looking for the perfect candidate. You have 100 applicants to interview, but there's a problem—you have to decide in real time. Once you reject a candidate, they're gone forever. If you hire too early, you might miss out on someone better. If you wait too long, your top choices might already be taken. So, when should you stop searching and make a decision?

Surprisingly, mathematicians and computer scientists have found an answer: 37%. This simple yet powerful rule helps determine the best time to stop exploring options and commit. It applies to hiring, investments, and countless other real-life choices where waiting too long or acting too soon can lead to regret.

WHY 37%?
THE MATH BEHIND THE RULE

The 37% rule comes from a mathematical concept called optimal stopping, which is part of probability theory. The idea is straightforward: after evaluating 37% of your options, you should pick the next choice that is better than everything you've seen so far.

Here is how it works :

- If you commit too early, you risk settling for something subpar.
- If you wait too long, you may run out of options and be forced to accept whatever is left.
- The sweet spot—balancing risk and opportunity—is 37%.

Mathematicians derived this number using advanced probability calculations, including factorials, integrals, and recursive functions. By stopping at 37%, you establish a benchmark that maximizes the likelihood of selecting the best possible choice from a limited pool. This concept is explored in Brian Christian and Tom Griffiths' book, ***Algorithms to Live By: The Computer Science of Human Decisions.*** The book explains how principles from computer science—such as optimal stopping, caching, and game theory—can help us make smarter real-world decisions. The 37% rule is one of its most practical takeaways.

Now, let's analyze the situation we introduced in the beginning. If a company plans to interview 100 candidates, the best strategy is to interview the first 37 without hiring anyone. After that, the next candidate who is better than all the previous ones should be selected, ensuring the company doesn't hire too soon or miss out on top talent.

The same logic applies to buying a car—if you plan to test drive 20 options, use the first 7 to set a benchmark, then buy the next car that surpasses them. Investors can also use this rule when evaluating multiple business opportunities; they should spend the first 37% of their time assessing potential deals without committing, then invest in the first one that stands out.

THE CATCH: NO GUARANTEES, JUST BETTER ODDS

While the 37% rule increases your chances of success, it doesn't guarantee a perfect outcome. The best option might appear too early or too late. However, it remains the mathematically optimal strategy for making decisions efficiently without getting stuck in analysis paralysis.

Additionally, the rule assumes that you know how many options you'll have in total. In real life, this isn't always clear. But even when the number of choices is uncertain, the 37% principle still serves as a useful mental model for balancing exploration and decision-making.

FINAL THOUGHTS: USE MATH TO MAKE SMARTER DECISIONS

So next time you're facing a tough decision—whether it's about hiring, investing, or even picking a Netflix show—remember the 37% rule. It won't make every choice easy, but it will help you make the smartest one. Instead of endlessly searching for perfection, trust the math, embrace the process, and move forward with confidence.

And if you're curious about how other algorithms can improve everyday life, Algorithms to Live By is a great place to start!

ARTICLE 4:

RAREFIED

THE MAN WHO KNEW INFINITY

UNDERSTANDING RAMANUJAN' S INFINITE NESTED RADICAL

VIDHYAVATHI V

22D3536 - III BSc. MATHEMATICS MPC

DWARAKA DOSS GOVERDHAN DOSS VAISHNAV COLLEGE

ABSTRACT:

Regarded as one of the greatest mathematicians of all time, Ramanujan had almost no formal training in pure mathematics. Despite it, he made substantial contributions to mathematical analysis, number theory, infinite series, and continued fractions, including solutions to problems then considered unsolvable. In this paper, I will try to interpret how he equated infinite nested radical to a finite number.

INTRODUCTION:

In 1910, Ramanujan met deputy collector V. Ramaswamy Aiyer, founder of the Indian Mathematical Society, wishing for a job at the revenue department. Aiyer sent him with letters of introduction to his mathematician friends in Madras. Some of them looked at his work and sent him to R. Ramachandra Rao, the district collector for Nellore and the secretary, IMS. He mentioned his correspondence with Professor Saldhana, a notable Bombay mathematician, who expressed a lack of understanding of his work but concluded that he was not a fraud. C. V. Rajagopalachari tried to quell Rao's doubts about Ramanujan's academic integrity. Rao, ultimately convinced, consented his need of work and financial support, and sent him to Madras. He continued his research with Rao's financial aid and with Aiyer's help, had his work published in the Journal of the IMS.

PROBLEM:

One of the first problems he posed in the journal was to find the value of:

$$\sqrt{1+2\sqrt{1+3\sqrt{1+\cdots}}}$$

The first question is to prove the following equation involving an infinite nested radical. In 1911, Ramanujan set the right-hand side of the following equation in his journal.

$$3=\sqrt{1+2\sqrt{1+3\sqrt{1+4\sqrt{1+5\sqrt{\cdots}}}}}$$

How to prove this?

DESCRIPTION:

All we need to prove this is the following elementary result:

$$(x+1)^2 = x^2 + 2x + 1$$
$$= x(x+2) + 1$$

Rearranging the terms, we get,

$$(x + 1)^2 = 1 + x\,(x + 2)$$

SOLUTION:

Now if we substitute 2, 3 and 4 for x, we get:

$3^2 = 1 + 2(4)$,

$4^2 = 1 + 3(5)$,

$5^2 = 1 + 4(6)$,

...

If we take the square roots of both sides of these equations, we get,

$$3 = \sqrt{1 + 2(4)} \qquad \text{(Equation 1)}$$

$$4 = \sqrt{1 + 3(5)} \qquad \text{(Equation 2)}$$

$$5 = \sqrt{1 + 4(6)} \qquad \text{(Equation 3)}$$

$$6 = \sqrt{1 + 5(7)} \qquad \text{(Equation 4)}$$

...

Replacing the (4) in Equation 1 with the right-hand side of Equation 2, we get:

$$3 = \sqrt{1 + 2\sqrt{1 + 3(5)}}$$

Now replace the (5) above with the right-hand side of Equation 3 to get:

$$3 = \sqrt{1 + 2\sqrt{1 + 3\sqrt{1 + 4(6)}}}$$

Repeating the same procedure with the next equation,

$$3 = \sqrt{1 + 2\sqrt{1 + 3\sqrt{1 + 4\sqrt{1 + 5(7)}}}}$$

It is easy to see that we can continue to replace the last integer in parentheses with the right-hand side of the next equation. So, the process can be carried out recursively to infinity. We can replace the 7 with an ellipsis (…) to show that the process can be repeated indefinitely, thus proving the correctness of the equation.

$$3 = \sqrt{1 + 2\sqrt{1 + 3\sqrt{1 + 4\sqrt{1 + 5\sqrt{\cdots}}}}}$$

MATHEMATICAL EXPLANATION:

Ramanujan obtained a general expression using three variables that can generate an infinite number of such equations. Say, define

$f(x) = x + n + a$, giving

$f(x)^2 = ax + (n + a)^2 + x\,f\,(x + n)$.

Carrying out the same recursive trick as above for any values of x, n, and a, we obtain many such examples.

He waited for a solution to be offered in three issues, over six months, but failed to receive any. Consequently, at the end, supplied an incomplete solution himself.

On page 105 of his first notebook, he formulated an equation that could be used to solve the infinitely nested radical problem.

$$x + n + a = \sqrt{ax + (n + a)^2 + x\sqrt{a(x + n) + (n + a)^2 + (x + n)\sqrt{\cdots}}}$$

Using this equation, the answer to the question posed in the journal was simply 3, obtained by setting

$x = 2$,

$n = 1$,

$a = 0$.

CONCLUSION:

In this paper, I have described how Ramanujan equated a simple small integer to an infinite nested radical. This fascinating puzzle indeed kindles thinking amongst readers and helps to understand simplification of infinite number of terms in a nested radical. This example ultimately accounts for the intellectual thought process and undemanding evaluation of complicated expressions. He was able to think through old problems that had stumped thinkers for centuries with a kind of nimble creativity that was shocking to academics. Ramanujan's work spanned several fields of mathematics, including highly composite numbers, hypergeometric theories, elliptic integrals, divergent theories, and more. He filled four notebooks, with almost 1,000 pages of his work. He did not record the ways that he came to his answers, instead only notating results without proofs. The lack of proofs inspired generations of mathematicians to try and figure out how he came to his answers. I dedicate this paper to the commemoration of his 137th birth anniversary, celebrated as the National Mathematics Day on 22nd December 2024, Sunday.

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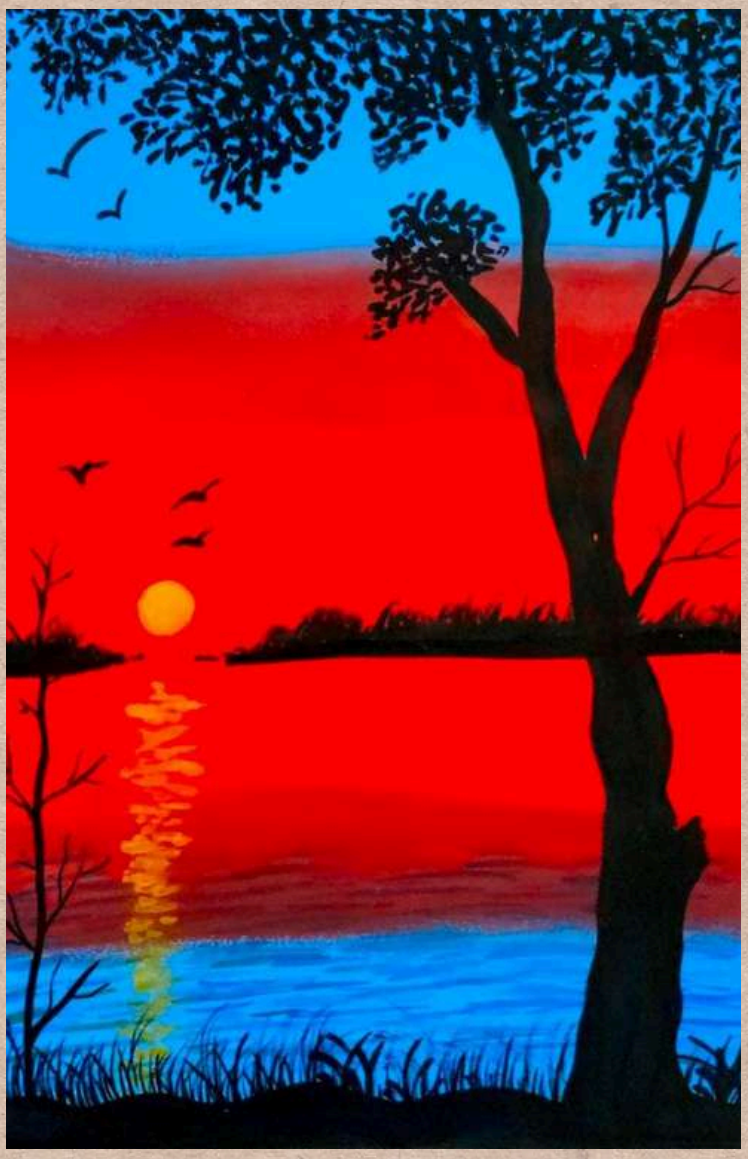
STUDENTS ART GALLERY

ART WORKS DONE BY M. GAYATHRI II MSC MATHS

STUDENTS ART GALLERY

ART WORKS DONE BY S. SIVARANJINI I MSC MATHS



INTERNATIONAL CONFERENCE ICARMIA 2025

The two-days International Conference on Advanced Research in Applied Mathematics and its Industrial Applications, organized by the PG and Research Department of Mathematics at Dwaraka Doss Goverdhan Doss Vaishnav College, was inaugurated on 17/02/2025 with great enthusiasm. The conference brought together scholars, professionals, and many knowledgeable Persons from across the globe to discuss the latest trends and advancements in applied Mathematics and its practical industrial applications to our Students through In Person and Online mode.

The conference commenced with a traditional lamp lighting ceremony, symbolizing the illumination of knowledge. The event was attended by a distinguished gathering, including Dr. V. V. Bhanu Rekha, Scientist F, who was the chief guest for the inaugural session. Her presence added immense value to the occasion.

The ceremony began with the welcome address by Mrs. M. Devika , the Head of the PG and Research Department of Mathematics. In her speech, she expressed her appreciation to all attendees, emphasizing the importance of bridging the gap between theoretical mathematics and its practical industrial applications. She acknowledged the collective efforts of the organizing committee in making the conference a reality and highlighted the conference's theme, focusing on cutting-edge research in applied mathematics and its significance in solving real-world challenges.

The inaugural session of the International Conference on Advanced Research in Applied Mathematics and its Industrial Applications set a positive and intellectually stimulating tone for the subsequent sessions. It provided an excellent platform for participants to explore the intersection of mathematical theory and industrial practice, fostering collaboration and innovation in the field of applied mathematics.

Scholars and industry experts shared their experiences, insights, and research findings, sparking discussions on emerging trends and challenges in applied mathematics.

DAY I OF ICARMIA 2025

Session 1:

Presentation by **Dr. Mohana Sundaram Muthuvalu,** Professor.

Topic: Computational Neuro-Oncology: Advances in Numerical Techniques for Brain Tumor Modelling and Prediction.

Dr. Mohana Sundaram Muthuvalu's session on Computational Neuro-Oncology: Advances in Numerical Techniques for Brain Tumor Modelling and Prediction at ICARMIA 2025 captivated attendees with a deep dive into the cutting-edge computational methods transforming brain tumor research. During his presentation, Dr. Muthuvalu highlighted the significant role of advanced numerical techniques in the modeling, simulation, and prediction of brain tumor behavior. By integrating mathematical models with clinical data, he demonstrated how computational tools can aid in understanding tumor growth dynamics, treatment response, and personalized healthcare strategies. He focused on innovations in machine learning, optimization algorithms, and mathematical modeling techniques that are improving the accuracy of brain tumor predictions, thus facilitating more effective treatment planning. The session underscored the interdisciplinary nature of neuro-oncology, showcasing how applied mathematics, computer science, and medical research are converging to offer new hope in the fight against brain cancer. After this students were provided with refreshments and were given a short break for about 10 minutes.

Session 2:

Presentation by **Dr. Priyavrat Deshpande,** Associate Professor.

Topic: Theory and Applications of Graph Kernels.

Dr. Priyavrat Deshpande's session on Theory and Applications of Graph Kernels at ICARMIA 2025 provided an insightful exploration into the powerful use of graph kernels in machine learning and data science. During his presentation, Dr. Deshpande discussed the theoretical foundations of graph kernels, which allow for the comparison and analysis of graph structures in various applications. His session was very energetic as the students were very much interested in listening his lecture. He emphasized their significance in fields such as the bioinformatics, social network analysis, and cheminformatics, where data is naturally represented as graphs. By leveraging graph kernels, complex relational data can be transformed into a format suitable for machine learning algorithms, enhancing predictive capabilities. Dr. Deshpande also highlighted the practical applications of graph kernels in tasks like graph classification, clustering, and graph matching, demonstrating their versatility and efficiency. His session offered a comprehensive understanding of how graph kernel methods are advancing research in both theoretical and applied domains, with a focus on real-world problem solving.

Session 3:

Presentation by **Dr. K. C. Sivakumar,** Professor.

Topic: Tridiagonal Matrices, an Optimization Problem and Related Results.

Dr. K. C. Sivakumar's session on Tridiagonal Matrices, an Optimization Problem, and Related Results at ICARMIA 2025 delved into the intriguing mathematical properties of tridiagonal matrices and their applications in optimization problems. Throughout his presentation, Dr. Sivakumar provided an in-depth analysis of tridiagonal matrices, which appear frequently in numerical linear algebra, particularly in the context of solving large systems of linear equations and eigenvalue problems. He explored how optimization techniques can be employed to enhance the efficiency of algorithms involving these matrices, focusing on minimizing computational complexity. Dr. Sivakumar also shared several key results related to the structure and properties of tridiagonal matrices, including methods to improve their computational stability and performance. By demonstrating the relevance of these matrices in optimization tasks, his session highlighted the important role of mathematical theory in addressing real-world challenges, particularly in computational mathematics and scientific computing. The session also addressed the application of tridiagonal matrix techniques in various fields such as signal processing, network analysis, and control systems. Additionally, Dr. Sivakumar proposed new research directions, encouraging participants to explore further the intersection of matrix theory and optimization in emerging technologies. The session was both thought-provoking and inspiring for researchers and students alike.

Session 4:

Presentation by **Dr. Benoit Rittaud,** Professor.

Topic: Combinatorics of Numeration System.

Dr. Benoit Rittaud's session on Combinatorics of Numeration Systems was the 1st online session of ICARMIA 2025, offered a fascinating exploration of the mathematical principles underlying numeration systems. In his presentation, Dr. Rittaud examined the combinatorial aspects of numeral systems and their applications in number theory, highlighting how different bases and representations can affect computational efficiency and mathematical structures. He discussed the importance of studying numeration systems in the context of sequences, patterns, and their relationship to combinatorics. Through the use of various examples and algorithms, Dr. Rittaud demonstrated how combinatorial methods can be applied to understand the properties of numbers, such as their growth rates, periodicity, and distribution within different bases. Despite the online format, the session was highly interactive, with Dr. Rittaud encouraging participants to explore the deep connections between combinatorics and numeration theory, fostering a dynamic exchange of ideas among scholars and students. His insightful discussion provided valuable perspectives for both theoretical research and practical applications in fields that require advanced numerical analysis.

Session 5:

Presentation by **Mr. Andy Brown,** Global CTO.

Topic: The Influence of Advanced Mathematics and AI in Modern ERP Systems.

Mr. Andy Brown's session on The Influence of Advanced Mathematics and AI in Modern Enterprise Resource Planning Systems at ICARMIA 2025, conducted online, provided a comprehensive look at the integration of mathematical techniques and artificial intelligence (AI) in enhancing Enterprise Resource Planning (ERP) systems. Mr. Brown discussed how advanced mathematical models, such as optimization algorithms and statistical analysis, are being employed to streamline business processes within ERP systems. He also highlighted the pivotal role of AI in automating decision-making, predicting demand, managing inventory, and improving supply chain efficiency. The session also explored how machine learning algorithms are being used to analyze vast amounts of data generated by ERP systems, enabling businesses to make data-driven decisions and improve operational efficiency. Mr. Brown showcased real-world examples of organizations that have successfully incorporated these technologies into their ERP systems, resulting in improved productivity and reduced costs. The online format allowed for an engaging discussion, with participants actively exchanging ideas on the future potential of combining mathematics, AI, and ERP. Overall, the session illuminated the transformative impact of these technologies on modern enterprises, demonstrating their ability to optimize and revolutionize business operations across industries.

DAY 2 OF ICARMIA 2025

Session 6:

Presentation by Ms. Leela Varadharajan, Instructor - Finance.

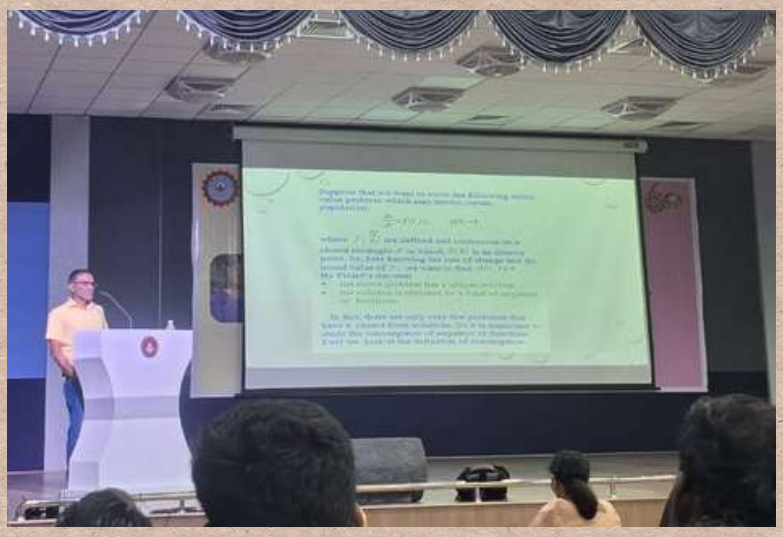
Topic: Rise of technology and AI in Financial Planning.

The first session of Day 2 ICARMIA - 2025 was by Ms. Leela Varadharajan, which was an online session. The rise of technology and AI in financial planning has revolutionized the way financial advisors and planners deliver services to their clients. With the advent of robo-advisors, automated investment platforms, and AI-powered financial planning tools, financial planning has become more accessible, efficient, and personalized. AI algorithms can analyze vast amounts of data, identify patterns, and also provide insights that help financial advisors create tailored well. Additionally, AI-powered chatbots and virtual assistants can provide 24/7 support, answering clients' queries and helping them make informed financial decisions. As a result, financial planning has become more streamlined, cost-effective, and client-centric, enabling financial advisors to focus on high-value tasks such as investment strategy and wealth management

Session 7:

Presentation by Dr. M. Pitchaimani , Professor.

Topic: Modelling with Dynamical systems.



The second session of Day 2 ICARMIA - 25 was by Dr. M Pitchaimani, which was an offline session. Modelling with dynamical systems involves using mathematical equations to describe and analyze complex systems that change over time. These systems can be physical, biological, or social, and can exhibit a wide range of behaviors, including oscillations, chaos, and stability. By representing the system's dynamics using differential equations or difference equations, and esearchers can also capture the interactions and feedback loops that drive the system's behavior. Applications of dynamical systems modelling include understanding population growth and disease spread, analysing financial markets and economic systems, and optimising complex systems such as traffic flow and supply chains.

Session 8:

Presentation by Dr. G Arun Kumar, Professor.

Topic: Chromatic Symmetric Function, Stanley's Tree Conjecture and Lie Algebras.

The third session of Day 2 of ICARMIA - 2025 was by Dr. G Arun Kumar. The Chromatic Symmetric Function, Stanley's Tree Conjecture, and Lie Algebras are interconnected concepts in algebraic combinatorics. The Chromatic Symmetric Function, introduced by Richard Stanley, is a polynomial that encodes the colorings of a graph. Stanley's Tree Conjecture, still an open problem, posits that the Chromatic Symmetric Function of a tree is a sum of elementary symmetric functions with non-negative coefficients. Lie Algebras, a fundamental concept in representation theory, have been used to study the Chromatic Symmetric Function and provides the framework for understanding the conjecture. Recent research has explored the connections between these areas, revealing deep relationships between graph theory, symmetric functions, and Lie theory, and shedding new light on the long-standing Tree Conjecture.

Session 9:

Paper Presentation by Students, Research Scholars and Professors

Chair Persons: Dr. G Arun Kumar and Dr. N Jansirani

Many students, research scholars and professors from various colleges presented their topics and research ideas in front of the chair persons.

ICARMIA 2025

VALEDICTORY CEREMONY OF ICARMIA - 2025

The two-day International Conference on Advanced Research in Mathematics and its Industrial Applications (ICARMIA 2025) culminated in a grand Valedictory Ceremony, where esteemed guests, dignitaries, and participants gathered to celebrate the conference's success. The ceremony began with a keynote address by the Chief Guest, who highlighted the significance of mathematical research in driving innovation and industrial growth. The conference organizers then presented awards and certificates to the best paper presenters, young researchers, and participants who made significant contributions to the conference. The ceremony concluded with a vote of thanks, followed by a cultural program that showcased the rich diversity of the participating countries. The Valedictory Ceremony served as a fitting finale to ICARMIA 2025, reinforcing the conference's mission to foster collaboration, knowledge sharing, and advancement in mathematical research and its industrial applications.

The Valedictory Ceremony of ICARMIA 2025 was graced by the presence of Mr. Harikrishna Venkatesh, Associate Partner at IBM, as the Chief Guest brought with him a wealth of experience and expertise in the field of technology and innovation, and his presence added a new dimension to the ceremony.

Following his address to the audience, Mr. Harikrishna Venkatesh, the Chief Guest, proceeded to certify the participants who had presented their research works during the conference. With a warm smile, he handed over the certificates to the eager recipients, acknowledging their hard work and contributions to the field of mathematics and its industrial applications.

In a moment of pride and accomplishment, students, professors, and research scholars were honored with certificates for their outstanding presentations at ICARMIA 2025. The certificates were a testament to their dedication, hard work, and innovative research in mathematics and its industrial applications. As they received their certificates, the recipients beamed with joy, feeling recognized and motivated to continue their pursuit of excellence in their respective fields.

Venue: SRG Auditorium

DAY 1
17 FEB 2025

SESSION -1 Time: 9:45 am to 10:45 am

Dr. Mohana Sundaram Muthuvalu
Professor
Department of Fundamental & Applied Sciences
Universiti Teknologi, Petronas
Malaysia

Topic: : Computational Neuro-Oncology: Advances in Numerical Techniques for Brain Tumour Modelling and Prediction

Tea break
10: 45 am to 11:00pm

SESSION -2 Time: 11:00 am to 12:00 noon

Dr. Priyavrat Deshpande
Associate professor
Chennai Mathematical Institute
Chennai

Topic: Theory and applications of graph kernels

SESSION -3 Time: 12:00 noon to 1:00 pm

Dr. K. C Sivakumar
Professor
Department of Mathematics
Indian Institute of Technology
Chennai

Topic : Tridiagonal matrices, an optimization problem and related results

LUNCH BREAK :
1:00 PM TO 2:00 PM

SESSION -4 Time: 2:00 pm to 3:00 pm

Dr. Benoit Rittaud
Professor
Sorbonne Paris Nord University
France

Topic: : Combinatorics of numeration systems

SESSION -5 Time: 3:00 pm to 4:00 pm

Mr. Andy Brown
Global CTO, SAP Practice
Atos Eviden
United Kingdom

Topic: : The influence of advanced mathematics and AI in modern Enterprise Resource Planning (ERP) systems

Venue: SRG Auditorium

DAY 2
18 FEB 2025

SESSION -6 Time: 9:00 am to 10:00 am

Ms. Leela Varadharajan
Instructor - Finance
College of Business
Oregon State university
Corvallis, USA

Topic : Rise of technology and AI in Financial Planning

SESSION -7 Time: 10:00 am to 11:00 am

Dr. M. Pitchaimani
Director
Associate Professor and Head
Ramanujan Institute for Advanced Study in Mathematics
University of Madras, Chennai

Topic: Modelling with Dynamical systems

Tea break
11: 00 am to 11:15 am

SESSION -8 Time: 11:15am to 12:15 pm

Dr. G. Arun kumar
Assistant Professor
Department of Mathematics
Indian Institute of Technology Chennai

Topic : Chromatic Symmetric Function, Stanley's Tree Conjecture and Lie Algebras

Paper Presentation Session - I & II
12:15 pm - 1:30pm

Chair person

Dr. G. Arun kumar
Assistant Professor
Department of Mathematics
Indian Institute of Technology Chennai

Chair person

Dr. N. Jansirani
Associate Professor and Head
Department of Mathematics
Queen Marys college, Chennai

LUNCH BREAK
1:30 PM TO 2:30 PM

Valedictory
3:00pm - 4:00 pm

STUDENTS ACHIEVEMENTS (2024-2025)

Students from the Post Graduate and Research Department of Mathematics are also encouraged to participate in various events organized by other colleges and institutions, even students actively participated in many events organized by sources other than Colleges and have also won several prices in those events. Some of their Achievements are listed below:

- **S. Sivaranjini** from I M.Sc. Mathematics has won the **First Prize** in Poster Making event organized by M.O.P Vaishnav College and Loyola College.
- **K. Kashish Mishra** from III B.Sc. Mathematics has won the **Second Prize** in Oratorical organized by GSS College, and won the **First Prize** in Speech and Poetry events organized by **Bank of Baroda**.
- **V. Vidhyavathi** from III B.Sc. Mathematics has won the **Second Prize** in Paper Presentation organized by Dwaraka Doss Goverdhan Doss Vaishnav College.
- **R. Mukesh and V. Paramaguru** from III B.Sc. Mathematics has got the **Certificate** for completing the Winter Training Program Organized by **The University of Madras**.
- **K.A. Moideen Asif** from III B.Sc. Mathematics has won the **First prize** in quiz competition organized by CTTE College and grabbed the **Second Prize** in Math Trivia and Quiz in Loyola and SDNB Vaishnav College Respectively.
- **V. Ranjini** from II B.Sc. Mathematics has won the **First Prize** in North Zone Throw Ball Championship Organized by the Pinnacle Sports Club.
- **S.A. Naresh** from III B.Sc. Mathematics has won the **First Prize** in speech competition organized by **Sardar Vallabhai Patel Trust** and received it from **The Honorable Governor of Tamil Nadu Thiru R. N. Ravi**.
- **B. Divya** from III B.Sc. Mathematics has won the **Second Prize** in Poster Making Event Organized by The Ethiraj College.
- Students from II M.Sc. Mathematics had participated in the College Level Competition for making **Drug Awareness Short Film or Reels**, Organized by **The Enforcement Bureau CID, Tamil Nadu and The Tamil Nadu Police Department** and got **Cash Prize of Rupees Ten Thousand** for their Short Film and received it from **The DGP and HoPF of Tamil Nadu, Mr. Shankar Jiwal, IPS.**

UPCOMING EVENT - MATHCIPHER

Our upcoming event is being titled as Mathcipher, an Intercollegiate Cultural Event organized by the Brahmaganith Club of the PG and Research Department of Mathematics, is scheduled to take place on 21st February 2025. This exciting occasion combines both mathematical challenges and cultural activities, offering a unique blend of intellectual rigor and creative expression. MathCipher will feature a variety of competitions and problem-solving challenges, where participants from various colleges will showcase their mathematical skills and quick thinking.

Alongside the academic events, there will also be cultural performances, ensuring a vibrant atmosphere where students can demonstrate their talents in music, dance, and other creative expressions. This fusion of mathematics and cultural activities aims to foster a spirit of camaraderie and collaboration among participants, encouraging them to explore both their academic and artistic sides. The event, organized by the Brahmaganith Club, promises to be an exciting day of learning, competition, and entertainment, offering students a platform to connect, compete, and celebrate the beauty of mathematics and culture in one grand event.

This year MathCipher has 17 major events which includes IPL Auction, Sherlock Holmes, Treasure Hunt, Ship Wreck etc..., which are organized by the student coordinators from the Department of Mathematics, in which the students from other various institutions and colleges are allowed to participate in the events. There will be an Overall Winner (The Wining Institution/College) for the entire event based on their performance throughout the events.

The cultural segment of MathCipher will add a dynamic touch, allowing students to unwind and showcase their artistic flair while celebrating diversity through performances, exhibitions, and group activities. This holistic approach to the event highlights the importance of balancing academic rigor with creativity and teamwork. MathCipher is set to be an enriching and memorable experience, and the Brahmaganith Club is excited to welcome participants from across the region for a day full of learning, collaboration, and celebration.

ABOUT US

Nestled within the academic enclave of Dwarka Doss Goverdhan Doss Vaishnav College is a department that stands as a beacon of intellectual rigor and scholarly pursuit – the Mathematics Department. With a rich history of academic excellence and a commitment to nurturing mathematical talent, the department embodies a culture of inquiry, innovation, and interdisciplinary collaboration.

At the heart of the Mathematics Department are its esteemed faculty members, renowned for their expertise across various mathematical domains. From pure mathematics to applied fields, the faculty's diverse research interests contribute to the department's vibrant intellectual environment. Within the Mathematics Department at Dwarka Doss Goverdhan Doss Vaishnav College, there exists a vibrant community of passionate mathematicians united by their love for the subject – the Brahmaganith Club. Named after the Sanskrit word for mathematics, "Brahmaganith" embodies the club's dedication to exploring the boundless mysteries and beauty of mathematics through engaging activities, discussions, and events.

The Brahmaganith Club plays a pivotal role in enriching the academic experience of students within the Mathematics Department. Guest lectures by esteemed mathematicians, alumni panels, and workshops on specialized topics provide members with unique opportunities to expand their knowledge, gain insights into cutting-edge research, and explore potential career paths in mathematics and related fields. By bridging the gap between theory and practice, the club enhances students' understanding of the relevance and applications of mathematics in the real world.