

M.A.M. COLLEGE OF ENGINEERING AND TECHNOLOGY

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CONFERENCE PROCEEDINGS

NATIONAL CONFERENCE ON FUZZY ADVANCED MATHEMATICS AND ITS APPLICATIONS



07th July 2025



Organised by

Department of Science & Humanities

**NATIONAL CONFERENCE ON FUZZY ADVANCED MATHEMATICS
AND ITS APPLICATIONS (FAMA 2025)**

Organized By

**M.A.M. COLLEGE OF ENGINEERING AND TECHNOLOGY
(MAMCET)**

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PREFACE

We are delighted to present the Proceedings of **National Conference on Fuzzy Advanced Mathematics and Its Applications (FAMA 2025)**, organized by M.A.M. College of Engineering and Technology (MAMCET), Tiruchirappalli, India, held on **July 07, 2025**, this conference served as a premier global platform to unite distinguished researchers, academicians, and industry leaders

Discuss New Developments in Fuzzy Mathematics to highlight recent innovations in fuzzy mathematics, such as fuzzy algebra, fuzzy optimization, fuzzy decision-making models, and their implications for solving complex problems in various fields. Explore Practical Applications in Various Industries to examine how fuzzy mathematics can be applied to real-world challenges in sectors like engineering, computer science, healthcare, finance, artificial intelligence, and more.

Create dedicated opportunities for students and early-career researchers to present their work, participate in discussions, and engage with leading experts in the field of fuzzy mathematics. This initiative aims to foster the next generation of researchers by offering platforms for networking, mentorship, and professional development. Promote Integration with Emerging technologies to explore the use of fuzzy systems in modern technologies such as artificial intelligence (AI), machine learning, the Internet of Things (IoT), big data, and data analytics. Develop New theories and Models to encourage the development of new mathematical theories, models, and computational tools in fuzzy mathematics that can enhance existing methodologies for solving complex problems.

We owe our heartfelt gratitude to our keynote speakers **Dr. V. Lakshmana Gomathi Nayagam, Dr. P. Dhanasekaran, and Dr. S. Vijayabalaji** for their inspirational insights. Our thanks also go to the dedicated authors, session chairs, and reviewers whose expertise ensured academic excellence. Special appreciation is extended to our Conference Chair, Advisory Committee Members, the organizing committee, and the leadership team of MAMCET. We are particularly grateful to our Patrons, **Dr. M.A. Maluk Mohamed and Mrs. Fathima Bathool Maluk**, for their unwavering support.

Proceedings have been published with an ISBN, and selected papers subject to authors' consent are being considered for inclusion in Scopus-indexed journals.

We hope this collection will serve as a valuable reference for researchers, practitioners, and students, and will inspire further innovation at the intersection of intelligent systems and sustainable solutions. May FAMA 2025 mark a milestone in shaping a smarter, efficient, and greener future.

EDITORIAL NOTE

The Editors of the FAMA 2025 pre-conference volume extend their heartfelt gratitude to the organizers of this National conference for entrusting them with the responsibility of compiling and preparing this publication. It has been a privilege to contribute to this significant academic event hosted by **M.A.M. College of Engineering and Technology, Tiruchirappalli**, on **07th July 2025**.

In curating this volume, the editorial team has made every effort to maintain the academic integrity and high standards of the conference, ensuring that the originality, insights, and methodologies of the contributing authors remain untouched and respected. This compilation features Pure Mathematics, Computational Mathematics and Applied Mathematics.

We also acknowledge with appreciation the editorial assistance provided by:

Dr.K.Hema, Professor of Mathematics at M.A.M.College of Engineering and Technology, Tiruchirappalli, hold a Ph.D. in Mathematics on the topic “Contributions to the Study on Assignment Problems in Fuzzy Environment” from Anna University,Chennai. She has a total of 27 years of teaching experience in Engineering Mathematics. She has published ten papers and presented four in International Conferences.

Dr. S. Anitha, Associate Professor of Mathematics at M.A.M. College of Engineering and Technology, Tiruchirappalli, hold a Ph.D. in Mathematics on the topic “Bipolar Fuzzy Soft Algebraic Structures and their Actions on Certain Fields” from Manonmaniam Sundaranar University, Tirunelveli. She has a total of 22 years of teaching experience in Engineering Mathematics. She has published ten papers and presented two in International Conferences.

Mr. M. Karthikeyan, Assistant Professor of Mathematics at M.A.M. College of Engineering and Technology, Tiruchirappalli, Submitted thesis on the topic “A Study on Fuzzy Time Series in Real Life Problems”. He has a total of 13 years of teaching experience in Engineering Mathematics. He published seven papers and attended two International Conferences. He has played a key role in editing the FAMA 2025 proceeding.

Mrs. K. Pushpa, Assistant Professor of Mathematics at M.A.M. College of Engineering and Technology, Tiruchirappalli. She has a total of 14 years of teaching experience in Engineering Mathematics. She has attended one National Conference.

Dr. L. Mohammad Abbas, Librarian at M.A.M. College of Engineering and Technology, Tiruchirappalli, hold a Ph.D. in Library and Information Science. With expertise in research support, digital tools, and academic publishing, he played a key role in editing the FAMA 2025 proceedings and contributed to the successful organization of the conference.

Mr. S. Sridhar, Faculty SDP at M.A.M. College of Engineering and Technology, Tiruchirappalli, is skilled in technical training, software development, and recruitment. He has contributed significantly to academic events by developing a robust Conference Paper Management Tool, akin to Microsoft CMT, streamlining submissions, reviews, and revisions. His expertise bridges education, technology, and talent acquisition, enhancing both academic and placement outcomes.

Their dedication and support were instrumental in preparing this volume.

We sincerely hope that the deliberations and interactions during the FAMA2025 conference will be insightful and rewarding for all participants. It is our earnest wish that this pre-conference volume serves as a valuable resource for researchers, educators, students, and professionals in engineering, technology, and information sciences.

Editors

INSTITUTIONAL GRATITUDE

We extend our heartfelt gratitude to the management and leadership of M.A.M. College of Engineering and Technology, Tiruchirappalli, for their unwavering support, encouragement, and visionary guidance in the successful conduct of this academic event. We are deeply indebted to our esteemed Director and Chairman, **Dr. M. A. Maluk Mohamed**, for his inspiring leadership and constant motivation. His relentless commitment to academic excellence, innovation, and global perspective continues to be the guiding force behind all our institutional endeavors. We also express our sincere thanks to **Mrs. Fathima Bathool Maluk**, Secretary and CEO of the MASTeR Group of Institutions, for her dynamic administration and unwavering encouragement. Her efforts toward empowering students and nurturing holistic education have been instrumental in shaping the culture of excellence at MAMCET.

We gratefully acknowledge the guidance and support of our senior leadership team **Dr.X.Susan Christina**, Principal, for her academic insight and strategic direction, **Dr.B.Muruganantham**, Registrar, and **Dr. S. Rajasekaran**, Dean, for their meticulous planning and administrative excellence. We also extend our heartfelt thanks to **Dr. N. Saiva Raju**, Professor & Head, Department of Science and Humanities, and Conference Convener, for his dedicated coordination and unwavering commitment to making this event a success. Our appreciation also extends to the Heads of Departments, faculty members, technical staff, and student volunteers whose tireless efforts have significantly contributed to the smooth and successful execution of this event.

We thank all participants, reviewers, and resource persons for their valuable contributions. Lastly, we acknowledge the support of all sponsors, partners, and well wishers whose involvement has been vital in bringing this initiative to fruition.

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TRACKS

- **PURE MATHEMATICS**
- **COMPUTATIONAL MATHEMATICS**
- **APPLIED MATHEMATICS**

EOQ-BASED INVENTORY OPTIMIZATION FOR SOCIAL MEDIA-TRENDING REAL-WORLD PRODUCTS USING HEPTAGONAL FUZZY NUMBERS AND AI FORECASTING

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Abstract

This study explores the collected information of real -world case as example to obtain predictable demand in advance, combining fuzzy inventory modeling and AI and Fuzzy EOQ (Economic Order Quantity), Heptagonal Fuzzy Number to represent uncertain demand values for prior prediction of unexpected demand surges. The case consideration of Trending Matcha tea, a globally trending product is taken as example to demonstrate the effectiveness of the integrated model. This is the hybrid framework to optimize inventory control under complexity that integrates Fuzzy logic- to manage uncertainty and Artificial Intelligence (AI) to forecast demand patterns based on real –time Data streams

Keywords: *Fuzzy set, Fuzzy logic, Heptagonal fuzzy number, Artificial intelligence, Matcha tea demand prediction.*

1. Introduction

Social media hashtags and viral trends have caused unexpected product shortages, leading to sudden price surges. In today’s rapidly evolving consumer markets, inventory systems face unprecedented challenges due to the influence of social media-driven demand surges; global trendsetters can shift consumer behavior overnight. Viral posts, influencer marketing, and digital buzz can rapidly increase the demand for specific products, often leaving businesses unprepared to respond. Traditional inventory models based on static forecasts and historical trends, are increasingly inadequate in managing real-time market fluctuations. Recent health studies report that Matcha contains **L – theanine and EGCG**, a compound known to reduce anxiety and improve