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Applied Mathematics and Scientific Computing

International Conference on Advances in
Mathematical Sciences, Vellore, India,
December 2017 - Volume II

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ISSN 2297-0215

Trends in Mathematics

ISBN 978-3-030-01122-2

<https://doi.org/10.1007/978-3-030-01123-9>

ISSN 2297-024X (electronic)

ISBN 978-3-030-01123-9 (eBook)

Library of Congress Control Number: 2018966596

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The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

The Department of Mathematics, School of Advanced Sciences, Vellore Institute of Technology (Deemed to be University), Vellore, Tamil Nadu, India, organized the International Conference on Advances in Mathematical Sciences—2017 (ICAMS 2017) in association with the Society for Industrial and Applied Mathematics VIT Chapter from December 1, 2017, to December 3, 2017. The major objective of ICAMS 2017 was to promote scientific and educational activities toward the advancement of common man's life by improving the theory and practice of various disciplines of Mathematics. This prestigious conference was partially financially supported by the Council of Scientific and Industrial Research (CSIR), India. The Department of Mathematics has 90 qualified faculty members and 30 research scholars, and all were delicately involved in organizing ICAMS 2017 grandly. In addition, 30 leading researchers from around the world served as an advisory committee for this conference. Overall, more than 450 participants (professors/scholars/students) enriched their knowledge in the wings of Mathematics.

There were 9 eminent speakers from overseas and 33 experts from various states of India who delivered the keynote address and invited talks in this conference. Many leading scientists and researchers worldwide submitted their quality research articles to ICAMS. Moreover, 305 original research articles were shortlisted for ICAMS 2017 oral presentations that were authored by dynamic researchers from 25 states in India and 20 countries around the world. We hope that ICAMS will further stimulate research in Mathematics, share research interest and information, and create a forum of collaboration and build a trust relationship. We feel honored and privileged to serve the best of recent developments in the field of Mathematics to the reader.

A basic premise of this book is that quality assurance is effectively achieved through the selection of quality research articles by a scientific committee consisting of more than 100 reviewers from all over the world. This book comprises the contribution of several dynamic researchers in 62 chapters. Each chapter identifies the existing challenges in the areas of Differential Equations, Fluid Dynamics, and Graph Theory and emphasizes the importance of establishing new methods and algorithms to address the challenges. Each chapter presents a research problem, the

technique suitable for solving the problem with sufficient mathematical background, and discussions on the obtained results with physical interruptions to understand the domain of applicability. This book also provides a comprehensive literature survey which reveals the challenges, outcomes, and developments of higher level mathematics in this decade. The theoretical coverage of this book is relatively at a higher level to meet the global orientation of mathematics and its applications in science and engineering.

The target audience of this book is postgraduate students, researchers, and industrialists. This book promotes a vision of pure and applied mathematics as integral to modern science and engineering. Each chapter contains important information emphasizing core Mathematics, intended for the professional who already possesses a basic understanding. In this book, theoretically oriented readers will find an overview of Mathematics and its applications. Industrialists will find a variety of techniques with sufficient discussion in terms of physical point of view to adapt for solving the particular application based on mathematical models. The reader can make use of the literature survey of this book to identify the current trends in Mathematics. It is our hope and expectation that this book will provide an effective learning experience and referenced resource for all young mathematicians.

As Editors, we would like to express our sincere thanks to all the administrative authorities of Vellore Institute of Technology, Vellore, for their motivation and support. We also extend our profound thanks to all faculty members and research scholars of the Department of Mathematics and all staff members of our institute. We especially thank all the members of the organizing committee of ICAMS 2017 who worked as a team by investing their time to make the conference a great success. We thank the national funding agency, Council of Scientific and Industrial Research (CSIR), Government of India, for the financial support they contributed toward the successful completion of this international conference. We express our sincere gratitude to all the referees for spending their valuable time to review the manuscripts, which led to substantial improvements and selection of the research papers for publication. The organizing committee is grateful to Mr. Christopher Tominich, Editor at Birkhäuser/Springer, for his continuous encouragement and support toward the publication of this book.

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