

# Preface

Welcome to the Proceedings of the International Conference on Recent Trends in Mathematical Analysis and its Applications 2014 (ICRTMAA-2014). With a view to bringing together experts and young researchers working on various areas of Mathematical Analysis and its Applications, the Department of Mathematics at the Indian Institute of Technology, Roorkee, decided to organize this international conference from December 21 to 23, 2014. We invited many mathematicians of repute to deliver invited lectures on topics of their interest and also young researchers to present their research during the conference. The conference provided an opportunity to exchange ideas and share cutting-edge research.

The conference had invited speakers and participants from United States of America, Germany, South Africa, the Sultanate of Oman, and reputed institutions from India. When we called for papers, we received 94 papers. Each of these was sent to two carefully chosen referees, who went through the papers and gave their recommendations on whether the paper should be included in the proceedings of the conference. Based on the recommendations, we selected 60 papers for inclusion in the proceedings.

Mathematical Analysis is an interesting subject which has applications in many different areas of pure and applied mathematics. The papers included in this volume demonstrate the versatility and inherent beauty of Analysis. The areas included are Compressive sensing, Approximation Theory, Solitons and nonlinear waves, Galerkin methods, singularly perturbed differential and difference equations, fractal interpolations and surface fitting, equilibrium problems, optimization using various techniques, different methods to approach pricing European options, Fractional, functional and other types of differential equations, stochastic integro-differential equations, mathematical models from Biology, wavelet frames, Frames in semi-inner product spaces, and Frames in Hilbert  $C^*$  module.

The main theme in each of these papers is to employ analytical techniques to solve the problems at hand and wherever possible to find their numerical solutions. The large collection of papers in Approximation theory shows the use of operators,  $q$ -integers, and splines. The authors of these papers have carefully described the problem and showed appropriate methods to obtain the solution. For a problem in

mathematical biology one may need to validate the model by showing that the model is a realistic representation of the problem, and its solution may yield valuable insights. In these proceedings, the papers have been classified into two parts namely, “Mathematical Analysis” and “Applications.”

The trend in research is constantly changing due to developments of new tools, and a conference of this type is a valuable means for knowledge transfer. This volume which contains the research papers and a few carefully selected survey papers will provide the readers with an opportunity to see how mathematical analysis can be applied in various contexts to solve problems.

As the Conference Chairs of ICRTMAA 2014, we are thankful to all the funding agencies for their grant support for the successful completion of this international conference. The conference was supported partially by the following funding agencies:

1. Department of Science and Technology (DST), Government of India, New Delhi
2. Uttarakhand State Council for Science and Technology (UCOST), India
3. Quality Improvement Programme Centre, Indian Institute of Technology (IIT) Roorkee, India
4. International Society for Analysis, Applications and Computation (ISAAC)

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We are grateful to the Chairs and Members of the Screening Committee, Registration Committee, Publication Committee, Academic Programme Committee, Catering Committee, Cultural Committee, Finance Committee, and Advisory Committee which worked as a team by investing their invaluable time and hard work to make this event a success.

We extend our hearty thanks to the keynote speakers who kindly accepted our invitation. Especially, we would like to thank the following experts:

1. Prof. R.A. Zalik, Auburn University, USA
2. Prof. R.N. Mohapatra, University of Central Florida, USA
3. Prof. Zhiseng Shuai, University of Central Florida, USA
4. Prof. Margareta Heilmann, Germany
5. Prof. Elena Berdysheva, Muskat, Oman
6. Prof. M.C. Joshi, IIT Gandhinagar, India
7. Prof. R.K. Mohanty, South Asian University, India

A total of 71 subject experts from around the world contributed to the peer-review process. We express our sincere gratitude to the reviewers for spending their valuable time to review the papers and for sorting out the papers for presentation at the conference.

Our goal will be accomplished if the readers find this volume useful and informative for their future research. We are thankful to Springer for publishing the proceedings of the conference.

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