Preface

The Indian Society of Industrial and Applied Mathematics (ISIAM) was established during a national symposium on differential equations in September 1990 at Aligarh Muslim University. Since then it has been organizing national and international conferences, seminars, workshops and symposiums in different parts of India. Proceedings of these academic activities have been published by reputed publishers including Longman (Pitman Research Notes in Mathematics), Kluwer Academic Publications (Now part of Springer Group), Taylor and Francis Publications, etc.

The present volume contains invited talks and some contributory talks of 11th International Biennial Conference on "Emerging Mathematical Methods, Models and Algorithms for Science and Technology" organized under the auspices of the society. This international conference was organized at Gautam Buddha University, National Capital Region, India, from December 15–16, 2012. This conference commemorates 125th birth year of the Mathematics Wizard Srinivasa Ramanujan. The conference was attended by more than 200 persons belonging to different specializations of mathematics, engineering, physics, computer science, information technology, and management studies coming from various states of India and countries like USA, Germany, France, Italy, Turkey, Saudi Arabia, and Oman. The conference was really interdisciplinary in nature, where applications of mathematical concepts to emerging technologies were focused.

The conference was inaugurated by Prof. Krishan Lal, President of the Indian National Science Academy (INSA) and eminent academicians such as Prof. H.P. Dikshit (Chairman EPCO. Institute of Environmental Studies, Govt. of Madhya Pradesh and former Vice-Chancellor of IGNOU), Prof. U.B. Desai, Director IIT Hyderabad (a renowned expert of information Technology and Tele Communication), Prof. N.K. Gupta, IIT Delhi (a renowned expert of Impact Problems and former Vice-President of INSA and Current President ISIAM), Prof. Moinuddin, Pro. Vice-Chancellor Delhi Technical University (Former Director NIT, Jalandhar), Prof. Aparajita Ojha, Director IIIT Jabalpur, Prof. Rajat Gupta, Director NIT, Srinagar, Prof. M. Brokate, former Dean School of Mathematical Sciences, Technical University Munich, Germany, Prof. R. Lozi,

CNRS & Nice University France et al. participated and delivered lectures. A special session on 125th birthday celebration of Ramanujan was also organized during the conference, and Prof. Dinesh Singh, Vice-Chancellor, Delhi University was the chief guest of this function.

On this occasion, Prof. U.B. Desai was conferred Dr. Zakir Husain Award 2011/2012 for his valuable contribution in the emerging areas like cyber physical systems, cognitive radio, wireless communication, wireless sensor networks, additive signal, and image processing. He has extensively used mathematical concepts such as wavelets and multiresolution analysis, artificial neural network, and fractals in his research works.

In the inaugural address, Prof. Krishan Lal highlighted the importance of mathematics for industrial and technological development of any nation. He expressed the serious concern of the scientists, engineers, and all well-wishers of our nation on dwindling standard of mathematics and especially applications of mathematics. He emphasized that the need of the hour is to attract talented young researchers towards applications of mathematics in emerging areas of science and technology. All invited speakers on this occasion echoed the same sentiment.

During the inaugural function, Prof. Pammy Manchanda, Convener Scientific Committee read the messages of the Hon'ble President of India, Hon'ble Union Minister of Communication and Information Technology, Minister of External Affairs, Minister of Water resources, Governors of Bengal, Jammu and Kashmir, Uttrakhand, Minister of State for Human Resource Development, and 10 other dignitaries including Prof. Barbara Lee Keyfitz, President International Council of Industrial and Applied Mathematics (www.iciam.org).

The invited and contributory talks published in the proceedings provide valuable information on certain current trends in mathematical models, methods, and algorithms. Rene Lozi discusses the cryptography-based chaos which provides a new mechanism for undersampling chaotic numbers obtained by the ring coupling of one-dimensional maps in Chap. 1. In Chap. 2, D.K. Chaturvedi provides the vital information about applications of soft computing techniques. Image decomposition–reconstruction is very important in image analysis and it has a wide range of applications in radar imaging which is discussed by Gaik Ambartsoumian and Venkateswaran P. Krishnan in Chaps. 3 and 4 respectively. Two-dimensional nonlinear elliptic boundary value problems by cubic spline approximation method is explored by R.K. Mohanty in Chap. 5. Application of Monte Carlo simulation to pricing of path-dependent European-type options is discussed by Siddhartha P. Chakrabarty in Chap. 6. Messaoud Boulbrachene's paper deals with the finite element approximation of the impulse control quasivariational inequality in Chap. 7. In Chap. 8, Chefi Triki and Nasr Al-Hinai give an overview of the Periodic Petrol Station Replenishment Problem. Mushahid Husain and Ayub Khan present their recent work in nanotechnology in Chap. 9. Chapter 10 contains results on generalized monotone mappings by R. Rais et al.

Rashmi Bhardwaj highlights the application of wavelet and fractal methods to environmental problems, especially problem of air and water pollution in Chap. 11. Mohd Ahmad Ansari provides an algorithm by context modeling of medical image

compression using discrete wavelet transform in Chap. 12. In Chap. 13, K. Srinivasa Rao (first DST-Ramanujan Professor) gives an elegant account of the life and work of Ramanujan, a creative genius. Sushil Kumar et al. study the dispersion in steady and oscillatory flows through curved channels with absorbing boundaries in Chap. 14. Noor-e-Zahra explains the basic ingredients of a new technology, compression—sensing in Chap. 15. Ruchira Aneja's paper is devoted to the emergence of shearlets and its applications in Chap. 16. Nagma Irfan et al. discuss the application of CAS wavelets in numerical evaluation of Hankel transforms arising in seismology in Chap. 17.

The main message conveyed through the conference is that mathematics has great potential to analyze and understand the challenging problems of nanotechnology, biotechnology, medical science, oil industry, environmental sciences, engineering, and financial technology. It has been emphasized throughout the conference that young researchers of the country should embark on those areas of mathematics which have significant applications in these fields.

I take this opportunity to thank Profs. Pammy Manchanda and Rashmi Bhardwaj coeditors of the proceedings for their valuable help.

Prof. Abul Hasan Siddiqi