Preface

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Biographical notes: Yuhang Yang is a Professor at the Department of Electronic Engineering, Shanghai Jiao Tong University. He was awarded top honours in the Technology Improvement Award by the Electronics Ministry of Chinese Government in 1995, the most outstanding person Cross of the Century by the National Education Committee in 1997, the first class Shanghai Scientific Technology Progress Prize in 1999, the top ten of the most influential people in IT industry of China in 2000, the third class Shanghai Scientific Technology Progress Prize in 2003. His current research interest lies mainly in the field of computational science and broadband wireless. He has about 150 international academic publications in IEEE academic journals, IEEE conference papers, and book chapters.

Maode Ma received his BE degree from Tsinghua University in 1982 and his ME degree from Tianjin University in 1991. He received his PhD degree from Hong Kong University of Science and Technology in 1999. Since 2000 he has been a faculty member with the School of Electrical and Electronic Engineering at Nanyang Technological University, Singapore, where he is currently an Associate Professor. His major research interest is in distributed computing, protocol design and analysis in wireless networks and optical networks. He has about 100 international academic publications in IEEE academic journals, IEEE conference papers, and book chapters.

With the rapid development of computer science and technology, 'computing' has become the third approach of science research. Scientific computing is the field of study concerned with constructing mathematical models and numerical solution techniques and using computers to analyse and solve scientific, social scientific and engineering problems. In practical use, it is typically the application of computer simulation and other forms of computation to problems in various scientific disciplines. Numerical analysis is an important underpinning for techniques used in computational science and there are many unresolved problems worth studying. This special issue aims to give a timely and comprehensive presentation of the findings and achievements from such an exploration in the areas.

There were 37 papers submitted for consideration for publication in this special issue. Those papers came from more than ten countries. We thank those who submitted papers to this special issue. After two rounds of rigorous peer-review and revision processes, only 11 papers were selected for publication in this issue. Given the volume of papers received, we were able to accept only papers that are clearly outstanding and without any negative comments. We are sorry that we do not have space for some other quite good papers. We briefly summarise the papers included in this issue as follows.

The first paper in this issue, 'Investigating the shock-capturing properties of some composite numerical schemes for the 1-D linear advection equation', by A.R. Appadu, enables us to understand better the shock-capturing property of composite schemes. The study allows us to understand why not all composite schemes can be effective to control dispersion and dissipation in regions of shocks when used to solve 1-D linear advection problems.

The second paper, 'Solving the nonlinear complementarity problem via an aggregate homotopy method', by X. Fan et al., presents a new aggregate homotopy method to solve the non-linear complementarily problem. The homotopy equation is constructed based on the aggregate function which is the smooth approximation to the reformulation of the nonlinear complementarily problem.

The third one, 'Mesh density and mesh orientation dependence of FE model submitted to low-frequency vibration', by J. Oudry et al., investigates the influence of the mesh densities and mesh orientations of three-dimensional finite element models (FE) with shell elements on elastic wave propagation.

The fourth paper, 'The optimal design of sheet metal forming processes: application to the clinching of thin sheets', by N. Lebaal et al., presents an optimisation procedure using the Response Surface Methodology to increase the strength of clinch joints, based on an adaptive moving target zone.

The fifth paper, 'Inversion techniques and reciprocal formulae', by C. Wei and D. Gong, establishes several pairs of interesting reciprocal formulae by employing Gould-Hsu inversions and Carlitz inversions to establish several pairs of interesting reciprocal formulae.

The sixth paper, 'Numerical simulation of Saint-Venant equations with turbulence using radial basis functions: application to Lake Bouregreg', by Y. Alhuri et al., presents the application of Radial Basis Functions (RBF) for solving a set of non-linear 2D Saint-Venant equations.

The seventh paper, 'On the expected penalty function for a risk model perturbed by diffusion', by J-H. Xie and W. Zou, proposes a continuous time risk model perturbed by an independent diffusion (Wiener) process. The claim number process is assumed to be a generalised Erlang(2) process.

The eighth paper, 'Automatic building extraction based on improved watershed segmentation, mutual information match and snake model', by G. Li et al., proposes a new method for automatic building extraction based on improved watershed segmentation, mutual information match and improved snake model.

The ninth paper, 'HPGRID: a new resource management architecture with its topological properties for massively parallel systems', by D.D.H. Miriam and K.S. Easwarakumar, presents an introduction to the topology of the HPGRID along with isomorphic partitioning of the system which aids to enhance resource discovery and scheduling mechanism.

The tenth paper, 'Identification method of independent module for dynamic fault tree with interdependent basic events and repeated events', by H-L. Zhang et al., proposes a method to find all the independent modules in dynamic fault tree with interdependent basic events and repeated events, which converts dynamic fault tree to dependent tree according the dependency relations of the nodes.

The last paper, 'High performance power flow algorithm for symmetrical distribution networks with unbalanced loading', by I. Dzafic et al., presents an approach using Single Instruction Multiple Data (SIMD) instructions and multiprocessing, which takes a symmetrically constructed but unbalanced loaded distribution network as a use case for a power flow calculation.

The Guest Editors would like to thank all the authors for their contributions and the referees for their helpful comments on the papers. Thanks are also due to Prof. Quanmin Zhu, the Editor-in-Chief of *IJCAT*, and staff at the Inderscience Publishers for their assistance in publishing this special issue.