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## Foreword

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**Biographical notes:** Dr. Minyi Guo received his PhD in Information Science from the University of Tsukuba, Japan in 1998. From 1998 to 2000, he was a research scientist with NEC Soft, Ltd. Japan. He is currently a Full Professor at the Department of Computer Software, The University of Aizu, Japan. From 2001 to 2003, he was a visiting Professor at Georgia State University, USA and Hong Kong Polytechnic University, Hong Kong. He has served as General Chair, Program Committee or Organising Committee Chair for many international conferences. He is the Editor in Chief of the *International Journal of Embedded Systems*. He is also on the editorial board of the *International Journal of High Performance Computing and Networking*, *Journal of Embedded Computing*, *International Journal of Computational Science and Engineering* and *International Journal of Computer and Applications*. His research interests include parallel and distributed processing, parallelising compilers, data parallel languages, data mining, molecular computing and software engineering. He is a member of the ACM, IEEE, IEEE Computer Society and IEICE. He is listed in Marquis Who's Who in Science and Engineering.

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Welcome to the special issue on New Technologies for Networking and Parallel Scientific Applications, The *International Journal of Computational Science and Engineering*. In recent years, Parallel and Distributed Scientific and Engineering Computation has become a key technology which will play an important part in determining and shaping future research and development activities in many academic and industrial branches.

The stated goal of this special issue was to provide a forum for computer scientists and engineers and applied mathematicians and researchers to present and exchange ideas, results, work in progress and experience of research on new technologies of Parallel and Distributed Scientific and Engineering Applications.

The special issue is in conjunction with the 2003 International Symposium on Parallel and Distributed Processing and Applications (ISPA-03) held in Aizu-Wakamatsu City, Japan on 2nd–4th July, 2003. We selected nine papers finally to form this special issue, including two best papers awarded at ISPA-03.

In the first paper, Chuang and Jiang propose a strategy for balancing traffic in a mesh connected network. They use three dynamic channel selection policies to fit different routing characteristics. They also evaluate performance of six adaptive routing algorithms with various channel selection policies through simulation.

Huang et al. present a method to generate a tree shape scatternet, called the bluetree, hierarchically in the second paper. That is, the nodes are added into the bluetree, level by level. This kind of hierarchical grown bluetree (HGB) topology resolves the defects of the conventional bluetree. During growing up, HGB always remains balanced so as to preserve shorter routing paths. As a result, the traffic load at

parent nodes can be greatly improved and only two separate parts will be induced if a parent node is lost.

In the third paper, Watanabe and Okawa propose a new interconnection network topology called extended star graphs. They prove that the extended star graphs have hypercube structures. They also provide a routing algorithm for node to node communication for this topology in the paper.

In the fourth paper, Hwang and Chang propose a new key agreement protocol based on a shared conference password for Ad Hoc networks. With this protocol, they provide an efficient algorithm that takes less computation cost to construct a secret communication channel.

The fifth paper explores the applicability of time series analysis for stock trend forecast and presents the Self-projecting Time Series Forecasting (STSF) System that Deng and Shen have developed. The basic idea behind this system is the online discovery of mathematical formulae that can approximately generate historical patterns from given time series. SPTF offers a set of combined prediction functions for stocks, including Point Forecast and Confidence Interval Forecast, where the latter could be considered as a subsidiary index of the former, in the process of decision making. The authors also propose a new approach to determine the support line and resistance line that are essential for market assessment.

In the sixth paper, Wu et al. present a method to resolve the unacceptable flaw problem to parallel image processing when the number of partitions is not the power of seven like 7, 49, every subimage except one is split into a few fragments which are mixed together.

The seventh paper, contributed by Chen and Zhou, presents a reactive system approach to achieving the fault

tolerance in such a distributed database system. The reactive system concepts are an attractive paradigm for system design, development and maintenance because they separate policies from mechanisms. They give a solution using different reactive modules to implement the fault tolerant policies and the failure detection mechanisms. The solution shows that they can be separated without impact on each other; thus the system can adapt to constant changes in environments and user requirements.

In the eighth paper, Guo et al. present a DNA based algorithm for solving a NP complete problem – Set Basis Problem. Their method is to construct the solution space of by using DNA strand based on sticker model. The biological operations are applied in the Adleman-Lipton model. The simulation results show the algorithm fast.

Yu et al. analyse in the ninth paper, the blocking probabilities of horizontally expanded and vertically stacked optical banyan (HVOB) networks with one extra stage, and

develop their upper bound with respect to the number of planes in the networks.

In the tenth paper, Shao et al. studies the scheduling problem that minimises both schedule length and switching activities for applications with loops on multiple-functional-unit architectures. They show that, to find a schedule that has the minimal switching activities among all minimum latency schedules with or without resource constraints is NP complete. An algorithm, Power Reduction Rotation Scheduling (PRRS), is proposed in the paper, which attempts to minimise both switching activities and schedule length while performing scheduling and allocation simultaneously.

We would like to express our sincere appreciation to all authors for their valuable contributions and to all referees for their cooperation in completing the hard work and putting in the long hours to review each paper in a timely and processional way.