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Computational Science – ICCS 2006

6th International Conference
Reading, UK, May 28-31, 2006
Proceedings, Part IV

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Preface

The Sixth International Conference on Computational Science (ICCS 2006) was held in Reading, United Kingdom, May 28-31 and continued the traditions of previous conferences in the series: ICCS 2005 in Atlanta, Georgia, USA; ICCS 2004 in Krakow, Poland; ICCS 2003 held simultaneously at two locations in, Melbourne, Australia and St. Petersburg, Russia; ICCS 2002 in Amsterdam, The Netherlands; and ICCS 2001 in San Francisco, California, USA.

Since the first conference in San Francisco, rapid developments in Computational Science as a mainstream area facilitating multi-disciplinary research essential for the advancement of science have been observed. The theme of ICCS 2006 was “Advancing Science through Computation”, marking several decades of progress in Computational Science theory and practice, leading to greatly improved applications science. The conference focused on the following major themes: tackling Grand Challenges Problems; modelling and simulations of complex systems; scalable algorithms and tools and environments for Computational Science. Of particular interest were the following major recent developments in novel methods and modelling of complex systems for diverse areas of science, scalable scientific algorithms, advanced software tools, computational grids, advanced numerical methods, and novel application areas where the above novel models, algorithms and tools can be efficiently applied such as physical systems, computational and systems biology, environmental systems, finance, and others.

Keynote lectures were delivered by Mateo Valero (Director, Barcelona Supercomputing Centre) - “Tackling Grand Challenges Problems”; Chris Johnson (Distinguished Professor, University of Utah) - “Visualizing the Future”; José Moreira (IBM, Chief Architect, Commercial Scale Out) - “Achieving Breakthrough Science with the Blue Gene/L Supercomputer”; Martin Curley (INTEL, Global Director of Innovation and IT Research) - “IT Innovation: A New Era”; Vaidy Sunderam (Samuel Candler Dobbs Professor of Computer Science, Emory University, USA) - “Metacomputing Revisited: Alternative Paradigms for Distributed Resource Sharing”; and Ron Bell (AWE plc.) - “The AWE HPC Benchmark”.

In addition, two special sessions were held - one by industry and one by the funding bodies. Three tutorials preceded the main technical program of the conference: “Tools for Program Analysis in Computational Science” by Dieter Kranzlmüller; “P-GRADE Portal” by P. Kascuk, T. Kiss and G. Sipos; and “Scientific Computing on Graphics Hardware” by Dominik Göddeke. We would like to thank all the keynote, the invited, and the tutorial speakers for their inspiring talks.

Apart from the plenary sessions and tutorials the conference included twelve parallel oral sessions and two poster sessions. Since the first ICCS in San

Francisco the conference has grown steadily attracting increasing numbers of researchers in the field of Computational Science. For ICCS 2006 we received over 1,400 submissions, around 300 for the main track and over 1,100 for the originally proposed workshops. Of these submissions, 98 were accepted as full papers and 29 as posters for the main track; and 500 were accepted as full papers, short papers or posters for the 32 workshops. This selection was possible due to the tremendous work done by the Program Committee and the 720 reviewers. The author index contains over 1,000 names and over 600 participants from all the major continents. The papers cover a wide variety of topics in Computational Science, ranging from Grand Challenges problems and modelling of complex systems in various areas to advanced numerical algorithms and new scalable algorithms in diverse application areas and software environments for Computational Science. The ICCS 2006 Proceedings consist of four volumes, 3991 to 3994, where the first volume contains the papers from the main track and all the posters; the remaining three volumes contain the papers from the workshops. ICCS this year is primarily published on a CD and we would like to thank Springer for their cooperation and partnership. We hope that the ICCS 2006 Proceedings will be a major intellectual resource for many computational scientists and researchers for years ahead. During the conference the best papers from the main track and workshops as well as the best posters were nominated and commended on ICCS 2006 website. A number of selected papers will also be published in special issues of relevant mainstream journals.

We would like to thank all workshop organisers and the program committee for the excellent work, which further enhanced the conference's standing and led to very high quality event with excellent papers. We would like to express our gratitude to Advanced Computing and Emerging Technologies Centre staff, postgraduates and students for their wholehearted support of ICCS 2006. We would like to thank the School of Systems Engineering, Conference Office, Finance Department and various units at the University of Reading for different aspects of the organization and for their constant support in making ICCS 2006 a success. We would like to thank the Local Organizing Committee for their persistent and enthusiastic work towards the success of ICCS 2006. We owe special thanks to our sponsors: Intel, IBM, SGI, Microsoft Research, EPSRC and Springer; and to ACET Centre and the University of Reading for their generous support. We would like to thank SIAM, IMACS, and UK e-Science programme for endorsing ICCS 2006.

ICCS 2006 was organized by the Advanced Computing and Emerging Technologies Centre, University of Reading, with support from the Section Computational Science at the Universiteit van Amsterdam and Innovative Computing Laboratory at the University of Tennessee, in cooperation with the Society for Industrial and Applied Mathematics (SIAM), the International Association for Mathematics and Computers in Simulation (IMACS), and the UK Engineering and Physical Sciences Research Council (EPSRC). We invite you to visit the ICCS 2006 website (<http://www.iccs-meeting.org/iccs2006/>) and ACET Centre website (<http://www.acet.reading.ac.uk/>) to recount the events leading up

to the conference, to view the technical programme, and to recall memories of three and a half days of engagement in the interest of fostering and advancing Computational Science.

June 2006

Vassil N. Alexandrov
G. Dick van Albada
Peter M.A. Sloot
Jack J. Dongarra

Organisation

ICCS 2006 was organised by the Centre for Advanced Computing and Emerging Technologies (ACET), University of Reading, UK, in cooperation with the University of Reading (UK), the Universiteit van Amsterdam (The Netherlands), the University of Tennessee (USA), Society for Industrial and Applied Mathematics (SIAM), International Association for Mathematics and Computers in Simulation (IMACS) and Engineering and Physical Sciences Research Council (EPSRC). The conference took place on the Whiteknights Campus of the University of Reading.

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Tools for Program Development and Analysis in Computational Science

D. Kranzlmüller - GUP, Joh. Kepler University, Linz, Austria
R. Wismüller - University of Siegen, Germany
A. Bode - Technische Universität München, Germany
J. Volkert - GUP, Joh. Kepler University, Linz, Austria

Collaborative and Cooperative Environments

C. Anthes - GUP, Joh. Kepler University, Linz, Austria
V.N. Alexandrov - ACET, University of Reading, UK
D.J. Roberts - NICVE, University of Salford, UK
J. Volkert - GUP, Joh. Kepler University, Linz, Austria
D. Kranzlmüller - GUP, Joh. Kepler University, Linz, Austria

Second International Workshop on Bioinformatics Research and Applications (IWBRA'06)

A. Zelikovsky - Georgia State University, USA
Y. Pan - Georgia State University, USA
I.I. Mandoiu - University of Connecticut, USA

Third International Workshop on Practical Aspects of High-Level Parallel Programming (PAPP 2006)

A. Benoît - Laboratoire d'Informatique du Parallélisme, Ecole Normale Supérieure de Lyon, France
F. Loulergue - LIFO, Université d'Orléans, France

Wireless and Mobile Systems

H. Choo - Networking Laboratory, Sungkyunkwan University, Suwon, KOREA

GeoComputation

Y. Xue - Department of Computing, Communications Technology and Mathematics, London Metropolitan University, UK

Computational Chemistry and Its Applications

P. Ramasami - Department of Chemistry, University of Mauritius

Knowledge and Information Management in Computer Communication Systems (KIMCCS 2006)

N.T. Nguyen - Institute of Control and Systems Engineering,
Wroclaw University of Technology, Poland

- A. Grzech - Institute of Information Science and Engineering,
Wroclaw University of Technology, Poland
R. Katarzyniak - Institute of Information Science and Engineering,
Wroclaw University of Technology, Poland

Modelling of Complex Systems by Cellular Automata (MCSCA 2006)

- J. Kroc - University of West Bohemia, Czech Republic
T. Suzudo - Japan Atomic Energy Agency, Japan
S. Bandini - University of Milano - Bicocca, Italy

Dynamic Data Driven Application Systems (DDDAS 2006)

- F. Darema - National Science Foundation, USA

Parallel Monte Carlo Algorithms for Diverse Applications in a Distributed Setting

- I.T. Dimov - ACET, University of Reading, UK
V.N. Alexandrov - ACET, University of Reading, UK

International Workshop on Intelligent Storage Technology (IST06)

- J. Shu - Department of Computer Science and Technology, Tsinghua University,
Beijing, P.R. China

Intelligent Agents in Computing Systems

- R. Schaefer - Department of Computer Science, Stanislaw Staszic University
of Science and Technology in Kraków
K. Cetnarowicz - Department of Computer Science, Stanislaw Staszic University
of Science and Technology in Kraków

First International Workshop on Workflow Systems in e-Science (WSES06)

- Z. Zhao - Informatics Institute, University of Amsterdam, The Netherlands
A. Belloum - University of Amsterdam, The Netherlands

Networks: Structure and Dynamics

- B. Tadic - Theoretical Physics Department, J. Stefan Institute, Ljubljana,
Slovenia
S. Thurner - Complex Systems Research Group, Medical University Vienna,
Austria

Evolution Toward Next Generation Internet (ENGI)

Y. Cui - Tsinghua University, P.R. China

T. Korkmaz - University of Texas at San Antonio, USA

**General Purpose Computation on Graphics Hardware (GPGPU):
Methods, Algorithms and Applications**

D. Göldeke - Universität Dortmund, Institut für Angewandte Mathematik
und Numerik, Germany

S. Turek - Universität Dortmund, Institut für Angewandte Mathematik
und Numerik, Germany

Intelligent and Collaborative System Integration Technology (ICSIT)

J.-W. Lee - Center for Advanced e-System Integration Technology,
Konkuk University, Seoul, Korea

Computational Methods for Financial Markets

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Lithuania

V. Sakalauskas - Department of Informatics, Kaunas Faculty, Vilnius University,
Lithuania

D. Kriksciuniene - Department of Informatics, Kaunas Faculty,
Vilnius University, Lithuania

**2006 International Workshop on P2P for High Performance
Computational Sciences (P2P-HPCS06)**

H. Jin - School of Computer Science and Technology, Huazhong University of
Science and Technology, Wuhan, China

X. Liao - Huazhong University of Science and Technology, Wuhan, China

Computational Finance and Business Intelligence

Y. Shi - Graduate School of the Chinese Academy of Sciences, Beijing, China

**Third International Workshop on Automatic Differentiation Tools
and Applications**

C. Bischof - Inst. for Scientific Computing, RWTH Aachen University, Germany

S.A. Forth - Engineering Systems Department, Cranfield University,
RMCS Shrivenham, UK

U. Naumann - Software and Tools for Computational Engineering,
RWTH Aachen University, Germany

J. Utke - Mathematics and Computer Science Division, Argonne National
Laboratory, IL, USA

2006 Workshop on Scientific Computing in Electronics Engineering

Y. Li - National Chiao Tung University, Hsinchu City, Taiwan

New Trends in the Numerical Solution of Structured Systems with Applications

T. Politi - Dipartimento di Matematica, Politecnico di Bari, Itali

L. Lopez - Dipartimento di Matematica, Università di Bari, Itali

Workshop on Computational Science in Software Engineering (CSSE'06)

D. Rodríguez García - University of Reading, UK

J.J. Cuadrado - University of Alcalá, Spain

M.A. Sicilia - University of Alcalá, Spain

M. Ruiz - University of Cádiz, Spain

Digital Human Modeling (DHM-06)

Y. Cai - Carnegie Mellon University, USA

C. Imielinska - Columbia University

Real Time Systems and Adaptive Applications (RTSAA 06)

T. Kuo - National Taiwan University, Taiwan

J. Hong - School of Computer Science and Engineering, Kwangwoon University, Seoul, Korea

G. Jeon - Korea Polytechnic University, Korea

International Workshop on Grid Computing Security and Resource Management (GSRM'06)

J.H. Abawajy - School of Information Technology, Deakin University, Geelong, Australia

Fourth International Workshop on Autonomic Distributed Data and Storage Systems Management Workshop (ADSM 2006)

J.H. Abawajy - School of Information Technology, Deakin University, Geelong, Australia

Table of Contents – Part IV

Evolution Toward Next Generation Internet (ENGI)

A New Energy Efficient Target Detection Scheme for Pervasive Computing <i>Thanh Hai Trinh, Hee Yong Youn</i>	1
A Load Balance Based On-Demand Routing Protocol for Mobile Ad-Hoc Networks <i>Liqiang Zhao, Xin Wang, Azman Osman Lim, Xiangyang Xue</i>	9
Handover Control Function Based Handover for Mobile IPv6 <i>Guozhi Wei, Anne Wei, Ke Xu, Hui Deng</i>	17
Unified Error Control Framework with Cross-Layer Interactions for Efficient H.264 Video Transmission over IEEE 802.11e Wireless LAN <i>Jeong-Yong Choi, Jitae Shin</i>	25
A Novel Control Plane Model of Extensible Routers <i>Kun Wu, Jianping Wu, Ke Xu</i>	33
AM-Trie: A High-Speed Parallel Packet Classification Algorithm for Network Processor <i>Bo Zheng, Chuang Lin</i>	41
Speedup Requirements for Output Queuing Emulation with a Sliding-Window Parallel Packet Switch <i>Chia-Lung Liu, Woei Lin, Chin-Chi Wu</i>	49
Combining Cross-Correlation and Fuzzy Classification to Detect Distributed Denial-of-Service Attacks <i>Wei Wei, Yabo Dong, Dongming Lu, Guang Jin</i>	57
Convergence of the Fixed Point Algorithm of Analytical Models of Reliable Internet Protocols (TCP) <i>Debessay Fesehay Kassa, Sabine Wittevrangel</i>	65
A Peer-to-Peer Approach to Semantic Web Services Discovery <i>Yong Li, Sen Su, Fangchun Yang</i>	73

Multicast Routing Protocol with Heterogeneous and Dynamic Receivers <i>Huimei Lu, Hongyu Hu, Quanshuang Xiang, Yuanda Cao</i>	81
Using Case-Based Reasoning to Support Web Service Composition <i>Ruixing Cheng, Sen Su, Fangchun Yang, Yong Li</i>	87
Secure OWL Query <i>Baowen Xu, Yanhui Li, Jianjiang Lu, Dazhou Kang</i>	95
Efficient Population Diversity Handling Genetic Algorithm for QoS-Aware Web Services Selection <i>Chengwen Zhang, Sen Su, Junliang Chen</i>	104
A New Algorithm for Long Flows Statistics—MGCBF <i>Mingzhong Zhou, Jian Gong, Wei Ding</i>	112
Estimating Original Flow Length from Sampled Flow Statistics <i>Weijiang Liu, Jian Gong, Wei Ding, Yanbing Peng</i>	120
Easily-Implemented Adaptive Packet Sampling for High Speed Networks Flow Measurement <i>Hongbo Wang, Yu Lin, Yuehui Jin, Shiduan Cheng</i>	128
Multi-layer Network Recovery: Avoiding Traffic Disruptions Against Fiber Failures <i>Anna Urrea, Eusebi Calle, Jose L. Marzo</i>	136
An Algorithm for Estimation of Flow Length Distributions Using Heavy-Tailed Feature <i>Weijiang Liu, Jian Gong, Wei Ding, Guang Cheng</i>	144
Performance Evaluation of Novel MAC Protocol for WDM/Ethernet- PON <i>Bokrae Jung, Hyunho Yun, Jaegwan Kim, Mingon Kim, Minho Kang</i>	152
An Efficient Mobility Management Scheme for Two-Level HMIPv6 Networks <i>Xuezheng Pan, Zheng Wan, Lingdi Ping, Fanjun Su</i>	156
Analysis of Packet Transmission Delay Under the Proportional Fair Scheduling Policy <i>Jin-Hee Choi, Jin-Ghoo Choi, Chuck Yoo</i>	160
Precise Matching of Semantic Web Services <i>Yonglei Yao, Sen Su, Fangchun Yang</i>	164

Evolving Toward Next Generation Wireless Broadband Internet <i>Seung-Que Lee, Namhun Park, Choongho Cho, Hyongwoo Lee, Seungwan Ryu</i>	168
A Decision Maker for Transport Protocol Configuration <i>Jae-Hyun Hwang, Jin-Hee Choi, Chuck Yoo</i>	172
On the Generation of Fast Verifiable IPv6 Addresses <i>Qianli Zhang, Xing Li</i>	176
A MAC Protocol to Reduce Sleep Latency and Collisions in Wireless Sensor Network <i>Jinsuk Pak, Jeongho Son, Kijun Han</i>	180
IC Design of IPv6 Routing Lookup for High Speed Networks <i>Yuan-Sun Chu, Hui-Kai Su, Po-Feng Lin, Ming-Jen Chen</i>	184
 General Purpose Computation on Graphics Hardware (GPGPU): Methods, Algorithms and Applications	
GPU Accelerated Smith-Waterman <i>Yang Liu, Wayne Huang, John Johnson, Sheila Vaidya</i>	188
A Graphics Hardware Accelerated Algorithm for Nearest Neighbor Search <i>Benjamin Bustos, Oliver Deussen, Stefan Hiller, Daniel Keim</i>	196
The Development of the Data-Parallel GPU Programming Language CGIS <i>Philipp Lucas, Nicolas Fritz, Reinhard Wilhelm</i>	200
Spline Surface Intersections Optimized for GPUs <i>Sverre Briseid, Tor Dokken, Trond Runar Hagen, Jens Olav Nygaard</i>	204
A GPU Implementation of Level Set Multiview Stereo <i>Patrick Labatut, Renaud Keriven, Jean-Philippe Pons</i>	212
Solving the Euler Equations on Graphics Processing Units <i>Trond Runar Hagen, Knut-Andreas Lie, Jostein R. Natvig</i>	220
Particle-Based Fluid Simulation on the GPU <i>Kyle Hegeman, Nathan A. Carr, Gavin S.P. Miller</i>	228

Spiking Neurons on GPUs <i>Fabrice Bernhard, Renaud Keriven</i>	236
--	-----

Intelligent and Collaborative System Integration Technology (ICSIT)

SONA: An On-Chip Network for Scalable Interconnection of AMBA-Based IPs <i>Eui Bong Jung, Han Wook Cho, Neungsoo Park, Yong Ho Song</i>	244
--	-----

Semi-automatic Creation of Adapters for Legacy Application Migration to Integration Platform Using Knowledge <i>Jan Pieczykolan, Bartosz Kryza, Jacek Kitowski</i>	252
---	-----

A Self-configuration Mechanism for High-Availability Clusters <i>Hocheol Sung, Sunyoung Han, Bok-Gyu Joo, Chee-Wei Ang, Wang-Cho Cheng, Kim-Sing Wong</i>	260
--	-----

Development of Integrated Framework for the High Temperature Furnace Design <i>Yu Xuan Jin, Jae-Woo Lee, Karp Joo Jeong, Jong Hwa Kim, Ho-Yon Hwang</i>	264
--	-----

A Distributed Real-Time Tele-operation System Based on the TMO Modeling <i>Hanku Lee, Segil Jeon</i>	272
---	-----

A Sharing and Delivery Scheme for Monitoring TMO-Based Real-Time Systems <i>Yoon-Seok Jeong, Tae-Wan Kim, Chun-Hyon Chang</i>	280
--	-----

An Algorithm for the Generalized k -Keyword Proximity Problem and Finding Longest Repetitive Substring in a Set of Strings <i>Inbok Lee, Sung-Ryul Kim</i>	289
---	-----

A Grid-Based Flavonoid Informatics Portal <i>HaiGuo Xu, Karpjoo Jeong, Seunho Jung, Hanku Lee, Segil Jeon, KumWon Cho, Hyunmyung Kim</i>	293
---	-----

Computational Methods for Financial Markets

Computer Construction of Quasi Optimal Portfolio for Stochastic Models with Jumps of Financial Markets <i>Aleksander Janicki</i>	301
---	-----

A New Computational Method of Input Selection for Stock Market Forecasting with Neural Networks <i>Wei Huang, Shouyang Wang, Lean Yu, Yukun Bao, Lin Wang</i>	308
Short-Term Investment Risk Measurement Using VaR and CVaR <i>Virgilijus Sakalauskas, Dalia Kriksciuniene</i>	316
Computational Asset Allocation Using One-Sided and Two-Sided Variability Measures <i>Simone Farinelli, Damiano Rossello, Luisa Tibiletti</i>	324
Stock Trading System Based on Formalized Technical Analysis and Ranking Technique <i>Saulius Masteika, Rimvydas Simutis</i>	332
Deriving the Dependence Structure of Portfolio Credit Derivatives Using Evolutionary Algorithms <i>Svenja Hager, Rainer Schöbel</i>	340
Stochastic Volatility Models and Option Prices <i>Akvilina Valaitytė, Eimutis Valakevičius</i>	348
Extraction of Interesting Financial Information from Heterogeneous XML-Based Data <i>Juryon Paik, Young Ik Eom, Ung Mo Kim</i>	356
A Hybrid SOM-Altman Model for Bankruptcy Prediction <i>Egidijus Merkevičius, Gintautas Garšva, Stasys Girdzijauskas</i>	364
Learning and Inference in Mixed-State Conditionally Heteroskedastic Factor Models Using Viterbi Approximation <i>Mohamed Saidane, Christian Lavergne</i>	372
 2006 International Workshop on P2P for High Performance Computational Sciences (P2P-HPCS06)	
Constructing a P2P-Based High Performance Computing Platform <i>Hai Jin, Fei Luo, Xiaofei Liao, Qin Zhang, Hao Zhang</i>	380
LDMA: Load Balancing Using Decentralized Decision Making Mobile Agents <i>M. Aramudhan, V. Rhymend Uthariaraj</i>	388

A Hybrid Scheme for Object Allocation in a Distributed Object-Storage System

Fang Wang, Shunda Zhang, Dan Feng, Hong Jiang, Lingfang Zeng, Song Lv 396

Survive Under High Churn in Structured P2P Systems: Evaluation and Strategy

Zhiyu Liu, Ruifeng Yuan, Zhenhua Li, Hongxing Li, Guihai Chen 404

Analyzing Peer-to-Peer Traffic’s Impact on Large Scale Networks

Mao Yang, Yafei Dai, Jing Tian 412

Analyzing the Dynamics and Resource Usage of P2P File Sharing by a Spatio-temporal Model

Riikka Susitaival, Samuli Aalto, Jorma Virtamo 420

Understanding the Session Durability in Peer-to-Peer Storage System

Jing Tian, Yafei Dai, Hao Wang, Mao Yang 428

Popularity-Based Content Replication in Peer-to-Peer Networks

Yohei Kawasaki, Noriko Matsumoto, Norihiko Yoshida 436

Computational Finance and Business Intelligence

A New Method for Crude Oil Price Forecasting Based on Support Vector Machines

Wen Xie, Lean Yu, Shanying Xu, Shouyang Wang 444

Credit Risk Evaluation Based on LINMAP

Tai-yong Mou, Zong-fang Zhou, Yong Shi 452

Logic Mining for Financial Data

G. Felici, M.A. Galante, L. Torosantucci 460

Mining Both Associated and Correlated Patterns

Zhongmei Zhou, Zhaohui Wu, Chunshan Wang, Yi Feng 468

A New Multi-criteria Convex Quadratic Programming Model for Credit Analysis

Gang Kou, Yi Peng, Yong Shi, Zhengxin Chen 476

Multiclass Credit Cardholders’ Behaviors Classification Methods

Gang Kou, Yi Peng, Yong Shi, Zhengxin Chen 485

Hybridizing Exponential Smoothing and Neural Network for Financial Time Series Predication <i>Kin Keung Lai, Lean Yu, Shouyang Wang, Wei Huang</i>	493
Assessment the Operational Risk for Chinese Commercial Banks <i>Lijun Gao, Jianping Li, Jianming Chen, Weixuan Xu</i>	501
Pattern Recognition for MCNs Using Fuzzy Linear Programming <i>Jing He, Wuyi Yue, Yong Shi</i>	509
Comparisons of the Different Frequencies of Input Data for Neural Networks in Foreign Exchange Rates Forecasting <i>Wei Huang, Lean Yu, Shouyang Wang, Yukun Bao, Lin Wang</i>	517

Third International Workshop on Automatic Differentiation Tools and Applications

Automatic Differentiation of C++ Codes for Large-Scale Scientific Computing <i>Roscoe A. Bartlett, David M. Gay, Eric T. Phipps</i>	525
A Sensitivity-Enhanced Simulation Approach for Community Climate System Model <i>Jong G. Kim, Elizabeth C. Hunke, William H. Lipscomb</i>	533
Optimal Checkpointing for Time-Stepping Procedures in ADOL-C <i>Andreas Kowarz, Andrea Walther</i>	541
On the Properties of Runge-Kutta Discrete Adjoints <i>Adrian Sandu</i>	550
Source Transformation for MATLAB Automatic Differentiation <i>Rahul V. Kharche, Shaun A. Forth</i>	558
The Data-Flow Equations of Checkpointing in Reverse Automatic Differentiation <i>Benjamin Dauvergne, Laurent Hascoët</i>	566
Linearity Analysis for Automatic Differentiation <i>Michelle Mills Strout, Paul Hovland</i>	574
Hybrid Static/Dynamic Activity Analysis <i>Barbara Kreaseck, Luis Ramos, Scott Easterday, Michelle Strout, Paul Hovland</i>	582

Automatic Sparsity Detection Implemented as a Source-to-Source Transformation

Ralf Giering, Thomas Kaminski 591

2006 Workshop on Scientific Computing in Electronics Engineering

Lattice Properties of Two-Dimensional Charge-Stabilized Colloidal Crystals

Pavel Dyshlovenko, Yiming Li 599

Self-consistent 2D Compact Model for Nanoscale Double Gate MOSFETs

S. Kolberg, T.A. Fjeldly, B. Iñiguez 607

Neural Network Based MOS Transistor Geometry Decision for TSMC 0.18 μ Process Technology

Mutlu Avcı, Tulay Yildirim 615

Vlasov-Maxwell Simulations in Singular Geometries

Franck Assous, Patrick Ciarlet Jr. 623

Fast Rigorous Analysis of Rectangular Waveguides by Optimized 2D-TLM

Ayhan Akbal, Hasan H. Balik 631

A New Approach to Spectral Domain Method: Functional Programming

Hasan H. Balik, Bahadır Sevinc, Ayhan Akbal 638

Optimized Design of Interconnected Bus on Chip for Low Power

Donghai Li, Guangsheng Ma, Gang Feng 645

A Conservative Approach to SystemC Parallelization

B. Chopard, P. Combes, J. Zory 653

Modular Divider for Elliptic Curve Cryptographic Hardware Based on Programmable CA

Jun-Cheol Jeon, Kee-Won Kim, Jai-Boo Oh, Kee-Young Yoo 661

New Trends in the Numerical Solution of Structured Systems with Applications

A General Data Grid: Framework and Implementation

Wu Zhang, Jian Mei, Jiang Xie 669

Path Following by SVD <i>Luca Dieci, Maria Grazia Gasparo, Alessandra Papini</i>	677
Comparing Leja and Krylov Approximations of Large Scale Matrix Exponentials <i>L. Bergamaschi, M. Caliarì, A. Martínez, M. Vianello</i>	685
Combined Method for Nonlinear Systems of Equations <i>Peng Jiang, Geng Yang, Chunming Rong</i>	693
A General Family of Two Step Runge-Kutta-Nyström Methods for $y'' = f(x, y)$ Based on Algebraic Polynomials <i>Beatrice Paternoster</i>	700
Schur Decomposition Methods for the Computation of Rational Matrix Functions <i>T. Politi, M. Popolizio</i>	708
Piecewise Constant Perturbation Methods for the Multichannel Schrödinger Equation <i>Veerle Ledoux, Marnix Van Daele, Guido Vanden Berghe</i>	716
State Dependent Symplecticity of Symmetric Methods <i>Felice Iavernaro, Brigida Pace</i>	724
On the Solution of Skew-Symmetric Shifted Linear Systems <i>T. Politi, A. Pugliese</i>	732
Workshop on Computational Science in Software Engineering (CSSE'06)	
Search Based Software Engineering <i>Mark Harman</i>	740
Modular Monadic Slicing in the Presence of Pointers <i>Zhongqiang Wu, Yingzhou Zhang, Baowen Xu</i>	748
Modified Adaptive Resonance Theory Network for Mixed Data Based on Distance Hierarchy <i>Chung-Chian Hsu, Yan-Ping Huang, Chieh-Ming Hsiao</i>	757
Checking for Deadlock, Double-Free and Other Abuses in the Linux Kernel Source Code <i>Peter T. Breuer, Simon Pickin</i>	765

Generating Test Data for Specification-Based Tests Via Quasirandom Sequences <i>Hongmei Chi, Edward L. Jones, Deidre W. Evans, Martin Brown</i>	773
Support Vector Machines for Regression and Applications to Software Quality Prediction <i>Xin Jin, Zhaodong Liu, Rongfang Bie, Guoxing Zhao, Jixin Ma</i>	781
Segmentation of Software Engineering Datasets Using the M5 Algorithm <i>D. Rodríguez, J.J. Cuadrado, M.A. Sicilia, R. Ruiz</i>	789
A Web User Interface of the Security Requirement Management Database Based on ISO/IEC 15408 <i>Daisuke Horie, Shoichi Morimoto, Jingde Cheng</i>	797
Domain Requirements Elicitation and Analysis - An Ontology-Based Approach <i>Yueqin Lee, Wenyun Zhao</i>	805
Digital Human Modeling (DHM-06)	
Integrative Computational Frameworks for Multiscale Digital Human Modeling and Simulation <i>Richard C. Ward, Line C. Pouchard, James J. Nutaro</i>	814
Multi-scale Modeling of Trauma Injury <i>Celina Imielinska, Andrzej Przekwas, X.G. Tan</i>	822
Investigation of the Biomechanic Function of Cruciate Ligaments Using Kinematics and Geometries from a Living Subject During Step Up/Down Motor Task <i>Luigi Bertozzi, Rita Stagni, Silvia Fantozzi, Angelo Cappello</i>	831
Optimization Technique and FE Simulation for Lag Screw Placement in Anterior Column of the Acetabulum <i>Ruo-feng Tong, Sheng-hui Liao, Jin-xiang Dong</i>	839
Model of Mechanical Interaction of Mesenchyme and Epithelium in Living Tissues <i>Jiří Kroc</i>	847
Three-Dimensional Virtual Anatomic Fit Study for an Implantable Pediatric Ventricular Assist Device <i>Arielle Drummond, Timothy Bachman, James Antaki</i>	855

Soft Computing Based Range Facial Recognition Using Eigenface <i>Yeung-Hak Lee, Chang-Wook Han, Tae-Sun Kim</i>	862
A Privacy Algorithm for 3D Human Body Scans <i>Joseph Laws, Yang Cai</i>	870
The Study of the Detection and Tracking of Moving Pedestrian Using Monocular-Vision <i>Hao-li Chang, Zhong-ke Shi, Qing-hua Fu</i>	878
An Implementation of Real Time-Sentential KSSL Recognition System Based on the Post Wearable PC <i>Jung-Hyun Kim, Yong-Wan Roh, Kwang-Seok Hong</i>	886
Patient Modeling Using Mind Mapping Representation as a Part of Nursing Care Plan <i>Hye-Young Ahn, Eunja Yeon, Eunmi Ham, Woojin Paik</i>	894
Real Time Systems and Adaptive Applications (RTSAA 06)	
A Technique for Code Generation of USN Applications Based on Nano-Qplus <i>Kwanggyong Lee, Woojin Lee, Juil Kim, Kiwon Chong</i>	902
A Study on the Indoor Real-Time Tracking System to Reduce the Interference Problem <i>Hyung Su Lee, Byunghun Song, Hee Yong Youn</i>	910
A Task Generation Method for the Development of Embedded Software <i>Zhigang Gao, Zhaohui Wu, Hong Li</i>	918
Active Shape Model-Based Object Tracking in Panoramic Video <i>Daehee Kim, Vivek Maik, Dongeun Lee, Jeongho Shin, Joonki Paik</i>	922
Interworking of Self-organizing Hierarchical Ad Hoc Networks and the Internet <i>Hyukjoon Lee, Seung Hyong Rhee, Dipankar Raychaudhuri, Wade Trappe</i>	930
A Dependable Communication Network for e-Textiles <i>Nenggan Zheng, Zhaohui Wu, Lei Chen, Yanmiao Zhou, Qijia Wang</i>	938

EAR-RT: Energy Aware Routing with Real-Time Guarantee for Wireless Sensor Networks <i>Junyoung Heo, Sangho Yi, Geunyoung Park, Yookun Cho, Jiman Hong</i>	946
A Design of Energy-Efficient Receivers for Cluster-Head Nodes in Wireless Sensor Networks <i>Hyungkeun Lee, Hwa-sung Kim</i>	954
An Error Control Scheme for Multicast Video Streaming on the Last Hop Wireless LANs <i>Junghoon Lee, Mikyung Kang, Gyungleen Park, Hanil Kim, Choelmin Kim, Seongbaeg Kim</i>	962
Design of a Fast Handoff Scheme for Real-Time Media Application on the IEEE 802.11 Wireless LAN <i>Mikyung Kang, Junghoon Lee, Jiman Hong, Jinhwan Kim</i>	970
Accuracy Enhancement by Selective Use of Branch History in Embedded Processor <i>Jong Wook Kwak, Seong Tae Jhang, Chu Shik Jhon</i>	979
A Novel Method of Adaptive Repetitive Control for Optical Disk Drivers <i>Kyungbae Chang, Gwitae Park</i>	987
A Real Time Radio Link Monitoring Using CSI <i>Hyukjun Oh, Jiman Hong</i>	991
Adaptive Encoding of Multimedia Streams on MPSoC <i>Julien Bernard, Jean-Louis Roch, Serge De Paoli, Miguel Santana</i>	999
International Workshop on Grid Computing Security and Resource Management (GSRM'06)	
A Mechanism to Make Authorization Decisions in Open Distributed Environments Without Complete Policy Information <i>Chiu-Man Yu, Kam-Wing Ng</i>	1007
A Reputation-Based Grid Information Service <i>J.H. Abawajy, A.M. Goscinski</i>	1015
Transparent Resource Management with Java RM API <i>Arkadiusz Janik, Krzysztof Zieliński</i>	1023

Resource Discovery in Ad-Hoc Grids <i>Rafael Moreno-Vozmediano</i>	1031
JIMS Extensions for Resource Monitoring and Management of Solaris 10 <i>Krzysztof Zieliński, Marcin Jarząb, Damian Wieczorek, Kazimierz Balos</i>	1039
An Agent Based Semi-informed Protocol for Resource Discovery in Grids <i>Agostino Forestiero, Carlo Mastroianni, Giandomenico Spezzano</i>	1047
 Fourth International Workshop on Autonomic Distributed Data and Storage Systems Management Workshop (ADSM 2006)	
Replica Based Distributed Metadata Management in Grid Environment <i>Hai Jin, Muzhou Xiong, Song Wu, Deqing Zou</i>	1055
Data Replication Techniques for Data-Intensive Applications <i>Jaechun No, Chang Won Park, Sung Soon Park</i>	1063
Managing Data Using Neighbor Replication on Triangular-Grid Structure <i>Ali Mamat, M. Mat Deris, J.H. Abawajy, Suhaila Ismail</i>	1071
Author Index	1079