

The 6th World Multiconference on Systemics, Cybernetics and Informatics

July 14-18, 2002 Orlando, Florida, USA

PROCEEDINGS

Volume XVI
Computer Science III

Organized by IIIS



International Institute of Informatics and Systemics

Member of International Federation of Systems Research IFSR EDITED BY
Nagib Callaos
Toshikazu Ebisuzaki
Barbara Starr
Jair Minoro Abe
Daniel Lichtblau

CONTENTS

VOLUME XVI

Computer Science III

Contents		i
-	eory, Combinatorics, and Computing – Invited Session Yung-Ling Lai (Taiwan)	
	Chen, Jung-Chih; Lai, Hang-Chin (Taiwan): "Conditions for Zero Duality Gap of Nonconvex Programming"	1
	Lai, Yung-Ling; Chiang, Feng-Hsu (Taiwan, R.O.C.): "Bandwidth of Some Graph Products"	7
	Lai, Yung-Ling; Chiang, Feng-Hsu; Lin, Chu-He; Yu, Tung-Chin (Taiwan): "Orientable Step Domination of Complete r-Partite Graphs"	12
_	Graphics, Geometric Modelling, Animation – Invited Session Savva Andreas (Cyprus)	
	Brandão, M. L. (Brazil): "Marching Finite-Element Schemes for Nonlinear Optical Propagation"	31
	Filho, Rogério T. Carvalho; Fernandes, Humberto C. Chaves (Brazil): "Superconducting Microstrip Antenna Array Analyzed by TTL Method"	36
	Chaves Fernandes, Humberto C.; Rocha, Arthur R. B. (Brazil): "Utilization of the TTL Method for Analysis of Antennas With PBG Substrate"	40
	Fernandes, Humberto C.; Silva, Magno C. (Brazil): "Analysis of the Finline Resonator"	43
	Kravchenko, V. F. *; Popov, A.Yu. *; Fernandes, Humberto C. C. ** (* Russian-Federation, ** Brazil): "An Improved Method of Signal-Averaged ECG Processing"	47
	Neto, José Elesbão C.; Oliveira, Giuliano F. Batista; Fernandes, Humberto C. Chaves (Brazil): "TTL Numerical Analysis of Microstrip Antenna Array with GaAS and Fenolite Substrates"	50
- •	mulation and Answer Determination — Invited Session Barbara Starr (USA)	
	Caudill, Maureen; Starr, Barbara (USA): "Event Templates for Improved Narrative Understanding in Question Answering Systems"	54
	Caudill, Maureen; Starr, Barbara; Buss, Teresa (USA): "The AQUA Question-Answering System: Bi-Directional Dynamic Semantic Alignment	60

in a Multiple-O	ntology Environment"	
Hermjakob, Ulf Based Question	; Hovy, Eduard H.; Lin, Chin-Yew (USA): "Knowledge- Answering"	66
Katz, Boris; Lir	n, Jimmy J. (USA): "Start and Beyond"	72
Cluster Computing – Invit Organizer: Felix Garcia-C		
	ernández, J.; Pérez, J. M.; García-Carballeira, F. (Spain): strumentation Systems Using CORBA"	80
	lerón, A.; Perez, M. S.; Sanchez, L. M. (Spain): "Evaluating llel File System Using NFS Servers"	86
Hordijk, Michae	d R.; Volkar, Matthew J.; Cain, James T.; Farren, Benjamin; el (USA): "ClusterNet Nios: Utilizing Central Processing r's Network Switch"	92
	Qinke; Shen, Junyi; Hu, Baosheng (China): "Metrics and imploying Database Systems in Clustered Server"	98
Quantum Computing Mati Organizer: Anatoliy Pryka	hematics And Applications – Invited Session arpatsky (Poland)	
Ufuk ***; Soroi	nis *; Basiura, Robert **; Prykarpatsky, Anatoliy **; Taneri, ka, Orysia * (* USA, ** Poland, *** Turkey): "Factorized nical Systems and their Integrability"	102
** Turkey, ***]	nis *; Taneri, Ufuk **; Prykarpatsky, Anatoliy *** (* USA, Poland): "Quantum Coherent Transform of Integrable stems and Quantum Computing"	105
Russian-Federa Maxwell-Bloch	Nickolai *, Taneri, Ufuk **; Prykarpatsky, Anatoliy *** (* tion, ** Cyprus, *** Poland): "On Modeling Of The Quantum Optical Super-Radiance Process And Its Quantum Computing"	111
Automated Reasoning Bas Applications – Invited Ses Organizer: Jun Liu (Belgio		
	iu, Yang; Ma, Jun (P. R. China): "α-Resolution Principle e-valued Modal Propositional Logic <i>LMP(X)</i> "	114
	Yang (P. R. China): "Ot-Resolution Principle Based on an ement Lattice-valued First-order Logic IELF(X)"	119
	g, Xu, Yang (P. R. China): "Ultraproduct Theorem of First- lued Logic FM"	125
Xu, Yang; Liu,	Jun; Li, Wenjiang; Qin, Keyun (P. R. China): "On Multi-	130

Dimension and Multiple Approximate Reasoning Based on $L_{\rm vpl}$ "

Applications of Mathematica in Technology and Research – Invited Session

Organizer: Daniel Lichtblau (USA)

	Champion, Brett (USA): "Numerical Optimization in Mathematica: An Insider's View of NMinimize"	136
	Coleman, Mark S. (USA): "Simulating Historical Ratings Transition Matrices for Credit Risk Analysis in <i>Mathematica</i> "	141
	Jacob, Christian J.; Nazir, Aamer (Canada): "Polyhedron Evolver-Evolution of 3D Shapes with Evolvica"	· 147
	Jankowski, Mariusz (USA): "Digital Image Processing with Mathematica"	153
	Kozlowski, Andrzej (Japan): "Derivative Pricing with Mathematica"	157
	Kraus, Martin (Germany): "Parametrized Graphics in Mathematica"	163
	Lichtblau, Daniel (USA): "Discrete Optimization using Mathematica"	169
	Quinlan, Michael (Ireland): "The xLab Series of Mathematica-based High Precision 2-D Elliptic PDE Solvers"	175
- Invited Ses	nal Methodologies for Treating Risk Analysis Uncertainty sion Arlin Cooper (USA)	
	D'Antonio, Perry E. (USA): "A Risk-Based Approach to Reducing Systems Accidents"	179
	Ferson, Scott; Tucker, W. Troy (USA): "Probability Bounds with Uncertain Input Distributions and Correlations"	186
	Sentz, Kari; Ferson, Scott (USA): "Combination Rules in Dempster-Shafer Theory"	191
	cy In Artificial Intelligence And Robotics - Invited Session ir Minoro Abe (Brazil)	
	Abe, Jair Minoro *; Da Silva Filho, Joao I. *; Nakamatsu, Kazumi ** (* Brazil, ** Japan): "Paraconsistent Multimodal Systems Φ _n "	197
	Abe, Jair Minoro; Da Silva Filho, João Inácio; Almeida Prado, João Carlos (Brazil): "Paraconsistent Artificial Neural Networks and its application on Pattern Recognition"	202
	Abe, Jair Minoro *; Scalzitti, Alexandre *; Nakamatsu, Kazumi **; Da Silva Filho, Joao I. * (* Brazil, ** Japan): "Incorporating Time in Paraconsistent Reasoning"	216

	Murai, Tetsuya; Sato, Yoshiharu (Japan): "Paraconsistency in Belief Formation Based on Evidence"	221
	Nakamatsu, Kazumi; Suito, Hiroshi; Suzuki, Atsuyuki (Japan): "Probabilistic EVALPSN and its Application to Safety Verification for Air Traffic Control"	225
	Resconi, Germano *; Da Costa, Newton C. A. ** (* Italy, ** Brazil): "Interaction between physical models and physical eyents in quantum systems, described by paraconsistent sets"	231
	Fechnolgy Applications in Transportation – Invited Session Ianoj K. Jha (USA)	
	Austin, Mark; Kaisar, Evangelos I. (USA): "Multi-Level Object-Based Analysis of Narrow Passageway Transportation Systems"	235
	Kaisar, Evangelos I.; Haghani, Ali; Panchamgam, Kiran (USA): "A Simulation Model for Two-Lane Urban Work Zones"	241
	Ogallo, Hellon G.; Jha, Manoj K. (USA): "An Expert System for Selecting Optimum Travel Route During Emergencies"	247
	Perrin, Joseph; Coleman, Brad (USA): "Know Before You Go: Improving Level of Service and Alerting the Public in real-time"	251
	Perrin, Joseph; Hansen, Blake (USA): "Road Weather Information Systems: Finding out what people want to know"	256
	nse Processing Engineering – Invited Session kinori Abe (Japan)	
	Abe, Akinori (Japan): "Computational Generation of Affective Phrase"	261
	Ikeda, Sadahiro; Kaneda, Shigeo (Japan): "A "Catchy" Copy and Concept Evaluation System Using a Natural Language Processing Approach"	267
	Kasahara, Kaname; Inago, Nozomu; Kanasugi, Tomoko; Nagamori, Chiharu; Kato, Tsuneaki (Japan): "Comparison of Two Weights of Relation Between Words: Recollection Weight and Relevancy Weight"	. 273
	Kato, Yoshikiyo; Hori, Koichi; Taketa, Kohei (Japan): "Capturing Design Rationale by Annotating E-mails"	278
	Shoji, Hiroko; Mori, Mikihiko; Hori, Koichi (Japan): "Creative Communication for Concept Articulation in Shopping"	283
_	of Stochastic Schemes – Invited Session larcus Spruill (USA)	
·	Mendivil, Franklin *; Shonkwiler, Ron ** (* Canada, ** USA): "Estimating the parameters of a stochastic search"	289

	Shonkwiler, R. (USA): "Estimating Basin Size for the Traveling Salesman Problem"	295
	Spruill, M. C. (USA): "Convergence Rates for Renewal Sequences"	300
	s and Data Processing –Invited Session Tetsuya Murai (Japan)	
	Kudo, Mineichi (Japan): "Automatic Determination of Size for Feature Selection"	305
	Mori, Yasukuni; Kudo, Mineichi (Japan): "Interactive Data Exploration Using Graph Representation"	312
•	Sakurai, Hirohito; Takahashi, Kunihiko (Japan): "Bootstrap Tests for the Equality of Two Distributions Using Kolmogorov-Smirnov Statistic"	318
	Tanaka, Akira; Imai, Hideyuki; Miyakoshi, Masaaki (Japan): "Relations and Differences Between Classical and Modern Formulations in Image Restoration Problems"	324
	Taniguchi, Furnitake; Kudo, Mineichi (Japan): "Random Selection of Samples and Features for Getting General Accuracy of Classifier Combination"	329
- Invited S	ous High Performance Integrated Systems and Networks Session Mary Eshaghian-Wilner (USA)	
	El Naga, Halima M.; El Naga, Nagi M. (USA): "Performance Evaluation of a Multithreaded System"	333
	Eshaghian-Wilner, Mary Mehrnoosh (USA): "Integrated Architectural Solutions for Protein Sequence-Structure Alignment (Preliminary Version)"	337
	Habib, Sami J. *; Parker, Alice C. ** (* Kuwait, ** USA): "Automating Heterogeneous Intranet Design Including Data Management"	343
Şi	Mangir, Tulin E.; Mori, Yutaka; Solanki, Kalpesh (USA): "Resilient Overlay Networks - Advantages and Issues" (Invited Paper)	349
	Tchernykh, Andrei *; Trystram, Denis ** (* Mexico, ** France): "Adaptive Strategy for On-Line Scheduling of Real World Parallel Applications"	354
	Systems: Tools and Applications –Invited Session Haleh Vafale (USA)	
	Bala, Jerzy; Baik, Sung; Hadjarian, Ali; Pachowicz, Peter (USA): "Cognitive Support of Imagery Exploitation Through Incorporation of Naīve Geographical Reasoning"	360
	Bala, Jerzy, Baik, Sung, Hadjarian, Ali, Pachowicz, Peter (USA): "Moving	365

	Vafaie, Haleh; Bethem, Thomas; Shaughnessy, Mark; Burton, Janet (USA): "Intelligent Decision Support System for Monitoring Major US Waterways"	370
	eata Analysis –Invited Session Richi Nayak (Australia)	
	Ebrahim, Yasser H. (Canada): "Effect of diagram size, fan-out and layout on the Useability of Tree Diagrams, an Empirical Study"	376
	Emam, Ahmed Z.; Kantardzic, Mehmed; Elmaghraby, Adel S.; Min, Hokey (USA): "Profile Association Rule Mining from Mixed Database"	382
	George, Susan E.; George, David F. J. (Australia): "Spatio-Temporal Visualisation of Road Traffic Flow using the Self-Organising Feature Map"	· 388
	Hogo, Mofreh A.; Šnorek, M; Syam, Mostafa M. (Czech-Republic): "Hand Written Arabic Numeral Recognition Using Three Clustering Techniques"	394
	Nayak, Richi (Australia): "Intelligent Data Analysis: Issues and Challenges"	400
	Tan, Hiong Sen; George, Susan E. (Australia): "Medical Information Resource using a Self-Organising Map for Visualising Web Search Results"	406
	sociation Memory – Invited Session Shu-Ching Chen (USA)	
	Kountchev, Roumen *; Rubin, Stuart ** (* Bulgaria, ** USA): "Image Compression with Adaptive Inverse Difference Pyramid"	412
	Kulasekere, E. C.; Premaratne, K.; Shyu, M. L.; Bauer, P. H. (USA): "Association Rule Mining with Subjective Knowledge"	417
	Louis, Sushil J.; McDonnell, John; Gizzi, Nick (USA): "Dynamic Strike Force Asset Allocation Using Genetic Search and Case-Based Reasoning"	423
	Rubin, Stuart H. *; Rush, Robert J. *; Trajkovic, Ljiljana **; Murthy, Jayaram * (* USA, ** Canada): "KASER: A Qualitatively Fuzzy Object-Oriented Expert System Inference Engine"	429
	Shyu, Mei-Ling; Haruechaiyasak, Choochart; Chen, Shu-Ching; Premaratne, Kamal (USA): "Mining Association Rules With Uncertain Item Relationships"	435
Confirmation	orithms and Software Quality (Problems, Tools and n) - Invited Session	
Organizer: \	Valery A. Granovsky (Russian-Federation)	
	Dmitriev, S. P.; Chelpanov, I. B. (Russian-Federation): "Certification of Algorithms and Programs of Signal Processing in Navigation Systems"	441
	Granovsky, Valery A.; Siraya, Tatiana N. (Russian-Federation): "Adequacy Problem in Metrology: Measurand and Error"	445
	Granovsky, Valery A.; Siraya, Tatiana N. (Russian-Federation): "Models,	451

	Algorithms, and Software for Data Processing in Measurements: Quality Evaluation"	
	Nesenjuk, Leonid P. (Russian-Federation): "Engineering Approach to Kalman-Wiener Filter Design Based on Initial Data Reliability Control"	457
	odels of Financial Econometrics — Invited Session evgeny Jevgenijs Tsarkov Carkovs (Latvia)	
	Ajevskis, Viktors; Gutmanis, Normunds; Liepa, Evija; Pocs, Remigijs (Latvia): "On Latvian Economic Indicators"	462
	Carkova, Viktorija; Gutmanis, Normunds (Latvia): "Control Theory Approach to GARCH Convergence Analysis"	464
	Kholmurodov, Kholmirzo *; Ebisuzaki, Toshikazu *; Yasuoka, Kenji *; Puzynin, Igor **; Smith, William *** (* Japan, ** Russian-Federation, *** UK): "Fast Forces Calculations in the DL_POLY Molecular Simulation Package: Adapting the Program for a Special-Purpose Computer MDM"	466
	Leidman, Mark; Tsarkov, Yevgeny; Počs, Remigijs (Latvia): "Price Equilibrium Stochastic Analysis"	472
	Sadurskis, Karlis, Tsarkov, Yevgeny (Latvia): "On Price Cycle Stochastic Bifurcation Owing to Random Delay of Supply"	474
_	ose Computers and their Applications to Scientific Invited Session	
	oshikazu Ebisuzaki (Japan)	
	Chau, Nguyen Hai; Kawai, Atsushi; Ebisuzaki, Toshikazu (Japan): "Implementation of Fast Multipole Algorithm on Special-Purpose Computer MDGRAPE-2"	477
	Hoefinger, Siegfried *; Berces, Attila *; Narumi, Tetsu **; Ebisuzaki, Toshikazu ** (* Austria, ** Japan): "Opportunities and Challenges in Utilizing Application Specific Integrated Circuits in Drug Design"	482
	Hosono, Satoru; Ito, Tomoyoshi; Toshikazu, Ebisuzaki (Japan): "Special-purpose Computer for DNA and Protein Sequence Homology Search"	488
	Kawai, Atsushi; Ebisuzaki, Toshikazu (Japan): "MDM: A Special-Purpose Computer for Molecular Dynamics"	494
	Kinjo, Tomoyuki; Yasuoka, Kenji (Japan): "Molecular Dynamics Simulation of Simple Model for Organic Salts using MDGRAPE-2"	500
	Koishi, T. *; Yasuoka, K. *; Zeng, X. C. **; Narumi, T. *; Susukita, R. *; Kawai, A. *; Furusawa, H. *; Ebisuzaki, T. * (* Japan, ** USA): "A Large Scale Molecular Dynamics Simulation for Water with Special-Purpose Computer MDM"	503
	Makino Junichiro (Japan): "The GR APE project: Current Status"	508

Ohno, Yousuke; Taiji, Makoto; Konagaya, Akihiko; Ebisuzaki, Toshikazu (Japan): "MACE: MAtrix Calculation Engine"	514
Tachikawa, Masanori; Kawai, Atsushi; Ebisuzaki, Toshikazu (Japan): "Application of a Special-Purpose Computer MDM for the First-Principles Calculation"	518
es & Grid Computing – Invited Session Jen-Yao Chung (USA)	
Luo, Zongwei; Chen, Shyh-Kwei; Kumaran, Santhosh; Zhang, Liang-Jie; Chung, Jen-Yao; Chang, Henry (USA): "A Web-Services-Based Deployment Framework In Grid Computing Environment"	522
Sheth, Arnit; Cardoso, Jorge; Miller, John; Kochut, Krys; Kang, Myong (USA): "QoS for Service-oriented Middleware"	528
Shi, Min-Hua *; Chen, De-Ren *; Zhang, Liang-Jie ** (* P. R. China, ** USA): "A Framework of Universal Web Services"	535
Zhang, Liang-Jie; Chao, Tian; Chang, Henry; Chung, Jen-Yao (USA): "Automatic Method Signature Adaptation Framework for Dynamic Web Service Invocation"	541
 ense Processing Engineering – Invited Session Akinori Abe (Japan)	
Kato, Yu-ichro (Japan): "Designing Brand Knowledge Structure Considering Characteristics of Higher-order Cognitive Process in Advertising Communication"	547

514