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# Rough Sets, Fuzzy Sets, Data Mining, and Granular Computing

10th International Conference, RSFDGrC 2005  
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# Preface

This volume contains the papers selected for presentation at the 10th International Conference on Rough Sets, Fuzzy Sets, Data Mining, and Granular Computing, RSFDGrC 2005, organized at the University of Regina, August 31st–September 3rd, 2005. This conference followed in the footsteps of international events devoted to the subject of rough sets, held so far in Canada, China, Japan, Poland, Sweden, and the USA. RSFDGrC achieved the status of biennial international conference, starting from 2003 in Chongqing, China.

The theory of rough sets, proposed by Zdzisław Pawlak in 1982, is a model of approximate reasoning. The main idea is based on indiscernibility relations that describe indistinguishability of objects. Concepts are represented by approximations. In applications, rough set methodology focuses on approximate representation of knowledge derivable from data. It leads to significant results in many areas such as finance, industry, multimedia, and medicine.

The RSFDGrC conferences put an emphasis on connections between rough sets and fuzzy sets, granular computing, and knowledge discovery and data mining, both at the level of theoretical foundations and real-life applications. In the case of this event, additional effort was made to establish a linkage towards a broader range of applications. We achieved it by including in the conference program the workshops on bioinformatics, security engineering, and embedded systems, as well as tutorials and sessions related to other application areas.

## Revision Process

There were 277 submissions, excluding the invited, workshop, and special session papers. Every paper was examined by at least three reviewers. Out of the papers initially selected, some were approved subject to major revision and then additionally evaluated by the Advisory Board and Program Committee members; 119 papers were finally accepted, this gives an acceptance ratio equal to 43.0%.

In the case of workshops, 22 out of 130 submissions were finally approved to be published in the proceedings; this gives an acceptance ratio equal to 16.9%.

The reviewing process for the special session included in the proceedings was conducted independently by its organizers; 5 papers were finally accepted.

Final versions of all invited, regular, workshop, and special session papers were thoroughly revised by the editors, often with several iterations of corrections.

## Layout of Proceedings

The regular, invited, workshop, and special session papers are published within 30 chapters, grouped with respect to their topics. The conference materials are split into two volumes (LNAI 3641 and 3642), both consisting of 15 chapters.

This volume contains 75 papers. Three invited papers are gathered in Chap. 1. The remaining 72 regular papers are gathered in Chaps. 2–15, related to rough

set approximations, rough-algebraic foundations, feature selection and reduction, reasoning in information tables, rough-probabilistic approaches, rough-fuzzy hybridization, fuzzy methods in data analysis, evolutionary computing, machine learning, approximate and uncertain reasoning, probabilistic network models, spatial and temporal reasoning, non-standard logics, and granular computing.

## Acknowledgements

We wish to thank Zdzisław Pawlak and Lotfi A. Zadeh for acting as honorary chairs of the conference. We are also very grateful to the scientists who kindly agreed to give the keynote, plenary, and tutorial lectures: Vladimir Vapnik and Ronald Yager; Salvatore Greco, Hung Son Nguyen, Witold Pedrycz, Dimiter Vakarelov, Julio Valdés, and Ning Zhong; and Andrzej Czyżewski, Stéphane Demri, Igor Jurisica, Bożena Kostek, Ewa Orłowska, and Piotr Wasilewski.

Our special thanks go to Andrzej Skowron for presenting the keynote lecture on behalf of Zdzisław Pawlak, James F. Peters and René V. Mayorga for organizing the special session, and Jiman Hong, Tai-hoon Kim, and Sung Y. Shin for organizing three workshops at RSFDGrC 2005.

We are grateful for support given by the University of Regina, Faculty of Science, and Department of Computer Science. We would like to express our gratitude to all the people who helped in the organization of the conference in Regina: Brien Maguire and Lois Adams for coordinating all the arrangements, as well as Donald Kozłowski, Connie Novitski, and Janice Savoie for support at various stages of conference preparations; Cory Butz for serving as a publicity chair; Robert Cowles and Peng Yao for administrating and improving the conference software systems; Hong Yao for launching the conference homepage, and Shan Hua for its updating and taking care of email correspondence; all other students of Computer Science who helped during the conference preparations.

We would like to thank the authors who contributed to this volume. We are very grateful to the chairs, Advisory Board, and Program Committee members who helped in the revision process. We also acknowledge all the reviewers not listed in the conference committee. Their names are listed on a separate page, including also those who evaluated the workshop paper submissions.

Last but not least, we are grateful to Alfred Hofmann and Anna Kramer at Springer for support and cooperation during preparation of this volume.

June 2005

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# Table of Contents – Part I

## Invited Papers

Rough Sets and Flow Graphs <i>Zdzisław Pawlak</i> .....	1
A Modal Characterization of Indiscernibility and Similarity Relations in Pawlak’s Information Systems <i>Dimitar Vakarelov</i> .....	12
Granular Computing with Shadowed Sets <i>Witold Pedrycz</i> .....	23

## Rough Set Approximations

Rough Sets and Higher Order Vagueness <i>Andrzej Skowron, Roman Swiniarski</i> .....	33
Approximation in Formal Concept Analysis <i>Ming-Wen Shao, Wen-Xiu Zhang</i> .....	43
Second-Order Rough Approximations in Multi-criteria Classification with Imprecise Evaluations and Assignments <i>Krzysztof Dembczyński, Salvatore Greco, Roman Słowiński</i> .....	54
New Approach for Basic Rough Set Concepts <i>A.A. Allam, M.Y. Bakeir, E.A. Abo-Tabl</i> .....	64
A Partitional View of Concept Lattice <i>Jian-Jun Qi, Ling Wei, Zeng-Zhi Li</i> .....	74
Characterizations of Attributes in Generalized Approximation Representation Spaces <i>Guo-Fang Qiu, Wen-Xiu Zhang, Wei-Zhi Wu</i> .....	84

## Rough-Algebraic Foundations

Proximity Spaces of Exact Sets <i>Peter John Apostoli, Akira Kanda</i> .....	94
Rough Group, Rough Subgroup and Their Properties <i>Duoqian Miao, Suqing Han, Daoguo Li, Lijun Sun</i> .....	104



Concept Lattices vs. Approximation Spaces <i>Piotr Wasilewski</i> .....	114
Rough Sets over the Boolean Algebras <i>Gui-Long Liu</i> .....	124
Algebraic Approach to Generalized Rough Sets <i>Michiro Kondo</i> .....	132
Logic for Rough Sets with Rough Double Stone Algebraic Semantics <i>Jian-Hua Dai</i> .....	141

**Feature Selection and Reduction**

On Partial Tests and Partial Reducts for Decision Tables <i>Mikhail Ju. Moshkov, Marcin Piliszczyk</i> .....	149
The Second Attribute <i>Suqing Han, Jue Wang</i> .....	156
Pairwise Cores in Information Systems <i>Jakub Wróblewski</i> .....	166
Data Preprocessing and Kappa Coefficient <i>Gaelle Legrand, Nicolas Nicoloyannis</i> .....	176
Incremental Attribute Reduction Based on Elementary Sets <i>Feng Hu, Guoyin Wang, Hai Huang, Yu Wu</i> .....	185
Finding Rough Set Reducts with SAT <i>Richard Jensen, Qiang Shen, Andrew Tuson</i> .....	194
Feature Selection with Adjustable Criteria <i>JingTao Yao, Ming Zhang</i> .....	204
Feature Selection Based on Relative Attribute Dependency: An Experimental Study <i>Jianchao Han, Ricardo Sanchez, Xiaohua Hu</i> .....	214

**Reasoning in Information Systems**

On Consistent and Partially Consistent Extensions of Information Systems <i>Zbigniew Suraj, Krzysztof Pancierz, Grzegorz Owsiany</i> .....	224
--	-----

A New Treatment and Viewpoint of Information Tables <i>Mineichi Kudo, Tetsuya Murai</i> .....	234
Incomplete Data and Generalization of Indiscernibility Relation, Definability, and Approximations <i>Jerzy W. Grzymala-Busse</i> .....	244
Discernibility Functions and Minimal Rules in Non-deterministic Information Systems <i>Hiroshi Sakai, Michinori Nakata</i> .....	254
Studies on Rough Sets in Multiple Tables <i>R.S. Milton, V. Uma Maheswari, Arul Siromoney</i> .....	265
Normalization in a Rough Relational Database <i>Theresa Beaubouef, Frederick E. Petry, Roy Ladner</i> .....	275

## **Rough-Probabilistic Approaches**

Probabilistic Rough Sets <i>Wojciech Ziarko</i> .....	283
Variable Precision Bayesian Rough Set Model and Its Application to Human Evaluation Data <i>Tatsuo Nishino, Mitsuo Nagamachi, Hideo Tanaka</i> .....	294
Variable Precision Rough Set Approach to Multiple Decision Tables <i>Masahiro Inuiguchi, Takuya Miyajima</i> .....	304
Rough Membership and Bayesian Confirmation Measures for Parameterized Rough Sets <i>Salvatore Greco, Benedetto Matarazzo, Roman Słowiński</i> .....	314
Rough Sets Handling Missing Values Probabilistically Interpreted <i>Michinori Nakata, Hiroshi Sakai</i> .....	325
The Computational Complexity of Inference Using Rough Set Flow Graphs <i>Cory J. Butz, Wen Yan, Boting Yang</i> .....	335

## **Rough-Fuzzy Hybridization**

Upper and Lower Probabilities of Fuzzy Events Induced by a Fuzzy Set-Valued Mapping <i>Wei-Zhi Wu</i> .....	345
---	-----

Variable Precision Fuzzy Rough Sets Model in the Analysis of Process Data  
*Alicja Mieszkowicz-Rolka, Leszek Rolka* . . . . . 354

CRST: A Generalization of Rough Set Theory  
*Hong Tian, Pixi Zhao, Xiukun Wang* . . . . . 364

An Extension of Rough Approximation Quality to Fuzzy Classification  
*Van-Nam Huynh, Tetsuya Murai, Tu-Bao Ho, Yoshiteru Nakamori* . . . . . 373

Fuzzy Rules Generation Method for Classification Problems Using Rough Sets and Genetic Algorithms  
*Marek Sikora* . . . . . 383

Multilayer FLC Design Based on RST  
*Hongbo Guo, Fang Wang, Yuxia Qiu* . . . . . 392

**Fuzzy Methods in Data Analysis**

Interpretable Rule Extraction and Function Approximation from Numerical Input/Output Data Using the Modified Fuzzy TSK Model, TaSe Model  
*L.J. Herrera, H. Pomares, I. Rojas, A. Guilén, M. Awad, J. González* . . . . . 402

A New Feature Weighted Fuzzy Clustering Algorithm  
*Jie Li, Xinbo Gao, Licheng Jiao* . . . . . 412

User-Driven Fuzzy Clustering: On the Road to Semantic Classification  
*Andres Dorado, Witold Pedrycz, Ebroul Izquierdo* . . . . . 421

**Evolutionary Computing**

Research on Clone Mind Evolution Algorithm  
*Gang Xie, Hongbo Guo, Keming Xie, Wenjing Zhao* . . . . . 431

A Study on the Global Convergence Time Complexity of Estimation of Distribution Algorithms  
*R. Rastegar, M.R. Meybodi* . . . . . 441

Finding Minimal Rough Set Reducts with Particle Swarm Optimization  
*Xiangyang Wang, Jie Yang, Ningsong Peng, Xiaolong Teng* . . . . . 451

MEA Based Nonlinearity Correction Algorithm for the VCO of LFM CW Radar Level Gauge <i>Gaowei Yan, Gang Xie, Yuxia Qiu, Zehua Chen</i> .....	461
---	-----

## Machine Learning

On Degree of Dependence Based on Contingency Matrix <i>Shusaku Tsumoto, Shoji Hirano</i> .....	471
Model Selection and Assessment for Classification Using Validation <i>Wojciech Jaworski</i> .....	481
Dependency Bagging <i>Yuan Jiang, Jin-Jiang Ling, Gang Li, Honghua Dai, Zhi-Hua Zhou</i> .....	491
Combination of Metric-Based and Rule-Based Classification <i>Arkadiusz Wojna</i> .....	501
Combining Classifiers Based on OWA Operators with an Application to Word Sense Disambiguation <i>Cuong Anh Le, Van-Nam Huynh, Hieu-Chi Dam, Akira Shimazu</i> ....	512
System Health Prognostic Model Using Rough Sets <i>Zbigniew M. Wojcik</i> .....	522

## Approximate and Uncertain Reasoning

Live Logic <sup>TM</sup> : Method for Approximate Knowledge Discovery and Decision Making <i>Marina Sapir, David Verbel, Angeliki Kotsianti, Olivier Saidi</i> .....	532
Similarity, Approximations and Vagueness <i>Patrick Doherty, Witold Lukaszewicz, Andrzej Szalas</i> .....	541
Decision Theory = Performance Measure Theory + Uncertainty Theory <i>Eugene Eberbach</i> .....	551

## Probabilistic Network Models

The Graph-Theoretical Properties of Partitions and Information Entropy <i>Cungen Cao, Yuefei Sui, Youming Xia</i> .....	561
--	-----

A Comparative Evaluation of Rough Sets and Probabilistic Network Algorithms on Learning Pseudo-independent Domains  
*Jae-Hyuck Lee* ..... 571

On the Complexity of Probabilistic Inference in Singly Connected Bayesian Networks  
*Dan Wu, Cory Butz* ..... 581

**Spatial and Temporal Reasoning**

Representing the Process Semantics in the Situation Calculus  
*Chunping Li* ..... 591

Modeling and Refining Directional Relations Based on Fuzzy Mathematical Morphology  
*Haibin Sun, Wenhui Li* ..... 601

A Clustering Method for Spatio-temporal Data and Its Application to Soccer Game Records  
*Shoji Hirano, Shusaku Tsumoto* ..... 612

Hierarchical Information Maps  
*Andrzej Skowron, Piotr Synak* ..... 622

**Non-standard Logics**

Ordered Belief Fusion in Possibilistic Logic  
*Churn-Jung Liau* ..... 632

Description of Fuzzy First-Order Modal Logic Based on Constant Domain Semantics  
*Zaiyue Zhang, Yuefei Sui, Cungen Cao* ..... 642

Arrow Decision Logic  
*Tuan-Fang Fan, Duen-Ren Liu, Gwo-Hshiung Tzeng* ..... 651

Transforming Information Systems  
*Piero Pagliani* ..... 660

A Discrete Event Control Based on EVALPSN Stable Model Computation  
*Kazumi Nakamatsu, Sheng-Luen Chung, Hayato Komaba, Atsuyuki Suzuki* ..... 671

## Granular Computing

Tolerance Relation Based Granular Space <i>Zheng Zheng, Hong Hu, Zhongzhi Shi</i> .....	682
Discernibility-Based Variable Granularity and Kansei Representations <i>Yuji Muto, Mineichi Kudo</i> .....	692
Rough Set Approximation Based on Dynamic Granulation <i>Jiye Liang, Yuhua Qian, Chengyuan Chu, Deyu Li, Junhong Wang</i> .....	701
Granular Logic with Closeness Relation " $\sim_\lambda$ " and Its Reasoning <i>Qing Liu, Qianying Wang</i> .....	709
Ontological Framework for Approximation <i>Jarostaw Stepaniuk, Andrzej Skowron</i> .....	718
Table Representations of Granulations Revisited <i>I-Jen Chiang, Tsau Young Lin, Yong Liu</i> .....	728
<b>Author Index</b> .....	739

# Table of Contents – Part II

## Invited Papers

Generalizing Rough Set Theory Through Dominance-Based Rough Set Approach <i>Salvatore Greco, Benedetto Matarazzo, Roman Słowiński . . . . .</i>	1
Approximate Boolean Reasoning Approach to Rough Sets and Data Mining <i>Hung Son Nguyen . . . . .</i>	12
Towards Human-Level Web Intelligence <i>Ning Zhong . . . . .</i>	23

## Rough Set Software

Credibility Coefficients in ARES Rough Set Exploration System <i>Roman Podraza, Mariusz Walkiewicz, Andrzej Dominik . . . . .</i>	29
DIXER – Distributed Executor for Rough Set Exploration System <i>Jan G. Bazan, Rafał Latkowski, Marcin Szczuka . . . . .</i>	39
RoSy: A Rough Knowledge Base System <i>Robin Andersson, Aida Vitória, Jan Matuszyński, Jan Komorowski . . . . .</i>	48

## Data Mining

A Classification Model: Syntax and Semantics for Classification <i>Anita Wasilewska, Ernestina Menasalvas . . . . .</i>	59
“Rule + Exception” Strategies for Knowledge Management and Discovery <i>Yiyu Yao, Fei-Yue Wang, Jue Wang . . . . .</i>	69
Outlier Detection Using Rough Set Theory <i>Feng Jiang, Yuefei Sui, Cungen Cao . . . . .</i>	79
Reverse Prediction <i>Julia Johnson, Patrick Campeau . . . . .</i>	88

Prediction Mining – An Approach to Mining Association Rules for Prediction  
*Jitender Deogun, Liying Jiang* ..... 98

A Rough Set Based Model to Rank the Importance of Association Rules  
*Jiye Li, Nick Cercone* ..... 109

**Hybrid and Hierarchical Methods**

A Hierarchical Approach to Multimodal Classification  
*Andrzej Skowron, Hui Wang, Arkadiusz Wojna, Jan Bazan* ..... 119

Rough Learning Vector Quantization Case Generation for CBR Classifiers  
*Yan Li, Simon Chi-Keung Shiu, Sankar Kumar Pal, James Nga-Kwok Liu* ..... 128

ML-CIDIM: Multiple Layers of Multiple Classifier Systems Based on CIDIM  
*Gonzalo Ramos-Jiménez, José del Campo-Ávila, Rafael Morales-Bueno* ..... 138

Constructing Rough Decision Forests  
*Qing-Hua Hu, Da-Ren Yu, Ming-Yang Wang* ..... 147

Attribute Reduction in Concept Lattice Based on Discernibility Matrix  
*Wen-Xiu Zhang, Ling Wei, Jian-Jun Qi* ..... 157

Reducing the Storage Requirements of 1-v-1 Support Vector Machine Multi-classifiers  
*Pawan Lingras, Cory J. Butz* ..... 166

A Possibilistic Approach to RBFN Centers Initialization  
*A. Guillén, I. Rojas, J. González, H. Pomares, L.J. Herrera, O. Valenzuela, A. Prieto* ..... 174

**Information Retrieval**

Intelligent Information Retrieval Based on the Variable Precision Rough Set Model and Fuzzy Sets  
*Ming He, Bo-qin Feng* ..... 184



A Comprehensive OWA-Based Framework for Result Merging in Metasearch <i>Elizabeth D. Diaz, Arijit De, Vijay Raghavan</i> . . . . .	193
Efficient Pattern Matching of Multidimensional Sequences <i>Sangjun Lee, Kyoungsu Oh, Dongseop Kwon, Wonik Choi, Jiman Hong, Jongmoo Choi, Donghee Lee</i> . . . . .	202
HQC: An Efficient Method for ROLAP with Hierarchical Dimensions <i>Xing-Ye Dong, Hou-Kuan Huang, Hong-Song Li</i> . . . . .	211
Knowledge Discovery Based Query Answering in Hierarchical Information Systems <i>Zbigniew W. Raś, Agnieszka Dardzińska, Osman Gürdal</i> . . . . .	221

## Image Recognition and Processing

A Content-Based Image Quality Metric <i>Xinbo Gao, Tao Wang, Jie Li</i> . . . . .	231
A Novel Method of Image Filtering Based on Iterative Fuzzy Control <i>Rui-hua Lu, Ming Yang, Yu-hui Qiu</i> . . . . .	241
Land Cover Classification of IKONOS Multispectral Satellite Data: Neuro-fuzzy, Neural Network and Maximum Likelihood Methods <i>JongGyu Han, KwangHoon Chi, YeonKwang Yeon</i> . . . . .	251
Rough Set Approach to Sunspot Classification Problem <i>Sinh Hoa Nguyen, Trung Thanh Nguyen, Hung Son Nguyen</i> . . . . .	263
Jacquard Image Segmentation Method Based on Fuzzy Optimization Technology <i>Zhilin Feng, Jianwei Yin, Jiong Qiu, Xiaoming Liu, Jinxiang Dong</i> . . . . .	273

## Multimedia Applications

Intelligent Algorithms for Optical Track Audio Restoration <i>Andrzej Czyzewski, Marek Dziubinski, Lukasz Litwic, Przemyslaw Maziewski</i> . . . . .	283
Multiresolution Pitch Analysis of Talking, Singing, and the Continuum Between <i>David Gerhard</i> . . . . .	294

Toward More Reliable Emotion Recognition of Vocal Sentences by Emphasizing Information of Korean Ending Boundary Tones  
*Tae-Seung Lee, Mikyoung Park, Tae-Soo Kim* ..... 304

Some Issues on Detecting Emotions in Music  
*Piotr Synak, Alicja Wieczorkowska* ..... 314

A Global-Motion Analysis Method via Rough-Set-Based Video Pre-classification  
*Zhe Yuan, Yu Wu, Guoyin Wang, Jianbo Li* ..... 323

Analysis and Generation of Emotionally-Charged Animated Gesticulation  
*Bożena Kostek, Piotr Szczuko* ..... 333

**Medical Applications**

Handling Missing Attribute Values in Preterm Birth Data Sets  
*Jerzy W. Grzymala-Busse, Linda K. Goodwin, Witold J. Grzymala-Busse, Xinqun Zheng* ..... 342

Attribute Selection and Rule Generation Techniques for Medical Diagnosis Systems  
*Grzegorz Ilczuk, Alicja Wakulicz-Deja* ..... 352

Relevant Attribute Discovery in High Dimensional Data Based on Rough Sets and Unsupervised Classification: Application to Leukemia Gene Expressions  
*Julio J. Valdés, Alan J. Barton* ..... 362

A Hybrid Approach to MR Imaging Segmentation Using Unsupervised Clustering and Approximate Reducts  
*Sebastian Widz, Kenneth Revett, Dominik Ślęzak* ..... 372

**Bioinformatic Applications**

Analysis of Gene Expression Data: Application of Quantum-Inspired Evolutionary Algorithm to Minimum Sum-of-Squares Clustering  
*Wengang Zhou, Chunguang Zhou, Yanxin Huang, Yan Wang* ..... 383

An Open Source Microarray Data Analysis System with GUI: Quintet  
*Jun-kyoung Choe, Tae-Hoon Chung, Sunyong Park, Hwan Gue Cho, Cheol-Goo Hur* ..... 392

Similarity Index for Clustering DNA Microarray Data Based on Multi-weighted Neuron <i>Wenming Cao</i> .....	402
Screening for Ortholog Clusters Using Multipartite Graph Clustering by Quasi-Concave Set Function Optimization <i>Akshay Vashist, Casimir Kulikowski, Ilya Muchnik</i> .....	409
An Ontology-Based Pattern Mining System for Extracting Information from Biological Texts <i>Muhammad Abulaish, Lipika Dey</i> .....	420
Parallel Prediction of Protein-Protein Interactions Using Proximal SVM <i>Yoojin Chung, Sang-Young Cho, Sung Y. Shin</i> .....	430
Identification of Transcription Factor Binding Sites Using Hybrid Particle Swarm Optimization <i>Wengang Zhou, Chunguang Zhou, Guixia Liu, Yanxin Huang</i> .....	438
A Grid Computing-Based Monte Carlo Docking Simulations Approach for Computational Chiral Discrimination <i>Youngjin Choi, Sung-Ryul Kim, Suntae Hwang, Karpjoo Jeong</i> .....	446

## Web Content Analysis

Web Mining of Preferred Traversal Patterns in Fuzzy Environments <i>Rui Wu, Wansheng Tang, Ruiqing Zhao</i> .....	456
Discovering Characteristic Individual Accessing Behaviors in Web Environment <i>Long Wang, Christoph Meinel, Chunnian Liu</i> .....	466
An Efficient and Practical Algorithm for the Many-Keyword Proximity Problem by Offsets <i>Sung-Ryul Kim, Jiman Hong</i> .....	477

## Business Applications

Simplifying the Manager Competency Model by Using the Rough Set Approach <i>Wei-Wen Wu, Yu-Ting Lee, Gwo-Hshiung Tzeng</i> .....	484
---	-----

Financial Risk Prediction Using Rough Sets Tools: A Case Study  
*Santiago Eibe, Raquel Del Saz, Covadonga Fernández,  
 Óscar Marbán, Ernestina Menasalvas, Concepción Pérez* . . . . . 495

Using Rough Set and Worst Practice DEA in Business  
 Failure Prediction  
*Jia-Jane Shuai, Han-Lin Li* . . . . . 503

**Security Applications**

Intrusion Detection System Based on Multi-class SVM  
*Hansung Lee, Jiyoung Song, Daihee Park* . . . . . 511

A Development of Intrusion Detection and Protection System Using  
 Netfilter Framework  
*Min Wook Kil, Seung Kyeom Kim, Geuk Lee,  
 Youngmi Kwon* . . . . . 520

A Group Decision-Making Model of Risk Evasion in Software Project  
 Bidding Based on VPRS  
*Gang Xie, Jinlong Zhang, K.K. Lai* . . . . . 530

Research on Risk Probability Estimating Using Fuzzy Clustering for  
 Dynamic Security Assessment  
*Fang Liu, Yong Chen, Kui Dai, Zhiying Wang,  
 Zhiping Cai* . . . . . 539

Ensuring Data Security Against Knowledge Discovery in Distributed  
 Information Systems  
*Seunghyun Im, Zbigniew W. Raś* . . . . . 548

A Scheme for Inference Problems Using Rough Sets and Entropy  
*X. Chen, R. Wei* . . . . . 558

Towards New Areas of Security Engineering  
*Tai-hoon Kim, Chang-hwa Hong, Myoung-sub Kim* . . . . . 568

**Industrial Applications**

Application of Variable Precision Rough Set Model and Neural  
 Network to Rotating Machinery Fault Diagnosis  
*Qingmin Zhou, Chenbo Yin, Yongsheng Li* . . . . . 575

Integration of Variable Precision Rough Set and Fuzzy Clustering: An Application to Knowledge Acquisition for Manufacturing Process Planning <i>Zhonghao Wang, Xinyu Shao, Guojun Zhang, Haiping Zhu</i> . . . . .	585
An Obstacle Avoidance Technique for AUVs Based on BK-Product of Fuzzy Relations <i>Le-Diem Bui, Yong-Gi Kim</i> . . . . .	594
SVR-Based Method Forecasting Intermittent Demand for Service Parts Inventories <i>Yukun Bao, Wen Wang, Hua Zou</i> . . . . .	604
Fuzzy Forecast Modeling for Gas Furnace Based on Fuzzy Sets and Rough Sets Theory <i>Keming Xie, Zehua Chen, Yuxia Qiu</i> . . . . .	614
<b>Embedded Systems and Networking</b>	
Flexible Quality-of-Control Management in Embedded Systems Using Fuzzy Feedback Scheduling <i>Feng Xia, Liping Liu, Youxian Sun</i> . . . . .	624
Improvement of Multicast Routing Protocol Using Petri Nets <i>Dan Li, Yong Cui, Ke Xu, Jianping Wu</i> . . . . .	634
An Efficient Bandwidth Management Scheme for a Hard Real-Time Fuzzy Control System Based on the Wireless LAN <i>Junghoon Lee, Mikyung Kang, Yongmoon Jin, Hanil Kim, Jinhwan Kim</i> . . . . .	644
Application of Rough Set for Routing Selection Based on OSPF Protocol <i>Yanbing Liu, Hong Tang, Menghao Wang, Shixin Sun</i> . . . . .	654
Energy Aware Routing with Dynamic Probability Scaling <i>Geunyoung Park, Sangho Yi, Junyoung Heo, Woong Chul Choi, Gwangil Jeon, Yookun Cho, Charlie Shim</i> . . . . .	662
Application of (Max, +)-Algebra to the Optimal Buffer Size in Poisson Driven Deterministic Queues in Series with Blocking <i>Dong-Won Seo, Byung-Kwen Song</i> . . . . .	671

Uncertainty Handling in Tabular-Based Requirements Using  
Rough Sets  
*Zhizhong Li, Günther Ruhe* ..... 678

## Intelligent and Sapient Systems

Behavioral Pattern Identification Through Rough Set Modelling  
*Jan G. Bazan, James F. Peters, Andrzej Skowron* ..... 688

Selecting Attributes for Soft-Computing Analysis in Hybrid  
Intelligent Systems  
*Puntip Pattaraintakorn, Nick Cercone, Kanlaya Naruedomkul* ..... 698

Brain Signals: Feature Extraction and Classification Using Rough  
Set Methods  
*Reza Fazel-Rezai, Sheela Ramanna* ..... 709

On the Design and Operation of *Sapient (Wise)* Systems  
*René V. Mayorga* ..... 719

Three Steps to *Robo Sapiens*  
*José Negrete-Martínez* ..... 727

**Author Index** ..... 735