Contents

Invited Talks

Decision Rules, Bayes' Rule and Rough Sets 1
Z. Pawlak

A New Direction in System Analysis: From Computation with Measurements to Computation with Perceptions 10
L. A. Zadeh

On Text Mining Techniques for Personalization 12
C. C. Aggarwal, P. S. Yu

A Road to Discovery Science 19
S. Arikawa

Rough Computing: Foundations and Applications

Calculi of Granules Based on Rough Set Theory: Approximate Distributed Synthesis and Granular Semantics for Computing with Words 20
L. Polkowski, A. Skowron

Discovery of Rules about Complications 29
S. Tsumoto

Rough Genetic Algorithms 38
P. Lingras, C. Davies

Classifying Faults in High Voltage Power Systems: A Rough-Fuzzy Neural Computational Approach 47
L. Han, J. F. Peters, S. Ramanna, R. Zhai

Rough Set Theory and Its Applications

Toward Spatial Reasoning in the Framework of Rough Mereology 55
L. Polkowski

An Algorithm for Finding Equivalence Relations from Tables with Non-deterministic Information 64
H. Sakai, A. Okuma

On the Extension of Rough Sets under Incomplete Information 73
J. Stefanowski, A. Tsoukias

On Rough Relations: An Alternative Formulation 82
Y. Y. Yao, T. Wang

Formal Rough Concept Analysis 91
J. Saquer, J. S. Deogun

Noise Reduction in Telecommunication Channels
Using Rough Sets and Neural Networks 100
R. Krolikowski, A. Czyzewski

Rough Set Analysis of Electrostimilation Test Database
for the Prediction of Post-Operative Profits in Cochlear
Implanted Patients 109
A. Czyzewski, H. Skarzynski, B. Kostek, R. Krolikowski

A Rough Set-Based Approach to Text Classification 118
A. Chouchoulas, Q. Shen

Modular Rough Fuzzy MLP: Evolutionary Design 128
P. Mitra, S. Mitra, S. K. Pal

Approximate Reducts and Association Rules:
Correspondence and Complexity Results 137
H. S. Nguyen, D. Slezak

Handling Missing Values in Rough Set Analysis of
Multi-Attribute and Multi-Criteria Decision Problems 146
S. Greco, B. Matarazzo, R. Slowinski

The Generic Rough Set Inductive Logic Programming Model and
Motifs in Strings 158
A. Siromoney, K. Inoue

Rough Problem Settings for Inductive Logic Programming 168
C. Liu, N. Zhong

Using Rough Sets with Heuristics to Feature Selection 178
J. Z. Dong, N. Zhong, S. Ohsuga

The Discretization of Continuous Attributes Based on Compatibility Rough Set and Genetic Algorithm 188
L. Sun, W. Gao

Fuzzy Set Theory and Its Applications

Level Cut Conditioning Approach to the Necessity Measure Specification 193
M. Inuiguchi, T. Tanino

Four c-regression Methods and Classification Functions 203
S. Miyamoto, K. Umayahara, T. Nemoto

Context-Free Fuzzy Sets in Data Mining Context 212
S. Tsumoto, T. Y. Lin

Applying Fuzzy Hypothesis Testing to Medical Data 221
M. Last, A. Schenker, A. Kandel

Generating A Macroeconomic Fuzzy Forecasting System Using Evolutionary Search 230
R. Veliev, A. Rubinov, A. Stranieri

Fuzzy Control of Nonlinear Systems Using Nonlinearized Parameterization 239
H. Han, H. Kawabata

Control of Chaotic Systems Using Fuzzy Model-Based Regulators 248
K. Watanabe, L. Udawatta, K. Kiguchi, K. Izumi

Fuzzy Behavior-Based Control for the Obstacle Avoidance of Multi-Link Manipulators 257
P. Dassanayake, K. Watanabe, K. Izumi

Fuzzy Future Value and Annual Cash Flow Analyses 266
N. Cetin, C. Kahraman

Semi-Linear Equation with Fuzzy Parameters 271
S. Melliani

Non-Classical Logic and Approximate Reasoning

First Order Rough Logic-Revisited 276
T. Y. Lin, Q. Liu

A Generalized Decision Logic in Interval-set-valued Information Tables ... 285
Y. Y. Yao, Q. Liu

Many-Valued Dynamic Logic for Qualitative Decision Theory 294
C. J. Liau

Incorporating Fuzzy Set Theory and Matrix Logic
in Multi-Layer Logic 304
H. Yamauchi, S. Ohsuga

Fuzzy Logic as Interfacing Media for Constraint Propagation
Based on Theories of Chu Space and Information Flow 314
K. Sato, T. Horiuchi, T. Hiraoka, H. Kawakami, O. Katai

Pattern Reasoning: A New Solution for Knowledge Acquisition Problem .. 324
H. Tsukimoto

Probabilistic Inference and Bayesian Theorem Based
on Logical Implication 334
Y. Yamauchi, M. Mukaidono

Reasoning with Neural Logic Networks 343
R. Yasdi

The Resolution for Rough Propositional Logic with Lower (L)
and Upper (H) Approximate Operators 352
Q. Liu

Information Granulation and Granular Computing

Information Granules in Distributed Environment 357
A. Skowron, J. Stepaniuk

Evolving Granules for Classification for Discovering Difference
in the Usage of Words 366
T. Yoshida, T. Kondo, S. Nishida

Interval Evaluation by AHP with Rough Sets Concept 375
K. Sugihara, Y. Maeda, H. Tanaka

Interval Density Functions in Conflict Analysis 382
Y. Maeda, K. Senoo, H. Tanaka

Incorporating Personal Databases by Granular Computing 390
Y. Kakemoto

Data Mining and Knowledge Discovery

Knowledge-Driven Discovery of Operational Definitions 395
J. M. Żytkow

A Closest Fit Approach to Missing Attribute Values
in Preterm Birth Data 405
J. W. Grzymala-Busse, W. J. Grzymala-Busse, L. K. Goodwin

Visualizing Discovered Rule Sets with Visual Graphs Based on
Compressed Entropy Density 414
E. Suzuki, H. Ishihara

A Distance-Based Clustering and Selection of
Association Rules on Numeric Attributes 423
X. Du, S. Suzuki, N. Ishii

Knowledge Discovery for Protein Tertiary Substructures 433
C. K. Chen, D. Y. Y. Yun

Integrating Classification and Association Rule Mining:
A Concept Lattice Framework 443
K. Hu, Y. Lu, L. Zhou, C. Shi

Using Rough Genetic and Kohonen's Neural Network
for Conceptual Cluster Discovery in Data Mining 448
H. Kiem, D. Phuc

Towards Automated Optimal Equity Portfolios Discovery
in A Knowledge Sharing Financial Data Warehouse 453
Y. C. Lu, H. Cheng

Rule-Evolver: An Evolutionary Approach for Data Mining 458
C. Lopes, M. Pacheco, M. Vellasco, E. Passos

Machine Learning

Decision Making with Probabilistic Decision Tables 463
W. Ziarko

The Iterated Version Space Learning 472
J. J. Zhang, N. Cercone

An Empirical Study on Rule Quality Measures 482
A. An, N. Cercone

Rules as Attributes in Classifier Construction 492
M. S. Szczuka

An Algorithm to Find the Optimized Network Structure
in An Incremental Learning 500
J. C. Lee, W. D. Lee, M. S. Han

Patterns in Numerical Data: Practical Approximations
to Kolmogorov Complexity 509
T. Y. Lin

Performance Prediction for Classification Systems 514
F. Sun

Intelligent Agents and Systems

Flexible Optimization and Evolution of Underwater
Autonomous Agents 519
E. Eberbach, R. Brooks, S. Phoha

Ontology-Based Multi-Agent Model of An Information Security System .. 528
V. I. Gorodetski, L. J. Popyack, I. V. Kotenko, V. A. Skormin

Optimal Multi-Scale Time Series Decomposition for Financial
Forecasting Using Wavelet Thresholding Techniques 533
T. Shin, I. Han

Computerized Spelling Recognition of Words Expressed in
the Sound Approach 543
M. Higgins, W. Ziarko

An Adaptive Handwriting Recognition System 551
G. Qian

Author Index 557