Contents – Part I

Invited Talks

Zdzisław Pawlak: Man, Creator and Innovator of Computer Sciences: Personal Memories ............................................. 3

Urszula Wybraniec-Skardowska

Data-Driven Granular Cognitive Computing .................................. 13

Guoyin Wang

Advances in Rough Set Based Hybrid Approaches for Medical Image Analysis .................................................. 25

Pradipta Maji

User Friendly NPS-Based Recommender System for Driving Business Revenue ............................................. 34

Zbigniew W. Ras, Katarzyna A. Tarnowska, Jieyan Kuang, Lynn Daniel, and Doug Fowler

The Multi-purpose Role of the Relational Approach to Classic and Generalized Approximation Spaces. A Tutorial ......................... 49

Piero Pagliani

General Rough Sets

Heterogeneous Approximate Reasoning with Graded Truth Values ........ 61

Francesco Luca De Angelis, Giovanna Di Marzo Serugendo, Barbara Dunin-Kępińska, and Andrzej Szalas

Computer Certification of Generalized Rough Sets Based on Relations .... 83

Adam Grabowski

New Algebras and Logic from a Category of Rough Sets ................... 95

Anuj Kumar More and Mohua Banerjee

Rough and Near: Modal History of Two Theories .......................... 109

Marcin Wolski and Anna Gomolińska

Multi-stage Optimization of Matchings in Trees with Application to Kidney Exchange ................................................ 123

Michal Mankowski and Mikhail Moshkov

A Rough-Set Based Solution of the Total Domination Problem .......... 131

Anhui Tan, Yuzhi Tao, and Chao Wang
Yet Another Kind of Rough Sets Induced by Coverings ............................. 140
Ryszard Janicki

Approximation Operators in Covering Based Rough Sets
from Submodular Functions ..................................................... 154
Mauricio Restrepo

Toward Adaptive Rough Sets ....................................................... 165
Soma Dutta and Andrzej Skowron

Optimal Scale Selections in Consistent Generalized Multi-scale
Decision Tables ................................................................. 185
You-Hong Xu, Wei-Zhi Wu, and Anhui Tan

A Framework for Analysis of Granular Neural Networks ..................... 199
Julian Skirzyński

Petri Nets over Ontological Graphs: Conception and Application
for Modelling Tasks of Robots .................................................. 207
Jarosław Szkoła and Krzysztof Pancerz

Fractal Analysis Approaches to Granular Computing ........................... 215
JingTao Yao, Oladunni A. Oladimeji, and Yan Zhang

Generating Natural Language Explanations from Knowledge-Based
Systems Results, Using Ontology and Discourses Patterns ................. 223
Víctor Flores, Yahima Hadfeg, and Claudio Meneses

Discernibility Matrix and Rules Acquisition Based Chinese Question
Answering System ...................................................................... 239
Zhao Han, Duqiong Miao, Fuji Ren, and Hongyun Zhang

Methods Based on Pawlak’s Model of Conflict
Analysis - Medical Applications .................................................. 249
Małgorzata Przybyła-Kasperek

Comprehensive Operational Control of the Natural and Anthropogenic
Territory Safety Based on Analytical Indicators ................................ 263
Tatiana Penkova, Valeriy Nicheporchuk, and Anna Metus

Metaphor Detection Using Fuzzy Rough Sets ................................... 271
Sunny Rai and Shampa Chakraverty

Acr2Vec: Learning Acronym Representations in Twitter .................... 280
Zhifei Zhang, Sheng Luo, and Shuwen Ma

Attribute Reduction on Distributed Incomplete Decision
Information System ................................................................. 289
Jun Hu, Kai Wang, and Hong Yu
The Attribute Reductions Based on Indiscernibility and Discernibility Relations ........................................ 306
  Keyun Qin and Sihui Jing

Stable Rules Evaluation for a Rough-Set-Based Bipolar Model:
A Preliminary Study for Credit Loan Evaluation .................. 317
  Kao-Yi Shen, Hiroshi Sakai, and Gwo-Hshiung Tzeng

On Combining Discretisation Parameters and Attribute Ranking
for Selection of Decision Rules .................................. 329
  Urszula Stańczyk and Beata Zielosko

Induction of Rule for Differential Diagnosis ...................... 350
  Shusaku Tsumoto and Shoji Hirano

Attribute Reduction: An Ensemble Strategy ....................... 362
  Suping Xu, Pingxin Wang, Jinhai Li, Xibei Yang, and Xiangjian Chen

On Importance of Rows for Decision Tables ....................... 376
  Hassan AbouEisha, Mohammad Azad, and Mikhail Moshkov

Assignment Reduction of Relation Decision Systems ............... 384
  Guilong Liu

Automatically Determining the Popularity of a Song ............... 392
  Costin Chiru and Oana-Georgiana Popescu

iPDO: An Effective Feature Depth Estimation Method
for 3D Face Reconstruction ......................................... 407
  Xun Gong, Xinxin Li, Shengdong Du, and Yang Zhao

Proposal of Dominance-Based Rough Set Approach by STRIM
and Its Applied Example ........................................... 418
  Yuichi Kato, Takahiro Itsuno, and Tetsuro Saeki

Regularization and Shrinkage in Rough Set Based Canonical
Correlation Analysis .................................................. 432
  Ankita Mandal and Pradipta Maji

Temporal Relations of Rough Anti-patterns in Software Development ...... 447
  Łukasz Pławiński

Temporal Prediction Model for Social Information Propagation ...... 465
  Fei Teng, Rong Tang, Yan Yang, Hongjie Wang, and Rongjie Dai

Characteristic Sets and Generalized Maximal Consistent Blocks
in Mining Incomplete Data .......................................... 477
  Patrick G. Clark, Cheng Gao, Jerzy W. Grzymala-Busse,
  and Teresa Mroczek
Rough Sets in Incomplete Information Systems with Order Relations
Under Lipski’s Approach ................................................. 487
  Michinori Nakata, Hiroshi Sakai, and Keitarou Hara

A Measure of Inconsistency for Simple Decision Systems
over Ontological Graphs .................................................. 507
  Krzysztof Pancerz

A Rough View on Incomplete Information in Games ....................... 523
  Georg Peters

A Proposal of Machine Learning by Rule Generation from Tables
with Non-deterministic Information and Its Prototype System .......... 535
  Hiroshi Sakai, Michinori Nakata, and Junzo Watada

Rough Set Analysis of Classification Data with Missing Values .......... 552
  Marcin Szelag, Jerzy Błaszczyński, and Roman Slowiński

The Optimal Estimation of Fuzziness Parameter in Fuzzy C-Means Algorithm .......................................................... 566
  Hsun-Chih Kuo and Yu-Jau Lin

Supercluster in Statics and Dynamics: An Approximate Structure
Imitating a Rough Set ..................................................... 576
  Ivan Rodin and Boris Mirkin

Integration of Gene Expression and Ontology for Clustering
Functionally Similar Genes .................................................. 587
  Sushmita Paul

Multi-view Clustering Algorithm Based on Variable Weight and MKL .... 599
  Peirui Zhang, Yan Yang, Bo Peng, and Mengjiao He

An Overlapping Clustering Approach with Correlation Weight .......... 611
  Yingge Xu, Yan Yang, Hongjun Wang, and Jie Hu

Software and Systems for Rough Sets

A Metadata Diagnostic Framework for a New Approximate Query
Engine Working with Granulated Data Summaries ......................... 623
  Agnieszka Chądzyńska-Krasowska, Sebastian Stawicki,
  and Dominik Ślęzak

Scalable Maximal Discernibility Discretization for Big Data ............. 644
  Michal Czolombitko and Jaroslaw Stepiuk
Contents – Part II

Vagueness, Rough Sets, Mereology

Approximations from Anywhere and General Rough Sets ................. 3
   A. Mani

Generalized Ideals and Co-granular Rough Sets ......................... 23
   A. Mani

Certainty-Based Rough Sets ............................................. 43
   Davide Ciucci and Ivan Forcati

The Rough Membership Function on One Type of Covering-Based
Rough Sets and Its Applications .................................... 56
   Xun Ge, Jianguo Tang, and Pei Wang

Mereogeometry Based Approach for Behavioral Robotics ............... 70
   Piotr Gnyś

Distinguishing Vagueness from Ambiguity in Dominance-Based Rough Set
Approach by Means of a Bipolar Pawlak-Brouwer-Zadeh Lattice ........ 81
   Salvatore Greco, Benedetto Matarazzo, and Roman Słowiński

Similarity Based Rough Sets ........................................... 94
   Dávid Nagy, Tamás Mihálydeák, and László Aszalós

On Mereology as a Tool in Problems of Intelligent Control, Granular
Computing, Data Analysis and Approximate and Spatial Reasoning ..... 108
   Lech Polkowski

A Topological Approximation Space Based on Open Sets of Topology
Generated by Coverings ................................................. 130
   Bożena Staruch and Bogdan Staruch

Actual Existence Predicate in Mereology and Mereotopology
(Extended Abstract) .................................................... 138
   Dimiter Vakarelov

Path Planning Based on Potential Fields from Rough Mereology ...... 158
   Łukasz Zmudzinski and Piotr Artiemjew
Three-Way Decisions, Uncertainty, Granular Computing

Three-Way Decision Community Detection Algorithm Based on Local Group Information ................................................. 171
   Jie Chen, Liandi Fang, Yanping Zhang, Shu Zhao, Ling Zhang,
   Fulan Qian, Feng Liu, Xiangyang Wang, and Xuegang Hu

Actionable Strategies in Three-Way Decisions with Rough Sets ........ 183
   Cong Gao and Yiyu Yao

Rough Set Approximations in an Incomplete Information Table .......... 200
   Mengjun J. Hu and Yiyu Y. Yao

Two Novel Decomposition Approaches for Knowledge Acquisition Model................................................................. 216
   Na Jiao

Three-Way Decisions with DEA Approach .................................. 226
   Dun Liu and Decui Liang

Covering-Based Optimistic Multigranulation Decision-Theoretic Rough Sets Based on Maximal Descriptors ......................... 238
   Caihui Liu, Meizhi Wang, and Nan Zhang

A Three-Way Decision Model Based on Intuitionistic Fuzzy Decision Systems ............................................................. 249
   Jiubing Liu, Xianzhong Zhou, Bing Huang, and Huaxiong Li

Sequential Three-Way Decisions in Efficient Classification of Piecewise Stationary Speech Signals ......................... 264
   Andrey V. Savchenko

A Three-Way Recommender System for Popularity-Based Costs ........ 278
   Yuan-Yuan Xu, Heng-Ru Zhang, and Fan Min

Three-Way Decisions Based on Intuitionistic Fuzzy Sets .................. 290
   Xiaoping Yang and Anhui Tan

A Framework of Three-Way Cluster Analysis ............................... 300
   Hong Yu

A Semi-supervised Three-Way Clustering Framework for Multi-view Data ........................................................... 313
   Hong Yu, Xincheng Wang, and Guoyin Wang

Determining Thresholds in Three-Way Decisions:
A Multi-object Optimization View ........................................... 326
   Yuanjian Zhang, Duoqian Miao, Jianfeng Xu, and Zhifei Zhang
Three-Way Decisions Cost Model Based on Continuous Domain .......... 340
  Tao Zhang, Qinghua Zhang, and Chenchen Yang

Conflict Analysis for Pythagorean Fuzzy Information Systems .......... 359
  Guangming Lang, Duoqian Miao, Zhifei Zhang, and Ning Yao

Attribute Reduction in Utility-Based Decision-Theoretic Rough Set Models. .................................................. 368
  Nan Zhang, Lili Jiang, and Caihui Liu

Dynamic Three Way Decisions and Its Application Based on Two-Direction PS-Probabilistic Rough Set. ...................... 376
  Chunying Zhang, Liya Wang, and Baoxiang Liu

Recent Advances in Biomedical Data Analysis, Trends in Multi-Agent Systems, Formal Concept Analysis, Rough Set Theory and Their Applications

Robust Sigmoidal Control Response of C. elegans Neuronal Network .... 393
  Rahul Badhwar and Ganesh Bagler

Resolving the Conflicts Between Cuts in a Decision Tree with Verifying Cuts. .................................................. 403
  Sylwia Buregwa-Czuma, Jan G. Bazan, Stanisława Bazan-Socha, Wojciech Rzasa, Łukasz Dydo, and Andrzej Skowron

Depression Behavior Detection Model Based on Participation in Serious Games ................................................... 423
  Rytis Maskeliūnas, Tomas Blažauskas, and Robertas Damaščius

Persuasive Strategies in Dialogue Games with Emotional Reasoning .... 435
  Magdalena Kacprzak

An Approach for Hospital Planning with Multi-Agent Organizations ...... 454
  John Bruntse Larsen and Jørgen Villadsen

A Novel Description Language for Two-Agent Dialogue Games .......... 466
  Anna Sawicka, Magdalena Kacprzak, and Andrzej Zbrzezny

Simple SMT-Based Bounded Model Checking for Timed Interpreted Systems ...................................................... 487
  Agnieszka M. Zbrzezny and Andrzej Zbrzezny

A Neural Network Pattern Recognition Approach to Automatic Rainfall Classification by Using Signal Strength in LTE/4G Networks .......... 505
  Francesco Beritelli, Giacomo Capizzi, Grazia Lo Sciuto, Francesco Scaglione, Dawid Polish, and Marcin Wóżniak
Attribute Reduction in Rough Set Theory and Formal Concept Analysis . . . . 513
   María José Benítez-Caballero, Jesús Medina,
   and Eloísa Ramírez-Poussa

Toward Interactive Attribute Selection
with Infolattices – A Position Paper . . . . . . . . . . . . . . . . . . . . . . . . . 526
   Dominik Ślęzak, Marek Grzegorowski, Andrzej Janusz,
   and Sebastian Stawicki

AFS-Based Formal Concept Analysis on Multi-valued Context. . . . . . . 540
   Lidong Wang, Xiaodong Liu, and Jinhai Li

Turning Krimp into a Triclustering Technique on Sets
of Attribute-Condition Pairs that Compress. . . . . . . . . . . . . . . . . . . . . . . . 558
   Maxim Yurov and Dmitry I. Ignatov

Classification Model Based on Topological Approximation Space . . . . . . 570
   Bożena Staruch

Author Index . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 579