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# Transactions on Rough Sets V

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# Preface

Volume V of the Transactions on Rough Sets (TRS) is dedicated to the monumental life and work of Zdzisław Pawlak<sup>1</sup>. During the past 35 years, since the introduction of knowledge description systems in the 1970s, the theory and applications of rough sets have grown rapidly. This volume continues the tradition begun with earlier volumes of the TRS series and introduces a number of new advances in the foundations and application of rough sets. These advances have profound implications in a number of research areas such as adaptive learning, approximate reasoning and belief systems, approximation spaces, Boolean reasoning, classification methods, classifiers, concept analysis, data mining, decision logic, decision rule importance measures, digital image processing, recognition of emotionally-charged gestures in animations, flow graphs, Kansei engineering, movie sound track restoration, multicriteria decision analysis, relational information systems, rough-fuzzy sets, rough measures, signal processing, variable precision rough set model, and video retrieval. It can be observed from the papers included in this volume that research concerning the foundations and applications of rough sets remains an intensely active research area worldwide. A total of 37 researchers from 8 countries are represented in this volume, the countries being, Canada, India, P.R. China, Poland, Japan, Taiwan, UK and the USA.

A capsule view of the life and work of Zdzisław Pawlak is included in an article at the beginning of this volume. During his lifetime, the research interests of Pawlak were rich and varied. His research ranged from his pioneering work on knowledge description systems and rough sets during the 1970s and 1980s as well as his work on the design of computers, information retrieval, modeling conflict analysis and negotiation, genetic grammars and molecular computing. Added to that was Pawlak's lifelong interest in painting, photography and poetry. During his lifetime, Pawlak nurtured worldwide interest in approximation, approximate reasoning and rough set theory and its applications. Evidence of the influence of Pawlak's work can be seen in the growth in the rough-set literature that now includes over 4000 publications as well as the growth and maturity of the International Rough Set Society.

TRS V also includes 15 papers that explore the theory of rough sets as well as new applications of rough sets. In addition, this volume of the TRS includes a complete monograph on rough sets and approximate Boolean reasoning systems that includes both the foundations as well as the applications of data mining, by Hung Son Nguyen. New developments in the foundations of rough sets are represented by a number of papers in this volume, namely, Rough Truth, Consistency and Belief Change (Mohua Banerjee), Rough Set Approximations in Formal Concept Analysis (Yiyu Yao and Yaohua Chen), Rule Importance Measures (Jiye Li and Nick Cercone), Generalized Rough-Fuzzy Approximation Operators (Wei-Zhi Wu), Rough Set Flow Graphs (Cory Butz, W. Yan, and

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<sup>1</sup> Prof. Pawlak passed away on 7 April 2006.

B. Yang), Vague Concept Approximation and Adaptive Learning (Jan Bazan, Andrzej Skowron, and Roman Świniarski), and Arrow Decision Logic (Tuan-Fang Fan, Duen-Ren Liu, and Gwo-Hshung Tzeng). Applications of rough sets are also represented by the following papers in this volume: Matching 2D Image Segments with Genetic Algorithms and Approximations Spaces (Maciej Borkowski and James Peters), Rough Set-Based Application to Recognition of Emotionally-Charged Animated Characters Gestures (Bożena Kostek and Piotr Szczuko), Movie Sound Track Restoration (Andrzej Czyżewski, Marek Dziubinski, Lukasz Litwic, and Przemyslaw Maziewski), Multimodal Classification Case Studies (Andrzej Skowron, Hui Wang, Arkadiusz Wojna, and Jan Bazan ), P300 Wave Detection Using Rough Sets (Sheela Ramanna and Reza Fazel Rezaei), Motion-Information-Based Video Retrieval Using Rough Pre-classification (Zhe Yuan, Yu Wu, Guoyin Wang, and Jianbo Li), Variable Precision Bayesian Rough Set Model and Its Application to Kansei Engineering (Tatsuo Nishino, Mitsuo Nagamachi, and Hideo Tanaka).

The Editors of this volume extend their hearty thanks to the reviewers of the papers that were submitted to this TRS volume: Mohua Banerjee, Jan Bazan, Teresa Beauboeuf, Maciej Borkowski, Gianpiero Cattaneo, Nick Cercone, Davide Cuicci, Andrzej Czyżewski, Jitender Deogun, Ivo Düntsch, Reza Fazel-Rezaei, Anna Gomolińska, Jerzy Grzymała-Busse, Masahiro Iniguichi, Jouni Järvinen, Mieczysław Kłopotek, Beata Konikowska, Bożena Kostek, Marzena Kryszkiewicz, Rafał Latkowski, Churn-Jung Liao, Pawan Lingras, Jan Małuszyński, Benedetto Matarazzo, Michał Mikołajczyk, Mikhail Moshkov, Maria Nicoletti, Hoa Nguyen, Son Nguyen, Piero Pagliani, Sankar Pal, Witold Pedrycz, Lech Polkowski, Anna Radzikowska, Vijay Raghavan, Sheela Ramanna, Zbigniew Raś, Dominik Ślęzak, Jerzy Stefanowski, Jarosław Stepaniuk, Zbigniew Suraj, Roman Świniarski, Piotr Synak, Marcin Szczuka, Daniel Vanderpooten, Dimiter Vakarelov, Alicja Wierzchowska, Arkadiusz Wojna, Marcin Wolski, Jakub Wróblewski, Dan Wu, Wei-Zhi Wu, Yiyu Yao, and Wojciech Ziarko.

This issue of the TRS was made possible thanks to the reviewers as well as to the laudable efforts of a great many generous persons and organizations. The editors and authors of this volume also extend an expression of gratitude to Alfred Hofmann, Ursula Barth, Christine Günther and the other LNCS staff at Springer for their support in making this volume of the TRS possible. In addition, the editors of this volume extend their thanks to Dominik Ślęzak for his help and suggestions concerning extensions of selected RSFDGrC 2005 papers included in this volume of the TRS. We anticipate that additional RSFDGrC 2005 papers now being reviewed will be included in future volumes of the TRS. We also extend our thanks to Marcin Szczuka for his consummate skill and care in the compilation of this volume. The Editors of this volume have been supported by the Ministry for Scientific Research and Information Technology of the Republic of Poland, research grant No. 3T11C00226, and the Natural Sciences and Engineering Research Council of Canada (NSERC) research grant 185986 respectively.

# LNCS Transactions on Rough Sets

This journal subline has as its principal aim the fostering of professional exchanges between scientists and practitioners who are interested in the foundations and applications of rough sets. Topics include foundations and applications of rough sets as well as foundations and applications of hybrid methods combining rough sets with other approaches important for the development of intelligent systems.

The journal includes high-quality research articles accepted for publication on the basis of thorough peer reviews. Dissertations and monographs up to 250 pages that include new research results can also be considered as regular papers. Extended and revised versions of selected papers from conferences can also be included in regular or special issues of the journal.

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# Table of Contents

## Commemoration

Zdzisław Pawlak: Life and Work .....	1
<i>James F. Peters, Andrzej Skowron</i>	

## Regular Papers

Rough Belief Change .....	25
<i>Mohua Banerjee</i>	
Rough Sets and Vague Concept Approximation: From Sample Approximation to Adaptive Learning .....	39
<i>Jan Bazan, Andrzej Skowron, Roman Swiniarski</i>	
Matching 2D Image Segments with Genetic Algorithms and Approximation Spaces .....	63
<i>Maciej Borkowski, James F. Peters</i>	
An Efficient Algorithm for Inference in Rough Set Flow Graphs .....	102
<i>C.J. Butz, W. Yan, B. Yang</i>	
Intelligent Algorithms for Movie Sound Tracks Restoration .....	123
<i>Andrzej Czyżewski, Marek Dziubiński, Lukasz Litwic, Przemysław Maziewski</i>	
Rough Set-Based Application to Recognition of Emotionally-Charged Animated Character's Gestures .....	146
<i>Bożena Kostek, Piotr Szczuko</i>	
Introducing a Rule Importance Measure .....	167
<i>Jiye Li, Nick Cercone</i>	
Variable Precision Bayesian Rough Set Model and Its Application to <i>Kansei</i> Engineering .....	190
<i>Tatsuo Nishino, Mitsuo Nagamachi, Hideo Tanaka</i>	
P300 Wave Detection Based on Rough Sets .....	207
<i>Sheela Ramanna, Reza Fazel-Rezai</i>	
Multimodal Classification: Case Studies .....	224
<i>Andrzej Skowron, Hui Wang, Arkadiusz Wojna, Jan Bazan</i>	
Arrow Decision Logic for Relational Information Systems .....	240
<i>Tuan-Fang Fan, Duen-Ren Liu, Gwo-Hshiung Tzeng</i>	

On Generalized Rough Fuzzy Approximation Operators..... 263  
*Wei-Zhi Wu, Yee Leung, Wen-Xiu Zhang*

Rough Set Approximations in Formal Concept Analysis..... 285  
*Yiyu Yao, Yaohua Chen*

Motion-Information-Based Video Retrieval System Using Rough  
Pre-classification ..... 306  
*Zhe Yuan, Yu Wu, Guoyin Wang, Jianbo Li*

**Dissertations and Monographs**

Approximate Boolean Reasoning: Foundations and Applications in  
Data Mining ..... 334  
*Hung Son Nguyen*

**Author Index** ..... 507