

# Contents

---

## Part I. Rough Sets, Granular Computing, and Rough-Neurocomputing: Foundations

---

<b>1 Elementary Rough Set Granules: Toward a Rough Set Processor . . . . .</b>	<b>5</b>
<i>Zdzisław Pawlak</i>	
<b>2 Rough-Neuro Computing: An Introduction . . . . .</b>	<b>15</b>
<i>Sankar K. Pal, James F. Peters, Lech Polkowski, Andrzej Skowron</i>	
<b>3 Information Granules and Rough-Neurocomputing . . . . .</b>	<b>43</b>
<i>Andrzej Skowron, Jarosław Stepaniuk</i>	
<b>4 A Rough-Neural Computation Model Based on Rough Mereology . . . . .</b>	<b>85</b>
<i>Lech Polkowski</i>	
<b>5 Knowledge-Based Networking in Granular Worlds . . . . .</b>	<b>109</b>
<i>Witold Pedrycz</i>	
<b>6 Adaptive Aspects of Combining Approximation Spaces . . . . .</b>	<b>139</b>
<i>Jakub Wróblewski</i>	
<b>7 Algebras from Rough Sets . . . . .</b>	<b>157</b>
<i>Mohua Banerjee, Mihir K. Chakraborty</i>	

---

## Part II. Hybrid Approaches

---

<b>8 Approximation Transducers and Trees: A Technique for Combining Rough and Crisp Knowledge . . . . .</b>	<b>189</b>
<i>Patrick Doherty, Witold Łukaszewicz, Andrzej Skowron, Andrzej Szalas</i>	
<b>9 Using Contextually Closed Queries for Local Closed-World Reasoning in Rough Knowledge Databases . . . . .</b>	<b>219</b>
<i>Patrick Doherty, Jarosław Kachniarz, Andrzej Szalas</i>	

<b>10 On Model Evaluation, Indexes of Importance, and Interaction Values in Rough Set Analysis</b> . . . . .	251
<i>Günther Gediga, Ivo Düntsch</i>	
<b>11 New Fuzzy Rough Sets Based on Certainty Qualification</b> . . . . .	277
<i>Masahiro Inuiguchi, Tetsuzo Tanino</i>	
<b>12 Toward Rough Datalog: Embedding Rough Sets in Prolog</b> . . . . .	297
<i>Jan Matuszyński, Aida Vitória</i>	
<b>13 On Exploring Soft Discretization of Continuous Attributes</b> . . . . .	333
<i>Hung Son Nguyen</i>	
<b>14 Rough-SOM with Fuzzy Discretization</b> . . . . .	351
<i>Sankar K. Pal, Biswarup Dasgupta, and Pabitra Mitra</i>	

---

### Part III. Exemplary Application Areas

---

<b>15 Biomedical Inference: A Semantic Model</b> . . . . .	373
<i>Jan Doroszewski</i>	
<b>16 Fundamental Mathematical Notions of the Theory of Socially Embedded Games: A Granular Computing Perspective</b> . . . . .	411
<i>Anna Gomolińska</i>	
<b>17 Fuzzy Games and Equilibria: The Perspective of the General Theory of Games on Nash and Normative Equilibria</b> . . . . .	435
<i>Tom R. Burns, Ewa Roszkowska</i>	
<b>18 Rough Neurons: Petri Net Models and Applications</b> . . . . .	471
<i>James F. Peters, Sheela Ramanna, Zbigniew Suraj, Maciej Borkowski</i>	
<b>19 Information Granulation in a Decision-Theoretical Model of Rough Sets</b> . . . . .	491
<i>Yiyu Yao</i>	

---

### Part IV. Case Studies

---

<b>20 Intelligent Acquisition of Audio Signals Employing Neural Networks and Rough Set Algorithms</b> . . . . .	521
<i>Andrzej Czyżewski</i>	
<b>21 An Approach to Imbalanced Data Sets Based on Changing Rule Strength</b> . . . . .	543
<i>Jerzy W. Grzymala-Busse, Linda K. Goodwin, Witold J. Grzymala-Busse, Xinqun Zheng</i>	

<b>22 Rough-Neuro Approach to Testing the Influence of Visual Cues on Surround Sound Perception</b> . . . . .	555
<i>Bożena Kostek</i>	
<b>23 Handwritten Digit Recognition Using Adaptive Classifier Construction Techniques</b> . . . . .	573
<i>Tuan Trung Nguyen</i>	
<b>24 From Rough through Fuzzy to Crisp Concepts: Case Study on Image Color Temperature Description</b> . . . . .	587
<i>Władysław Skarbek</i>	
<b>25 Information Granulation and Pattern Recognition</b> . . . . .	599
<i>Andrzej Skowron, Roman W. Swiniarski</i>	
<b>26 Computational Analysis of Acquired Dyslexia of Kanji Characters based on Conventional and Rough Neural Networks</b> . . . . .	637
<i>Shusaku Tsumoto</i>	
<b>27 WaRS: A Method for Signal Classification</b> . . . . .	649
<i>Piotr Woźdyłło</i>	
<b>28 A Hybrid Model for Rule Discovery in Data</b> . . . . .	689
<i>Ning Zhong, Chunnian Liu, Ju-Zhen Dong, Setsuo Ohsuga</i>	
<b>Author Index</b> . . . . .	723
<b>Index</b> . . . . .	725



<http://www.springer.com/978-3-540-43059-9>

Rough-Neural Computing  
Techniques for Computing with Words  
Pal, S.K.; Polkowski, L. (Eds.)  
2004, XXV, 736 p., Hardcover  
ISBN: 978-3-540-43059-9