# Table of Contents

Preface ................................................................................................................................................xiii

Acknowledgment ...............................................................................................................................xxii

Chapter 1
Human-Inspired Granular Computing .................................................................................................... 1
   Yiyu Yao, University of Regina, Canada

Chapter 2
Discovery of Process Models from Data and Domain Knowledge: A Rough-Granular Approach...... 16
   Hung Son Nguyen, Warsaw University, Poland
   Andrzej Jankowski, Institute of Decision Processes Support and
   AdgaM Solutions Sp. z o.o., Poland
   James F. Peters, University of Manitoba, Canada
   Andrzej Skowron, Warsaw University, Poland
   Jaroslaw Stepaniuk, Bialystok University of Technology, Poland
   Marcin Szczuka, Warsaw University, Poland

Chapter 3
Supervised and Unsupervised Information Granulation: A Study in Hyperbox Design ...................... 48
   Andrzej Bargiela, The University of Nottingham, UK
   Witold Pedrycz, Polish Academy of Sciences, Poland

Chapter 4
On Characterization of Relation Based Rough Set Algebras................................................................. 69
   Wei-Zhi Wu, Zhejiang Ocean University, P. R. China
   Wen-Xiu Zhang, Xi’an Jiaotong University, P. R. China

Chapter 5
A Top-Level Categorization of Types of Granularity .......................................................................... 92
   C. Maria Keet, Free University of Bozen-Bolzano, Italy
Chapter 6
From Interval Computations to Constraint-Related Set Computations: Towards Faster Estimation of Statistics and ODEs under Interval, p-Box, and Fuzzy Uncertainty .................................................. 131
  Martine Ceberio, University of Texas at El Paso, USA
  Vladik Kreinovich, University of Texas at El Paso, USA
  Andrzej Pownuk, University of Texas at El Paso, USA
  Barnabás Bede, University of Texas - Pan American, USA

Chapter 7
Granular Computing Based Data Mining in the Views of Rough Set and Fuzzy Set......................... 148
  Guoyin Wang, Chongqing University of Posts and Telecommunications, P.R. China
  Jun Hu, Chongqing University of Posts and Telecommunications, P.R. China
  Qinghua Zhang, Chongqing University of Posts and Telecommunications, P.R. China
  Xianquan Liu, Chongqing University of Posts and Telecommunications, P.R. China
  Jiaqing Zhou, Southwest Jiaotong University, P.R. China

Chapter 8
Near Sets in Assessing Conflict Dynamics within a Perceptual System Framework ....................... 179
  Sheela Ramanna, University of Winnipeg, Canada
  James F. Peters, University of Manitoba, Canada

Chapter 9
Rule Extraction and Rule Evaluation Based on Granular Computing.............................................. 196
  Jiye Liang, Shanxi University, P.R. China
  Yuhua Qian, Shanxi University, P.R. China
  Deyu Li, Shanxi University, P.R. China

Chapter 10
Granular Models: Design Insights and Development Practices ..................................................... 243
  Witold Pedrycz, Polish Academy of Sciences, Poland
  Athanasios Vasilakos, Polish Academy of Sciences, Poland

Chapter 11
Semantic Analysis of Rough Logic................................................................................................. 264
  Qing Liu, Nanchang University, China

Chapter 12
Rough Entropy Clustering Algorithm in Image Segmentation......................................................... 285
  Dariusz Małyszko, Białystok University of Technology, Poland
  Jarosław Stepaniuk, Białystok University of Technology, Poland

Chapter 13
Modelling Classification by Granular Computing.......................................................................... 305
  Yan Zhao, University of Regina, Canada
Chapter 14
Discovering Perceptually Near Granules ................................................................. 326
James F. Peters, University of Manitoba, Canada

Chapter 15
Granular Computing in Object-Oriented Software Development Process ............. 351
Jianchao Han, California State University, USA

Chapter 16
Granular Computing in Formal Concept ................................................................. 370
Yuan Ma, University of Science and Technology Liaoning, China
Zhangang Liu, University of Science and Technology Liaoning, China
Xuedong Zhang, University of Science and Technology Liaoning, China

Chapter 17
Granular Synthesis of Rule-Based Models and Function Approximation Using Rough Sets........ 408
Carlos Pinheiro, Federal University of Itajubá, Brazil
Fernando Gomide, State University of Campinas, Brazil
Otávio Carpinteiro, Federal University of Itajubá, Brazil
Isaías Lima, Federal University of Itajubá, Brazil

Chapter 18
A Genetic Fuzzy Semantic Web Search Agent Using Granular Semantic Trees for
Ambiguous Queries ................................................................................................. 426
Yan Chen, Georgia State University, USA
Yan-Qing Zhang, Georgia State University, USA

Chapter 19
Dominance-Based Rough Set Approach to Granular Computing ........................... 439
Salvatore Greco, University of Catania, Italy
Benedetto Matarazzo, University of Catania, Italy
Roman Slowinski, Poznań University of Technology, Poland

Compilation of References ..................................................................................... 497

About the Contributors ......................................................................................... 528

Index...................................................................................................................... 540