## Contents

### Part I General Issues in the Representation and Processing of Uncertainty and Imprecision

**Paired Structures, Imprecision Types and Two-Level Knowledge Representation by Means of Opposites**

J. Tinguaro Rodríguez, Camilo Franco, Daniel Gómez and Javier Montero

**Suggestions to Make Dempster’s Rule Convenient for Knowledge Combining**

Ewa Straszecka

**On Partially Ordered Product Spaces**

Považan Jaroslav and Riečan Beloslav

**Various Kinds of Ordinal Sums of Fuzzy Implications**

Paweł Drygaś and Anna Król

**A-Poset with Multiplicative Operation**

Daniela Kluvancová

**Method for Uncertainty Measurement and Its Application to the Formation of Interval Type-2 Fuzzy Sets**

Mauricio A. Sanchez, Oscar Castillo and Juan R. Castro

**A Proposal for a Method of Defuzzification Based on the Golden Ratio—GR**

Wojciech T. Dobrosielski, Janusz Szczepański and Hubert Zarzycki

**A New Approach to the Equivalence of Relational and Object-Oriented Databases**

Swietłana Lebiediewa, Hubert Zarzycki and Wojciech T. Dobrosielski
Part II  Intuitionistic Fuzzy Sets: Foundations, Tools and Techniques

Intuitionistic Fuzzy Implications and Klir-Yuan’s Axioms ............... 97
Nora Angelova and Krassimir Atanassov

On Separability of Intuitionistic Fuzzy Sets. ............................. 111
Evgeniy Marinov, Peter Vassilev and Krassimir Atanassov

On an Intuitionistic Fuzzy Probability Theory ...................... 125
Čunderlíková Katarína and Riečan Beloslav

Semi-properties of Atanassov Intuitionistic Fuzzy Relations .......... 137
Urszula Bentkowska, Barbara Pękala, Humberto Bustince,
Javier Fernandez and Edurne Barrenechea

Intuitionistic Fuzzy Complete Lattices ................................. 149
Soheyb Milles, Ewa Rak and Lemnaouar Zedam

Traversing and Ranking of Elements of an Intuitionistic Fuzzy Set
in the Intuitionistic Fuzzy Interpretation Triangle .................... 161
Vassia Atanassova, Ivelina Vardeva, Evdokia Sotirova
and Lyubka Doukovska

A Novel Similarity Measure Between Intuitionistic Fuzzy Sets
for Constructing Intuitionistic Fuzzy Tolerance ...................... 175
Janusz Kacprzyk, Dmitri A. Viattnchenin, Stanislau Shyrai
and Eulalia Szmidt

A New Proposal of Defuzzification of Intuitionistic
Fuzzy Quantities ...................................................... 185
Luca Anzilli and Gisella Facchinetti

Part III  Intuitionistic Fuzzy Sets: Applications

A New Heuristic Algorithm of Possibilistic Clustering
Based on Intuitionistic Fuzzy Relations .............................. 199
Janusz Kacprzyk, Jan W. Owsiński, Dmitri A. Viattchenin
and Stanislau Shyrai

Aggregation of Inconsistent Expert Opinions with Use
of Horizontal Intuitionistic Membership Functions ................ 215
Andrzej Piegat and Marek Landowski

Intuitionistic Fuzzy Evaluations of the Elbow Joint Range
of Motion .............................................................. 225
Simeon Ribagin, Anthony Shannon and Krassimir Atanassov

Using Phi Coefficient to Interpret Results Obtained
by InterCriteria Analysis ........................................... 231
Lyudmila Todorova, Peter Vassilev and Jivko Surchev
Part IV Generalized Nets and Neural Networks

Modeling Logic Gates and Circuits with Generalized Nets. 243
Lenko Erbakanov, Todor Kostadinov, Todor Petkov,
Sotir Sotirov and Veselina Bureva

Generalized Net Model of Person Recognition Using ART2 Neural
Network and Viola-Jones Algorithm. 257
Todor Petkov, Sotir Sotirov and Stanimir Surchev

Optimization of the LVQ Network Architectures
with a Modular Approach for Arrhythmia Classification. 267
Jonathan Amezcua and Patricia Melin

Part V Issues in Metaheuristic Search Algorithms
and Their Applications

Imperialist Competitive Algorithm with Fuzzy Logic
for Parameter Adaptation: A Parameter Variation Study. 277
Emer Bernal, Oscar Castillo and José Soria

Fuzzy Logic for Improving Interactive Evolutionary Computation
Techniques for Ad Text Optimization. 291
Quetzali Madera, Mario Garcia and Oscar Castillo

InterCriteria Analysis of Generation Gap Influence
on Genetic Algorithms Performance. 301
Olympia Roeva and Peter Vassilev

Proposed CAEva Simulation Method for Evacuation of People
from a Buildings on Fire. 315
Jacek M. Czerniak, Łukasz Apiecionek, Hubert Zarzycki
and Dawid Ewald

The CutMAG as a New Hybrid Method for Multi-edge Grinder
Design Optimisation. 327
Jacek M. Czerniak, Marek Macko and Dawid Ewald

Part VI Applications and Implementations

A Proposal of a Fuzzy System for Hypertension Diagnosis. 341
Juan Carlos Guzmán, Patricia Melin and German Prado-Arechiga

Using Intercriteria Analysis for Assessment of the Pollution Indexes
of the Struma River. 351
Tatiana Ilkova and Mitko Petrov
Application of the InterCriteria Decision Making Method to Universities Ranking ........................................ 365
Maciej Krawczak, Veselina Bureva, Evdokia Sotirova
and Eulalia Szmidt

The Algorithms of Automation of the Process of Creating Acoustic Units Databases in the Polish Speech Synthesis .................. 373
Janusz Rafalko

InterCriteria Analysis Approach to Parameter Identification of a Fermentation Process Model .................. 385
Tania Pencheva, Maria Angelova, Peter Vassilev and Olympia Roeva

Author Index ................................................................. 399
Novel Developments in Uncertainty Representation and Processing
Advances in Intuitionistic Fuzzy Sets and Generalized Nets - Proceedings of 14th International Conference on Intuitionistic Fuzzy Sets and Generalized Nets
2016, X, 400 p. 128 illus., 60 illus. in color., Softcover
ISBN: 978-3-319-26210-9