

Taner Bilgiç Bernard De Baets
Okyay Kaynak (Eds.)

Fuzzy Sets and Systems – IFSA 2003

10th International Fuzzy Systems Association World Congress
Istanbul, Turkey, June 30 – July 2, 2003
Proceedings



Springer

Table of Contents

Invited Papers

A Perspective on the Philosophical Grounding of Fuzzy Theories	1
<i>I. Burhan Türkşen</i>	
Binary Operations on Fuzzy Sets: Recent Advances	16
<i>János Fodor</i>	
Multiple Criteria Choice, Ranking, and Sorting in the Presence of Ordinal Data and Interactive Points of View	30
<i>Marc Roubens</i>	
Dual Interval Model and Its Application to Decision Making	39
<i>Hideo Tanaka</i>	
Automatic Taxonomy Generation: Issues and Possibilities	52
<i>Raghu Krishnapuram, Krishna Kummamuru</i>	

Mathematical Areas

A Fuzziness Measure of Rough Sets	64
<i>Hsuan-Shih Lee</i>	
Fuzzy Closure Operators Induced by Similarity	71
<i>Radim Bělohlávek</i>	
A New Approach to Teaching Fuzzy Logic System Design	79
<i>Emine Inelmen, Erol Inelmen, Ahmad Ibrahim</i>	
On the Transitivity of Fuzzy Indifference Relations	87
<i>Susana Díaz, Bernard De Baets, Susana Montes</i>	
About Z_f , the Set of Fuzzy Relative Integers, and the Definition of Fuzzy Bags on Z_f	95
<i>Patrick Bosc, Daniel Rocacher</i>	
The Difference Between 2 Multidimensional Fuzzy Bags: A New Perspective on Comparing Successful and Unsuccessful User's Web Behavior	103
<i>George Meghabghab</i>	
A Discussion of Indices for the Evaluation of Fuzzy Associations in Relational Databases	111
<i>Didier Dubois, Henri Prade, Thomas Sudkamp</i>	

On a Characterization of Fuzzy Bags	119
<i>Miguel Delgado, María J. Martín-Bautista, Daniel Sánchez, María A. Vila</i>	
A New Proposal of Aggregation Functions: The Linguistic Summary	127
<i>Ignacio Blanco, Daniel Sánchez, José M. Serrano, María A. Vila</i>	
Fuzzy Quantifiers, Multiple Variable Binding and Branching Quantification	135
<i>Ingo Glöckner</i>	
Modeling the Concept of Fuzzy Majority Opinion	143
<i>Gabriella Pasi, Ronald R. Yager</i>	
Modelling Fuzzy Quantified Statements under a Voting Model Interpretation of Fuzzy Sets	151
<i>Félix Díaz-Hermida, Alberto Bugarín, Purificación Cariñena, Manuel Mucientes, David E. Losada, Senén Barro</i>	
Arithmetic of Fuzzy Quantities Based On Vague Arithmetic Operations ..	159
<i>Mustafa Demirci</i>	
Level-Sets as Decomposition of the Topological Space SpecA	167
<i>Paavo Kukkurainen</i>	
Axiomatization of Any Residuated Fuzzy Logic Defined by a Continuous T-norm	172
<i>Francesc Esteva, Lluís Godo, Franco Montagna</i>	
Extension of Łukasiewicz Logic by Product Connective	180
<i>Rostislav Horčík, Petr Cintula</i>	
Formulas of Łukasiewicz's Logic Represented by Hyperplanes	189
<i>Antonio Di Nola, Ada Lettieri</i>	
Fuzzifying the Thoughts of Animats	195
<i>Iztok Lebar Bajec, Nikolaj Zimic, Miha Mraz</i>	
Approximating Fuzzy Control Strategies via CRI	203
<i>Siegfried Gottwald, Vilem Novák, Irina Perfilieva</i>	
Inequalities in Fuzzy Probability Calculus	211
<i>Saskia Janssens, Bernard De Baets, Hans De Meyer</i>	
Fuzziness and Uncertainty within the Framework of Context Model	219
<i>Van-Nam Huynh, Mina Ryoke, Yoshiteru Nakamori, Tu Bao Ho</i>	
Uncertainty in Noise Mapping: Comparing a Probabilistic and a Fuzzy Set Approach	229
<i>Tom De Muer, Dick Botteldooren</i>	

Trapezoidal Approximations of Fuzzy Numbers	237
<i>Przemysław Grzegorzewski, Edyta Mrówka</i>	
Methodological Areas	
A Discrete-Time Portfolio Selection with Uncertainty of Stock Prices	245
<i>Yuji Yoshida, Masami Yasuda, Jun-ichi Nakagami, Masami Kurano</i>	
A Fuzzy Approach to Stochastic Dominance of Random Variables	253
<i>Bart De Schuymer, Hans De Meyer, Bernard De Baets</i>	
Extracting Strict Orders from Fuzzy Preference Relations	261
<i>Koen Maes, Bernard De Baets</i>	
T -Ferrers Relations versus T -biorders	269
<i>Susana Díaz, Bernard De Baets, Susana Montes</i>	
Sugeno Integrals for the Modelling of Noise Annoyance Aggregation	277
<i>Andy Verkeyn, Dick Botteldooren, Bernard De Baets, Guy De Tré</i>	
On Separability of Intuitionistic Fuzzy Sets	285
<i>Krassimir T. Atanassov, Janusz Kacprzyk, Eulalia Szmidt, Ljudmila P. Todorova</i>	
Calculating Limit Decisions in Factoring Using a Fuzzy Decision Model Based on Interactions between Goals	293
<i>Rudolf Felix</i>	
Fuzzy Models of Rainfall-Discharge Dynamics	303
<i>Hilde Vernieuwe, Olga Georgieva, Bernard De Baets, Valentijn R.N. Pauwels, Niko E.C. Verhoest</i>	
A Rule-Based Method to Aggregate Criteria with Different Relevance . . .	311
<i>Gerardo Canfora, Luigi Troiano</i>	
Imprecise Modelling Using Gradual Rules and Its Application to the Classification of Time Series	319
<i>Sylvie Galichet, Didier Dubois, Henri Prade</i>	
A Semi-supervised Clustering Algorithm for Data Exploration	328
<i>Abdelhamid Bouchachia, Witold Pedrycz</i>	
A Comparative Study of Classifiers on a Real Data Set	338
<i>Sofia Visa, Anca Ralescu</i>	
A Note on Quality Measures for Fuzzy Association Rules	346
<i>Didier Dubois, Eyke Hüllermeier, Henri Prade</i>	
Differentiated Treatment of Missing Values in Fuzzy Clustering	354
<i>Heiko Timm, Christian Döring, Rudolf Kruse</i>	

Mining Multi-level Diagnostic Process Rules from Clinical Databases
Using Rough Sets and Medical Diagnostic Model..... 362
Shusaku Tsumoto

Rough Sets and Information Granulation 370
James F. Peters, Andrzej Skowron, Piotr Synak, Sheela Ramanna

Indiscernibility-Based Clustering: Rough Clustering 378
Shoji Hirano, Shusaku Tsumoto

Fuzzy Multiset Space and c-Means Clustering Using Kernels with
Applications to Information Retrieval..... 387
Sadaaki Miyamoto, Kiyotaka Mizutani

Using Similarity Measures for Histogram Comparison..... 396
Dietrich Van der Weken, Mike Nachtegaele, Etienne Kerre

A CHC Evolutionary Algorithm for 3D Image Registration..... 404
Oscar Cordón, Sergio Damas, Jose Santamaría

Color Image Enhancement Using the Support Fuzzification..... 412
Vasile Pătraşcu

Lattice Fuzzy Signal Operators and Generalized Image Gradients 420
Petros Maragos, Vassilis Tzouvaras, Giorgos Stamou

Non-uniform Coders Design for Motion Compression Method by Fuzzy
Relational Equations 428
Hajime Nobuhara, Kaoru Hirota

A Method for Coding/Decoding Images by Using Fuzzy Relation
Equations..... 436
Ferdinando Di Martino, Vincenzo Loia, Salvatore Sessa

Application Areas

Embedded Fuzzy Control System in an Open Computerized Numerical
Control: A Technology Transfer Case-Study 442
*Rodolfo E. Haber, José R. Alique, Angel Alique,
Ramón Uribe-Etxebarria, Javier Hernández*

Activation of Trapezoidal Fuzzy Subsets with Different Inference
Methods 450
Anis Sakly, Mohamed Benrejeb

Design and Simulation of a Fuzzy Substrate Feeding Controller for an
Industrial Scale Fed-Batch Baker Yeast Fermentor 458
Cihan Karakuzu, Sıtkı Öztürk, Mustafa Türker

Fuzzy Supervisor for Combining Sliding Mode Control and H_{∞} Control	466
<i>Najib Essounboui, Abdelaziz Hamzaoui, Noureddine Manamanni</i>	
Intelligent PID Control by Immune Algorithms Based Fuzzy Rule Auto-Tuning	474
<i>Dong Hwa Kim, Jin Ill Park</i>	
Implementation and Applications of a Constrained Multi-objective Optimization Method	483
<i>Hossein S. Zadeh</i>	
System Modelling Using Fuzzy Numbers	492
<i>Petr Hušek, Renata Pytelková</i>	
Fuzzy Adaptive Sliding Mode Control for a Class of Uncertain Nonlinear MIMO Systems with Application to a 2DOF Twin Propeller	500
<i>Aria Alasti, Hamid Bolandhemat, Navid Dadkhah Tehrani</i>	
Improvement of Second Order Sliding-Mode Controller Applied to Position Control of Induction Motors Using Fuzzy Logic	508
<i>Mahdi Jalili-Kharaajoo, Hassan Ebrahimirad</i>	
Hybrid Electric Vehicles: Application of Fuzzy Clustering for Designing a TSK-based Fuzzy Energy Flow Management Unit	516
<i>Lucio Ippolito, Pierluigi Siano</i>	
A Fuzzy Logic Vision and Control System Embedded with Human Knowledge for Autonomous Vehicle Navigation	526
<i>Charles E. Kinney, Dean B. Edwards</i>	
Fuzzy Logic Based Dynamic Localization and Map Updating for Mobile Robots	535
<i>Mohammad Molhim, Kudret Demirli</i>	
An Overview on Soft Computing in Behavior Based Robotics	544
<i>Frank Hoffmann</i>	
Asymmetric Redundancy of Tuples in Fuzzy Relational Database	552
<i>Rolly Intan, Masao Mukaidono</i>	
Fuzzy Clustering in Classification Using Weighted Features	560
<i>Lourenço P.C. Bandeira, João M.C. Sousa, Uzay Kaymak</i>	
Data and Cluster Weighting in Target Selection Based on Fuzzy Clustering	568
<i>Uzay Kaymak</i>	

Cross-Disciplinary Areas

On-line Design of Takagi-Sugeno Models	576
<i>Plamen Angelov, Dimitar Filev</i>	
Gradient Projection Method and Equality Index in Recurrent Neural Fuzzy Network	585
<i>Rosangela Ballini, Fernando Gomide</i>	
Experimental Analysis of Sensory Measurement Imperfection Impact for a Cheese Ripening Fuzzy Model	595
<i>Irina Ioannou, Nathalie Perrot, Gilles Mauris, Gilles Trystram</i>	
Generation of Fuzzy Membership Function Using Information Theory Measures and Genetic Algorithm	603
<i>Masoud Makrehchi, Otman Basir, Mohamed Kamel</i>	
Analyzing the Performance of a Multiobjective GA-P Algorithm for Learning Fuzzy Queries in a Machine Learning Environment	611
<i>Oscar Cordón, Enrique Herrera-Viedma, María Luque, Félix de Moya, Carmen Zarco</i>	
Commutativity as Prior Knowledge in Fuzzy Modeling	620
<i>Pablo Carmona, Juan L. Castro, José M. Zurita</i>	
Evolutionary Optimization of Fuzzy Models with Asymmetric RBF Membership Functions Using Simplified Fitness Sharing	628
<i>Min-Soeng Kim, Chang-Hyun Kim, Ju-Jang Lee</i>	
Fuzzy Multi-objective Optimization Approach for Rod Shape Design in Long Product Rolling	636
<i>Victor Oduguwa, Rajkumar Roy, Didier Farrugia</i>	
A Fuzzy-Based Meta-model for Reasoning about Number of Software Defects	644
<i>Marek Reformat</i>	
A Dual Representation of Uncertain Dynamic Spatial Information	652
<i>Gloria Bordogna, Paola Carrara, Sergio Chiesa, Stefano Spaccapietra</i>	
Enabling Fuzzy Object Comparison in Modern Programming Platforms through Reflection	660
<i>Fernando Berzal, Juan-Carlos Cubero, Nicolás Marín, Olga Pons</i>	
An XML-based Approach to Processing Imprecise Requirements	668
<i>Jonathan Lee, Yong-Yi Fanjiang, Tzung-Jie Chen, Ying-Yan Lin</i>	
Inducing Fuzzy Concepts through Extended Version Space Learning	677
<i>Eyke Hüllermeier</i>	

A Symbolic Approximate Reasoning under Fuzziness	685
<i>Mazen El-Sayed, Daniel Pacholczyk</i>	
Making Fuzzy Absolute and Fuzzy Relative Orders of Magnitude Consistent	694
<i>Didier Dubois, Allel HadjAli, Henri Prade</i>	
Learning First Order Fuzzy Logic Rules	702
<i>Henri Prade, Gilles Richard, Mathieu Serrurier</i>	
An Interactive Fuzzy Satisfying Method for Multiobjective Nonlinear Integer Programming Problems through Genetic Algorithms.....	710
<i>Masatoshi Sakawa, Kosuke Kato</i>	
A Global Optimization Method for Solving Fuzzy Relation Equations....	718
<i>Ş. İlker Birbil, Orhan Feyzioğlu</i>	
A Study on Fuzzy Random Linear Programming Problems Based on Possibility and Necessity Measures	725
<i>Hideki Katagiri, Masatoshi Sakawa</i>	
Author Index	733