

## Sessions and papers

### SS01 - Recent Advances in Evolving Fuzzy Systems

Chair: **E. Lughofer**

- 211 Nurfadhlina Mohd Sharef, Trevor Martin and Yun Shen
- 224 Gernot Herbst and Steffen F. Bocklisch
- 231 Laurent Hartert, Moamar Sayed Mouchaweh and Patrice Billaudel
- 217 Edwin Lughofer and Plamen Angelov
- 364 Gancho Vachkov

**Friday, July 24, 14:20-16:00, Sala 2**

- Minimal Combination for Incremental Grammar Fragment Learning
- Online Recognition of Fuzzy Time Series Patterns
- A Dynamic Classification Method for the Discrimination of Evolving Data
- Detecting and Reacting on Drifts and Shifts in On-Line Data Streams with Evolving Fuzzy Systems
- Online Classification of Machine Operation Modes Based on Information Compression and Fuzzy Similarity Analysis

### SS02 - Advances in Soft Computing Applied to Databases and Information Systems - Part 1

Chair: **S. Zadrozny**

- 405 Henrik Bulskov and Troels Andreasen
- 111 Ludovic Liétard and Daniel Rocacher
- 243 Nicolás Marin, Carlos Molina, Olga Pons and M. Amparo Vila
- 366 Xiaohui Tang, Guoqing Chen and Qiang Wei
- 60 Patrick Bosc, Carmen Brando, Allel Hadjali, Hélène Jaudoin and Olivier Pivert

**Tuesday, July 21, 10:10-11:50, Auditório 2**

- On Conceptual Indexing for Data Summarization
- On the Definition of Extended Norms and Co-norms to Aggregate Fuzzy Bipolar Conditions
- Semantically-Driven Flexible Division in Fuzzy Object Oriented Models

Introducing Relation Compactness for Generating a Flexible Size of Search Results in Fuzzy Queries  
Semantic Proximity Between Queries and the Empty Answer Problem

### SS02 - Advances in Soft Computing Applied to Databases and Information Systems - Part 2

Chair: **G. De Tré**

- 208 Juan Miguel Medina, Sergio Jaime-Castillo, Carlos D. Barranco and Jesús R. Campaña
- 109 Amine Mokhtari, Olivier Pivert and Allel Hadjali
- 91 German Hurtado Martin, Chris Cornelis and Helga Naessens
- 7 Klaas Bosteels, Elias Pampalk and Etienne Kerre
- 319 Slawomir Zadrozny and Janusz Kacprzyk

**Tuesday, July 21, 14:20-16:00, Auditório 2**

- Flexible Retrieval of X-Ray Images Based on Shape Descriptors Using a Fuzzy Object-Relational Database
- Integrating Complex User Preferences into a Route Planner: A Fuzzy-Set-Based Approach
- Training a Personal Alert System for Research Information Recommendation
- On the Benefits of Representing Music Objects as Fuzzy Sets
- Bipolar Queries: An Approach and its Various Interpretations

### SS02 - Advances in Soft Computing Applied to Databases and Information Systems - Part 3

Chair: **A. Hadjali**

- 221 Carlos Barranco and Sven Helmer
- 90 Henrik Legind Larsen
- 147 Antoon Bronselaer and Guy De Tre
- 89 Kobra Etminani, Mohammad Reza Akbarzadeh Toootoonchi and Noorali Raeiji Yanehsari
- 136 Sadaaki Miyamoto, Yuichi Kawasaki and Keisuke Sawazaki

**Tuesday, July 21, 16:20-18:00, Auditório 2**

- Increasing the Performance of Fuzzy Retrieval Using Impact Ordering
- Multiplicative and Implicative Importance Weighted Averaging Aggregation Operators with Accurate Andness Direction
- Semantical Evaluators
- Web Usage Mining: users' navigational patterns extraction from web logs using ant-based clustering method
- An Explicit Mapping for Kernel Data Analysis and Application to Text Analysis

**SS03 - Fuzzy Transforms, Time Series and Other Applications - Part 1 F-Transforms****Chair:** I. Perfilieva

127 Luciano Stefanini  
128 Irina Perfilieva and Martina Daňková  
153 Martina Dankova and Martin Stepnicka  
14 Ferdinando di Martino, Vincenzo Loia and Salvatore Sessa  
170 Barnabas Bede and Imre J. Rudas

Fuzzy Transform and Smooth Functions  
Towards F-transform of a Higher Degree  
Approximation Properties of Inverse Fuzzy Transforms over the Residuated Lattice  
Multi-Dimensional Fuzzy Transforms for Attribute Dependencies

Fuzzy Transforms, Korovkin Theorems and the Durrmeyer Operator

**SS03 - Fuzzy Transforms, Time Series and Other Applications - Part 2 Time Series****Chair:** M. Stepnicka

432 David Martin, Domingo Miguel Guinea, Maria C. Garcia-Alegre and Domingo Guinea  
105 Martin Stepnicka, Viktor Pavliska, Vilem Novak, Irina Perfilieva, Lenka Vavrickova and Iva Tomanova  
441 Peter Sussner, Rodolfo Miyasaki and Marcos Eduardo Valle  
178 Nadezhda Yarushkina, Tagir Unusov and Tatyana Afanasyeva  
259 Daniel Graves and Witold Pedrycz

Mining Linguistic Information for Configuring a Visual Surface Inspection System  
Time Series Analysis and Prediction Based on Fuzzy Rules and the Fuzzy Transform  
An Introduction to Parameterized IFAM Models with Applications in Prediction  
Fuzzy Tendency based Time Series Model for Forecasting Server Traffic  
Multivariate Segmentation of Time Series with Differential Evolution

**SS04 - Fuzzy and Possibilistic Optimization - Part 1****Chair:** M. Inuiguchi

373 Mariano Jiménez, Amelia Bilbao, Mar Arenas and María Victoria Rodríguez-Uria  
308 Ricardo C. Silva and Akebo Yamakami  
71 Phantipa Thipwiwatpotjana and Weldon Lodwick  
347 Ricardo C. Silva, Carlos Cruz and Akebo Yamakami  
335 A. David Baez-Sánchez

Repairing Infeasibility in Fuzzy Goal Programming  
Definition of Fuzzy Pareto-Optimality by Using Possibility Theory  
The Use of Interval-Valued Probability Measures in Fuzzy Linear Programming: a constraint set approach  
A Parametric Method to Solve Quadratic Programming Problems with Fuzzy Costs  
Two Results About Optimization of Fuzzy Variable Functions

**SS04 - Fuzzy and Possibilistic Optimization - Part 2****Chair:** Y. Yoshida

70 Heinrich Rommelfanger  
34 Yuji Yoshida  
200 Masahiro Inuiguchi

Production and Transportation Planning — A fuzzy Approach for Minimizing the Total Cost  
The Minimization of the Risk of Falling in Portfolios under Uncertainty  
A Semi-infinite Programming Approach to Possibilistic Optimization under Necessity Measure Constraints

**SS05 - Fuzzy Differential Equations - Part 1**Chair: **Y. Chalco-Cano**

- 163 Barnabas Bede and Luciano Stefanini
- 326 Muhammad Zaini Ahmad and Bernard De Baets
- 156 Yurilev Chalco-Cano, Heriberto Román-Flores and María Dolores Jiménez-Gamero
- 62 Rosana Motta Jafelice, Cesar Guilherme Almeida, João Frederico C. A. Meyer and Heraldo L. Vasconcelos
- 56 Marina R. B. Dias and Laécio C. Barros

**Friday, July 24, 10:10-11:50, Auditório 2**

Numerical Solution of Interval Differential Equations with Generalized Hukuhara Differentiability

A Predator-Prey Model with Fuzzy Initial Populations

Fuzzy Differential Equation with  $n$ -Derivative

Dispersal of Leaf-Cutting Ants: fuzzy mathematical modeling, numerical approximation and simulations

Differential Equations based on Fuzzy Rules

**SS05 - Fuzzy Differential Equations - Part 2**Chair: **Y. Chalco-Cano**

- 61 Rosana M. Jafelice, Laécio C. Barros and Rodney C. Bassanezi
- 52 Heriberto Román-Flores, Yurilev Chalco-Cano and Geraldo Nunes-Silva
- 129 Jiri Kupka

**Friday, July 24, 12:00-13:00, Auditório 2**

A Fuzzy Delay Differential Equation Model for HIV Dynamics

Chaos Induced by Turbulent and Erratic Functions

Some Chaotic and Mixing Properties of Zadeh's Extension

**SS06 - Soft-computing for Web 2.0 and Semantic Web**Chair: **M. Reformat**

- 395 Zhan Li, Ronald R. Yager and Marek Reformat
- 226 Trevor Martin and Yun Shen
- 327 Giuseppe Fenza, Vincenzo Loia and Sabrina Senatore
- 228 Veronika Vanekova and Peter Vojtas
- 277 Ernesto Damiani, Paolo Ceravolo and Marcello Leida

**Thursday, July 23, 16:20-18:00, Auditório 2**

Identification of Web Information using Concept Hierarchies and On-line Updates of Concept Importance

Data Integration, Approximate Categorisation and Fuzzy Associations

Local Semantic Context Analysis for Automatic Ontology Matching

Fuzziness as a Model of User Preference in Semantic Web Search

A toward Framework for Generic Uncertainty Management

**SS07 - Solvability of Fuzzy Relation Equations and Fuzzy Interpolation - Part 1 Solvability**Chair: **S. Gottwald**

- 400 Irina Perfilieva
- 22 Xue-ping Wang and Feng Sun
- 271 Iman Mohammadi Ardehali and Milad Avazbeigi

**Tuesday, July 21, 12:00-13:00, Sala 1**

Systems of Fuzzy Relation Equations in a Space with Fuzzy Preorder

Resolution of Fuzzy Relation Equations with Sup-Inf Composition over Complete Brouwerian Lattices — a review

A Generalized Numerical Solution for Fuzzy Relation Equations

**SS07 - Solvability of Fuzzy Relation Equations and Fuzzy Interpolation - Part 2 Fuzzy Interpolation****Chair:** **M. Stepnicka**

87 Siegfried Gottwald and Philipp Hüsam  
95 Martin Stepnicka and Balasubramaniam Jayaram  
424 Joan Jacas, Amadeu Montreal and Jordi Recasens

**Wednesday, July 22, 12:00-13:00, Sala 3**

Pointwise Defined CRI-Based Aggregation Distributive Operators Are Trivial  
The Bandler-Kohout Subproduct as a Suitable Inference  
Similarity Based Fuzzy Interpolation Applied to CAGD

**SS08 - Aggregation Operators - Part 1****Chair:** **R. Mesiar**

106 Aida Valls, Jordi Nin and Vicenç Torra  
63 Balasubramaniam Jayaram and Michal Baczynski  
287 Hoel Le Capitaine and Carl Frélicot  
67 Humberto Bustince, Javier Fernandez, Radko Mesiar, Javier Montero and Raul Orduna  
341 Gleb Beliakov, Tomasa Calvo and Simon James

**Thursday, July 23, 10:10-11:50, Sala 1**

On the Use of Aggregation Operators for Location Privacy  
Continuous R-Implications  
Towards a Unified Logical Framework of Fuzzy Implications to Compare Fuzzy Sets  
Overlap Index, Overlap Functions and Migrativity  
Some Results on Lipschitz Quasi-Arithmetic Means

**SS08 - Aggregation Operators - Part 2****Chair:** **T. Calvo**

73 Isabel Aguiló, Jaume Suñer and Joan Torrens  
124 Sebastià Massanet and Joan Torrens  
142 János Fodor and Imre J. Rudas  
269 Yasuo Narukawa and Vicenç Torra  
23 Doretta Vivona and Maria Divari

**Thursday, July 23, 14:20-16:00, Sala 1**

A Characterization of Residual Implications Derived from Uninorms  
Fuzzy Implications and the Weak Law of Importation  
On Some Classes of Aggregation Functions that are Migrative  
Continuous OWA Operator and its Calculation  
Aggregation Operators for Conditional Crispness

**SS09 - Fuzzy Sets in Computational Biology****Chair:** **U. Bodenhofer**

46 Jan Baetens and Bernard De Baets  
343 Ulrich Bodenhofer, Karin Schwarzbauer, Mihaela Ionescu and Sepp Hochreiter  
323 Thomas Fober and Eyke Hüllermeier

**Friday, July 24, 12:00-13:00, Sala 1**

Incorporating Fuzziness in Spatial Susceptible-Infected Epidemic Models  
Modeling Position Specificity in Sequence Kernels by Fuzzy Equivalence Relations  
Fuzzy Modeling of Labeled Point Cloud Superposition for the Comparison of Protein Binding Sites

**SS10 - Mathematical Fuzzy Logic - Part 1 Foundations****Chair:** **F. Esteva**

113 Petr Cintula and Carles Noguera  
92 Pilar Dellunde  
384 Félix Bou, Francesc Esteva, Lluís Godo and Ricardo Oscar Rodríguez  
98 Libor Behounek  
254 Thomas Vetterlein and Klaus-Peter Adlassnig

**Tuesday, July 21, 10:10-11:50, Sala 1**

An Abstract Approach to Fuzzy Logics: implicative semilinear logics  
On Reduced Semantics for Fuzzy Predicate Logics  
Characterizing Fuzzy Modal Semantics by Fuzzy Multimodal Systems with Crisp Accessibility Relations  
Number-free Mathematics Based on T-norm Fuzzy Logic  
T-norm-based Fuzzy Logics and Logics for Human Reasoning

**SS10 - Mathematical Fuzzy Logic - Part 2 Algebraic Aspects**Chair: **P. Cintula**

352 Vilem Novak and Martin Dyba  
131 Milan Petrík and Peter Sarkoci  
158 Brunella Gerla and Tomas Kroupa

**Tuesday, July 21, 14:20-16:00, Sala 1**

Non-Commutative EQ-Logics and Their Extensions  
Associativity of Triangular Norms in Light of Web Geometry  
Representation of States on MV-algebras by Probabilities on R-generated Boolean Algebras

**SS10 - Mathematical Fuzzy Logic - Part 3 Knowledge Representation**Chair: **C. Noguera**

318 Jiri Mockor  
206 Àngel García-Cerdaña, Eva Armengol and Francesc Esteva  
44 Fernando Bobillo and Umberto Straccia  
334 Jeroen Janssen, Steven Schockaert, Dirk Vermeir and Martine De Cock  
456 Hannes Strass, Susana Muñoz-Hernández and Victor Pablos Ceruelo

**Wednesday, July 22, 10:10-11:50, Sala 1**

Morphisms in Categories of Sets with Similarity Relations  
On Triangular Norm Based Fuzzy Description Logics

Fuzzy Descriptions Logics with Fuzzy Truth Values  
Fuzzy Answer Set Programming with Literal Preferences

Operational Semantics for a Fuzzy Logic Programming System with Defaults and Constructive Answers

**SS11 - Machine Learning and Data Mining - Part 1 Machine Learning**Chair: **D. Sanchez**

236 Julián Luengo and Francisco Herrera  
219 Thomas Gabriel, Kilian Thiel and Michael Berthold  
218 Alan Eckhardt and Peter Vojtas  
205 Arne-Jens Hempel and Steffen F. Bocklisch  
83 Javier Albusac, Jose Jesús Castro, Lorenzo Manuel López López, David Vallejo and Luis Jiménez

**Tuesday, July 21, 10:10-11:50, Sala 2**

On the use of Measures of Separability of Classes to Characterise the Domains of Competence of a Fuzzy Rule Based Classification System  
Multi-Dimensional Scaling applied to Hierarchical Rule Systems  
How to Learn Fuzzy User Preferences with Variable Objectives  
Parametric Fuzzy Modelling Framework for Complex Data-Inherent Structures  
Learning and Classification of Events in Monitored Environments

**SS11 - Machine Learning and Data Mining - Part 2 Data Mining**Chair: **E. Hüllermeier**

389 Carlos Molina, Daniel Sanchez, Jose-Maria Serrano and M. Amparo Vila  
302 María Ros, Miguel Delgado and Amparo Vila  
59 Miguel Delgado, M. Dolores Ruiz and Daniel Sanchez  
223 Christian Borgelt and Xiaomeng Wang  
328 Janusz Kacprzyk and Anna Wilbik

**Tuesday, July 21, 14:20-16:00, Sala 2**

Managing the Absence of Items in Fuzzy Association Mining  
A Fuzzy Approach for the Model of Sliding Window. An Application to Behaviour Patterns Mining  
A Restriction Level Approach for the Representation and Evaluation of Fuzzy Association Rules  
SaM: A Split and Merge Algorithm for Fuzzy Frequent Item Set Mining  
Using Fuzzy Linguistic Summaries for the Comparison of Time Series: an application to the analysis of investment fund quotations

**SS12 - Type-2 Fuzzy Logic, Advances and Applications - Part 1****Chair:** **S. Greenfield**

117 Christian Wagner and Hani Hagras

133 Hussam Hamrawi and Simon Coupland  
20 John T. Rickard, Sam Hamilton and Wendy Hamilton  
225 Sarah Greenfield, Francisco Chiclana and Robert John  
155 Simon Miller, Viara Popova, Robert John and Mario Gongora

**SS12 - Type-2 Fuzzy Logic, Advances and Applications - Part 2****Chair:** **I. B. Turksen**

345 Asli Celikyilmaz and I. Burhan Turksen  
9 M. H. Fazel Zarandi, Marzie Zarinbal and I. B. Turksen  
344 Juan R. Castro, Oscar Castillo, Patricia Melin, Antonio Rodriguez-Diaz and Olivia Mendoza  
102 Nils Rosemann, Werner Brockmann and Bastian Neumann  
447 Esko Juuso

**SS13 - Inter-relation Between Interval and Fuzzy Techniques****Chair:** **V. Kreinovich**

446 Eunjin Kim and Ladislav J. Kohout  
346 Olga Kosheleva  
313 Vladik Kreinovich and Hung Nguyen  
99 Karen Villaverde and Olga Kosheleva  
50 Carol Walker, Elbert Walker and Ronald Yager

**SS14 - Advances in Soft Computing for Spatiotemporal Information Systems****Chair:** **R. Ribeiro**

372 Yi Qiang, Katrin Asmussen, Matthias Delafontaine, Birger Stichelbaut, Guy De Tre, Philippe De Maeyer and Nico Van  
278 Matthias Steinbrecher and Rudolf Kruse  
212 Gloria Bordogna, Paola Carrara, Marco Pagani, Monica Pepe and Anna Rampini  
253 Ahed Alboody, Florence Sedes and Jordi Inglada  
348 Jozo Dujmovic, Guy De Tre and Suzana Dragicevic

**Thursday, July 23, 10:10-11:50, Sala 3**

Novel Methods for the Design of General Type-2 Fuzzy Sets based on Device Characteristics and Linguistic Labels Surveys  
Type-2 Fuzzy Arithmetic using Alpha-planes  
Type-2 Fuzzy Trust Aggregation  
The Collapsing Method: Does the Direction of Collapse Affect Accuracy?  
An Interval Type-2 Fuzzy Distribution Network

**Thursday, July 23, 16:20-18:00, Sala 3**

Spectral Learning with Type-2 Fuzzy Numbers for Question/Answering System  
Type-II Fuzzy Possibilistic C-Mean Clustering  
Universal Approximation of a Class of Interval Type-2 Fuzzy Neural Networks Illustrated with the Case of Non-linear Identification  
Enforcing Local Properties in Online Learning First Order TS-fuzzy Systems by Incremental Regularization  
Development of Multiple Linguistic Equation Models with Takagi-Sugeno Type Fuzzy Models

**Thursday, July 23, 10:10-11:50, Auditório 3**

Multiple Negations in Fuzzy Interval Logic  
Can We Learn Algorithms from People Who Compute Fast: an indirect analysis in the presence of fuzzy descriptions  
Towards Intuitive Understanding of the Cauchy Deviate Method for Processing Interval and Fuzzy Uncertainty  
Uncertainty Can Decrease Privacy: an observation  
Generating Minimum Dispersion Densities from an Interval-Valued Fuzzy Set

**Thursday, July 23, 14:20-16:00, Auditório 2**

Visualising Rough Time Intervals in a Two-Dimensional Space  
Fuzzy Descriptions to Identify Temporal Substructure Changes of Cooccurrence Graphs  
Managing Imperfect Temporal Metadata in the Catalog services of Spatial Data Infrastructures Compliant with INSPIRE  
Fuzzy Intersection and Difference Model for Topological Relations  
Comparison of Multicriteria Methods for Land-use Suitability Assessment

**SS15 - Interpretability of Fuzzy systems: Theory and Applications****Chair:** J. M. Alonso

- 30 José M. Alonso and Luis Magdalena
- 412 Hisao Ishibuchi and Yusuke Nojima
- 75 Corrado Mencar, Ciro Castiello and Anna M. Fanelli
- 407 Jorge Casillas
- 272 María José Gacto, Rafael Alcalá and Francisco Herrera

**Wednesday, July 22, 10:10-11:50, Sala 2**

- A Conceptual Framework for Understanding a Fuzzy System
- Discussions on Interpretability of Fuzzy Systems using Simple Examples
- A Logic-Based Approach for Evaluating Interpretability of Fuzzy Rule-Based Classifiers
- Embedded Genetic Learning of Highly Interpretable Fuzzy Partitions
- A Multiobjective Evolutionary Algorithm for Tuning Fuzzy Rule Based Systems with Measures for Preserving Interpretability

**SS17 - Computing With Words, Actions and Perceptions****Chair:** S. Guadarrama

- 151 Claudio Moraga and Enric Trillas
- 68 Enric Trillas, Claudio Moraga and Alejandro Sobrino
- 55 Ichiro Kobayashi and Naoko Okumura
- 350 Sergio Guadarrama
- 72 Gracian Trivino and Alejandro Sobrino

**Tuesday, July 21, 16:20-18:00, Sala 3**

- A Computing with Words Path from Fuzzy Logic to Natural Language
- On 'Family Resemblances' with Fuzzy Sets
- Verbalizing Time-series Data: With an Example of Stock Price Trends
- Computing with Actions: the case of driving a car in a simulated car race
- Human Perceptions versus Computational Perceptions in Computational Theory of Perceptions

**SS18 - New trends in Fuzzy Reasoning of Robotic Systems****Chair:** P. Goncalves

- 467 Paulo Goncalves, João Sousa and João Caldas Pinto
- 145 Seiji Yasunobu and Mitsuru Kokuhuda
- 3 Rainer Palm, Bourhane Kadmiry, Boyko Iliev and Dimiter Driankov
- 368 Áron Ballagi, Laszlo T. Koczy and Tom Gedeon

**Friday, July 24, 10:10-11:50, Auditório 3**

- Evolving Inverse Fuzzy Models for Uncalibrated Visual Servoing in 3D Workspace
- Intelligent Operation Support Method based on Time Change Fuzzy Sets
- Recognition and Teaching of Robot Skills by Fuzzy Time-Modeling
- Robot Cooperation without Explicit Communication by Fuzzy Signatures and Decision Trees

**SS19 - Fuzzy Numbers and Fuzzy Arithmetic - Part 1****Chair:** P. Grzegorzewski

- 35 Chi-Tsuen Yeh
- 382 Przemyslaw Grzegorzewski and Karolina Pasternak-Winiarska
- 383 Przemyslaw Grzegorzewski and Luciano Stefanini
- 181 Adrian Ban and Lucian Coroianu
- 464 Sylvie Galichet and Reda Boukezzoula

**Thursday, July 23, 14:20-16:00, Auditório 3**

- Approximations by Interval, Triangular and Trapezoidal Fuzzy Numbers
- Weighted Trapezoidal Approximations of Fuzzy Numbers
- Nonlinear-shaped Approximation of Fuzzy Numbers
- Continuity and Additivity of the Trapezoidal Approximation Preserving the Expected Interval Operator
- Optimistic Fuzzy Weighted Average

**SS19 - Fuzzy Numbers and Fuzzy Arithmetic - Part 2****Chair:** L. Stefanini

- 132 Luciano Stefanini and Laerte Sorini
- 409 Laerte Sorini
- 157 Zainab Assaghir, Philippe Girardin and Amedeo Napoli
- 141 Jaume Casasnovas and J. Vicente Riera
- 140 Saeid Abbasbandy

**Thursday, July 23, 16:20-18:00, Auditório 3**

- Fuzzy Arithmetic with Parametric LR Fuzzy Numbers
- A Desktop Calculator for Parametric Fuzzy Arithmetic
- Fuzzy Logic Approach to Represent and Propagate Imprecision in Agri-Environmental Indicator Assessment
- Lattice Properties of Discrete Fuzzy Numbers under Extended Min and Max
- Ranking of Fuzzy Numbers, Some Recent and New Formulas

**SS20 - Intuitionistic Fuzzy Sets I (Interval Valued Sets)****Chair:** E. Szmidt

288 Barbara Pękala

119 Mirko Navara

2 Benjamin Bedregal, Graçaliz Dimuro and Renata Reiser

**Thursday, July 23, 12:00-13:00, Sala 3**

Preservation of Properties of Interval-Valued Fuzzy Relations

Valuations on the Algebra of Intervals

An Approach to Interval-Valued R-Implications and Automorphisms

**SS20 - Intuitionistic Fuzzy Sets II****Chair:** E. Szmidt

104 Edurne Barrenechea, Humberto Bustince, Miguel Pagola, Javier Fernandez and Josean Sanz

351 Eulalia Szmidt and Janusz Kacprzyk

43 Glad Deschrijver

451 Panagiotis Chountas, Ermir Rogova and Krassimir T. Atanassov

152 Magdaléna Renčová

**Friday, July 24, 10:10-11:50, Sala 3**

Generalized Atanassov's Intuitionistic Fuzzy Index. Construction Method

Analysis of Similarity Measures for Atanassov's Intuitionistic Fuzzy Sets

Non-Conjunctive and Non-Disjunctive Uninorms in Atanassov's Intuitionistic Fuzzy Set Theory

Enhancing OLAP Querying with the aid of H-IFS

Notes on Q-Probabilities on Intuitionistic Fuzzy Events

**SS21 - New Advances on Genetic Fuzzy Systems - Part 1****Chair:** Y. Nojima

11 Alberto Fernández, Francisco José Berlanga, María José Del Jesús and Francisco Herrera

438 Ignacio Robles, Rafael Alcalá, José Manuel Benítez and Francisco Herrera

470 Akihiro Yorita and Naoyuki Kubota

379 Krzysztof Trawinski, Arnaud Quérin and Oscar Cordon

173 Vinicius da F. Vieira, Alexandre G. Evsukoff, Beatriz S. L. P. de Lima and Sylvie Galichet

**Wednesday, July 22, 14:20-16:00, Sala 2**

Genetic Cooperative-Competitive Fuzzy Rule Based Learning Method using Genetic Programming for Highly Imbalanced Data-Sets

Distributed Genetic Tuning of Fuzzy Rule-Based Systems

Evolutionary Robot Vision and Fuzzy Evaluation for Natural Communication of Partner Robots

Bi-criteria Genetic Selection of Bagging Fuzzy Rule-based Multiclassification Systems

Learning Fuzzy Rule Based Classifier in High Performance Computing Environment

**SS21 - New Advances on Genetic Fuzzy Systems - Part 2****Chair:** R. Alcalá

459 Yusuke Nojima and Hisao Ishibuchi

241 Michela Antonelli, Pietro Ducange, Beatrice Lazzarini and Francesco Marcelloni

262 Igor Walter and Fernando Gomide

418 János Botzheim, Péter Földesi and László Kóczy

184 Fevrier Valdez, Patricia Melin and Oscar Castillo

**Wednesday, July 22, 16:20-18:00, Sala 2**

Interactive Fuzzy Modeling by Evolutionary Multiobjective Optimization with User Preference

Learning Concurrently Granularity, Membership Function Parameters and Rules of Mamdani Fuzzy Rule-based Systems

Coevolutionary Genetic Fuzzy System to Assess Multiagent Bidding Strategies in Electricity Markets

Solution for Fuzzy Road Transport Traveling Salesman Problem Using Eugenic Bacterial Memetic Algorithm

Fuzzy Logic Adaptation of a Hybrid Evolutionary Method for Pattern Recognition

**SS21 - New Advances on Genetic Fuzzy Systems - Part 3**Chair: **Y. Nojima**

182 Ana Palacios, Luciano Sanchez and Ines Couso  
387 Manuel Muentes, Ismael Rodríguez-Fdez and Alberto Bugarín  
440 Alicia D. Benítez and Jorge Casillas  
244 Antonio Angel Márquez, Francisco Alfredo Márquez and Antonio Peregrín  
454 Guillermo Jimenez de la C., Jose A. Ruz-Hernandez, Evgen Shełomov and Ruben Salazar M.

**Thursday, July 23, 10:10-11:50, Sala 2**

A Baseline Learning Genetic Fuzzy Classifier Based on Low Quality Data  
Evolutionary Learning of Quantified Fuzzy Rules for Hierarchical Grouping of Laser Sensor Data in Intelligent Control  
Genetic Learning of Serial Hierarchical Fuzzy Systems for Large-Scale Problems  
Rule Base and Inference System Cooperative Learning of Mamdani Fuzzy Systems with Multiobjective Genetic Algorithms  
Optimization of an Oil Production System using Neural Networks and Genetic Algorithms

**SS22 - Fuzzy Measures and Integrals - Part 1**Chair: **M. Grabisch**

29 Erich Peter Klement, Anna Kolesárová, Radko Mesiar and Andrea Stupňanová  
18 Elias F. Combarro and Pedro Miranda  
79 Antonin Dvorak and Michal Holcapek  
110 Antonin Dvorak and Michal Holcapek  
32 Michel Grabisch

**Wednesday, July 22, 14:20-16:00, Sala 1**

Universal Integrals Based on Level Dependent Capacities

On the Structure of the  $k$ -Additive Fuzzy Measures  
Fuzzy Integrals over Complete Residuated Lattices  
Basic Properties of  $L$ -fuzzy Quantifiers of the Type  $\langle 1 \rangle$  Determined by Fuzzy Measures  
Games and Capacities on Partitions

**SS22 - Fuzzy Measures and Integrals - Part 2**Chair: **C. Labreuche**

139 Katsuhige Fujimoto and Aoi Honda  
38 Ulrich Faigle and Michel Grabisch  
21 Pedro Miranda and Michel Grabisch  
286 Silvia Angilella, Salvatore Greco and Benedetto Matarazzo  
123 Christophe Labreuche

**Wednesday, July 22, 16:20-18:00, Sala 1**

A Value via Posets Induced by Graph-Restricted Communication Situations  
A Monge Algorithm for Computing the Choquet Integral on Set Systems  
On Vertices of the  $k$ -Additive Monotone Core  
Non-additive Robust Ordinal Regression with Choquet integral, Bipolar and Level Dependent Choquet integrals  
On the Completion Mechanism Produced by the Choquet Integral on Some Decision Strategies

**SS22 - Fuzzy Measures and Integrals - Part 3**Chair: **J. Marichal**

80 Brice Mayag, Michel Grabisch and Christophe Labreuche  
137 Yasuo Narukawa and Vicenc Torra  
194 Eiichiro Takahagi  
114 Miguel Couceiro and Jean-Luc Marichal  
115 Miguel Couceiro and Jean-Luc Marichal

**Thursday, July 23, 16:20-18:00, Sala 1**

A Link Between the 2-additive Choquet Integral and Belief Functions

Distorted Probabilities and  $m$ -Separable Fuzzy Measures  
Choquet Integral Based Evaluations by Fuzzy Rules  
Polynomial Functions on Bounded Chains  
Quasi-Polynomial Functions on Bounded Chains

**SS23 - Fuzzy Geographical Information**Chair: **C. Fonte**

198 Gloria Bordogna, Giorgio Ghisalberti, Marco Pagani and Giuseppe Psaila

246 Luisa M. S. Gonçalves, Cidália C. Fonte, Eduardo N. B. S. Júlio and Mario Caetano

78 Bulent Tutmez, A. Erhan Tercan, Uzay Kaymak and Christopher D. Lloyd

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159 Tiago Pais and Rita Ribeiro

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Geographic Information Retrieval based on Two Orthogonal Criteria

On the Information Provided by Uncertainty Measures in the Classification of Remote Sensing Images

Local Models for the Analysis of Spatially Varying Relationships in a Lignite Deposit

Terrain Morphology Classification over Fuzzy Digital Elevation Models

Contributions to Dynamic Multicriteria Decision Making Models

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371 Tom Mélange, Mike Nachtegael and Etienne Kerre

468 Belén Prados-Suarez, Pilar Sobrevilla, Eduard Montseny and Santiago Romaní

13 Vasile Patrascu

307 Constantin Vertan

86 Ehsan Lotfi, M. Akbarzadeh-T., Hamid Reza Pourreza, Mona Yaghoubi and F. Dehghan

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A Fuzzy Filter for the Removal of Gaussian Noise in Colour Image Sequences

On the Reliability of the Color Gradient Vector Argument Approach

New Fuzzy Color Clustering Algorithm Based on hsl Similarity

Parallel Coordinates-based Fuzzy Color Distance and its Applications

A Hybrid Method for Soccer Video Events Retrieval Using Fuzzy Systems

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222 Pedro Couto, Pedro Melo-Pinto, Humberto Bustince, Edurne Barrenechea and Miguel Pagola

45 Oscar Ibáñez, Oscar Cordón, Sergio Damas, Sergio Guadarrama and José Santamaría

6 Cayetano Solana-Cipres, Luis Rodriguez-Benitez, Juan Moreno-Garcia, Luis Jimenez and Gerardo Fernandez

65 Robert Luke, Derek Anderson, James Keller and Simon Coupland

64 Derek Anderson, Robert Luke, Erik Stone and James Keller

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Colour Image Segmentation using A-IFSs

A New Approach to Fuzzy Location of Cephalometric Landmarks in Craniofacial Superimposition

Real-Time Segmentation of Moving Objects in H.264 Compressed Domain with Dynamic Design of Fuzzy Sets

Fuzzy Logic-Based Image Processing Using Graphics Processor Units

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**SS24 - Soft Computing in Image Processing and Computer Vision - Part 3**Chair: **B. Prados-Suarez**

39 Tom Mélange, Mike Nachtegael, Etienne Kerre and Peter Sussner	<b>Friday, July 24, 14:20-16:00, Auditório 3</b>	Decomposition of Interval-Valued Fuzzy Morphological Operations by Weak $[\alpha_1, \alpha_2]$ -cuts
444 Jesus Chamorro-Martinez, Pedro M. Martínez-Jimenez and Jose M. Soto-Hidalgo		Defining A Fuzzy Partition for Coarseness Modelling in Texture Images
57 Marcos Eduardo Valle		Sparsely Connected Autoassociative Fuzzy Implicative Memories for the Reconstruction of Large Gray-Scale Images
249 Sergio Jaime-Castillo, Juan Miguel Medina and Antonio Garrido		A Method for Locating the Iliac Crests Based on the Fuzzy Hough Transform
282 Grzegorz Nieradka and Bohdan Butkiewicz		Features Stereo Matching Based on Fuzzy Logic

**SS24 - Soft Computing in Image Processing and Computer Vision - Part 4**Chair: **P. Melo Pinto**

138 Manuel González Hidalgo, Arnau Mir Torres, Daniel Ruiz Aguilera and Joan Torrens-Sastre	<b>Friday, July 24, 16:20-18:00, Auditório 3</b>	Image Analysis Applications of Morphological Operators based on Uninorms
168 Daniel Paternain, Humberto Bustince, Josean Sanz, Mikel Galar and Carlos Guerra		Image Reduction with Interval-Valued Fuzzy Sets and OWA Operators
189 Aranzazu Jurio, Miguel Pagola, Daniel Paternain, Carlos Lopez-Molina and Pedro Melo-Pinto		Interval-Valued Restricted Equivalence Functions Applied on Clustering Techniques
10 Hamid R. Tizhoosh		Opposite Fuzzy Sets with Applications in Image Processing
174 Olivia Mendoza, Patricia Melin and Juan Ramon Castro		The Use of Interval Type-2 Fuzzy Logic as a General Method for Edge Detection

**SS26 - Fuzzy Models and Fuzzy Arithmetic in Economics and Business**Chair: **M. L. Guerra**

230 Elettra Agliardi, Maria Letizia Guerra and Luciano Stefanini	<b>Wednesday, July 22, 16:20-18:00, Auditório 2</b>	Efficient Calculation of the Value Function in Fuzzy Real Option by Differential Evolution Algorithms
317 Tindara Addabbo, Gisella Facchinetto, Giovanni Mastroleo and Tiziana Lang		Evaluating Firms' Gender Equity by Fuzzy Logic
118 David de la Fuente and María José Pardo		Flow Line Systems with Possibilistic Data: a System with Waiting Time in Line Uncertain
248 Hans Schjær-Jacobsen		On Interval and Fuzzy Calculations of Economic Uncertainty
340 José M. Merigó		Probabilistic Decision Making with the OWA Operator and its Application in Investment Management

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448 Rui Jorge Almeida, Susana Vieira, Viorel Milea, Uzay Kaymak and Joao Miguel Costa Sousa	<b>Tuesday, July 21, 16:20-18:00, Auditório 3</b>	Knowledge Discovery in the Prediction of Bankruptcy
439 Meysam Alizadeh, Roy Rada, Akram Khaleghieh Ghosheh Balagh and Mir Mehdi Seyyed Esfahani		Forecasting Exchange Rates: A Neuro-Fuzzy Approach
453 Rui Jorge Almeida and Uzay Kaymak		Tail Point Density Estimation Using Probabilistic Fuzzy Systems
452 Milan Lovric, Rui Jorge Almeida, Uzay Kaymak and Jaap Spronk		Modeling Investor Optimism with Fuzzy Connectives
265 Takashi Hasuike and Hiroaki Ishii		A Type-2 Fuzzy Portfolio Selection Problem Considering Possibility Measure and Crisp Possibilistic Mean Value

**SS28 - Topics in Decision-Making Using Fuzzy Sets****Chair:** D. Ralescu

329 Miguel López-Díaz and Luis J. Rodríguez-Muñiz  
399 Keisuke Osone and Takehisa Onisawa  
423 Marek Gągolewski and Przemysław Grzegorzewski

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Exchanging Iterated Expectations of Random Upper Semicontinuous Functions: an application to decision theory  
Cooperative Partner Agent of Seven-Card-Stud Poker  
Possible and Necessary h-Indices

**SS29 - Decision Making in Fuzzy Environments - Part 1****Chair:** M. T. Lamata

386 Piero Bonissone, José M. Cadenas, Carmen Garrido, Ramón Andrés Díaz and Raquel Martínez  
408 Marta Cardin and Silvio Giove  
103 David Pelta and Ronald R. Yager  
268 Müjde Erol Genevois and Tuncay Gürbüz  
426 Clara M. Campos, Lourdes Canós, María J. Canós, Vicente Liern, José A. Moreno and Dolores Santos

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Weighted Decisions in a Fuzzy Random Forest  
Non Additive Measures for Group Multi Attribute Decision Models  
Dynamic vs. Static Decision Strategies in Adversarial Reasoning  
Finding the Best Flexibility Strategies by Using an Integrated Method of FAHP and QFD  
Decision Making in Competitive Location using Fuzzy Sets

**SS29 - Decision Making in Fuzzy Environments - Part 2****Chair:** D. Pelta

385 Julio Brito, José Andrés Moreno and José Luis Verdegay  
150 Jana Talasova and Pavel Holecek  
148 Jose M. Cadenas, Juan V. Carrillo, M. Carmen Garrido, Carlos Ivorra, Teresa Lamata and Vicente Liern  
362 H. Ziya Ulukan and Yeşim Kop  
275 Carlos Cruz, Ricardo C. Silva, José Luis Verdegay and Akebo Yamakami

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Multiple-Criteria Fuzzy Evaluation: The FuzzME Software Package  
A Hybrid Meta-Heuristic to Solve the Portfolio Selection Problem  
A Two Step Solution Procedure to a Fuzzy Medical Waste Disposal Facility Location Problem  
A Parametric Approach to Solve Quadratic Programming Problems with Fuzzy Environment in the Set of Constraints

**SS29 - Decision Making in Fuzzy Environments - Part 3****Chair:** J. Moreno

4 Francisco Javier Cabrerizo, Juan Manuel Moreno and Enrique Herrera-Viedma  
48 Nesrin Halouani, Luis Martínez, Habib Chabchoub, Jean-Marc Martel and Jun Liu  
121 Jun Ma, Guangquan Zhang, Jie Lu and Da Ruan  
149 M. Socorro García-Cascales and M. Teresa Lamata  
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A Consensus Model for Group Decision Making with Incomplete Unbalanced Fuzzy Linguistic Preference Relations  
A Multi-granular Linguistic Promethee Model  
Impute Missing Assessments by Opinion Clustering in Multi-Criteria Group Decision Making Problems  
Information System for the valuation of Universities in Spain  
Multi-Goal Aggregation of Reduced Preference Relations Based on Fuzzy Interactions between Decision Goals

**SS30 - Soft Computing in Medical Imaging**Chair: **E. Montseny**

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357 Robert Koprowski and Zygmunt Wrobel

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Interval-Valued Fuzzy System for Segmentation of Prostate Ultrasound Images  
Hierarchic Approach in the Analysis of Tomographic Eye Image

**SS31 - Medical Concepts in Soft Computing**Chair: **R. Seising**

428 Mila Kwiatkowska, Krzysztof Kielan and Krzysztof Michalik  
394 Tatiana Kiseliova  
421 Petri Heinonen, Marjo Mannelin, Hannu Iskala, Aki Sorsa and Esko Juuso  
51 Elisabeth Rakus-Andersson

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A Fuzzy-Semiotic Framework for Modeling Imprecision in the Assessment of Depression  
Towards an Interpretation of the Connectivity Analysis in the Frame of Fuzzy Equivalence Relations for Medical Diagnoses  
Development of a Fuzzy Expert System for a Nutritional Guidance Application  
Approximate Reasoning in Surgical Decisions

**SS32 - Philosophical, Sociological and Economical Thinking - Part 1**Chair: **R. Seising**

330 Rudolf Seising  
377 Veronica Sanz  
122 Vesa Niskanen  
96 Olga Kosheleva  
227 Alejandro Sobrino and Martín Pereira

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60 years "A Mathematical Theory of Communication" — Towards a "Fuzzy Information Theory"  
Soft Computing Confronting Philosophical and Sociological Critiques to Classical AI  
Application of Zadeh's Impossibility Principle to Approximate Explanation  
Early Start Can Inhibit Learning: Towards A New Explanation  
Around Fuzziness. Some Philosophical Thoughts

**SS32 - Philosophical, Sociological and Economical Thinking - Part 2**Chair: **R. Seising**

455 Joao Paulo Carvalho and Jose Tome  
201 Enric Trillas, Claudio Moraga and Eloy Renedo  
331 Rudolf Seising

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Rule Based Fuzzy Cognitive Maps in Socio-Economic Systems  
On Aristotle's NC and EM Principles in Three-valued Logics  
On Classical, Fuzzy Classical, Quantum and Fuzzy Quantum Systems

**Linguistic Fuzzy Systems**Chair: **L. Magdalena**

28 Rosa M. Rodriguez, Luis Martinez and Macarena Espinilla  
31 José M. Alonso and Luis Magdalena

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A Comparative Analysis of Symbolic Linguistic Computational Models  
An Experimental Study on the Interpretability of Fuzzy Systems

**Fuzzy Algebra****Chair:** T. Vetterlein

187 Paavo Kukurainen  
252 Jorge Jiménez, Susana Montes, Branimir Šešelja and Andreja Tepavčević  
342 Bayram Ali Ersoy and Dan Ralescu

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Fuzzy Subgroups and the Teichmüller Space  
Characterization of L-Fuzzy Semi-Filters and Semi-Ideals  
L-Prime Spectrum of Modules

**Non-classical Algebras and Bags****Chair:** M. Navara

425 Juan Martínez-Moreno, Antonio Roldán and Concepcion  
112 Beloslav Riečan  
135 Sadaaki Miyamoto

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Poincaré Recurrence Theorem in MV-Algebras  
Operations for Real-Valued Bags and Bag Relations

**Attribute Domain Granulation****Chair:** B. Bouchon-Meunier

165 Marcos Cintra, Heloisa Camargo and Trevor Martin  
93 Yassine Djouadi, Basma Alouane and Henri Prade  
449 Vasile Georgescu

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Optimising the Fuzzy Granulation of Attribute Domains  
Fuzzy Clustering for Finding Fuzzy Partitions of Many-Valued Attribute Domains in a Concept Analysis Perspective  
Generalizations of Fuzzy C-Means Algorithm to Granular Feature Spaces, based on Underlying Metrics: Issues and Related Works

**Feature Selection****Chair:** C. Borgelt

419 Susana Vieira, João M.C. Sousa and Uzay Kaymak  
220 Edwin Lughofer and Stefan Kindermann  
167 Nick Pizzi and Witold Pedrycz

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Feature Selection Using Fuzzy Objective Functions  
Rule Weight Optimization and Feature Selection in Fuzzy Systems with Sparsity Constraints  
Discriminatory Components for Pattern Classification

**Classification****Chair:** L. Koczy

196 Hoel Le Capitaine and Carl Frélicot  
460 Moamar Sayed Mouchaweh and Bernard Riera  
306 Salem Benferhat and Karim Tabia  
66 Tuan-Fang Fan, Churn-Jung Liau and Duen-Ren Liu  
450 Carlos Campos Bracho

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Classification with Reject Options in a Logical Framework: a fuzzy residual implication approach  
Incremental Possibilistic Approach for Online Clustering and Classification  
On the Use of Min-Based Revision Under Uncertain Evidence for Possibilistic Classifiers  
Dominance-based Rough Set Analysis for Uncertain Data Tables  
Combining Wavelets and Computational Intelligence Methods with Applications on Multi-class Classification Datasets

**Hybrid Systems**Chair: **O. Castillo**

256 Cyro Muniz, Marley Vellasco, Ricardo Tanscheit and Karla Figueiredo  
378 Rita Lovassy, Laszlo T. Koczy and Laszlo Gal  
183 Miguel Lopez, Patricia Melin and Oscar Castillo  
458 László Gál, János Botzheim, Laszlo T. Koczy and Antonio Ruano  
304 Javad Jassbi and Sohrab Khanmohammadi

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A Neuro-fuzzy System for Fraud Detection in Electricity Distribution

Optimizing Fuzzy Flip-Flop Based Neural Networks by Bacterial Memetic Algorithm  
Pattern Recognition in Blur Motion Noisy Images using Fuzzy Methods for Response Integration in Ensemble Neural Networks  
Applying Bacterial Memetic Algorithm for Training Feedforward and Fuzzy Flip-Flop based Neural Networks  
Organizational Risk Assessment using Adaptive Neuro-Fuzzy Inference System

**Approximate Reasoning**Chair: **L. Godo**

406 Bernadette Bouchon-Meunier, Christophe Marsala and Maria Rifqi  
188 Emad Saad, Shamiaa Elmorsy, Mahmoud Gabr and Yasser Reasoning about Actions in Fuzzy Environment Hassan  
207 Itziar García-Honrado, Enric Trillas, Sergio Guadarrama and Eloy Renedo  
16 Cristina Alcalde, Ana Burusco and Ramon Fuentes-González  
270 Liliana D'Errico and Michele Loreti

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Fuzzy Analogical Model of Adaptation for Case-Based Reasoning

Reasoning about Actions in Fuzzy Environment

Evaluating Premises, Partial Consequences and Partial Hypotheses

Interval-Valued Fuzzy Propositions. An Application to the L-Fuzzy Contexts with Absent Values

A process Algebra Approach to Fuzzy Reasoning

**Applications of Fuzzy Systems**Chair: **R. Kruse**

172 Maria Erman, Abbas Mohammed and Elisabeth Rakus-Andersson  
162 Arkadiusz Salski  
316 Sohrab Khanmohammadi, Mohammad Ali Tinati, Sehraneh Ghaemi and Mohammad Ali Badamchizadeh  
41 Joao Pedro, Joao Pires and João Paulo Carvalho  
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Fuzzy Logic Applications in Wireless Communications

A Fuzzy Set Approach to Ecological Knowledge Discovery

Fuzzy and PSO Based Algorithm for Driver's Behavior Modeling

Ant Colony Optimization for Distributed Routing Path Optimization in Optical Burst-Switched Networks

A Preliminary Analysis for Improving Model Structure of Fuzzy Habitat Preference Model for Japanese Medaka (*Oryzias latipes*)

**Human-centered Systems****Chair:** **F. Gomide**

40 Luisa Lucila Lazzari, Patricia Inés Mouliá and Mariano Eriz

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An Alternative Operationalization of Fuzzy Consideration Set. Application to Tourism

27 Ronei Moraes and Liliane Machado

257 Dilza Szwarcman, Jesus Domech, Ricardo Tanscheit,  
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97 Farzaneh Tatari and Mohammad-R. Akbarzadeh-T

Fuzzy Continuous Evaluation in Training Systems Based on Virtual Reality

A Fuzzy System for the Assessment of Human Reliability

Intensity Assessment of Pedestrian Collisions in City of Mashhad based on Fuzzy Probabilities

**Combinatorial Problems****Chair:** **A. Kasperski**

88 Adam Kasperski and Paweł Zieliński

94 Adam Kasperski and Paweł Zieliński

215 Nele Verbiest, Chris Cornelis and Yvan Saeys

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A Possibilistic Approach to Bottleneck Combinatorial Optimization Problems with Ill-Known Weights

On Possibilistic Sequencing Problems with Fuzzy Parameters

Valued Constraint Satisfaction Problems Applied to Functional Harmony

**Control****Chair:** **S. Galichet**

250 Jean-Yves Dieulot and Nesrine Elfelly

164 Laurent Vermeiren, Thierry M. Guerra and Hakim Lamara

413 Anis Sakly, Basma Zahra and Mohamed Benrejeb

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Membership Dependent Stability Analysis of TS Fuzzy Controlled Systems using Coupling Attenuation

Phi-Calculus Fuzzy Arithmetic: application to model based control

Stability Analysis of Continuous PI-like Fuzzy Control Systems based on Vector Norms Approach

**Decision Analysis****Chair:** **U. Kaymak**

404 Shin-ichi Ohnishi, Takahiro Yamanoi and Hideyuki Imai

37 Tomoe Entani

427 Salem Benferhat, Faiza Haned, Aïcha Mokhtari and  
Ismahane Zeddigha

333 Masaaki Ida

107 Ondrej Pavlacka and Jana Talasova

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A Fuzzy Weight Representation for Inner Dependence Method AHP

Interval AHP for Group of Decision Makers

Using Syntactic Possibilistic Fusion for Modeling Optimal Optimistic Qualitative Decision

Possibility and Necessity Evaluations based on Ordinal Comparability

Application of Fuzzy Vectors of Normalized Weights in Decision Making Models

**Uncertainty****Chair:** **A. Colubi**

24 Koichi Yamada, Vilany Kimala and Muneyuki Unehara

398 Gilles Mauris

354 Gil González-Rodríguez, Wolfgang Trutschnig and Ana  
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299 Pedro Teran

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A New Conditioning Rule, Its Generalization and Evidential Reasoning

Possibility Distribution: a unified representation for parameter estimation

Confidence Regions for the Mean of a Fuzzy Random Variable

A New Bridge Between Fuzzy Sets and Statistics

Cloud Based Design Optimization

**Fuzzy Relations****Chair:** **B. De Baets**

388 Michal Holcapek and Matej Turcan  
191 Ramón González del Campo, Luis Garmendia and Jordi Recasens  
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176 Susana Díaz, Susana Montes and Bernard De Baets

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Graded Equipollence of Fuzzy Sets  
Transitive Closure of Interval-valued Relations

An Axiomatical Approach to T-Multi-indistinguishabilities  
Comparison of Two Versions of the Ferrers Property of Fuzzy Interval Orders  
Decomposition of the Transitivity for Additive Fuzzy Preference Structures

**Clustering****Chair:** **H. Ishibuchi**

273 Yukihiro Hamasuna, Yasunori Endo and Sadaaki Miyamoto On Tolerant Fuzzy c-Means Clustering with L1-Regularization

374 Francisco Queiroz, Antonio Braga and Witold Pedrycz  
36 Thomas A. Runkler  
320 Eyke Hüllermeier and Maria Rifqi  
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Sorted Kernel Matrices as Cluster Validity Indexes  
Fuzzy c-Means Herding  
A Fuzzy Variant of the Rand Index for Comparing Clustering Structures  
Clustering of Fuzzy Shapes by Integrating Procrustean Metrics and Full Mean Shape Estimation into K-Means Algorithm

**Data Analysis****Chair:** **N. Pal**

325 Amory Bisserier, Reda Boukezzoula and Sylvie Galichet  
353 Ana Colubi, M. Ángeles Gil, Gil González-Rodríguez and Wolfgang Trutschnig  
380 Mohammad Hossein Fazel Zarandi, Milad Avazbeigi and I. Burhan Turksen  
197 Yuchi Kanzawa, Yasunori Endo and Sadaaki Miyamoto  
195 Krystyna Biletska, Sophie Midenet, Marie-Hélène Masson and Thierry Denoeux

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An Interval Approach for Fuzzy Linear Regression with Imprecise Data  
Discriminant Analysis for Fuzzy Random Variables Based on Nonparametric Regression

A New Fuzzy Noise-Rejection Data Partitioning Algorithm with Revised Mahalanobis Distance  
Fuzzy c-Lines for Data with Tolerance  
Fuzzy Modelling of Sensor Data for the Estimation of an Origin-Destination Matrix

**Management Science****Chair:** **P. Zielinski**

445 Esmaeil Mehdizadeh and Reza Tavakkoli-Moghaddam  
82 Bo-Ruei Kao, K. Robert Lai and Menq-Wen Lin  
375 Mahmoud El Hajj, Serge Guillaume and Agnes Begue

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A Fuzzy Particle Swarm Optimization Algorithm for a Cell Formation Problem  
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Complementary Source Information Cooperation Within a Decision System for Crop Monitoring

**Process Control****Chair:** **A. Dourado**

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310 Maryam Nasiri and Stefan Berlik  
279 Gyeongdong Baek, Moon-Ho Choi, Tae-Ryong Jeon, Jaewoo Cho and Sungshin Kim  
47 Ieroham Baruch and Carlos Román Mariaca Gaspar  
100 Ieroham Baruch and Rosalba Galvan-Guerra

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Industrial Monitoring by Evolving Fuzzy Systems  
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Online Measurement of Oily-water Using Rule-based Fuzzy Concentration Map and Halogen Fluorescence  
Recurrent Neural Kalman Filter Identification and Indirect Adaptive Control of a Continuous Stirred Tank Bioprocess  
Decentralized Adaptive Fuzzy-Neural Control of an Anaerobic Digestion Bioprocess Plant

**Formal Concept Analysis****Chair:** **M. Ojeda-Aciego**

311 Ondrej Kridlo and Stanislav Krajci  
255 Jesús Medina and Manuel Ojeda-Aciego  
232 Didier Dubois and Henri Prade

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Fuzzy Concept Lattice is Made by Proto-Fuzzy Concepts  
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Possibility Theory and Formal Concept Analysis in Information Systems

**Mathematics****Chair:** **A. Sostak**

433 Vechislav Ruzha and Svetlana Asmuss  
402 Alexander Sostak  
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A construction of an L-fuzzy valued measure of L-fuzzy sets  
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415 Jose M. Merigo and Anna M. Gil-Lafuente  
381 José Luis García-Lapresta, Bonifacio Llamazares and Teresa Peña  
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The fuzzy Induced Generalized OWA Operator and its Application in Business Decision Making  
Determining OWA Weights by Maximizing Consensus  
A Fuzzy Multi-Criteria Approach to WEEE Treatment Strategy Selection  
Consistency of Pair-wise Comparison Matrix with Fuzzy Elements