
Sunday**8 September 2019**

17:00 – 19:30 **Registration & Welcome drink**CIIRC/Penthouse

Monday**9 September 2019**

8:00 – 9:30 **Registration**

Hotel International

9:30 – 10:00 **Opening ceremony**Hotel International/Congress Hall

Keynote 1**Chair:** V. NovákHotel International/Congress Hall

10:00 – 11:00 **Simple Properties with Considerable Impact: Some Mathematical Comments and Examples**
*Erich Peter Klement*11:00 – 11:30 **Coffee break**Hotel International

Keynote 2**Chair:** L. GodoHotel International/Congress Hall

11:30 – 12:30 **Fuzzy Sets beyond Zadeh: Where Do We Go from Here?**
*Didier Dubois*13:00 – 14:30 **Lunch**CIIRC/Respirium

Session 1**Chair:** R. Mesiar

CIIRC/B-670

SS 13 - Aggregation functions: recent trends and developments, and applications

14:30 – 14:50 **Aggregation of Partial T-Indistinguishability Operators**
*Tomas Calvo Sánchez and Pilar Fuster-Parra*14:50 – 15:10 **Characterizing Positive Definite Matrices with T-Norms**
*Jordi Recasens*15:10 – 15:30 **Generalized Deviation Functions and Construction of Aggregation Functions**
*Andrea Stupňanová and Peter Smrek*15:30 – 15:50 **Cross-Migrative Commutative Aggregation Functions with Respect to Archimedean Triangular Norms**
*Wenwen Zong, Yong Su and Hua-Wen Liu*15:50 – 16:10 **Merging Clusters in Summary Structures for Data Stream Mining Based on Fuzzy Similarity Measures**
Leonardo Schick, Priscilla de A. Lopes and Heloisa A. Camargo

Session 2**Chair:** P. Murinová

CIIRC/B-671

SS 9 - Mathematical Fuzzy Logic

14:30 – 14:50 **Translating Classical Probability Logics into Modal Fuzzy Logics**
*Paolo Baldi, Petr Cintula and Carles Noguera*14:50 – 15:10 **Representations of Locally Finite Many-Valued Logics**
*Brunella Gerla*15:10 – 15:30 **Modelling Competing Theories**
*Willem Conradie, Andrew Craig, Alessandra Palmigiano and Nachoem Wijnberg*15:30 – 15:50 **Quasi-i-Boolean Algebras vs. Quasi-m Boolean Algebras**
*Afrodita Iorgulescu*15:50 – 16:10 **A Representation Theorem for Finite Gödel Algebras with Operators**
Tommaso Flaminio, Lluís Godo and Ricardo Rodríguez

Session 3**Chair:** D. Lobo

CIIRC/B-770

SS 4 - Representing and Managing Uncertainty: different scenarios, different tools

14:30 – 14:50 **New Methods to Compare Cardinalities of IVFSS and Their Applications in Decision Making on Uncertain Data**
*Krzysztof Dyczkowski and Barbara Pękala*14:50 – 15:10 **Uncertainty of Value and Structure**
Patrik Eklund and Magnus Löfstrand

- 15:10 – 15:30 Some Remarks on Topological Structures in the Context of Fuzzy Relational Mathematical Morphology
Alexander Šostak and Ingrida Ulijane
- 15:30 – 15:50 Uncertainty-Aware Similarity Measures – Properties and Construction Method
Patryk Żywica and Anna Stachowiak
- 15:50 – 16:10 Abductive Reasoning in Normal Residuated Logic Programming via Bipolar Max-Product Fuzzy Relation Equations
David Lobo, M. Eugenia Cornejo and Jesús Medina

Session 4

Chair: P. Grzegorzewski

CIIRC/B-771

SS 14 – Soft Models in Probability and Statistics

- 14:30 – 14:50 Two Theorems from Extreme Value Theory for Interval Valued Events
Katarína Čunderlíková
- 14:50 – 15:10 Consistent Inverse Probability and Possibility Propagation
Dominik Hose and Michael Hans
- 15:10 – 15:30 Fuzzy Confidence Interval Estimation by Likelihood Ratio
Rédina Berkachy and Laurent Donzé
- 15:30 – 15:50 Clustering a Body of Evidence Based on Conflict Measures
Andrey Bronevich and Alexander Lepskiy
- 15:50 – 16:10 Flexible Bootstrap Based on the Canonical Representation of Fuzzy Numbers
Przemysław Grzegorzewski, Olgierd Hryniewicz and Maciej Romaniuk

16:10 – 16:40 **Coffee break**

CIIRC/Respirium

Session 5

Chair: G. Pereira Dimuro

CIIRC/B-670

SS 13 – Aggregation functions: recent trends and developments, and applications

- 16:40 – 17:00 Application of Non-Additive Measures and Integrals for Analysis of the Importance of Party Positions for Voting
Alexander Lepskiy and Vladimir Smolev
- 17:00 – 17:20 A Monotonicity-Preserving Transformation on a Class of Aggregation Functions
Hans De Meyer and Bernard De Baets
- 17:20 – 17:40 New Aspects of Composition of Interval Valued Fuzzy Relations Used in Medical Decision Support
Krzysztof Balicki, Paweł Drygaś and Barbara Pękala
- 17:40 – 18:00 A Characterization of Uninorms by Means of a Pre-Order They Induce
Dana Hliněná and Martin Kalina

Session 6

Chair: B. Gerla

CIIRC/B-671

SS 9 – Mathematical Fuzzy Logic

- 16:40 – 17:00 Computing Generators of Binary Operations from Partial Derivatives
Mírko Navara and Milan Petrík
- 17:00 – 17:20 Interpretation of Generalized Syllogisms in Fuzzy Natural Logic
Daniela Einšpígllová and Petra Murinová
- 17:20 – 17:40 On Modeling of Syllogisms with Quantifiers "A few", "Several" and "A little"
Petra Murinová and Vilém Novák
- 17:40 – 18:00 Restriction-Based Fuzzy Quantifiers
Antonín Dvořák and Michal Holčápek
- 18:00 – 18:20 Design of Interval Type 2 Fuzzy Fault-Tolerant Controller for a Non-Minimum Phase System: Application to Quadruple Conical Tank System
Himanshukumar R. Patel and Vipul A. Shah

Session 7

Chair: D. Lobo

CIIRC/B-770

SS 4 – Representing and Managing Uncertainty: different scenarios, different tools

- 16:40 – 17:00 A Probabilistic Semantics for Unknown Fuzzy Degrees with Monte Carlo Approximation
Libor Běhounek
- 17:00 – 17:20 On Hidden Conflicts of Belief Functions
Milan Daniel and Václav Kratochvíl
- 17:20 – 17:40 Type-2 Fuzzy Logic Approach for Overloaded Hosts in Consolidation of Virtual Machines in Cloud Computing
Bruno M. P. Moura, Guilherme B. Schneider, Adenauer C. Yamin, Mauricio L. Pilla and Renata H. S. Reiser
- 17:40 – 18:00 The Improved Interval Weight Estimation Method from a Pairwise Comparison Matrix and the Advantages of Interval Evaluations
Masahiro Inuiguchi and So Komatsu

Session 8**Chair:** P. Orlovs

CIIRC/B-771

Decision making

- 16:40 – 17:00 Automatic Generation of a Type-2 Fuzzy System for Time Series Forecast Based on Genetic Programming
Marco Antônio da Cunha Ferreira, Ricardo Tanscheit and Marley Velasco
- 17:00 – 17:20 Performance Comparisons of Law Offices and Optimum Allocation of Debt Files Using Z-Fuzzy AHP
Cengiz Kahraman, Basar Oztaysi and Sezi Cevik Onar
- 17:20 – 17:40 Analytic Hierarchy Process-Fuzzy Sorting
Alessio Ishizaka, Menelaos Tasiou and Luis Martínez
- 17:40 – 18:00 Solid Waste Disposal Site Selection by Using Neutrosophic Combined Compromise Solution Method
Ali Karaşan and Eda Bolturk
- 18:00 – 18:20 Multi-Granular Information-Based Methodology for Smart Building Design: Office Building Application
Deniz Uztürk, Gülçin Büyüközkan, A. Fahri Negüs and M. Yaman Öztekin

Tuesday**10 September 2019****Session 9****Chair:** M. Holčapek

CIIRC/B-670

SS 21 - Fuzzy transforms: theory and applications to data analysis and image processing

- 9:30 – 9:50 On the Relationship Between L-Fuzzifying Approximation Spaces and L-Fuzzifying Pretopological Spaces
Anand P. Singh and Irina Perfilieva
- 9:50 – 10:10 Generalized Fuzzy Projection
Linh Nguyen
- 10:10 – 10:30 Forecasting Cryptocurrency Time Series Using Fuzzy Transform, Fourier Transform and Fuzzy Inference System
Srdan Jelinek, Ana Poledica, Bratislav Petrović and Pavle Milošević

Session 10**Chair:** M. Štěpnička

CIIRC/B-671

Best student's paper candidates

- 9:30 – 9:50 Some Remarks on the Generalized Scheme of Reduction to Absurdity and Generalized Hypothetical Syllogism in Fuzzy Logic
Katarzyna Miś, Michal Baczyński and Piotr Helbin
- 9:50 – 10:10 Extension of the Fuzzy Dominance-Based Rough Set Approach Using Ordered Weighted Average Operators
Marko Palangetić, Chris Cornelis, Salvatore Greco and Roman Słowiński
- 10:10 – 10:30 Fuzzy Multiset Clustering for Metagame Analysis
Alexander Dockhorn, Tony Schwensfeier and Rudolf Kruse

Session 11**Chair:** M. Burda

CIIRC/B-770

Applications

- 9:30 – 9:50 Extracting Group Decision Making Experts' Preferences from Debate Transcriptions Using Sentiment Analysis
Juan Antonio Morente-Molinera, Francisco Javier Cabrerizo, Ignacio J. Pérez, Sergio Alonso and Enrique Herrera-Viedma
- 9:50 – 10:10 Fault Tolerant Control Design Based on Takagi-Sugeno Fuzzy Logic: Application to a Three-Tank System
Himanshukumar R. Patel and Vipul A. Shah
- 10:10 – 10:30 Graphical Analysis of the Progression of Atrial Arrhythmia Through an Ensemble of Generative Adversarial Network Discriminators
Nahuel Costa, Jesús Fernández, Inés Couso and Luciano Sánchez

Session 12**Chair:** G. Castellano

CIIRC/B-771

SS 8 - Evolving and adaptive fuzzy models for data streams

- 9:30 – 9:50 Granular Evolving Min-Max Fuzzy Modeling
Alisson Porto and Fernando Gomide
- 9:50 – 10:10 Incremental Learning of Fuzzy Decision Trees for Streaming Data Classification
Riccardo Pecori, Pietro Ducange and Francesco Marcelloni
- 10:10 – 10:30 Credit Card Fraud Detection by Dynamic Incremental Semi-Supervised Fuzzy Clustering
Gabriella Casalino, Giovanna Castellano and Corrado Mencar

10:30 – 11:00 Coffee break

CIIRC/Respirium

Session 13**Chair:** I. Perfilieva

CIIRC/B-670

SS 21 - Fuzzy transforms: theory and applications to data analysis and image processing

- 11:00 – 11:20 Modified Multivariate F-Transform Based on B-Splines

Martins Kokainis and Svetlana Asmuss

- 11:20 – 11:40 Relational Variants of Categories of Fuzzy Sets Defined by Monads
Jiří Močkoř
- 11:40 – 12:00 Dimensionality Reduction and Its F-Transform Representation
Jiří Janeček and Irina Perfiljeva
- 12:00 – 12:20 Novel Numerical Solution of Black-Scholes Models Based on the F-Transform and Variational Methods
Michal Holčápek and Radek Valášek
- 12:20 – 12:40 Integral Transformations for Lattice-Valued Functions
Michal Holčápek and Viec Bui
- 12:40 – 13:00 On L^M -Valued F-Transforms and L^M -Valued Fuzzy Rough Sets
Abha Tripathi, S. P. Tiwari and Anand P. Singh
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Session 14

Chair: R. Rodríguez-López

CIIRC/B-671

Fuzzy mathematics

- 11:00 – 11:20 Solvability of Fuzzy Relational Equations Employing Undefined Values
Nhung Cao
- 11:20 – 11:40 Mathematical Programming Tools for Optimization under Fuzzy Relation Constraints
Reinis Lama and Svetlana Asmuss
- 11:40 – 12:00 A Reliable Scheme for Solving Fuzzy Differential Equations by Applying the CADNA Library Based on the Fuzzy Predictor-Corrector Methods
Mohammad Ali Fariborzi Araghi and Hasan Barzegar
- 12:00 – 12:20 Involving Fuzzy Metrics for Multi-Level Multi-Objective Linear Programming Problems
Olga Grigorenko
- 12:20 – 12:40 Many-Level Fuzzy Rough Approximation Spaces Induced by Many-Level Fuzzy Preorders and the Related Ditopological Structures
Alexander Sostak, Ingrida Uljane and Aleksandrs Elkins
- 12:40 – 13:00 On Fuzzy Approximation Operators and Fuzzy Transformation Systems
Sutapa Mahato and S. P. Tiwari
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Session 15

Chair: U. Kaymak

CIIRC/B-770

SS 2 - Fuzzy Systems in Business and Economics

- 11:00 – 11:20 Fuzzy Natural Logic in Mortality Rate Prediction
Soheyla Mirshahi, Linh Nguyen and Vilém Novák
- 11:20 – 11:40 Hospital Location Selection Using Spherical Fuzzy TOPSIS
Cengiz Kahraman, Fatma Kutlu Gündoğdu, Sezi Cevik Onar and Basar Oztaysi
- 11:40 – 12:00 Pattern Classification on Complex System Using Modified Gustafson-Kessel Algorithm
Miguel Khatounian Filho, Leo Koki and Renato Aguiar
- 12:00 – 12:20 Fuzzy Association Rules for Text Mining. A Use Case Using Twitter to Analyse the US Presidential Election
Jose Angel Díaz, M. Dolores Ruiz and Maria J. Martin-Bautista
- 12:20 – 12:40 Outlier Detection in Location Based Systems by Using Fuzzy Clustering
Basar Oztaysi, Sezi Cevik Onar and Cengiz Kahraman
- 12:40 – 13:00 Evaluating Collaboration Ability of R&D Team Members: A Multi-Granular Hesitant Fuzzy Linguistic Approach
Zhen Zhang, Junliang Gao and Wenyu Yu
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Session 16

Chair: N. Yarushkina

CIIRC/B-771

SS 17 - Soft Social Computing and Network Science

- 11:00 – 11:20 Fuzzy Logic-Predicate Network
Tatiana Kosovskaya
- 11:20 – 11:40 Artificial Intelligence in the Context of Psychological Security: Theoretical and Practical Implications
Alexey N. Averkin, Darya Yu. Bazarkina, Konstantin A. Pantsev and Evgeny N. Pashentsev
- 11:40 – 12:00 Socially Significant Behavior Model with Hidden Variables Based on Bayesian Belief Networks
Aleksandra Toropova, Maksim Abramov and Nikita Kharitonov
- 12:00 – 12:20 Extraction and Analysis Time Series Of Production Capacity Indicators
Anton Romanov, Irina Moshkina and Nadezhda Yarushkina
- 12:20 – 12:40 On the Problem of Possibilistic-Probabilistic Optimization with Constraints on Possibility/Probability in the Case of the Weakest T-Norm
Yulia Egorova and Alexandr Yazenin
- 12:40 – 13:00 Fuzzy Applications in Selected Aircraft On-board System
Norbert Grzesik, Janusz Ćwiklak, Mariusz Zieja and Grzegorz Kozłowski
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13:00 – 14:30 Lunch

CIIRC/Respirium

Session 17	Chair: M. Daňková	CIIRC/B-670
<i>Decision making</i>		
14:30 – 14:50	Aggregation of Credit Risk Ratings Based on a Fuzzy Metric <i>Pavels Orlovs and Svetlana Asmuss</i>	
14:50 – 15:10	Interpolative Boolean Algebra Fuzzy Inference Systems (IBA FIS): An Overview and Future Applications <i>Ivana Dragovic, Nina Turajlic, Bratislav Petrović and Aleksandar Rakićević</i>	
15:10 – 15:30	Ranking of Independent and Dependent Fuzzy Numbers by Two Ranking Methods and Their Use in Fuzzy MCDA <i>Boris Yatsalo, Alexander Korobov and Luis Martinez</i>	
15:30 – 15:50	Modeling CDC in a Fuzzy Description Logic. A Comparison of Different Approaches <i>Martin Unold and Christophe Cruz</i>	

Session 18	Chair: J. Kupka	CIIRC/B-671
<i>SS 23 – Fuzzy dynamical systems</i>		
14:30 – 14:50	Numerical Solution for Lotka–Volterra Model of Oscillating Chemical Reactions with Interactive Fuzzy Initial Conditions <i>Vinícius F. Wasques, Estevão Esmi, Laécio C. Barros and P. Sussner</i>	
14:50 – 15:10	Free Mechanical Vibrations Models via p -fuzzy Systems <i>Laécio C. de Barros, Daniel E. Sánchez, Rodolfo A. Lobo and Estevão Esmi</i>	
15:10 – 15:30	Zadeh's Extension of Piecewise Linear Functions <i>Nicole Škorupová and Jiří Kupka</i>	
15:30 – 15:50	Entropies of (Fuzzy) Dynamical Systems <i>Jose Cánovas and Jiří Kupka</i>	

Session 19	Chair: S. Schockaert	CIIRC/B-770
<i>Machine learning</i>		
14:30 – 14:50	Interval Type-2 Fuzzy Systems as Deep Neural Network Activation Functions <i>Aykut Beke and Tufan Kumbasar</i>	
14:50 – 15:10	Universal Preprocessing for Neural Networks Given by Image Represented by a Fuzzy Function <i>Petr Hurtík, Vojtěch Molek and Jan Hůla</i>	
15:10 – 15:30	Binary Classification Using the Sugeno Integral <i>Sadegh Abbaszadeh and Eyke Huellermeier</i>	

Session 20	Chair: N. Yarushkina	CIIRC/B-771
<i>SS 17 – Soft Social Computing and Network Science</i>		
14:30 – 14:50	An Approach to Vocabulary Expansion for Neural Network Language Model by Means of Hierarchical Clustering <i>Pavel Dudarin and Nadezhda Yarushkina</i>	
14:50 – 15:10	Prediction Quality of Bayesian Belief Network Model for Risky Behavior: Comparison of Subsamples with Different Rates <i>Alena Suvorova and Alexander Tulupyev</i>	
15:10 – 15:30	Sentiment Analysis in Social Networks: A Methodology Based on the Latent Dirichlet Allocation Approach <i>Domenico Santaniello, Francesco Colace, Marco Lombardi, Francesco Pascale and Fabio Clarizia</i>	

15:50 – 16:20 **Coffee break** **CIIRC/Respirium**

Keynote 3	Chair: M. Reformat	CIIRC/Red Hall
16:20 – 17:20	How Computer Vision Inadvertently Embraced Zadeh's Ideas <i>Carlos Lopez-Molina</i>	

17:30 – 18:30 **EUSFLAT Assembly** **CIIRC/Red Hall**

Wednesday **11 September 2019**

Keynote 4	Chair: B. De Baets	CIIRC/Red Hall
9:00 – 10:00	Towards Structured Vector Representations of Knowledge <i>Steven Schockaert</i>	

Session 21

Chair: C. Lopez-Molina

CIIRC/B-670

SS 22 – Soft Computing Techniques in Image Processing

10:30 – 10:50 Vascular Network Analysis with Manual and Automatic Segmentation Using Fuzzy Mathematical Morphology
Pedro Bibiloni, Manuel González-Hidalgo, Arnau Mir and Nuria Prats-Domínguez

10:50 – 11:10 A New Approach to Color Edge Detection
Pablo A. Flores-Vidal, Daniel Gómez, Javier Castro, Guillermo Villarino and Javier Montero

11:10 – 11:30 Image inpainting Using Interpolation Methods Combined with Fuzzy Transform
Martina Daňková and Viktor Pavliska

Session 22

Chair: P. Cordero

CIIRC/B-671

SS 5 – Formal Concept Analysis and Applications

10:30 – 10:50 Formal Context Analysis and Sequences of Orthopairs
Stefania Boffa and Brunella Gerla

10:50 – 11:10 Formal Equivalence Analysis
Francisco J. Valverde-Albacete, Carmen Peláez-Moreno, Pablo Cordero and Manuel Ojeda-Aciego

11:10 – 11:30 Towards Fuzzy Relational Galois Connections between Fuzzy T-Digraphs
Inma P. Cabrera, Pablo Cordero, Emilio Muñoz-Velasco and Manuel Ojeda-Aciego

Session 23

Chair: G. De Tré

CIIRC/B-770

SS 1 – Computational Intelligence in Database and Information Retrieval Systems

10:30 – 10:50 Fuzzy Semantic Web Architecture for Activity Detection in Wireless Multimedia Sensor Network Applications
Ali Nail Ozdin, Adnan Yazici and Murat Koyuncu

10:50 – 11:10 Mining Data Quality Rules Based on T-Dependence
Toon Boeckling, Antoon Bronselaer and Guy De Tré

11:10 – 11:30 An Enhancement of Fuzzy K-Nearest Neighbor Classifier Using Multi-Local Power Means
Mahinda Mailagaha Kumbure, Pasi Luukka and Mikael Collan

Session 24

Chair: J. Serrano

CIIRC/B-771

SS 19 – Soft Computing on the Web

10:30 – 10:50 Personalized Linguistic Information: A Framework of Granular Computing
Francisco Javier Cabrerizo, Juan Antonio Morente-Molinera, Sergio Alonso, Raquel Ureña and Enrique Herrera-Viedma

10:50 – 11:10 WordNet and Prolog: Why not?
Pascual Julián-Iranzo and Fernando Saénz-Pérez

11:10 – 11:30 Computing Sentiment Analysis through Aspect-Based Fuzzy Aggregations
Jesus Serrano-Guerrero, Jose A. Olivas and Francisco P. Romero

Session 25

Chair: C. Lopez-Molina

CIIRC/B-670

SS 22 – Soft Computing Techniques in Image Processing

11:40 – 12:00 Modeling Implicit Feedback and Latent Visual Features for Machine-Learning Based Recommendation
Yue Guan, Qiang Wei, Guoqing Chen and Xunhua Guo

12:00 – 12:20 Dragonflies Classification with Convolutional Neural Networks
Vojtěch Molek, Stanislav Ožana and Michal Hykel

12:20 – 12:40 Study of the Threat by Micropollutants in a Drinking Water Supply Basin: New Challenge to Water Safety
Tatiana Andrea Davila Martinez, Apolinar Figueroa Casas, Edgar Leonairo Pencué Fierro and Hans Van der Kwast

Session 26

Chair: V. Kreinovich

CIIRC/B-671

SS 25 – Inter-Relation Between Interval and Fuzzy Techniques

11:40 – 12:00 An Approach Towards Image Edge Detection Based on Interval-Valued Fuzzy Mathematical Morphology and Admissible Orders
Peter Sussner and Lisbeth Corbacho Carazas

12:00 – 12:20 Physics' Need for Interval Uncertainty and How It Explains Why Physical Space Is (at Least) 3-Dimensional
Olga Kosheleva and Vladik Kreinovich

12:20 – 12:40 Propagation of Data Uncertainty to Confidence of Fuzzy Association Rules
Michal Burda and Viktor Pavliska

Session 27**Chair:** O. Cordon

CIIRC/B-770

SS 3 - Fuzzy methods in Data Mining and Knowledge Discovery

- 11:40 – 12:00 Personalized Linguistic Summaries in Smartphone-Based Monitoring of Bipolar Disorder Patients
Katarzyna Kaczmarek-Majer, Olgierd Hryniewicz, Monika Dominiak and Łukasz Świącicki
- 12:00 – 12:20 A Comparative Analysis of Tools for Visualizing Association Rules: A Proposal for Visualising Fuzzy Association Rules
Carlos Fernandez-Basso, M. Dolores Ruiz, Miguel Delgado and Maria J. Martin-Bautista
- 12:20 – 12:40 Bigfoot Climbing the Hill with ILP to Grow Patterns in Fuzzy Tensors
Lucas Maciel, Jónatas Alves, Vinícius Fernandes dos Santos and Loïc Cerf

Session 28**Chair:** L. Kóczy

CIIRC/B-771

SS 7 - Fuzzy graphs and discrete models

- 11:40 – 12:00 Managing Temporal Uncertainty in Multi-Mode Z-number Fuzzy Graph Structures
Margarita Knyazeva, Alexander Bozhenyuk and Uzay Kaymak
- 12:00 – 12:20 Algorithm for Finding Domination Set in Intuitionistic Fuzzy Graph
Alexander Bozhenyuk, Margarita Knyazeva and Igor Rozenberg
- 12:20 – 12:40 Stability of Fuzzy Cognitive Maps with Interval Weights
István Á. Harmati and László T. Kóczy

12:40 – 14:00 **Lunch**

CIIRC/Respirium

14:00 – 18:30 **Free afternoon**17:00 – 18:30 **Guided tours (optional)**

Prague Castle

18:30 – 23:30 **Social dinner**

Martinický palác

Thursday**12 September 2019****Keynote 5****Chair:** I. Perfilieva

CIIRC/Red Hall

- 9:30 – 10:30 Fuzzy differential equations: on the properties of their solutions and some applications
Rosana Rodríguez-López

10:30 – 11:00 **Coffee break**

CIIRC/Respirium

Session 29**Chair:** L. Běhounek

CIIRC/B-670

Fuzzy set theory

- 11:00 – 11:20 Transitivity Properties of Ternary Fuzzy Relations
Lemnaouar Zedam and Bernard De Baets
- 11:20 – 11:40 Missing Values and Indeterminable Values in Fuzzy Relational Compositions
Nhung Cao
- 11:40 – 12:00 Tools to Obtain T-Norms on Bounded Lattices
Carlos Bejines López, María Jesús Chasco Ugarte, Jorge Elorza Barbajero and Vladimír Kobza
- 12:00 – 12:20 The Number of Triangular Norms on Some Special Lattices
Carlos Bejines López, Michaela Brutenicova, María Jesús Chasco Ugarte, Jorge Elorza Barbajero and Vladimír Janis
- 12:20 – 12:40 Typical Hesitant Fuzzy Sets - Evaluating Strategies in GDM Applying Consensus Measures
Monica Matzenauer, Renata Reiser, Helida Santos and Benjamin Bedregal

Session 30**Chair:** A. Dvořák

CIIRC/B-671

SS 13 - Aggregation functions: recent trends and developments, and applications

- 11:00 – 11:20 Learning to Aggregate: Tackling the Aggregation/Disaggregation Problem for OWA
Vitalik Melnikov and Eyke Huellermeier
- 11:20 – 11:40 A Local Contrast and Local Properties of a Fuzzy Relation
Barbara Peřkala and Urszula Bentkowska
- 11:40 – 12:00 Geometrical Differences in the Generalizations of Monotonicity Conditions
Laura De Miguel, Mikel Sesma-Sara, Javier Fernandez, Radko Mesiar and Humberto Bustince
- 12:00 – 12:20 Aggregation Functions Based on the Choquet Integral Applied to Image Resizing
Jéssica C. S. Bueno, Camila Alves Dias, Graçaliz P. Dimuro, Helida Santos, Eduardo N. Borges, Giancarlo Lucca and Humberto Bustince

Session 31**Chair:** J. Močkoř**CIIRC/B-770***Various topics*

- 11:00 – 11:20** Network Granulation Approach for Road Traffic Anomalies Forecasting: A Case Study
Jhonny Pincay, Alvin Oti Mensah, Edy Portmann and Luis Terán
- 11:20 – 11:40** A Case Study on Wildfire Propagation Modelling Using Evolving Rule Based Fuzzy Cognitive Maps
Joao P. Carvalho and Pedro Gregório
- 11:40 – 12:00** On a Category of Deterministic Fuzzy Automata
Priyanka Pal and S. P. Tiwari
- 12:00 – 12:20** On L-Fuzzy Partitioned Automata
Shailendra Singh and S. P. Tiwari
- 12:20 – 12:40** Forty Years of Fuzzy Sets and Systems: A Bibliometric Analysis
José M. Merigó Lindahl
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Session 32**Chair:** L. Martínez**CIIRC/B-771***Decision making*

- 11:00 – 11:20** A Debate Model for Cooperative Agents to Achieve Common Objectives
Abdelhak Imoussaten and Jacky Montmain
- 11:20 – 11:40** An Adaptive Consensus Reaching Process Dealing with Comparative Linguistic Expressions in Large-Scale Group Decision Making
Álvaro Labella, Rosa M. Rodríguez and Luis Martínez
- 11:40 – 12:00** Generating a Fuzzy Rule Based Classification System by Genetic Learning of Granularity Level Using TOPSIS
Antonio E. de O. Araujo and Renato A. Krohling
- 12:00 – 12:20** 2-Tuple Linguistic Integrated Group Decision Making Methodology for E-Commerce Strategy Selection
Gülçin Büyüközkan and Deniz Uztürk
- 12:20 – 12:40** Prioritizing the Strategies to Enhance Smart City Logistics by Intuitionistic Fuzzy CODAS
Gülçin Büyüközkan and Fethullah Göçer
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12:40 – 14:00 Lunch**CIIRC/Respiration**

Session 33**Chair:** M. Baczyński**CIIRC/B-670***SS 18 - Fuzzy Implication Functions*

- 14:00 – 14:20** Fuzzy Implicators Related to (Quasi-)Copulas
Anna Kolesárová and Radko Mesiar
- 14:20 – 14:40** RU-Implications Satisfying U-Modus Tollens
Isabel Aguilo Pons, Juan Vicente Riera and Joan Torrens
- 14:40 – 15:00** Graphical Characterizations of Discrete RU and (U,N)-Implications Derived from Idempotent Uninorms
Adrià Tobar, Sebastia Massanet and Joan Torrens
- 15:00 – 15:20** U-Modus Ponens for (U,N)-Implications
Sebastia Massanet, Ana Pradera, Daniel Ruiz-Aguilera and Joan Torrens
- 15:20 – 15:40** e-Operators on the Extension of Lattice-Valued (U,N)-Implications
Eduardo S. Palmeira, Benjamin Bedregal and Graçaliz Dimuro
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Session 34**Chair:** M. Navara**CIIRC/B-671***SS 15 - Workshop on Quantum Structures*

- 14:00 – 14:20** Towards a More Efficient Representation of Functions in Quantum and Reversible Computing
Oscar Galindo, Laxman Bokati and Vladik Kreinovich
- 14:20 – 14:40** Orthogonality Spaces Allowing Gradual Transitions
Thomas Vetterlein
- 14:40 – 15:00** Interpolation Properties, Maximality Property and Weakly Jauch-Piron States in Effect Algebras
Josef Tkadlec
- 15:00 – 15:20** Nuclei and Conuclei on Girard Posets
David Kruml and Jan Paseka
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Session 35**Chair:** J. Kupka**CIIRC/B-770***SS 3 - Fuzzy methods in Data Mining and Knowledge Discovery*

- 14:00 – 14:20** Extending Clusters of Social Network Users with Deep Relations
Manuel Francisco and Juan L. Castro

- 14:20 – 14:40 Confirmation Measures in Regression with Linguistic Rules
Jiří Kupka and Pavel Rusnok
- 14:40 – 15:00 Content Determination for Natural Language Descriptions of Predictive Bayesian Networks
Martín Pereira-Fariña and Alberto Bugarín
- 15:00 – 15:20 Explaining Computer Predictions with Augmented Appraisal Degrees
Marcelo Loor and Guy De Tré
- 15:20 – 15:40 Analysis of Privacy Profiles Applying Fuzzy Clustering Techniques
Aigul Kaskina and Oleksii K. Tyshchenko

Session 36

Chair: J. Kacprzyk

CIIRC/B-771

SS 6 – Theory and Applications of Intuitionistic Fuzzy Sets

- 14:00 – 14:20 Order Fulfillment Performance Evaluation in Supply Chain Management under Intuitionistic Fuzzy Environment
Serhat Aydın and Cengiz Kahraman
- 14:20 – 14:40 Genetic Optimization of Intuitionistic Fuzzy Integration Systems for Modular Neural Recognition Systems
Patricia Melin, Oscar Castillo, Sotir Sotirov and Evdokia Sotirova
- 14:40 – 15:00 Intercriteria Fuzzy MCDM Analysis in Paralympics Swimming Classification
Janani Bharatraj and Clement Joe Anand M.
- 15:00 – 15:20 A New Intuitionistic Fuzzy-Fractal Dimension Approach for Forecasting Financial and Economic Time Series
Oscar Castillo and Patricia Melin

15:40 – 16:10 **Coffee break**

CIIRC/Respirium

Session 37

Chair: S. Massanet

CIIRC/B-670

SS 18 – Fuzzy Implication Functions

- 16:10 – 16:30 Study on n-Dimensional R-Implications
Rosana Zanutelli, Renata Reiser and Benjamín Bedregal
- 16:30 – 16:50 First Steps Towards the Characterization of (S,N)-Implications with a Non-Continuous Fuzzy Negation
Raquel Fernandez-Peralta and Sebastia Massanet
- 16:50 – 17:10 Exchange Principle of Ordinal Sums of Fuzzy Implications
Anna Król and Paweł Drygaś

Session 38

Chair: T. Vetterlein

CIIRC/B-671

SS 15 – Workshop on Quantum Structures

- 16:10 – 16:30 Minimizing Quantum Structures with Small Spaces of Measures
Mírko Navara and Václav Voráček
- 16:30 – 16:50 For Quantum and Reversible Computing, Intervals Are More Appropriate Than General Sets, And Fuzzy Numbers Than General Fuzzy Sets
Oscar Galindo and Vladik Kreinovich
- 16:50 – 17:10 Towards Memory Access Optimization in Quantum Computing
Mateus Nascimento, Anderson de Avila, Renata Reiser and Mauricio Pilla

Session 39

Chair: P. Rusnok

CIIRC/B-770

SS 3 – Fuzzy methods in Data Mining and Knowledge Discovery

- 16:10 – 16:30 A Hybrid Model of Gene Expression Profiles Reducing Based on the Complex Use of Fuzzy Inference System and Clustering Quality Criteria
Sergii Babichev, Jiří Barilla, Jiří Fišer and Jiří Škvor
- 16:30 – 16:50 Exploiting Particle Swarm Optimization to Attune Strong Fuzzy Partitions Based on Cuts
Ciro Castiello and Corrado Mencar
- 16:50 – 17:10 Explainable Artificial Intelligence for Kids
Jose M. Alonso

Session 40

Chair: J. Kacprzyk

CIIRC/B-771

SS 6 – Theory and Applications of Intuitionistic Fuzzy Sets

- 16:10 – 16:30 Interpolative Boolean Algebra for Generalizations of Intuitionistic Fuzzy Sets
Pavle Milošević and Bratislav Petrović
- 16:30 – 16:50 A New Method for Attributes Selection in Intuitionistic Fuzzy Models
Eulalia Szmidt, Janusz Kacprzyk and Paweł Bujnowski

Session 41 Chair: Y. Chalco-Cano CIIRC/B-670

SS 24 - Fuzzy mathematical analysis and its applications

- 9:30 – 9:50 A Better Approach for Solving a Fuzzy Multiobjective Programming Problem
Maria Beatriz Hernández Jiménez, Rafaela Osuna-Gómez, Yurilev Chalco-Cano and Gabriel Ruíz-Garzón
- 9:50 – 10:10 On New Properties of the Generalized Hukuhara Derivative for Fuzzy Functions
Yurilev Chalco-Cano, Tiago Mendonça and Heriberto Román Flores
- 10:10 – 10:30 A Note on Defuzzification of Interval Type-2 Fuzzy Sets via Aumann Integration
Heriberto Román Flores, Juan Carlos Figueroa-García and Yurilev Chalco-Cano

Session 42 Chair: R. Pérez Fernández CIIRC/B-671

SS 16 - Perspectives and challenges in data aggregation

- 9:30 – 9:50 A Preliminary Inquiry into the Aggregation of Compositional Data
Raúl Pérez-Fernández and Bernard De Baets
- 9:50 – 10:10 Aggregation on Sets Equipped with a Betweenness Relation
Bernard De Baets and Raúl Pérez-Fernández
- 10:10 – 10:30 Ranking-Based knn (rknn): A Method for Avoiding the Worst Distance Metrics in knn
Noelia Rico, Raúl Pérez-Fernández and Irene Díaz
- 10:30 – 10:50 Fuzzy Approach Based Money Laundering Risk Assessment
Māris Krastiņš

Session 43 Chair: P. Hurtík CIIRC/B-770

Machine learning

- 9:30 – 9:50 Semi-Supervised Classification of Scientific Papers With Graph Convolutional Networks and Topic Modeling
Jan Hůla, David Mojžíšek and Miroslav Kubát
- 9:50 – 10:10 Scalarization for Approximate Multiobjective Multiclass Support Vector Machine Using the Large-k Norm
Yoshifumi Kusunoki and Keiji Tatsumi
- 10:10 – 10:30 Emotion Recognition from Speech Signal Using Fuzzy Clustering
Stefano Rovetta, Zied Mnasri, Francesco Masulli and Alberto Cabri
- 10:30 – 10:50 Explainable Neuro-Fuzzy Recurrent Neural Network to Predict Colorectal Cancer with Different Timeframe Data
Servio Lima, Luis Terán and Edy Portmann

Session 44 Chair: A. Dvořák CIIRC/B-771

SS 12 - Special Session on Fuzzy Logic Applications for the Digital Economy and Society

- 9:30 – 9:50 Logical Clustering Approach for Analysing Digital Economy and Society Performance of Countries
Jovana Rakićević, Aleksandar Rakićević and Ana Poledica
- 9:50 – 10:10 Fuzzy Modeling to 'Understand' Personal Preferences of mHealth Users: A Case Study
Raoul Nuijten, Uzay Kaymak, Pieter Van Gorp, Monique Simons, Pauline Van Den Berg and Pascale Le Blanc
- 10:10 – 10:30 Experton Approach to Vague Information in Portfolio Selection Problem with Many Views
Aleksandra Rutkowska and Marcin Bartkowiak
- 10:30 – 10:50 Risk-Sensitive Decision Making with Constraints of Coherent Risk Measures in Fuzzy and Stochastic Environment
Yuji Yoshida

10:50 – 11:20 **Coffee break** CIIRC/Respirium

Keynote 6 Chair: V. Novák CIIRC/Red Hall

- 11:20 – 12:20 Graded Model Theory: A Logical Study of Weighted Structures
Carles Noguera

12:20 – 12:30 Closing ceremony CIIRC/Red Hall

12:30 – 14:00 Farewell party / Lunch CIIRC/Respirium