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- 2:10PM *Analysis of Fuzzy Cognitive Maps with Multi-Step Learning Algorithms in Valuation of Owner-Occupied Homes*
Katarzyna Poczeta and Alexander Yastrebov 1029
- 2:30PM *Learning Large-Scale Fuzzy Cognitive Maps Using a Hybrid of Memetic Algorithm and Neural Network*
Yaxiong Chi and Jing Liu 1036
- 2:50PM *ICLA Imperialist Competitive Learning Algorithm for Fuzzy Cognitive Map*
Sadra Ahmadi, Somayeh Alizadeh, Nafiseh Forouzideh, Chung-Hsing Yeh, Rodney Martin and Elpiniki Papageorgiou 1041
- 3:10PM *Towards a Hybrid Approach of Primitive Cognitive Network Process and Fuzzy Cognitive Map for Box Office Analysis*
Nicole Yamei Zhou and Kevin Kam Fung Yuen 1049

WF1-3 Real World Applications, Chair: Tadanari Taniguchi and Huaguang Zhang, Room: 201C

- 1:30PM *Cooperative and Hierarchical Fuzzy MPC for Building Heating Control*
Barbara Mayer, Michaela Killian and Martin Kozek 1054
- 1:50PM *A Clustering Routing Protocol for Wireless Sensor Networks Based on Type-2 Fuzzy Logic and ACO*
QiYe Zhang, ZeMing Sun and Feng Zhang 1060
- 2:10PM *An Adaptive Interval Type-2 Fuzzy Logic Framework for Classification of Gait Patterns of Anterior Cruciate Ligament Reconstructed Subjects*
Owais A Malik, S. M. N. Arosha Senanayake and Danish Zaheer 1068
- 2:30PM *Fuzzy Chest Pain Assessment for Unstable Angina Based on Braunwald Symptomatic and Obesity Clinical Conditions*
Thiago Orsi, Ernesto Araujo and Ricardo Simoes 1076
- 2:50PM *Fuzzy Breast Cancer Risk Assessment*
Aniele C. Ribeiro, Deborha P. Silva, and Ernesto Araujo 1083
- 3:10PM *Long Term Prediction for Generation Amount of Converter Gas Based on Steelmaking Production Status Estimation*
Xiaoyan Tang, Jun Zhao, Chunyang Sheng and Wei Wang 1088

WeF1-4 Fuzzy Pattern Recognition & Image Processing, Chair: Dongbin Zhao and Isao Hayashi, Room: 201D

- 1:30PM *Fuzzy Classification of Orchard Pest Posture Based on Zernike Moments*
Wenyong Li, Shangfeng Du, Meixiang Chen, Ming Li and Chuanheng Sun 1096
- 1:50PM *Fuzzy Measures of Pixel Cluster Compactness*
Gleb Beliakov, Gang Li, Quan Vu and Tim Wilkin 1104
- 2:10PM *Image Composition Using F-Transform*
Marek Vajgl, Petr Hurtik, Irina Perfilieva and Petra Hodakova 1112

- 2:30PM *Fusion of Multi-Spectral and Panchromatic Satellite Images Using Principal Component Analysis and Fuzzy Logic*
Reham Gharbia, Ali Hassan El Baz, Aboul Ella Hassanien, Gerald Schaefer, Tomoharu Nakashima and Ahmad Taher Azar 1118
- 2:50PM *Structural Classification of Proteins through Amino Acid Sequence Using Interval Type-2 Fuzzy Logic System*
Thanh Nguyen, Abbas Khosravi, Douglas Creighton and Saeid Nahavandi 1123
- 3:10PM *A Hybrid Type-2 Fuzzy Clustering Technique for Input Data Preprocessing of Classification Algorithms*
Vahid Nouri, Mohammad-R Akbarzadeh-T and Alireza Rowhanimanesh 1131

Wednesday, July 9, 3:30PM-6:00PM

Poster Session: PF3 Fuzzy Theory & Decision Making, Chair: Christian Mayr and Anca Croitoru, Room: Posters Area (Level 2)

- P501 *On the Cross-Migrativity of Triangular Subnorms*
Hangdan Wang and Qin Feng 1139
- P502 *A Fast Geometric Defuzzication Algorithm for Large Scale Information Retrieval*
Simon Coupland, David Croft and Stephen Brown 1143
- P503 *A Novel Algorithm to Solve the Minimal Hitting Sets in MBD*
Jianfang Xu, Zhigang Liu and Chenxi Dai 1150
- P504 *Fuzzy Linguistic First Order Logic Based on Refined Hedge Algebra*
Duc Khanh Tran and Minh Tam Nguyen 1156
- P505 *Bayesian Games with Ambiguous Type Players*
Youzhi Zhang, Xudong Luo, Wenjun Ma and Ho-fung Leung 1164
- P506 *Clustering Based Outlier Detection in Fuzzy SVM*
Rahul Kumar Sevakula and Nishchal Kumar Verma 1172
- P507 *Situation-Based Allocation of Medical Supplies in Unconventional Disasters with Fuzzy Triangular Values*
Junhu Ruan and Yan Shi 1178
- P508 *Novel Hierarchical Fault Diagnosis Approach for Smart Power Grid with Information Fusion of Multi-Data Resources Based on Fuzzy Petri Net*
Yingnan Wang, Jinfeng Ye, Guojun Xu, Qingmiao Chen, Haiyang Li and Xinrui Liu 1183
- P509 *A New Approach to Improve the Consistency of Linguistic Pair-Wise Comparison Matrix and Derive Interval Weight Vector*
Hengshan Zhang, Qinghua Zheng, Ting Liu and Yan Nan 1190
- P510 *Collaborative Diagnosis through Fuzzy Petri Net Based Agent Argumentation*
Xuehong Tao, Yuan Miao, Yanchun Zhang and Zhiqi Shen 1197
- P511 *Estimations, Convergences and Comparisons on Fuzzy Integrals of Sugeno, Choquet and Gould Type*
Anca Croitoru and Nikos Mastorakis 1205
- P512 *An Approach to Covering-Based Rough Sets through Bipartite Graphs*
Jingqian Wang and William Zhu 1213
- P513 *A Generalized Equilibrium Value-Based Approach for Solving Fuzzy Programming Problem*
Chenxia Jin, Yan Shi, Meng Yang and Fachao Li 1219
- P514 *On Three Types of Covering-Based Rough Sets via Definable Sets*
Yanfang Liu and William Zhu 1226
- P515 *Multi-Agent Evolutionary Design of Beta Fuzzy Systems*
Yosra Jarraya, Souhir Bouaziz, Adel M. Alimi and Ajith Abraham 1234
- P516 *T-S Fuzzy Affine Linear Modeling Algorithm by Possibilistic C-Regression Models Clustering Algorithm*
Chung-Chun Kung and Hong-Chi Ku 1242

- P517 *An Under-Sampling Method Based on Fuzzy Logic for Large Imbalanced Dataset*
Ginny Y. Wong, Frank H. F. Leung and Sai-Ho Ling 1248
- P518 *A Differential Evolution Based Adaptive Neural Type-2 Fuzzy Inference System for Classification of Motor Imagery EEG Signals*
Debabrota Basu, Saugat Bhattacharyya, Dwaipayana Sardar, Amit Konar, D.N. Tibarewala and Atulya Nagar 1253
- P519 *Construction of Slope-Consistent Trapezoidal Interval Type-2 Fuzzy Sets for Simplifying the Perceptual Reasoning Method*
Chengdong Li, Jianqiang Yi, Guiqing Zhang and Ming Wang 1261

Wednesday, July 9, 4:00PM-6:00PM

Special Session: WeF2-1 Human Symbiotic Systems II, Chair: Daisuke Katagami, Room: 201A

- 4:00PM *Effect of Robot Utterances Using Onomatopoeia on Collaborative Learning*
Felix Jimenez, Masayoshi Kanoh, Tomohiro Yoshikawa, Takeshi Furuhashi and Tsuyoshi Nakamura 1268
- 4:20PM *Behavior Extraction from Tweets Using Character N-Gram Models*
Yuji Yano, Tomonori Hashiyama, Junko Ichino and Shun'ichi Tano 1273
- 4:40PM *Saliency Map for Visual Attention Region Prediction Based on Fuzzy Neural Network*
Mao Wang, Yoichiro Maeda and Yasutake Takahashi 1281
- 5:00PM *Melody Oriented Interactive Chaotic Sound Generation System Using Music Conductor Gesture*
Shuai Chen, Yoichiro Maeda and Yasutake Takahashi 1287
- 5:20PM *Intention Recognition by Inverted Two-Wheeled Mobile Robot through Interactive Operation*
Yasutake Takahashi, Takuya Inoue and Nakamura Takayuki 1291
- 5:40PM *Development of Facial Expression Recognition for Training Video Customer Service Representatives*
Linh Tuan Dang, Eric W. Cooper and Katsuari Kamei 1297

Special Session: WeF2-2 Modalities of Fuzzy Signatures in Knowledge Representation, Chair: Laszlo Koczy, Sukanya Manna and Tom Gedeon, Room: 201B

- 4:00PM *On the Development of Signatures for Artificial Intelligence Applications*
Claudiu Pozna, Radu-Emil Precup, Peter Foldesi and Laszlo Koczy 1304
- 4:20PM *A Price Prediction Model for Online Auctions Using Fuzzy Reasoning Techniques*
Preetinder Kaur, Madhu Goyal and Jie Lu 1311
- 4:40PM *OWA-Based Fuzzy Rule Interpolation for Group Decision Making*
Chengyuan Chen and Qiang Shen 1319
- 5:00PM *Sensitivity Analysis of the Weighted Generalized Mean Aggregation Operator and Its Application to Fuzzy Signatures*
Istvan Harmati, Adam Bukovics and Laszlo Koczy 1327
- 5:20PM *Understanding Early Childhood Obesity Risks: An Empirical Study Using Fuzzy Signatures*
Sukanya Manna and Abigail M. Jewkes 1333
- 5:40PM *A New Fuzzy Graph and Signature Based Approach to Describe Fuzzy Situational Maps*
Aron Ballagi, Claudiu Pozna and Laszlo Koczy 1340

WeF2-3 Hybrid Fuzzy Systems, Chair: Scott Dick and Chiew Foong Kwong, Room: 201C

- 4:00PM *Oil Spill Trajectory Tracking Using Swarm Intelligence and Hybrid Fuzzy System*
Mohsen Pashna, Rubiyah Yusof and Rasoul Rahmani 1346
- 4:20PM *Generating Interpretable Mamdani-Type Fuzzy Rules Using a Neuro-Fuzzy System Based on Radial Basis Functions*
Diego G. Rodrigues, Gabriel Moura, Carlos M. C. Jacinto, Paulo Jose de Freitas Filho and Mauro Roisenberg 1352

4:40PM	<i>An ANFIS Approach to Transmembrane Protein Prediction</i> Hassan Kazemian and Syed Adnan Yusuf	1360
5:00PM	<i>Binary Fish School Search Applied to Feature Selection: Application to ICU Readmissions</i> Joao Sargo, Susana Vieira, Joao Sousa and Carmelo Filho	1366
5:20PM	<i>The ANFIS Handover Trigger Scheme: The Long Term Evolution (LTE) Perspective</i> Chiew Foong Kwong, Teong Chee Chuah and Su Wei Tan	1374
5:40PM	<i>Genetic Fuzzy Classifier with Fuzzy Rough Sets for Imprecise Data</i> Janusz Starczewski, Robert Nowicki and Bartosz Nowak	1382
6:00PM	<i>An Improvement in Forecasting Interval based Fuzzy Time Series</i> Shanoli Samui Pal, Tandra Pal and Samarjit Kar	1390

WeF2-4 Fuzzy Decision Making and Decision Support Systems I, Chair: Mika Sato-Ilic and Mengyin Fu, Room: 201D

4:00PM	<i>The Prioritization for Higher Education Institutions Performance Criteria with Fuzzy Analytical Hierarchy Process</i> Rati Wongsathan, Witchakorn Khuankaew and Aitsari Khaothawirat	1395
4:20PM	<i>Use of Cumulative Information Estimations for Risk Assessment of Heart Failure Patients</i> Jan Bohacik, Chandra Kambhampati, Darryl Davis and John Cleland	1402
4:40PM	<i>A Quantitative Preference-Based Structured Argumentation System for Decision Support</i> Nouredine Tamani and Madalina Croitoru	1408
5:00PM	<i>Fuzzy Group Decision Making Based on Variable Weighted Averaging Operators</i> Deqing Li, Wenyi Zeng and Junhong Li	1416
5:20PM	<i>Developing Tw fuzzy DEMATEL Method for Evaluating Green Supply Chain Management Practices</i> Kuo-Ping Lin, Ru-Jen Lin and Kuo-Chen Hung	1422
5:40PM	<i>Gradient-Based Fuzzy Fault Isolation in Residual-Based Fault Detection Systems</i> Francisco Serdio, Edwin Lughofer, Kurt Pichler, Thomas Buchegger, Markus Pichler and Hajrudin Efendic	1428

Thursday, July 10, 1:30PM-3:30PM

Special Session: ThF1-1 Hand Skill Recognition and Transfer, Chair: Honghai Liu, Room: 201A

1:30PM	<i>Active Interaction Control of a Rehabilitation Robot Based on Motion Recognition and Adaptive Impedance Control</i> Wei Meng, Yilin Zhu, Zude Zhou, Kun Chen and Qingsong Ai	1436
1:50PM	<i>Fuzzy Neural Network-Based Adaptive Impedance Force Control Design of Robot Manipulator under Unknown Environment</i> Wei-Chen Wang and Ching-Hung Lee	1442
2:10PM	<i>Finger Pinch Force Estimation through Muscle Activations Using a Surface EMG Sleeve on the Forearm</i> Yinfeng Fang, Zhaojie Ju, Xiangyang Zhu and Honghai Liu	1449
2:30PM	<i>Joint Angle Estimation System for Rehabilitation Evaluation Support</i> Junya Kusaka, Takenori Obo, Janos Botzheim and Naoyuki Kubota	1456
2:50PM	<i>Fuzzy-Based Adaptive Motion Control of a Virtual iCub Robot in Human-Robot-Interaction</i> Zejun Xu, Chenguang Yang, Hongbin Ma and Mengyin Fu	1463
3:10PM	<i>Teleoperation of a Virtual iCub Robot under Framework of Parallel System via Hand Gesture Recognition</i> Chen Li, Hongbin Ma, Chenguang Yang and Mengyin Fu	1469

Special Session: ThF1-2 Hybridisations, Extensions, and High-Order Fuzzy Sets, Chair: Neil Mac Parthaláin and Richard Jensen, Room: 201B

1:30PM	<i>Approximate Nature of Traditional Fuzzy Methodology Naturally Leads to Complex-Valued Fuzzy Degrees</i>	
	Olga Kosheleva and Vladik Kreinovich	1475
1:50PM	<i>Tightly Coupled Fuzzy Rough Description Logic Programs under the Answer Set Semantics for the Semantic Web</i>	
	Tingting Zou, Yanpeng Qu and Ansheng Deng	1480
2:10PM	<i>Feature Grouping-Based Fuzzy-Rough Feature Selection</i>	
	Richard Jensen, Neil Mac Parthalain and Chris Cornelis	1488
2:30PM	<i>An Advancing Investigation on Reduct and Consistency for Decision Tables in Variable Precision Rough Set Models</i>	
	James N. K. Liu, Yanxing Hu, Jia You and He Yulin	1496
2:50PM	<i>Heuristic Search for Fuzzy-Rough Bireducts and Its Use in Classifier Ensembles</i>	
	Ren Diao, Neil Mac Parthalain, Richard Jensen and Qiang Shen	1504
3:10PM	<i>Hybrid Fuzzy Genetics-Based Machine Learning with Entropy-Based Inhomogeneous Interval Discretization</i>	
	Yuji Takahashi, Yusuke Nojima and Hisao Ishibuchi	1512

ThF1-3 Fuzzy Clustering, Chair: Seiichi Ozawa and Xiao-Jun Zeng, Room: 201C

1:30PM	<i>Incremental Fuzzy Clustering for Document Categorization</i>	
	Jianping Mei, Yangtao Wang, Lihui Chen and Chunyan Miao	1518
1:50PM	<i>Enhanced Cluster Validity Index for the Evaluation of Optimal Number of Clusters for Fuzzy C-Means Algorithm</i>	
	Neha Bharill and Aruna Tiwari	1526
2:10PM	<i>A Learning Scheme to Fuzzy C-Means Based on a Compromise in Updating Membership Degrees</i>	
	Shang-Lin Wu, Yang-Yin Lin, Yu-Ting Liu, Chih-Yu Chen and Chin-Teng Lin	1534
2:30PM	<i>Link-Based Pairwise Similarity Matrix Approach for Fuzzy C-Means Clustering Ensemble</i>	
	Pan Su, Changjing Shang and Qiang Shen	1538
2:50PM	<i>Fuzzy Clustering Using Automatic Particle Swarm Optimization</i>	
	Min Chen and Ludwig Simone	1545
3:10PM	<i>A Preprocessed Induced Partition Matrix Based Collaborative Fuzzy Clustering for Data Analysis</i>	
	Mukesh Prasad, Dong Lin Li, Yu-Ting Liu, Linda Siana, Chin-Teng Lin and Amit Saxena	1553
3:30PM	<i>Dynamic Texture Classification Using Local Fuzzy Coding</i>	
	Liuyang Wang, Huaping Liu and Fuchun Sun	1559

ThF1-4 Fuzzy Systems Modelling and Identification, Chair: Faa-Jeng Lin and Jozo Dujmovic, Room: 201D

1:30PM	<i>A New Monotonicity Index for Fuzzy Rule-Based Systems</i>	
	Lie Meng Pang, Kai Meng Tay and Chee Peng Lim	1566
1:50PM	<i>Sparse Fuzzy C-Regression Models with Application to T-S Fuzzy Systems Identification</i>	
	Minnan Luo, Fuchun Sun and Huaping Liu	1571
2:10PM	<i>A Systems Approach for Scheduling Aircraft Landings in JFK Airport</i>	
	Sina Khanmohammadi, Chun-An Chou, Harold W. Lewis III and Doug Elias	1578
2:30PM	<i>A New Fuzzy Ratio and Its Application to the Single Input Rule Modules Connected Fuzzy Inference System</i>	
	Chian Haur Jong, Kai Meng Tay and Chee Peng Lim	1586
2:50PM	<i>Fuzzy Uncertainty Assessment in RBF Neural Networks Using Neutrosophic Sets for Multiclass Classification</i>	
	Adrian Rubio-Solis and George Panoutsos	1591

3:10PM	<i>A New Adaptive Mamdani-Type Fuzzy Modeling Strategy for Industrial Gas Turbines</i> Yu Zhang, Jun Chen, Chris Bingham and Mahdi Mahfouf	1599
3:30PM	<i>Introduction to Tunable Equivalence Fuzzy Associative Memories</i> Estevao Esmi, Peter Sussner and Sandra Sandri	1604

Thursday, July 10, 3:30PM-6:00PM

Poster Session: PF4 Fuzzy Modeling, Control, & Applications II, Chair: Tomoharu Nakashima and Neha Bharill, Room: Posters Area (Level 2)

P701	<i>Reengineering Fuzzy Nested Relational Databases into Fuzzy XML Model</i> Weijun Li, Xu Chen and Z. M. Ma	1612
P702	<i>Evaluation of Responsiveness of Health Systems Using Fuzzy-based Technique</i> Sukanya Phongsuphap and Yongyuth Pongsupap	1618
P703	<i>A Fuzzy Logic Based Parkinson's Disease Risk Predictor</i> Siyuan Liu, Zhiqi Shen, Martin J. McKeown, Cyril Leung and Chunyan Miao	1624
P704	<i>An Integrated Intelligent Technique for Monthly Rainfall Time Series Prediction</i> Jesada Kajornrit, Kok Wai Wong, Chun Che Fung and Yew Soon Ong	1632
P705	<i>A Fuzzy Ontology Driven Method for a Personalized Query Reformulation</i> Hajer Baazaoui-zghal and Henda Ben ghezala	1640
P706	<i>A Comparison of Computational Intelligence Techniques for Energy Time Series Forecasting</i> Abbas Namdar and Hamid Berenji	1648
P707	<i>Perceptual Computing Based Performance Control Mechanism for Power Efficiency in Mobile Embedded Systems</i> Prashant Gupta and Pranab Muhuri	1654
P708	<i>Medical Diagnosis and Monotonicity Clarification Using SIRMs Connected Fuzzy Inference Model with Functional Weights</i> Hirosato Seki and Tomoharu Nakashima	1662
P709	<i>T-S Fuzzy Models Based Approximation for General Fractional Order Nonlinear Dynamic Systems</i> Yong Wang, Yiheng Wei, Min Zhu, Mengmeng Liu, Cheng Peng and Zeshao Chen	1666
P710	<i>A Mathematical Programming Method for the Multiple Attribute Decision Making with Interval Intuitionistic Fuzzy Values</i> Junfeng Chu and Xinwang Liu	1671
P711	<i>Fuzzy Multi Entity Bayesian Networks: A Model for Imprecise Knowledge Representation and Reasoning in High-Level Information Fusion</i> Keyvan Golestan, Fakhri Karray and Mohamed S. Kamel	1678
P712	<i>The Realization Problems Related to Weighted Transducers over Strong Bimonoids</i> Ping Li, Yongming Li and Shengling Geng	1686
P713	<i>Identification of Dynamic Systems Using a Differential Evolution-Based Recurrent Fuzzy System</i> Cristian dos Santos, Rogerio Espindola, Vinicius Vieira and Alexandre Evsukoff	1691
P714	<i>Similarities in Structured Spaces of Sets</i> Wladyslaw Homenda and Agnieszka Jastrzebska	1697
P715	<i>A Novel Low-Complexity Method for Determining Nonadditive Interaction Measures Based on Least-Norm Learning</i> Wei An, Chunxiao Ren, Song Ci, Dalei Wu, Haiyan Luo and Yanwei Liu	1705
P716	<i>Model Reference Adaptive Iterative Learning Control for Nonlinear Systems Using Observer Design</i> Ying-Chung Wang, Chiang-Ju Chien and I-Hong Jhuo	1713

Thursday, July 10, 4:00PM-6:00PM

Special Session: ThF2-1 Computational Intelligence for Cognitive Robotics, Chair: Naoyuki Kubota, Room: 201A

- 4:00PM *A Reduced Classifier Ensemble Approach to Human Gesture Classification for Robotic Chinese Handwriting*
Fei Chao, Yan Sun, Zhengshuai Wang, Gang Yao, Zuyuan Zhu, Changle Zhou, Qinggang Meng and Min Jiang 1720
- 4:20PM *Reinforcement Learning in Non-Stationary Environments: An Intrinsically Motivated Stress Based Memory Retrieval Performance (SBMRP) Model*
Tiong Yew Tang, Simon Egerton and Naoyuki Kubota 1728
- 4:40PM *A Modified EM Algorithm for Hand Gesture Segmentation in RGB-D Data*
Zhaojie Ju, Yuehui Wang, Wei Zeng, Haibin Cai and Honghai Liu 1736
- 5:00PM *Grounding Spatial Relations in Natural Language by Fuzzy Representation for Human-Robot Interaction*
Jiacheng Tan, Zhaojie Ju and Honghai Liu 1743
- 5:20PM *Vowel Recognition System of Lipsynchrobot in Lips Gesture Using Neural Network*
Indra Adji Sulistijono, Haikal Hakim Baiqunni, Zaqiatud Darojah and Didik Setyo Purnomo 1751
- 5:40PM *Quantum-Inspired Multidirectional Associative Memory for Human-Robot Interaction System*
Naoki Masuyama and Chu Kiong Loo 1757

Special Session: ThF2-2 Aggregation Operators, Chair: Simon James and Gang Li, Room: 201B

- 4:00PM *"And"- and "Or"-Operations for "Double", "Triple", etc. Fuzzy Sets*
Hung T. Nguyen, Vladik Kreinovich and Olga Kosheleva 1765
- 4:20PM *Upper and Lower Generalized Factoraggregations Based on Fuzzy Equivalence Relation*
Pavels Orlovs and Svetlana Asmuss 1772
- 4:40PM *Interpolative GCD Aggregators*
Jozo Dujmovic 1778
- 5:00PM *Analytical Solution Methods for the Linguistic Weighted Average Problem*
Xinwang Liu, Xu Yong, Tong Wu and Na Li 1786
- 5:20PM *Nearest Neighbour-Guided Induced OWA and Its Application to Journal Ranking*
Pan Su, Tianhua Chen, Changjing Shang and Qiang Shen 1794
- 5:40PM *Worker Ranking Determination in Crowdsourcing Platforms Using Aggregation Functions*
David Sanchez-Charles, Jordi Nin, March Sole and Victor Mentes-Mulero 1801

Special Session: ThF2-3 Paradigms of Fuzzy Systems for Medical Benefits, Chair: Syoji Kobashi and Md. Atiqur Rahman Ahad, Room: 201C

- 4:00PM *Fuzzy Object Growth Model for Newborn Brain Using Manifold Learning*
Ryosuke Nakano, Syoji Kobashi, Kei Kuramoto, Yuki Wakata, Kumiko Ando, Reiichi Ishikura, Tomomoto Ishikawa, Shozo Hirota and Yutaka Hata 1809
- 4:20PM *Investigating Distance Metric Learning in Semi-Supervised Fuzzy C-Means Clustering*
Daphne Teck Ching Lai, Jonathan Garibaldi and Jenna Repts 1817
- 4:40PM *Soft Class Decision for Nursing-Care Text Classification Using a K-Nearest Neighbor Based System*
Manabu Nii, Kazunobu Takahama, Atsuko Uchinuno and Reiko Sakashita 1825
- 5:00PM *An Automated Determination of Blumensaat Line Using Fuzzy System Based on Physician Experience from Femur CT Image*
Yosuke Uozumi, Kouki Nagamune, Naoki Nakano, Kanto Nagai, Yuichiro Nishizawa, Yuichi Hoshino, Takehiko Matsushita, Ryosuke Kuroda and Masahiro Kurosaka 1831
- 5:20PM *Multimodeling for the Prediction of Patient Readmissions in Intensive Care Units*
Marta Fernandes, Claudia Silva, Susana Vieira and Joao Sousa 1837

- 5:40PM *Benefits of Fuzzy Logic in the Assessment of Intellectual Disability*
Alessandro Di Nuovo, Santo Di Nuovo, Serafino Buono and Vincenzo Cutello 1843

**Special Session: ThF2-4 Advances to Self-tuning and Adaptive Fuzzy Control Systems,
Chair: Tsung-Chih Lin, Room: 201D**

- 4:00PM *Model-Based Takagi-Sugeno Fuzzy Approach for Vehicle Longitudinal Velocity Estimation during Braking*
Haiping Du and Weihua Li 1851
- 4:20PM *Analysis of the Performances of Type-1, Self-Tuning Type-1 and Interval Type-2 Fuzzy PID Controllers on the Magnetic Levitation System*
Ahmet Sakalli, Tufan Kumbasar, Engin Yesil and Hani Hagraş 1859
- 4:40PM *Robust Stabilization of Recurrent Fuzzy Systems via Switching Control*
Stefan Gering, Wolfgang Krippner and Juergen Adamy 1867
- 5:00PM *Performance Evaluation of Interval Type-2 and Online Rule Weighing Based Type-1 Fuzzy PID Controllers on a PH Process*
Tufan Kumbasar, Cihan Ozturk, Engin Yesil and Hani Hagraş 1875
- 5:20PM *Observer-Based Indirect Adaptive Supervisory Control for Unknown Time Delay System*
Ting-Ching Chu, Tsung-Chih Lin and Valentina Emilia Balas 1883
- 5:40PM *Direct Adaptive Fuzzy Tracking Control with Observer and Supervisory Controller for Nonlinear MIMO Time Delay Systems*
Chia-Hao Kuo, Tsung-Chih Lin and Chien-Liang Chen 1891

Friday, July 11, 8:10AM-10:10AM

**Special Session: FrF1-1 Handling Uncertainties in Big Data by Fuzzy Systems, Chair: Jie Lu,
Room: 201A**

- 8:10AM *A Fuzzy Tree Matching-Based Personalised E-Learning Recommender System*
Dianshuang Wu, Guangquan Zhang and Jie Lu 1898
- 8:30AM *On the Use of Map-Reduce to Build Linguistic Fuzzy Rule Based Classification Systems for Big Data*
Victoria Lopez, Sara Del Rio, Jose Manuel Benitez and Francisco Herrera 1905
- 8:50AM *A Trust-Based Performance Measurement Modeling Using DEA, T-Norm and S-Norm Operators*
Ali Azadeh, Saeed Abdolhosseinzadeh, Morteza Saberi, Farookh Khadeer Hussain and Omar Khadeer Hussain 1913
- 9:10AM *A Novel Evaluation Approach for Power Distribution System Planning Based on Linear Programming Model and ELECTRE III*
Tiefeng Zhang, Guangquan Zhang, Jie Lu and Jianwei Gu 1921
- 9:30AM *Multicriteria Decision Making with Fuzziness and Criteria Interdependence in Cloud Service Selection*
Le Sun, Hai Dong, Farookh Hussain, Omar Hussain, Jiangang Ma and Yanchun Zhang 1929
- 9:50AM *Medical Diagnosis by Fuzzy Standard Additive Model with Wavelets*
Thanh Nguyen, Abbas Khosravi, Douglas Creighton and Saeid Nahavandi 1937

Special Session: FrF1-2 Evolutionary Fuzzy Systems, Chair: Yusuke Nojima, Room: 201B

- 8:10AM *Aeroengine Prognosis through Genetic Distal Learning Applied to Uncertain Engine Health Monitoring Data*
Alvaro Martinez, Luciano Sanchez and Ines Couso 1945
- 8:30AM *GPFIS-Control: A Fuzzy Genetic Model for Control Tasks*
Adriano Koshiyama, Tatiana Escovedo, Marley Vellasco and Ricardo Tanscheit 1953
- 8:50AM *Tuning Larger Membership Grades for Fuzzy Association Rules*
Stephen G. Matthews 1960

- 9:10AM *Embedding Evolutionary Multiobjective Optimization into Fuzzy Linguistic Combination Method for Fuzzy Rule-Based Classifier Ensembles*
Krzysztof Trawinski, Oscar Cordon and Arnaud Quirin 1968
- 9:30AM *Spectral-Spatial Classification of Remote Sensing Images Using a Region-Based GeneSIS Segmentation Algorithm*
Stelios Mylonas, Dimitris Stavrakoudis, John Theocharis and Paris Mastorocostas 1976
- 9:50AM *Genetic-Fuzzy Mining with Type-2 Membership Functions*
Yu Li, Chun-Hao Chen, Tzung-Pei Hong and Yeong-Chyi Lee 1985

FrF1-3 Fuzzy Control and Intelligent Systems III, Chair: Shan Xu and Chun-Hsiung Fang, Room: 201C

- 8:10AM *Local H Infinity Control and Invariant Set Analysis for Continuous-Time T-S Fuzzy Systems with Magnitude- and Energy-Bounded Disturbances*
Dong Hwan Lee, Young Hoon Joo and Myung Hwan Tak 1990
- 8:30AM *Design of Indirect Adaptive Fuzzy Control (IAFC) for Nonlinear Hysteretic Systems*
Chi-Hsu Wang, Jyun-Hong Wang and Chun-Yao Chen 1998
- 8:50AM *Optimal Finite-Horizon Control with Disturbance Attenuation for Uncertain Discrete-Time T-S Fuzzy Model Based Systems*
Wen-Ren Horng, Jyh-Horng Chou and Chun-Hsiung Fang 2006
- 9:10AM *Distributed Fuzzy Proportional-Spatial Integral Control Design for a Class of Nonlinear Distributed Parameter Systems*
Jun-Wei Wang, Huai-Ning Wu, Yao Yu and Chang-Yin Sun 2010
- 9:30AM *Development and Implementation of Fuzzy, Fuzzy PID and LQR Controllers for an Roll-Plane Active Hydraulically Interconnected Suspension*
Sangzhi Zhu, Nong Zhang and Haiping Du 2017
- 9:50AM *New Fuzzy Model with Second Order Terms for the Design of a Predictive Control Strategy*
Leonel Gutierrez, Felipe Valencia, Doris Saez and Alejandro Marquez 2025
- 10:10AM *A Self-Tuning Fuzzy PID Controller Design Using Gamma Aggregation Operator*
Engin Yesil and Cagri Guzey 2032

FrF1-4 Fuzzy Data Mining and Forecasting, Chair: Mika Sato-Ilic and Meng Yuan, Room: 201D

- 8:10AM *Fuzzy Community Detection in Social Networks Using a Genetic Algorithm*
Jianhai Su and Timothy Havens 2039
- 8:30AM *A Minimax Model of Portfolio Optimization Using Data Mining to Predict Interval Return Rate*
Meng Yuan and Junzo Watada 2047
- 8:50AM *Modeling Time Series with Fuzzy Cognitive Maps*
Homenda Wladyslaw, Jastrzebska Agnieszka and Pedrycz Witold 2055
- 9:10AM *Possibilistic Projected Categorical Clustering via Cluster Cores*
Stephen G. Matthews and Trevor P. Martin 2063
- 9:30AM *Universal Fuzzy Clustering Model*
Mika Sato-Ilic 2071
- 9:50AM *Iterative Mixed Integer Programming Model for Fuzzy Rule-Based Classification Systems*
Shahab Derhami and Alice E. Smith 2079
- 10:10AM *Kernel Non-Local Shadowed C-Means for Image Segmentation*
Long Chen, Jing Zou and C. L. Philip Chen 2085

Friday, July 11, 10:30AM-12:30PM**Special Session: FrF2-1 Recent Advances in Fuzzy-Model-Based Control Design and Analysis I, Chair: Hak-Keung Lam, Room: 201A**

- 10:30AM *Stability Region Analysis for Polynomial Fuzzy Systems by Polynomial Lyapunov Functions*
Ying-Jen Chen, Motoyasu Tanaka, Kazuo Tanaka and H. O. Wang 2091
- 10:50AM *Dissipativity Analysis for Discrete-Time T-S Fuzzy Systems with Time-Varying Delay and Stochastic Perturbation*
Xiaozhan Yang, Zhong Zheng, Yuxin Zhao and Ligang Wu 2096
- 11:10AM *A Comparison between T-S Fuzzy Systems and Affine T-S Fuzzy Systems as Nonlinear Control System Models*
Xiao-Jun Zeng 2103
- 11:30AM *Relaxed Stability Conditions Based on Taylor Series Membership Functions for Polynomial Fuzzy-Model-Based Control Systems*
Chuang Liu, Hak-Keung Lam, Xian Zhang, Hongyi Li and Sai-Ho Ling 2111
- 11:50AM *Faults Diagnosis Based on Proportional Integral Observer for TS Fuzzy Model with Unmeasurable Decision Variable*
T. Youssef, H. R. Karimi and M. Chadli 2119
- 12:10PM *Dynamic Output Feedback Controller Design for T-S Fuzzy Plants with Actuator Saturation Using Linear Fractional Transformation*
Yang Liu, Xiaojun Ban, Fen Wu and Hak-Keung Lam 2125

Special Session: FrF2-2 Software for Soft Computing I, Chair: Jesus Alcalá-Fdez, Room: 201B

- 10:30AM *Supervising Classrooms Comprising Children with Dyslexia and Other Learning Problems with Graphical Exploratory Analysis for Fuzzy Data: Presentation of the Software Tool and Case Study*
Ana Palacios and Luciano Sanchez 2133
- 10:50AM *The Experimenter Environment of the NIP Imperfection Processor*
Raquel Martinez, Jose M. Cadenas and M. Carmen Garrido 2141
- 11:10AM *Learning from Data Using the R Package frbs*
Lala Septem Riza, Christoph Bergmeir, Francisco Herrera and Jose Manuel Benitez 2149
- 11:30AM *Parallel Mining of Fuzzy Association Rules on Dense Data Sets*
Michal Burda, Viktor Pavliska and Radek Valasek 2156
- 11:50AM *Designing a Compact Genetic Fuzzy Rule-Based System for One-Class Classification*
Pedro Villar, Bartosz Krawczyk, Ana M. Sanchez, Rosana Montes and Francisco Herrera 2163
- 12:10PM *A Method for Hybrid Personalized Recommender Based on Clustering of Fuzzy User Profiles*
Shan Xu and Junzo Watada 2171

Special Session: FrF2-3 Fuzzy Interpolation, Chair: Qiang Shen and Laszlo Koczy, Room: 201C

- 10:30AM *A New Interval-Based Method for Handling Non-Monotonic Information*
Yi Wen Kerk, Kai Meng Tay and Chee Peng Lim 2178
- 10:50AM *Closed Form Fuzzy Interpolation with Interval Type-2 Fuzzy Sets*
Longzhi Yang, Chengyuan Chen, Nanlin Jin, Xin Fu and Qiang Shen 2184
- 11:10AM *Building Fuzzy Inference Systems with Similarity Reasoning: NSGA II-Based Fuzzy Rule Selection and Evidential Functions*
Tze Ling Jee, Kok Chin Chai, Kai Meng Tay and Chee Peng Lim 2192
- 11:30AM *Genetic Algorithm-Aided Dynamic Fuzzy Rule Interpolation*
Nitin Naik, Ren Diao and Qiang Shen 2198
- 11:50AM *Antecedent Selection in Fuzzy Rule Interpolation Using Feature Selection Techniques*
Ren Diao, Shangzhu Jin and Qiang Shen 2206
- 12:10PM *Fuzzy Rule Interpolation Based Fuzzy Signature Structure in Building Condition Evaluation*
Gergely Molnarka, Szilveszter Kovacs and Laszlo Koczy 2214

FrF2-4 Fuzzy Decision Making and Decision Support Systems II, Chair: Vladik Kreinovich and Toshihiko Watanabe, Room: 201D

10:30AM	<i>Multiple Attribute Group Decision Making Using Interval-Valued Intuitionistic Fuzzy Soft Matrix</i> Sujit Das, Mohuya B. Kar, Tandra Pal and Samarjit Kar	2222
10:50AM	<i>Towards Data-Driven Environmental Planning and Policy Design -Leveraging Fuzzy Logic to Operationalize a Planning Framework</i> Amir Pourabdollah, Christian Wagner, Simon Miller, Michael Smith and Ken Wallace	2230
11:10AM	<i>A New Fuzzy Approach for Multi-Source Decision Fusion</i> Farnoosh Fatemipour, Mohammad-R Akbarzadeh-T and Rouhollah Ghasempour	2238
11:30AM	<i>Towards Decision Making under Interval, Set-Valued, Fuzzy, and Z-Number Uncertainty: A Fair Price Approach</i> Joe Lorkowski, Rafik Aliev and Vladik Kreinovich	2244
11:50AM	<i>A Fuzzy-Logic-Based Approach for Soft Data Constrained Multiple-Model PHD Filter</i> Sepideh Seifzadeh, Bahador Khaleghi and Fakhri Karray	2254
12:10PM	<i>Handling Preferences Under Uncertainty in Recommender Systems</i> Samia Boulkrinat, Allel Hadjali and Aicha Aissani-Mokhtari	2262
12:30PM	<i>Flexible Decision Support System Using Dynamic Partial Reconfiguration Technology</i> Janos Grantner and Chinh Nguyen	2270

Friday, July 11, 1:30PM-3:30PM

Special Session: FrF3-1 Recent Advances in Fuzzy-Model-Based Control Design and Analysis II, Chair: Hak-Keung Lam, Room: 201A

1:30PM	<i>Discrete-Time Takagi-Sugeno Descriptor Models: Controller Design</i> Victor Estrada-Manzo, Thierry Marie Guerra, Zsofia Lendek and Philippe Pudlo	2277
1:50PM	<i>Observer Design for Switching Nonlinear Systems</i> Zsofia Lendek, Paula Raica, Jimmy Lauber and Thierry-Marie Guerra	2282
2:10PM	<i>Model Predictive Control for Discrete Fuzzy Systems via Iterative Quadratic Programming</i> Carlos Arino, Emilio Perez, Antonio Sala and Andres Querol	2288
2:30PM	<i>A Novel Relaxed Stabilization Condition for a Class of T-S Time-Delay Fuzzy Systems</i> Shun-Hung Tsai and Cone-Jie Fang	2294
2:50PM	<i>SOS-Based Fuzzy Stability Analysis via Homogeneous Lyapunov Functions</i> Ji-Chang Lo	2300
3:10PM	<i>Fuzzy Disturbance Observer for a Class of Polynomial Fuzzy Control Systems</i> Hugang Han, Yuta Higaki and Hak-Keung Lam	2306

Special Session: FrF3-2 Software for Soft Computing II, Chair: Jesus Alcalá-Fdez, Room: 201B

1:30PM	<i>Jfcs Tool: A Java Software Tool to Design Fuzzy Color Spaces</i> Jose Manuel Soto-Hidalgo, Jesus Chamorro-Martinez, P. Martinez-Jimenez and D. Sanchez	2313
1:50PM	<i>JuzzyOnline: An Online Toolkit for the Design, Implementation, Execution and Sharing of Type-1 and Type-2 Fuzzy Logic Systems</i> Christian Wagner, Mathieu Pierfitte and Josie McCulloch	2321
2:10PM	<i>On Modelling Real-World Knowledge to Get Answers to Fuzzy and Flexible Searches without Human Intervention</i> Victor Pablos-Ceruelo and Susana Munoz-Hernandez	2329
2:30PM	<i>Specialized Software for Fuzzy Natural Logic and Fuzzy Transform Applications</i> Vilem Novak, Viktor Pavliska and Radek Valasek	2337
2:50PM	<i>A WiFi-Based Software for Indoor Localization</i> Noelia Hernandez, Manuel Ocana, Sergio Humanes, Pedro Revenga, David P. Pancho and Luis Magdalena	2345

- 3:10PM *Analyzing Fuzzy Association Rules with Fingrams in KEEL*
David P. Pancho, Jose M. Alonso, Jesus Alcala-Fdez and Luis Magdalena 2352

Special Session: FrF3-3 Theory of Type-2 Fuzzy Systems, Chair: Bob John, Jon Garibaldi and Simon Coupland, Room: 201C

- 1:30PM *Type-1 or Interval Type-2 Fuzzy Logic Systems - On the Relationship of the Amount of Uncertainty and FOU Size*
Jabran Aladi, Christian Wagner and Jonathan Garibaldi 2360
- 1:50PM *Building a Type-2 Fuzzy Regression Model Based on Credibility Theory and Its Application on Arbitrage Pricing Theory*
Yicheng Wei and Junzo Watada 2368
- 2:10PM *Building Linguistic Random Regression Model from the Perspective of Type-2 Fuzzy Set*
Fei Song, Shinya Imai and Junzo Watada 2376
- 2:30PM *Automatic Learning of General Type-2 Fuzzy Logic Systems Using Simulated Annealing*
Majid Almaraashi, Robert John and Hopgood Adrian 2384
- 2:50PM *A New Monotonic Type-Reducer for Interval Type-2 Fuzzy Sets*
Simon Coupland, Robert John and Hussam Hamrawi 2391
- 3:10PM *A Support Vector-Based Interval Type-2 Fuzzy System*
Volkan Uslan, Huseyin Seker and Robert John 2396

Special Session: FrF3-4 Brain and Physiological Computation for Affective Computing, Chair: Toshihiko Watanabe, Room: 201D

- 1:30PM *An Interactive Evolutionary Computation Framework Controlled via EEG Signals*
Shen Ren, Jiangjun Tang, Michael Barlow and Hussein A. Abbass 2402
- 1:50PM *Ocular Artifact Removal from EEG Using ANFIS*
Wei Chen, Ze Wang, Ka Fai Lao and Feng Wan 2410
- 2:10PM *Spatiotemporal Human Brain Activities on Recalling Body Parts*
Takahiro Yamanoi, Yoshinori Tanaka, Mika Otsuki, Hisahsi Toyoshima and Toshimasa Yamazaki 2418
- 2:30PM *Description of Activity of Living Neuronal Network by Fuzzy Bio-Indicator*
Isao Hayashi and Suguru N. Kudoh 2424
- 2:50PM *Human Behavioural Analysis with Self-Organizing Map for Ambient Assisted Living*
Kofi Appiah, Andrew Hunter, Ahmad Lotfi, Christopher Waltham and Patrick Dickinson 2430
- 3:10PM *Analysis and Extraction of Knowledge from Body Motion Using Singular Value Decomposition*
Yinlai Jiang, Isao Hayashi and Shuoyu Wang 2438

Friday, July 11, 4:00PM-6:00PM

Special Session: FrF4-1 Recent Advances in Fuzzy-Model-Based Control Design and Analysis III, Chair: Tadanari Taniguchi, Room: 201A

- 4:00PM *Non-PDC Controller Design for Takagi-Sugeno Models via Line-Integral Lyapunov Functions*
Abdelmadjid Cherifi, Kevin Guelton and Laurent Arcese 2444
- 4:20PM *Non-Quadratic Stabilization Of Second Order Continuous Takagi-Sugeno Descriptor Systems via Line-Integral Lyapunov Function*
Raymundo Marquez, Thierry Marie Guerra, Alexandre Kruszewski and Miguel Bernal 2451
- 4:40PM *Brain Style Control Scheme: Simultaneous Forward and Inverse Model Identification and Controller Design*
Luka Eciolaza, Tadanari Taniguchi and Michio Sugeno 2457
- 5:00PM *Tracking Control for a Non-Holonomic Car-Like Robot Using Dynamic Feedback Linearization Based on Piecewise Bilinear Models*
Tadanari Taniguchi, Luka Eciolaza and Michio Sugeno 2465

5:20PM	<i>Coordinate Transformation of Takagi-Sugeno Models: Stability Conditions and Observer Canonical Forms</i>	
	Horst Schulte and Soeren Georg	2472
5:40PM	<i>Design of Fuzzy Synergetic Controller</i>	
	Chi-Hua Liu and Ming-Ying Hsiao	2477

Special Session: FrF4-2 New Frontiers in Clustering and its Applications -Fusion of Clustering and Other Methodologies-, Chair: Yuchi Kanzawa, Room: 201B

4:00PM	<i>A Maximizing Model of Bezdek-Like Spherical Fuzzy C-Means Clustering</i>	
	Yuchi Kanzawa	2482
4:20PM	<i>Fuzzy c-Regression Models Combined with Support Vector Regression</i>	
	Tatsuya Higuchi and Sadaaki Miyamoto	2489
4:40PM	<i>Incremental Algorithms for Fuzzy Co-Clustering of Very Large Cooccurrence Matrix</i>	
	Katsuhiro Honda, Daiji Tanaka and Akira Notsu	2494
5:00PM	<i>Fuzzy Co-Clustering of Vertically Partitioned Cooccurrence Data with Privacy Consideration</i>	
	Katsuhiro Honda, Toshiya Oda and Akira Notsu	2500
5:20PM	<i>FCM-Type Fuzzy Co-Clustering by K-L Information Regularization</i>	
	Katsuhiro Honda, Shunnya Oshio and Akira Notsu	2505
5:40PM	<i>Stochastic Gradient Descent Based Fuzzy Clustering for Large Data</i>	
	Yangtao Wang, Lihui Chen and Jianping Mei	2511

FrF4-3 Fuzzy Logic & Fuzzy Set Theory II, Chair: Fuchun Sun and Plamen Angelov, Room: 201C

4:00PM	<i>Regularization-Based Learning of the Choquet Integral</i>	
	Derek Anderson, Stanton Price and Timothy Havens	2519
4:20PM	<i>Uniformly Strongly Prime Fuzzy Ideals</i>	
	Flaulles Bergamaschi and Regivan Santiago	2527
4:40PM	<i>Ranking Fuzzy Numbers by Their Expansion Center</i>	
	Zhenyuan Wang and Li Zhang-Westman	2533
5:00PM	<i>Rotation of Triangular Numbers via Quaternion</i>	
	Ronildo Moura, Flaulles Bergamaschi, Regivan Santiago and Benjamin Bedregal	2538
5:20PM	<i>Ontology-Based Service Matching in Cloud Computing</i>	
	Li Liu, Xiaofen Yao, Liangjuan Qin and Miao Zhang	2544
5:40PM	<i>Interval Type-2 Fuzzy Modeling and Chaotic Synchronization of Two Different Memristor-Based Lorenz Circuits</i>	
	Tsung-Chih Lin and Fu-Yu Huang	2551

FrF4-4 Fuzzy Models, Chair: Petrica C. Pop and Dimitar Filev, Room: 201D

4:00PM	<i>Learning Fuzzy Rules through Ant Optimization, LASSO and Dirichlet Mixture</i>	
	Arturo Garcia-Garcia and Andres Mendez-Vazquez	2558
4:20PM	<i>Prediction of Online Trade Growth Using Search-ANFIS: Transactions on Taobao as Examples</i>	
	Jiyuan Wang, Geng Peng and Wei Dai	2566
4:40PM	<i>Granular Cognitive Maps Reconstruction</i>	
	Homenda Wladyslaw, Jastrzebska Agnieszka and Pedrycz Witold	2572
5:00PM	<i>Fuzzy Multi-Objective Reliability-Redundancy Allocation Problem</i>	
	Ashraf Zubair, Pranab Muhuri, Q. M. Danish Lohani and Rahul Nath	2580
5:20PM	<i>On the Resilience of an Ant-Based System in Fuzzy Environments. An Empirical Study</i>	
	Gloria Cerasela Crisan, Camelia-M. Pinteau and Petrica C. Pop	2588
5:40PM	<i>An Investigation of Methods of Parameter Tuning For Q-Learning Fuzzy Inference System</i>	
	Ahmad Al-Talabi and Howard Schwartz	2594