A Fuzzy Logic Based Language to Model Autonomous Mobile Robots
Antonio Gómez Skarmeta, Humberto Martínez Barberá, Manuel Sánchez Alonso (Universidad de Murcia, Spain)

Fuzzy Rule Extraction for Shooting Action Controller of Soccer Robot
M. J. Jung, H. S. Kim, H. S. Shim, J. H. Kim (Korea Advanced Institute of Science & Technology, Korea)

Fuzzy Adaptive Output Tracking Control of Nonlinear Systems
Shaocheng Tong, Min Cai, Jun Zhou (Liaoning Institute of Technology, China)

Fuzzy Control Systems for the Regulation of Substrate Feeding Rate in the Fed-Batch Cultivation of Scutellaria baicalensis G.
Jeong-Woo Choi, Woochang Lee (Sogang University, Korea), Jeong-Gun Lee (LG Industrial Systems R&D Center, Korea), Young-Kee Kim, Won Hong Lee (Sogang University, Korea)

Application of Multivariable 2-DOF PID Controller with Neural Network Tuning Method to the Heat Exchange
Dong Hwa Kim (Taejon National University of Technology, Korea)

Tuesday, August 24, 1999

Plenary Speech I
"Function Approximation by Computational Models, with Emphasis on Rule Extraction by Clustering"
James C. Bezdek (University of West Florida, USA)

Plenary Speech II
"Soft Computing Systems: Commercial and Industrial Applications"
Piero P. Bonissone (GE Corporate Research and Development, USA)

TM-1 Information Processing (I)

TM-1-1 (Invited special talk)
Some Uses of Fuzzy Logic in Multimedia Databases Querying
Didier Dubois, Henri Prade, Florence Sédès (Université Paul Sabatier, France)

TM-1-2
About Fuzzy Query Processing - The Example of the Division
Patrick Bosc, Cédric Legrand, Olivier Pivert (IRISA/ENSSAT, France)

TM-1-3
Fuzzy Trigram Model for Speech Act Analysis of Utterances in Dialogues
Harksoo Kim, Jeong-Mi Cho, Jungyun Seo (Sogang University, Korea)

TM-1-4
Fuzzy Querying via WWW: Implementational Issues
Janusz Kacprzyk, Slawomir Zadrozny (Polish Academy of Sciences, Poland)
Text Categorization with the Concept of Fuzzy Set of Informative Keywords
Taeho C. Jo (Samsung SDS, Korea)

Flexible Queries in Object-oriented Databases: On the Study of Bags
Daniel Rocacher, François Connan (IRISA/ENSSAT, France)

**TM-2  Fuzzy Learning**

TM-2-1 *(invited special talk)*
Cooperation and Coordination Between Fuzzy Reinforcement Learning Agents in Continuous State Partially Observable Markov Decision Processes
Hamid R. Berenji, David Vengerov (NASA Ames Research Center, USA)

TM-2-2
Q-factor Map Matching Method Using Adaptive Fuzzy Network
Sinn Kim, Jong-Hwan Kim (Korea Advanced Institute of Science & Technology, Korea)

TM-2-3
An Efficient Learning Method of Fuzzy Inference System
Mu-Song Chen, RenJean Liou (Da-Yeh University, Taiwan)

TM-2-4
Performance Improvement of Evolution Strategies Using Reinforcement Learning
Sang-Hwan Lee, Hyo-Byung Jun, Kwee-Bo Sim (Chung-Ang University, Korea)

TM-2-5
A Generalized Net-Based Machine Learning Model of an Intuitionistic Fuzzy Abstract System
Hristo Ts. Aladjov, Krassimir T. Atanassov (Bulgarian Academy of Sciences, Bulgaria), Soon-Ki Kim, Ok-Bae Chang, Yung-Sung Kim (Chonbuk National University, Korea)

TM-2-6
Learning Fuzzy Control Rules by α Constrained Powell's Method
Tetsuyuki Takahama (Hiroshima City University, Japan), Setsuko Sakai (Hiroshima Shudo University, Japan)

**TM-3  Control Theory, Systems, and Applications (III)**

TM-3-1
Robot Manipulator Control with Soft Computing - Application of Adaptive Friction Models
Kazuo Kiguchi (Saga University, Japan), Toshio Fukuda (Nagoya University, Japan)

TM-3-2
Modelling Complex Dynamical Systems with a New Fuzzy Inference System for Differential Equations: The Case of Robotic Dynamic Systems
Oscar Castillo, Patricia Melin (Tijuana Institute of Technology, USA)

TM-3-3
Online Learning of Fuzzy Behaviours Using Genetic Algorithms & Real-Time Interaction with the Environment
Hani Hagras, Victor Callaghan, Martin Colley (Essex University, UK)
TM-3-4  
Visual Tracking for a Manipulator Using Fuzzy Rule-Based System  
Jae Seok Park, Jung Rae Ryoo, Myung Jin Chung (Korea Advanced Institute of Science & Technology, Korea)

TM-3-5  
Robot Motion Classification from the Standpoint of Learning Control  
Shaw-Ji Shiah, Kuu-young Young (National Chiao-Tung University, Taiwan)

TM-3-6  
Evolving Fuzzy Logic Controllers for Multiple Mobile Robots Solving a Continuous Pursuit Problem  
Il-Kwon Jeong (Electronics & Telecommunications Research Institute, Korea), Ju-Jang Lee (Korea Advanced Institute of Science & Technology, Korea)

TM-3-7  
Optimized Fuzzy Logic Controller Design for 4D Systems Using Cell State Space Technique with Reduced Mapping Error  
Feijun Song, Samuel M. Smith (Florida Atlantic University, USA), Charbel G. Rizk (The Boeing Company, USA)

TM-4  
Data and Decision Analysis (II)

TM-4-1  
Application of Fuzzy Time Series Analysis to Change Periods Detection  
Berlin Wu (National Chengchi University, Taiwan)

TM-4-2  
A Fuzzy Time Series Prediction Method Based on Consecutive Values  
Intaek Kim, Sung-Rock Lee (Myongji University, Korea)

TM-4-3  
A New Method for Evaluation of Design Alternatives Based on the Fuzzy Gray Relational Analysis  
Ting-Cheng Chang, Kun-Li Wen, Hsuan T. Chang, Mei-Li You (Chien Kuo Institute of Technology, Taiwan)

TM-4-4  
Multivariate Non-Linear Fuzzy Regression  
James J. Buckley (University of Alabama at Birmingham, USA), Thomas Feuring (University of Siegen, Germany), Yoichi Hayashi (Meiji University, Japan)

TM-4-5  
A Study for Second-order Modeling of Fuzzy Time Series  
Chao-Chih Tsai (National Tainan Teacher College, Taiwan), Shun-Jyh Wu (Saint John's & Saint Mary's Institute of Technology, Taiwan)

TM-4-6  
Multicriteria Analysis with Fuzzy Pairwise Comparison  
Hepu Deng (Monash University, Australia)

TM-4-7  
An Evaluation of an Accuracy of the Fuzzy Regression Analysis in the Electrical Load Estimation  
J. Nazarko, W. Zalewski (Bialystok Technical University, Poland)
TM-5  **Fuzzy Application (I)**

**TM-5-1**
Identification of Trash Types in Ginned Cotton Using Neuro Fuzzy Techniques
Murali Siddaiah *(New Mexico State University, USA)*, Michael A. Lieberman, S. E. Hughes *(USDA-ARS, USA)*, Nadipuram R. Prasad *(New Mexico State University, USA)*

**TM-5-2**
Application of Approximate Reasoning in Marine and Offshore Safety Engineering
Sil How Sing, M. Phil, T. Ruxton, Fi MarE *(Staffordshire University, UK)*, J. Wang *(Liverpool John Moores University, UK)*

**TM-5-3**
Predictive Fuzzy Explicit Rate Allocation (PFERA) for Traffic Control in ATM Networks
Seok-Yong Oh, Dong-Jo Park *(Korea Advanced Institute of Science & Technology, Korea)*

**TM-5-4**
Multicommodity Transportation Planning in Railway: Fuzzy Graph Approach
Rossana R. Mendes, Akebo Yamakami *(University of Campinas, Brazil)*

**TM-5-5**
Estimation of Optimal Green Time Simulation Using Fuzzy Neural Network
YouSik Hong, JongSoo Kim *(Sangji University, Korea)*, Kwangson Jeong *(Sangji Junior College, Korea)*, ChongKug Park *(Kyunghee University, Korea)*

**TM-5-6**
Advanced Control Schemes for Temperature Regulation of Air Heat Plant
T. Thyagarajan *(Crescent Engineering College, India)*, J. Shanmugam *(Anna University, India)*, M. Ponnaivaikko *(Crescent Engineering College, India)*, P. G. Rao *(Central Leather Research Institute, India)*

**TM-5-7**
Multi-Objective Fuzzy Scheduling with the OWA Operator for Handling Different Scheduling Criteria and Different Job Importance
Tadahiko Murata *(Ashikaga Institute of Technology, Japan)*, Hisao Ishibuchi *(Osaka Prefecture University, Japan)*, Mitsuo Gen *(Ashikaga Institute of Technology, Japan)*

**TM-6  Hybrid System (organized session)**

**TM-6-1**
Genetic-Algorithm-Based Approach to Linguistic Approximation of Nonlinear Functions with Many Input Variables
Hisao Ishibuchi, Tomoharu Nakashima *(Osaka Prefecture University, Japan)*

**TM-6-2**
Deriving Rules from Evolutionary Adapted Texture Filters by Neural Networks
Mario Köppen, Achim Zentner, Bertram Nickolay *(Fraunhofer-Institut IPK Berlin, Germany)*

**TM-6-3**
Rule-based Integration of Multiple Neural Networks Evolved Based on Cellular Automata
Geum-Beom Song, Sung-Bae Cho *(Yonsei University, Korea)*
TM-6-4
Soft Optimization with Fuzzy Weight Function
Rui-Ping Li (Caelum Research Corporation, USA), Fang-Fang Yin (Henry Ford Hospital, USA), Masao Mukaidono (Meiji University, Japan)

TM-6-5
Realization of Sound-scape Agent by the Fusion of Conceptual Fuzzy Sets and Ontology
Tomohiro Takagi, Shinichi Kasuya, Masao Mukaidono (Meiji University, Japan), Toru Yamaguchi (Utsunomiya University, Japan), Takashi Kokubo (Studio ION, Japan)

TM-6-6
A Proposal of Fuzzy Modeling for Dynamic Characteristics in State-Space Description
Ichiro Takeuchi, Takeshi Furuhashi (Nagoya University, Japan)

TA-1 Information Processing (II)

TA-1-1 (Invited special talk)
Fuzzy Logic for Linguistic Summarization of Databases
Janusz Kacprzyk (Polish Academy of Sciences, Poland)

TA-1-2
Information Fusion Based on Exponential Possibility Distributions
Peijun Guo, Hideo Tanaka (Osaka Prefecture University, Japan)

TA-1-3
Computational Model of Perceptual Information Processing
Atsushi Inoue (University of Cincinnati, USA), Anca L. Ralescu (RIKEN, Japan)

TA-1-4
A Software Safety Evaluation Method Based on Fuzzy Colored Petri Nets
Hanseong Son, Poonghyun Seong (Korea Advanced Institute of Science & Technology, Korea)

TA-1-5
A Fuzzy Approach to Goal Setting and Evaluation in Telecommunication Services
Long-Shuh Lin (Chunghwa Telecom Co., Ltd., Taiwan)

TA-1-6
A Support System Construction for Multimedia Information Data Acquisition
Kabsuk Oh (TongMyong College, Korea), Geuntaek Kang (Pukyong National University, Korea), Kaoru Hirota (Tokyo Institute of Technology, Japan)

TA-2 Signal/Image Processing and Computer (II)

TA-2-1 (Invited special talk)
Aspects of High Level Computer Vision Using Fuzzy Sets
James M. Keller (University of Missouri-Columbia, USA), Pascal Matsakis (Universite Paul Sabatier, France)

TA-2-2
MR Brain Image Segmentation Using Fuzzy Clustering
Ock-Kyung Yoon, Dong-Min Kwak (Kyungpook National University, Korea), Dong-Whee Kim (Taegu University, Korea), Kil-Houm Park (Kyungpook National University, Korea)
TA-2-3
Color Device Characterization of Electronic Cameras by Solving Adaptive Networks Nonlinear Least Squares Problems
Eiji Mizutani (University of California at Berkeley, USA), Kenichi Nishio, Naoya Katoh (Sony Corp. Personal IT Network Company, Japan), Michael Blasgen (Sony US Research Laboratories, USA)

TA-2-4
Geometrical Interpretation of Fuzzy Data and Shape Detection
Joon H. Han, Sung Y. Kim (Pohang University of Science & Technology, Korea)

TA-2-5
Shot Transition Detection with FAM-Based Fuzzy Inference
Seok-Woo Jang, Cheol-Ho Moon, Hyung-II Choi (Soongsil University, Korea)

TA-3 Control Theory, Systems, and Applications (IV)

TA-3-1
Fuzzy Control of Nonlinear Systems Using Two Standard Techniques
Reda Boukezzoula, Sylvie Galichet, Laurent Foulloy (Université de Savoie, France)

TA-3-2
Design of Optimal Controller for Nonlinear Systems Using Takagi-Sugeno Fuzzy Model
Choon-Young Lee, Ju-Jang Lee (KAIST, Korea)

TA-3-3
An Integrated Algorithm of Fuzzy Modeling and Controller Design for Nonlinear Systems
Kazuo Tanaka, Tsuyoshi Hori, Kazuo Yamafuji (The University of Electro-Communications, Japan), Hua O. Wang (Duke University, USA)

TA-3-4
Hyperbolic Approach to Fuzzy Modeling and Control
Michael Margaliot, Gideon Langholz (Tel Aviv University, Israel)

TA-3-5
A New PDC for Fuzzy Reference Models
Tadanari Taniguchi, Kazuo Tanaka, Kazuo Yamafuji (The University of Electro-Communications, Japan), Hua O. Wang (Duke University, USA)

TA-3-6
Intelligent Digitally Redesigned PAM Fuzzy Controller for Nonlinear Systems
Ho Jae Lee (Yonsei University, Korea), Young Hoon Joo (Kunsan University, Korea), Jin Bae Park (Yonsei University, Korea), Leang-San Shieh (University of Houston, USA)

TA-4 Data and Decision Analysis (III)

TA-4-1
A Simple Fuzzy Group Decision Making Method
Ching-Hsue Cheng (Chinese Military Academy, Taiwan)

TA-4-2
Fuzzy Inference-based Manager Evaluation of Venture Enterprises in Investment Decision Making
Lian Yu (Nagaoka University of Technology, Japan), Takashi Sekiguchi (Yokohama National University, Japan)
TA-4-3  
A New Fuzzy Synthetic Decision Model to Assist Advertisers Select Magazine Media  
Tsuen-Ho Hsu (I-Shou University, Taiwan), Tzung-Hsin Yang (National Cheng-Kung University, Taiwan)

TA-4-4  
Data-Driven Fuzzy Rule Induction and Its Application to Systems Monitoring  
Qiang Shen, Alexios Chouchoulas (University of Edinburgh, UK)

TA-4-5  
Time Series Prediction Using the Parallel-Structure Fuzzy System  
Min-Soo Kim, Seong-Gon Kong (Soongsil University, Korea)

TA-4-6  
Approximate Realization of Fuzzy Mappings by Regression Models, Neural Networks and Rule-Based Systems  
Hisao Ishibuchi, Manabu Nii, Chi-Hyon Oh (Osaka Prefecture University, Japan)

TA-5  Fuzzy Modelling (II)

TA-5-1  
A New Fuzzy Modeling Based on Input-Output Pseudolinearization and Walsh Function  
Jin-Tsong Jeng, Jeen-Fong Lin, Chen-Chia Chuang (Hwa-Hsia College of Technology & Commerce, Taiwan)

TA-5-2  
Constrained Parameter Estimation in Fuzzy Modeling  
J. Abonyi, R. Babuška, M. Setnes, H. B. Verbruggen (Delft University of Technology, The Netherlands),  
F. Szeifert (University of Veszprem, Hungary)

TA-5-3  
Fuzzy Models within Orthonormal Basis Function Framework  
G. H. C. Oliveira (LAS/CCET/PUCPR, Brazil), R. J. G. B. Campello, W. C. Amaral (DCA/FECC/UNICAMP, Brazil)

TA-5-4  
Structured Learning of Fuzzy Models for Reduction of Information Dimensionality  
Gancho Vachkov, Toshio Fukuda (Nagoya University, Japan)

TA-5-5  
Transformation of TSK Fuzzy System into Fuzzy System with Singleton Consequents and Its Application  
Yangbum Chae (Korea Maritime University, Korea), Kabsuk Oh (Tong Myong College, Korea),  
Wonchang Lee, Geuntaek Kang (Pukyong National University, Korea)

TA-5-6  
Fuzzy Sets - A Natural Way to Describe Power System Voltage Profile  
J. Curk (Iskra SYSEN, Slovenia), F. Gubina (University of Ljubljana, Slovenia)

TA-6  Incomplete/Imprecise Information Processing for Intelligent Systems (organized session)

TA-6-1  
Uncertainty and Display Management of Interface Agent under Time-Critical Situations  
Tetsuo Sawaragi, Teruyuki Ogura (Kyoto University, Japan)
Sensory Network for Fuzzy Controller of a Mobile Robot
Naoyuki Kubota, Toshihito Morioka (Osaka Institute of Technology, Japan), Fumio Kojima (Kobe University, Japan), Toshio Fukuda (Nagoya University, Japan)

Hiroshi Ohno (Toyota Central Research & Development Labs., Inc., Japan), Takeshi Furuhashi (Nagoya University, Japan)

Sparse Fitness Evaluation for Reducing User Burden in Interactive Genetic Algorithm
Joo-Young Lee, Sung-Bae Cho (Yonsei University, Korea)

A Study for Complexity of Chaotic Time Series and Prediction Accuracy
Tadashi Iokibe, Masaya Koyama, Minako Taniguchi (Meidensha Corporation, Japan)

Fuzzy Hierarchical Analysis
James J. Buckley (University of Alabama at Birmingham, USA), Thomas Feuring (University of Siegen, Germany), Yoichi Hayashi (Meiji University, Japan)

The Chain Variation of Non-additive Set Functions
Qiang Zhang (Northern Jiaotong University, China), Baoding Liu (Tsinghua University, China), Guozhong Ma (Southwest Jiaotong University, China)

Powers of t-norms
Carol L. Walker, Elbert A. Walker (New Mexico State University, USA)

Sobolev Approximation by means of Fuzzy Systems with Overlapping Gaussian Concepts
G. Ferrari-Trecate (Swiss Federal Institute of Technology, Switzerland), R. Rovatti (University of Bologna, Italy)

A Method for Describing the Rank of a Fuzzy Number and the k-th Largest Fuzzy Number with Fuzzy Sets
Jee-Hyong Lee, Kwang-Hyung Lee (KAIST, Korea), Keon-Myong Lee (Chungbuk National University, Korea)

A Fuzzy Correlation Coefficient for Fuzzy Random Variables
Norio Watanabe (Chuo University, Japan), Tadashi Imaizumi (Tama University, Japan)
On Generalized Net-Models of Intuitionistic Fuzzy Abstract System
Valentina V. Radeva, Krassimir T. Atanassov (Bulgarian Academy of Sciences, Bulgaria), Soon-Ki Kim, Ok-Bae Chang, Yung-Sung Kim (Chonbuk National University, Korea)

On Fuzzy Upper and Lower Semi-continuous Mappings
K. Hur, J. H. Ryou, Y. S. Ahn (Wonkwang University, Korea)

Analytical Structure of Hierarchical Discrimination
A. Ramer (University of New South Wales, Australia), B. Bouchon-Meunier, C. Marsala (Université P. et M. Curie, France)

Pattern Recognition and Clustering

Unsupervised Fuzzy Classification Method Based on a Fuzzy Proximity Graph and on a Graduated Hierarchy
Billaudel Patrice, Devillez Arnaud, Gérard Villermain Lecolier (Laboratoire d' Automatique et de Microélectronique, France)

Mandarin Four-tone Recognition with the Fuzzy C-means Algorithm
Jingjiao Li, Xiaodong Xia (Technology Center of HiSense Group, China), Shusheng Gu (Northeastern University, China)

A Neuro-Fuzzy Classifier for Land Cover Classification
Sang Gu Lee (Hannam University, Korea), Jong Gyu Han, Kwang Hoon Chi, Jae Young Suh (K/GAM, Korea), Hee Hyol Lee (Fukuoka Institute of Technology, Japan), Michio Miyazaki (Kanto Gakuin University, Japan), Kageo Akizuki (Waseda University, Japan)

Similar Objects and Groups Extraction from a Fuzzy Relation
Samir Elloumi (Campus Universitaire, Tunisia), Ali Jaoua (King Fahd University for Petroleum and Minerals, Saudi Arabia)

Clustering with Unconstrained Hyperboxes
F. M. Frattale Mascioli, A. Rizzi, M. Panella, G. Martinelli (University of Rome "La Sapienza", Italy)

Design of a Binary Decision Tree Using the Genetic Algorithm and K-means Algorithm for Recognition of the Defect Patterns of Cold Mill Strip
Kyoung Min Kim (Yosu National University, Korea), Byung Jin Lee, Kyoung Lyou, Gwi Tae Park (Korea University, Korea)

Implementation of the Recognition System of the Korean Stenographic Characters by Error Back Propagation Algorithm
Sang-Keun Kim (Kookmin University, Korea)
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<td>The Occam's Razor Principle for Degenerate Selfguessing Fuzzy Classifiers</td>
<td>Sergei Vatlin (<em>Belarusian Research Center for Medical Technologies, Computer Systems, Belarus</em>)</td>
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<td>D. Alahakoon (<em>Monash University, Australia</em>), S. K. Halgamuge (<em>University of Melbourne, Australia</em>), B. Srinivasan (<em>Monash University, Australia</em>)</td>
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<td>D. Abu-al-nadi, D. Popovic (<em>University of Bremen, Germany</em>)</td>
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<td>Tito G. Amaral (<em>Polytechnic Institute of Setúbal, Portugal</em>), Manuel M. Crisóstomo, A. Traça de Almeida (<em>University of Coimbra, Portugal</em>)</td>
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<td>Chang-Hoon Shin (<em>Chongju University, Korea</em>), Yoon-Ho Kim (<em>Mokwon University, Korea</em>), Myung-Kil Lee (<em>Daeduk College, Korea</em>), Joo-Shin Lee (<em>Chongju University, Korea</em>)</td>
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**Information Processing**

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<td>Justification of Heuristic Methods in Data Processing Using Fuzzy Theory, with Applications to Detection of Business Cycles from Fuzzy Data</td>
<td>Vladik Kreinovich (<em>University of Texas at El Paso, USA</em>), Hung T. Nguyen (<em>New Mexico State University, USA</em>), Berlin Wu (<em>National Chengchi University, Taiwan</em>)</td>
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Hiroshi Maeda (Kyushu Institute of Technology, Japan), Kouichiro Haro (Hitachi Co., Ltd., Japan), Norikazu Ikoma (Kyushu Institute of Technology, Japan)

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Mi Hee Yoon, Yong Ik Yoon, Kio Chung Kim (Sookmyung Women’s University, Korea)

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Richard Satur, Zhi-Qiang Liu (The University of Melbourne, Australia)

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Hybrid Coordination Agent Model Based on a Fuzzy Decision Method  
Young-Phil Choi (LG Information & Communications, Ltd., Korea), Kyung-Whan Oh (Sogang University, Korea)

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An Aggregation Model via Fuzzy Linear Programming to Rank the Objects with Multiple Attributes  
Peijun Guo, Hideo Tanaka (Osaka Prefecture University, Japan), Masahiro Inuiguchi (Osaka University, Japan)

PT-34  
A System Identifier Generating the Fourier Series for Periodic Dynamical Systems  
Byung Soo Moon, Seok Boong Hong (Korea Atomic Energy Research Institute, Korea)

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Fuzzy Modelling for a Combined Cycle Power Plant  
Doris Sáez, Aldo Cipriano (Catholic University of Chile, Chile)

PT-36  
Extension of the Subset Interactive AR Model Using Non-monotonic Fuzzy Measures  
Soon H. Kwon (Yeungnam University, Korea), M. Sugeno (Tokyo Institute of Technology, Japan)

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Mean-Variance Analysis of Agricultural Management Based on a Boltzmann Machine  
Takayuki Kawaura, Junzo Watada (Osaka Institute of Technology, Japan)