# Table of Contents

A Global Representation Scheme for Genetic Algorithms ........ 1  
*J. J. Collins and M. Eaton*

Genetic Algorithms, Schemata Construction and Statistics ........ 16  
*Al. Agapie and D. Caragea*

Adaptive Non-uniform Mutation for Genetic Algorithms .......... 24  
*A. Neubauer*

Structure Identification of Functional-Type Fuzzy Models with  
Application to Modeling Nonlinear Dynamic Plants .......... 35  
*P. Kortmann and H. Unbehauen*

Identification of Systems Using Radial Basis Networks Feedbacked  
with FIR Filters ............................................. 46  
*L. Boquete, R. Barea, R. García, M. Mazo and J. A. Bernad*

A Novel Neurocomputing Approach to Nonlinear Stochastic State  
Estimation .................................................. 52  
*M. B. Menhaj and F. R. Salmasi*

A Toolset for the Design of Analogous Fuzzy-Hardware .......... 61  
*S. Triebel, J. Kelber and G. Scarbata*

Genetic Algorithms with Optimal Structure Applied to Evolvable  
HardWare (EHW) ............................................ 69  
*D. Mihaila*

Position Control System with Fuzzy Microprocessor AL220 .......... 74  
*B. Butkiewicz*

Fuzzy-Neural Computing Systems: Recent Developments and  
Future Directions ........................................... 82  
*M. M. Gupta (Invited Lecture)*

Optimizing the Self-Organizing-Process of Topology Maps .......... 92  
*K. Haese*

Syntactical Self-Organizing Map ................................ 101  
*O. Grigore*

On-Line Learning Based on Adaptive Similarity and Fixed  
Size Rule Base ............................................. 110  
*J. M. Dias and A. D. Correia*
Ability of Fuzzy Constraint Networks to Reduce the Dynamic of Changes in Product Development ........................................ 122
W. Eversheim, A. Roggatz and R. E. Young

A Novel Neural Network Technique for Modeling Data Containing Multiple Functions ........................................ 141
O. M. Lewis and J. A. Ware

Using Genetic Engineering to Find Modular Structures and Activation Functions for Architectures of Artificial Neural Networks .................................................................................. 150
Ch. M. Friedrich and C. Moraga

Genetic Algorithms for Solving Systems of Fuzzy Relational Equations ........................................................................ 162
M. Giuclea and Al. Agapie

On the Chaining of Fuzzy IF-THEN Rule Bases Interpreted by the Principle FATI – II. The Case of Non-singleton Inputs ........ 168
K.-H. Temme and H. Thiele

Chaining Syllogism Applied to Fuzzy IF-THEN Rules and Rule Bases .................................................................................. 179
Ch. Igel and K.-H. Temme

Computational Properties of Fuzzy Logic Deduction ..................... 189
A. Dvořák

Fuzzy Diagnosis of Float-Glass Production Furnace ................. 197
L. Spaanenburg, H. TerHaseborg and J. A. G. Nijhuis

Application of Fuzzy Control to Fed-Batch Yeast Fermentation .... 207
N. Besli, E. Gul and M. Türker

Adaptation, Learning and Evolutionary Computing for Intelligent Robots ................................................................. 217
T. Fukuda and K. Shimojima (Invited Lecture)

About Linguistic Negation of Nuanced Property in Declarative Modeling in Image Synthesis ........................................... 229
D. Pacholczyk

Fuzzy Clustering and Images Reduction .................................... 241
A. F. Gómez-Skarmeta, J. Piernas and M. Delgado

Predicates and Superimposed Coding: An Application to Image Recognition ........................................................... 250
B.-J. Falkowski
Locally Adaptive Fuzzy Image Enhancement .......................... 272
H. R. Tizhoosh, G. Krell and B. Michaelis

Fuzzy Modeling of Conceptual Spaces ............................... 277
S. Adrian

Construction of a Fuzzy Model with Few Examples .................. 285
F. Benmakrouha

Rare Fault Detection by Possibilistic Reasoning ..................... 294
M. Thomas, A. Kanstein and K. Goser

Fuzzy Zeros and Indistinguishability of Real Numbers ............... 299
B. De Baets, M. Mareš and R. Mesiar

Detection of Sleep with New Preprocessing Methods for EEG Analyzing ............................................................... 304
A. Berger, D. P. F. Möller and M. Reuter

Application of Evolutionary Algorithms to the Problem of New Clustering of Psychological Categories Using Real Clinical Data Sets ................................................................. 311
Th. Villmann, B. Villmann and C. Albani

Forecasting Sales Using Neural Networks ................................ 321
F. M. Thiesing and O. Vornberger

Word-Concept Clusters in a Legal Document Collection ............. 329
T. D. Gedeon, R. A. Bustos, B. J. Briedis, G. Greenleaf and A. Mowbray

A Retrospective View and Outlook on Evolutionary Algorithms ...... 337
L. J. Fogel (Invited Lecture)

A Self-Tuning Fuzzy Controller ........................................... 343
S. K. Pandey

A New Type of Fuzzy Logic System for Adaptive Modeling and Control ................................................................. 363
J. Zhang, A. Knoll and K. V. Le

Scalar Optimization with Linear and Nonlinear Constraints Using Evolution Strategies ............................................. 381
T. Th. Binh and U. Korn

Continuous Control of a Synchronous Generator’s Active and Reactive Power Connected to Network by Using Fuzzy Neural Networks Algorithms ............................................. 393
M. Tanrıöven, C. Kocatepe and M. Uzunoğlu
Design of Adaptive Fuzzy Controller for Bolu Highway Tunnel Ventilation System .................................................. 403
E. Karakaş, H. Külık, E. Özdemir, E. Ölçer and B. Karagöz

Layered Neural Networks as Universal Approximators .......... 411
I. Ciucu and J. A. Ware

Fuzzy Backpropagation Training of Neural Networks .......... 416
M. Gerke and H. Hoyer

Fuzzy and Neural Network Controller – A New Tool for Stability Analysis ......................................................... 428
A. Simon

Evolution Strategies Applied to Controls on a Two Axis Robot . . . 434
R. Richter and W. Hofmann

Purposeful and Reactive Navigation Based on Qualitative Path Planning and Fuzzy Logic ........................................ 444
E. Stroulia, D. Schneider and E. Prassler

Application of the Approximate Fuzzy Reasoning Based on Interpolation in the Vague Environment of the Fuzzy Rulebase in the Fuzzy Logic Controlled Path Tracking Strategy of Differential Steered AGVs .......... 456
S. Kovács and L. T. Kóczy

An Approach for Data Analysis and Forecasting with Neuro Fuzzy Systems – Demonstrated on Flood Events at River Mosel ................................................................. 468
M. Stüber and P. Gemmar

Identification of Waste Water Treatment Plant Using Neural Networks ............................................................. 478
I. I. Voutchkov and K. D. Velev

Fuzzy Logic Based Control of Switched Reluctance Motor to Reduce Torque Ripple ........................................ 484
A. Derdiyok, N. İnanç, V. Özbulur, H. Pastaci and M. O. Bilgic

Fuzzy Logic Control of High Voltage DC Transmission System . . 492
E. Ölçer, B. Karagöz, H. Dincer, E. Özdemir and E. Karakaş

Compensation for Unbalances at Magnetic Bearings .......... 501
M. Paul and W. Hofmann

Supervised Classification of Remotely Sensed Images Based on Fuzzy Sets .................................................. 510
P. Sinčák
An Adjusted Evolutionary Algorithm for the Optimization of Fuzzy Controllers.......................... 517  
S. Wagner and H.-D. Kochs

Power Factor Correction in Power Systems Having Load Asymmetry by Using Fuzzy Logic Controller.............. 529  
M. Tanrıöven, C. Kocatepe, A. Ünal

Fuzzy Partitions in Learning from Examples.............................. 536  
W. Traczyk

Poster Abstracts

Economic Forecasting Using Genetic Algorithms .................... 543  
Ad. Agapie and Al. Agapie

Interactive Genetic Algorithms and Evolution Based Cooperative Problem-Solving.............. 545  
J. Albert and J. Schoof

A Fuzzy Model Based Control of Well Mixed Reactor with Cooling Jacket............................. 546  
M. Alpbaz, Z. Zeybek, L. Özbek and F. Aliev

Optimizing Video Signal Processing Algorithms by Evolution Strategies.......................... 547  
H. Blume, O. Franzen, M. Schmidt

An Example for Decision Support in Insurance.................. 549  
I. Borgulya

Fuzzy Identification of Distributed Components............. 550  
E. Damiani, M. G. Fugini

Neural Control of a Nonlinear Elastic Two-Mass System........ 553  
M. Englert, R. Trapp and R. de Klerk

A Learning Fuzzy System for Predicting Overshootings in Process Control.................. 554  
B. Freisleben, St. Strelen

ANN-based Power Unit Protective System............................ 556  
A. Halinka, M. Szewczyk and B. Witek

A Scheduling Problem with Multicriteria Evaluation............. 558  
I. Hamburg and L. Marin
Hardware Implementation of a Mixed Analog-Digital Neuron Network ........................................... 560
R. Izak, K. Trott, Th. Zahn and U. Markl

A Fuzzy Segmentation Method for Digital Substract Angiograms Analysis ........................................... 561
M. C. Jaulent, V. Bombardier, A. Bubel and J. Brémont

Application of Genetic Algorithms to Computer Assignment Problem in Distributed Hard Real-Time Systems .... 564
J. Martyna

Local Search for Computing Normal Circumstances Models ......................................................... 565
B. Mazure, L. Saiës and É. Grégoire

A Graphical Tool for Implementing Neural Networks for Digital Signal Processing on Parallel Computers .................. 567
C. J. O’Driscoll and J. G. Keating

Fuzzy Guidance Controller for Paraglider ................................................................. 568
V. Penev

An Efficient Algorithm Approximately Solving the General Routing Problem in Graphs ................................. 570
P. Richter

Design of a Method for Machine Scheduling for Core Blowers in Foundries ........................................ 572
M. Rüttgers

Paragen II: Evolving Parallel Transformation Rules ................................................................. 573
C. Ryan and P. Walsh

Alarm Optimizing by Fuzzy Logic in Preterm Infants Monitoring ..................................................... 574

Supervised Learning of Fuzzy Tree Hypotheses ................................................................. 575
Ch. Schommer and M. Stemmler

A Fuzzy Neural Network Sensor for Fermentation Processes ..................................................... 577
Ma. Soufian and Mu. Soufian

Convex Fuzzy Restriction  ........................................................................................................... 579
A. Tankeh and E. H. Mamdani

Genetic Programming in Optimization of Algorithms ................................................................. 581
P. Wasiewicz and J. Mulawka
Application of Fuzzy Logic in Solving Problems from the Area of Reliability and Maintenance of Aircraft Systems

M. Živaljević and B. Rašuo

A Fuzzy Based Texture Retrieval System That Considers Psychological Aspects

M. Köppen and J. Ruiz-del-Solar

Neuro-fuzzy Approach for Electro-discharge Sinking Process Control

F. Klocke, R. Raabe and G. Wiesner

Simulation of Analogue Electronic Circuits Using Fuzzy Curves

Ch. Reich

Correlated Activity Pruning (CAPing)

C. M. Roadknight, D. Palmer-Brown and G. E. Mills

Fuzzy Control Design of an Activated Sludge Plant

O. Georgieva

Use of Fuzzy Objects for Statistical Description of Discrete Systems with Complex Behavior

S. Barabash

On Applying Genetic Algorithms to an Intelligent Sliding-Mode Control System Training

M. Cistelecan

Neural Networks and Edge Detection

P. Heirman, R. Serneels

Design Elements of EHW Using GA with Local Improvement of Chromosomes

M. Gh. Negoita, A. H. Dediu, D. Mihaila

ANN and Fuzzy Logic Applied to Control of Disturbances in Mechatronics System

T. S. Matuszek and S. Grymek

Index