

Fuzzy Sets, Fuzzy Engineering and Applications

in the Research Group

"Fuzzy Engineering"

at the Polytechnical Institute of Iasi (IPI) Dept. of Electronics, and
Romanian Academy - Institute for Computing Technique (ITC) Iasi, Romania

Members of the Research Group (April 90)

A. From IPI

H.N.Teodorescu	Assoc. Professor in Electronics
J.Tofan	Assoc. Professor in Mathematics
S.Nistor	Assoc. Professor in Mathematics
S.Bogdan	Assoc. Professor in Electrotechnics
C.Posa	Assoc. Professor in Electronics

B. From ITC

M.Chelaru	Senior Researcher, engineer
C.Dumitrascu	Senior Researcher, engineer
C.Gherasim	Engineer

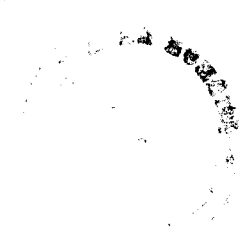
In the group are yearly indented students preparing their MS thesis.

All members of the group are also members of the Romanian Society for Fuzzy Systems (RSFS). Most of them are also members of the Romanian Scientists Association and of AMSE France.

Dr. H.N.Teodorescu is Executive Vice-President RSFS and Chairman of Technical Group for Fuzzy Systems AMSE, France. He chaired two international Symposia on fuzzy systems and also chaired many sessions at international conferences. He authored more than 60 scientific papers and is reviewer to five international journals.

Dr. J.Tofan is Scientific Secretary RSFS.

M.Chelaru is Secretary of the Fuzzy Engineering Commission RSFS.



TOPICS

- Fundamentals
- Control fuzzy systems implementation
- Adaptive fuzzy controllers
- Fuzzy modelling
- Arithmetic fuzzy systems and signals
- Applications
- Education in fuzzy systems

Fundamentals

Researchers H.N.Teodorescu, J.Tofan, S.Nistor

Topics under investigation include:

- Categorical foundations of recognition processes
- Fuzzy systems basical theory

References

- H.N.Teodorescu, J.Tofan - A categorical frame for fuzzy recognition, East European Category Seminar, 1989, Predela, Bulgaria
- H.N.Teodorescu, J.Tofan - Fuzzy recognition morphisms, East European Category Seminar, 1990, Predela, Bulgaria
- H.N.Teodorescu - Robustness in terms of fuzziness, in vol. Second IFSA Congress, Tokio, Japan, July 20-25, 1987, pp 733-736
- H.N.Teodorescu - Binary-like codes for trapezoidal fuzzy numbers, in Proc. 3rd IFSA Congress, Washington, USA, 1989

Control fuzzy systems implementation

Researchers H.N.Teodorescu, M.Chelaru, S.Bogdan, C.Gherasim, C.Dumitrascu

Topics under investigation include:

- Specific fuzzy implication operators
- Fast analytical methods for defuzzification
- Parallel computation of the system rules for fuzzy linguistic systems
- look-up table methods for hardware implementation
- Software for the simulation of fuzzy controlled closed-loop systems on IBM-PC
- Fuzzy PLLs

References

- H.N.Teodorescu, M.Chelaru - A fast method for the fuzzy systems implementation, in Proc. of AMSE Conf. on Systems and Signals, Brighton, UK, 1989, pp 101-109
- C.Gherasim, H.N.Teodorescu - Asymmetric fuzzy implication (in Romanian) 1st Coloquia on Fuzzy Sets and Systems, Iasi, Romania, 22 oct. 1989
- C.Gherasim, H.N.Teodorescu - Asymmetric fuzzy implication, paper submitted to IIZUKA Conf. on Fuzzy Systems, 22-25 July 1990, Japan
- S.Bogdan, H.N.Teodorescu - Fuzzy Plls, paper submitted to IIZUKA Conf. on Fuzzy Systems, 22-25 July 1990, Japan
- M.Chelaru, H.N.Teodorescu - Software implementation of linguistic systems (in Romanian) in vol. Fuzzy Sets and Systems, H.N.Teodorescu Ed., Iasi Romania, 1989

Adaptive fuzzy controllers

Researchers H.N.Teodorescu, M.Chelaru, S.Bogdan

Topics under investigation include:

- Adaptive linguistic controllers with the fuzzy relation adaptation by using similarity measures
- Fuzzy adaptive filters for control applications
- Adaptive fuzzy controllers with local linear control rules
- Adaptive linear combiner with fuzzy controlled adaptation algorithms
- Adaptive fuzzy PLLs

References

- M.Chelaru, H.N.Teodorescu - A fuzzy LMS algorithm, paper submitted to IIZUKA Conf. on Fuzzy Systems, 22-25 July, Japan, 1990
- M.Chelaru, H.N.Teodorescu - A new algorithm for the fuzzy adaptive control, paper submitted to AMSE Conf. on Fuzzy Systems, Cetinje, Jugoslavia, 3-5 Sept 1990
- S.Bogdan, H.N.Teodorescu - Fuzzy PLLs, paper submitted to IIZUKA Conf. on Fuzzy Systems, 22-25 July 1990, Japan

Fuzzy modelling

Researchers H.N.Teodorescu, M.Chelaru, C.Dumitrascu

Topics under investigation include:

- Fuzzy modelling by using fuzzy relational equations
- Pattern oriented fuzzy modelling

References

- G.Jumarie, H.N.Teodorescu - Modelling with minimum entropy, in Book oh Abstracts Int. Conf. "Modelling and Simulation", Istanbul, Turkey, July 1988, vol. 1, p. 178
- H.N.Teodorescu et al. - Fuzzy models in speech analysis and medical applications, in Book of Abstracts Int. Conf. "Modelling and Simulation", Istanbul, Turkey, July 1988, vol.1, p 162
- H.N.Teodorescu - Pattern oriented robust fuzzy filtering of imges, in vol. Proc. of IIZUKA Conf. on Fuzzy Systems, Kiushu, Japan, 1988

Applications

Researchers H.N.Teodorescu, S.Bogdan, M.Chelaru, C.Dumitrascu, C.Gherasim

Topics under investigation include:

- Fuzzy PLL systems
- Adaptive fuzzy controllers for time-variant linear systems
- Fuzzy control for the adaptation of the lineae combiner
- Fuzzy systems for signal classification

References

- H.N.Teodorescu et al. - Fuzzy methods in assessing noise hazard in medical acoustics, in Proc. Noise Control'88, crakow, Poland
- H.N.Teodorescu et al. - Fuzzy models in speech analysis and medical applications, Book of Abstracts Int. Conf. "Modelling and Simulation", Istanbul Turkey, July 1988, p.162
- H.N.Teodorescu - Pattern-oriented robust filtering of images, in vol.Archives of the 10th ISPRS Congress, Kyoto, Japan, July 1-10 1988
- H.N.Teodorescu - Sigma-counts in fuzzy pattern recognition, Int. Conf. on Expert Systems Applications (EXEPERSYS'89), Paris, Oct. 23-24 1989

Arithmetic fuzzy systems and signals

Researchers H.N.Teodorescu, J.Tofan, M.Chelaru

Topics under investigation include:

- Decomposition of fuzzy numbers
- Properties of numerical fuzzy signals
- Basical theory of numerical fuzzy systems

References

- H.N.Teodorescu - Fuzzy methods in signal processing, BUSEFAL nr.36, 1988, pp 156-161
- H.N.Teodorescu - Pattern-oriented robust fuzzy filtering - Digital methods, Preprints IIZUKA'88, pp 59-60
- H.N.Teodorescu - Properties of the binary codes for fuzzy numbers (in Romanian) Proc. IPI'88 Symposium, pp 424-429
- H.N.Teodorescu - Congruences of fuzzy numbers, Poznan Seminar Proc., 1988
- H.N.Teodorescu - Binary representation of fuzzy numbers, Research Report WG - FSS RR 05-90, Polytechnic Institute of Iasi, 1990

Education in fuzzy systems

Active individuals : H.N.Teodorescu, J.Tofan, M.Chelaru, S.Nistor

Topics of activity:

- Curricula in fuzzy systems theory and applications for undergraduate and graduate students and for continuing education for students in mathematics, engineering and medical sciences
- Textbooks, demonstration software, collection of problems

References

- H.N.Teodorescu, M.Chelaru, D.Gâlea, S.Nistor, J.Tofan - Fuzzy systems and applications, Textbook (in Romanian), Iasi, 1989, Romania
- H.N.Teodorescu - Education in fuzzy systems, Resarch Report RR - WG 03 - 90, Iasi Polytecnic Institute.

The Group looks for research co-operation with other groups from abroad, including Contract-based co-operation in all fields of fuzzy systems. Although the above described research topics are of primary interest, other fields, such as knowledge bases and fuzzy expert systems are also envisaged.

Members of the group are also available for conferences and lectures abroad, as well as for participation as lecturers in summer schools, exchange of scientific literature, editing textbooks and translation of books.

Mailing Addresses

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