

RECENT DEVELOPMENT OF DIFFERENT BRANCHES OF THEORETICAL AND APPLIED MATHEMATICS IN THE CONTEXT OF FUZZY SETS

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After the inception of the concept of a fuzzy set in 1965 by L. Zadeh [1] and its extension in 1967 to the concept of a lattice-valued, or an L-fuzzy set by J. A. Goguen [2] the attention of many mathematicians working both in theoretical and applied branches of mathematics was directed to the development of the counterparts of these branches in the context of (L-)fuzzy sets. On the other hand, the researchers working in other fields of science, found the concept of a fuzzy set as an important alternative to the probabilistic methods of research. Methods of research based on fuzzy sets are effective in particular in cases when one has to encounter problems caused by vagueness or uncertainty, whose nature is not of the probabilistic origin. In this talk we shall give a very brief survey of theoretical aspects of fuzzy sets and their role in different branches of mathematics and its applications. In particular, we plan to touch the following items:

1. A short introduction into the prehistory and the history of fuzzy sets.
2. The concept of a fuzzy set. Fuzzy numbers, fuzzy quantities and operations with them.
3. Fuzzy sets as the basis for fuzzy logics.
4. Topological and algebraic structures in the context of fuzzy sets.
5. Fuzzy measures and integrals.
6. Fuzzy algebraic equations. Fuzzy differential equations.
7. Modelling in fuzzy environment. Decision making in fuzzy environment.
8. Applications of fuzzy sets in other fields of science and in industry.
9. Research work done in the field of "Fuzzy Mathematics" at the University of Latvia.

REFERENCES

- [1] L. Zadeh. Fuzzy Sets. *Inform. and Control*, **8** :338–353, 1965.
[2] J.A. Goguen. L-Fuzzy Sets. *J. Math. Anal. Appl.*, **18** :145–174, 1967.