

On fuzzy natural logic and its applications

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L. A. Zadeh, the founder of the fuzzy set theory, demonstrated in many of his papers that his approach makes it possible to develop a unique mathematical model of the semantics of some expressions of natural language and to apply it in solution of various practical problems. Recall one of the most successful applications — the fuzzy control in which control is realized by transforming operators (i.e., expert) knowledge formulated in natural language into an algorithm.

The fundamental role in these applications is played by expressions of natural language such as “small, very weak, medium, extremely large, significantly expensive” etc. Recall that they form a special class of linguistic expressions called *evaluative linguistic expressions*. In this talk, we will place them into a wider program of the so-called *Fuzzy Natural Logic* (FNL). Its goal is to develop a mathematical model of human reasoning whose typical feature is the use of natural language. Among results of FNL, besides the theory of evaluative expressions, belongs also sophisticated theory of intermediate (linguistic) quantifiers, or a special inference method called *Perception-based Logic Deduction* (PbLD), which provides the algorithm that behaves as if “understanding” linguistic expressions.

Besides the above theory, we also mention applications of FNL in control, multiple-criteria decision-making, forecasting, and mining information from time series.