

Abstract: Fuzzy logic is a noble formal logical theory that non-trivially generalizes classical logic and provides models of various problems in which significant role is played by vagueness. In this lecture, we will present some of the main concepts of fuzzy logic and then focus on fuzzy IF-THEN rules as the principal tool of fuzzy logic applications. Sets of such rules are called linguistic descriptions. We will show that linguistic descriptions are in the theory of approximate reasoning used in one of two principal areas:

1. To approximate functions that are known only roughly.
2. To deduce conclusions in human way when linguistic descriptions are interpreted as sets of genuine conditional linguistic expressions.

We will show that logical deduction based on linguistic descriptions has the ability to mimic human way of reasoning since different linguistic expressions such as "small, very small, medium, big" are distinguished and appropriately elaborated. The principle is implemented in the software package LFLC 2000 which has been successfully applied to control and decision-making. We will demonstrate some of the properties of this method during the lecture.