

Interpretability of Linguistic Variables: A Formal Account.

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Abstract: This contribution is concerned with the interpretability of fuzzy rule-based systems. While this property is widely considered to be a crucial one in fuzzy rule-based modeling, a more detailed formal investigation of what “interpretability” actually means is not available. So far, interpretability has most often been associated with rather heuristic assumptions about shape and mutual overlapping of fuzzy membership functions. In this paper, we attempt to approach this problem from a more general and formal point of view. First, we clarify what the different aspects of interpretability are in our opinion. Consequently, we propose an axiomatic framework for dealing with the interpretability of linguistic variables (in Zadeh’s original sense) which is underlined by examples and application aspects, such as, fuzzy systems design aid, data-driven learning and tuning, and rule base simplification.

Keywords: fuzzy modeling; interpretability; linguistic variable; machine learning;

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