INVOLVING FUZZY ORDER IN THE DEFINITION OF MONOTONICITY FOR THE AGGREGATION PROCESS

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Since the introduction of the concept of a fuzzy set by L. A. Zadeh [4] and its generalization by J. A. Goguen [2], fuzzy analogues of basic concepts of classical mathematics were introduced and investigated, fuzzy relations [5] among them. In the last years theoretical results obtained in the theory of fuzzy relations were involved for solving problems of practical nature (see eg.[1]). The aim of this work is to involve fuzzy order relation in the study of aggregation process (see eg.[3]). Namely, we use the fuzzy order relation instead of the crisp order relation in the definition of monotonicity. Recall that aggregation function is a mapping satisfying boundary conditions and the condition of monotonicity. In this work we focus only on the condition of monotonicity and define the degree of monotonicity in the following way:

**Definition 1.** Let \( f : [0, 1]^n \to [0, 1] \) be a function (aggregation function), \( P : [0, 1]^2 \to [0, 1] \) be a fuzzy order relation and \( \Rightarrow_T \) the residuum corresponding to a t-norm \( T : [0, 1]^2 \to [0, 1] \).
We define the degree of monotonicity for a function (aggregation function) \( f \) w.r.t fuzzy relation \( P \) and residuum \( \Rightarrow_T \) in the following way:

\[
M_{P, \Rightarrow_T}(f) = \inf_{x,y}(\land_i P(x_i, y_i) \Rightarrow_T P(f(x), f(y))).
\]

After giving main definitions we illustrate the introduced notions by examples and study the properties of aggregation functions which have a certain degree of monotonicity.

**REFERENCES**


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