

Towards a General Class of Operators for Fuzzy Systems

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Abstract

Our starting point is the multiplicative utility function which is extensively used in the theory of multicriteria decision making. Its associativity is shown and as its generalization a class of operators is introduced with fine and useful properties. As special cases it reduces to well-known operators of fuzzy set theory: min/max, product, Einstein, Hamacher, Dombi and drastic. As a consequence, we generalize the addition of velocities in Einstein's special relativity theory to multiple moving objects. Also, a new form of the Hamacher operator is given, which makes multi-argument calculations easier. We examine the De Morgan identity which connects the conjunctive and disjunctive operators by a negation. It is shown that in some special cases (min/max, drastic and Dombi) the operator class forms a De Morgan triple with any involutive negation.

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