

The Generalized Dombi operator family and the multiplicative utility function

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Abstract

We start with the multiplicative utility function and we show its associativity. On this basis we construct a general method to develop strict t-norms.

Our main objective is to introduce a class of generalized operators which includes most of the well-known operators. This class is a two-parametrical family of operators which generalize the Dombi operators by preserving its main properties. This operator class contains the product, the Hamacher operators, the Einstein operators and as a limit we can get the min-max and drastic operators, too.

As a corollary of the multivariate Einstein operator we get the closed form of the additivity law of velocities in the framework of special relativity theory. We give a new form of the Hamacher operator family, with which its multivariate case can be handled more easily.

Finally we show the form of the weighted operator and the impacts of the weights for the min, max operators and for the drastic operator.

Keywords: Terms-triangular norms, Einstein, Hamacher, product, Dombi, drastic, min-max, multiplicative utility function