De Baets, Bernard; **Marková-Stupňanová, Andrea**
Analytical expressions for the addition of fuzzy intervals. (English) Zbl 0919.04005
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Summary: The addition of fuzzy quantities is undeniably the most important operation in fuzzy arithmetic. In this paper, we consider the general case of the addition of fuzzy intervals based on a continuous triangular norm. We start our discussion with an extensive literature review in which we recall explicit formulae for the addition based on the strongest and the weakest triangular norm, for the addition based on the algebraic product, and several recent results for the addition based on a continuous Archimedean triangular norm, including specific theorems for strict and nilpotent triangular norms. Subsequently, the addition based on an ordinal sum is studied, and it is shown how this addition can be transformed into a series of additions based on the summands of this ordinal sum. This important observation implies that the addition based on an arbitrary continuous triangular norm can be practically performed, provided the summands of the corresponding ordinal sum representation and the fuzzy intervals involved fulfil the appropriate conditions mentioned in the overview. This is illustrated by means of several examples.

MSC:

03E72   Theory of fuzzy sets, etc.

Cited in **15** Documents

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t-norm; addition; fuzzy quantities; fuzzy arithmetic; fuzzy intervals; triangular norm; ordinal sum

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