Multivalued representation and new algebraic structures for fuzzy numbers

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ABSTRACT.

In this paper we introduce a new representation of fuzzy numbers (called the multivalued representation) and a new multiplication on the set $\mathfrak{F}$ of fuzzy numbers. Introducing a Dorroh type product between fuzzy numbers, we construct some semiring structures on the set $\mathfrak{F}$. Two important particular cases of the general Dorroh type product are the cross product, introduced in [Ban, A. I. and Bede, B., *Properties of the cross product of fuzzy numbers*, Journal of Fuzzy Mathematics, **14** (2006), 513–531] and the Dorroh product, introduced in this paper. An equivalence relation, compatible with the addition and the Dorroh product, is also given.

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