

## A New Concept for Deriving the Expected Value of Fuzzy Random Variables

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**Abstract :** Fuzzy random variables have been introduced as an imprecise concept of numeric values for characterizing the imprecise knowledge. The descriptive parameters can be used to describe the primary features of a set of fuzzy random observations. In fuzzy environments, the expected values are usually represented as fuzzy-valued, interval-valued or numeric-valued descriptive parameters using various metrics. Instead of the concept of area metric that is usually adopted in the relevant studies, the numeric expected value is proposed by the concept of distance metric in this study based on two characters (fuzziness and randomness) of FRVs. Comparing with the existing measures, although the results show that the proposed numeric expected value is same with those using the different metric, if only triangular membership functions are used. However, the proposed approach has the advantages of intuitiveness and computational efficiency, when the membership functions are not triangular types. An example with three datasets is provided for verifying the proposed approach.

**Keywords :** fuzzy random variables, distance measure, expected value, descriptive parameters

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