Fuzzy parameterized complex multi-fuzzy soft expert set theory and its application in decision-making

Abstract

Contemporary research has refined systems with complex fuzzy sets in order to improve the design and model of real-life applications. Symmetry and antisymmetry are basic characteristics of binary relations used when modeling the decision maker's preferences. A recent focus has been the analysis of a complex data set using the properties of fuzzy concept lattice and the complex soft set. We will introduce a new concept to represent the information which utilizes the time factor, called fuzzy parameterized complex multi-fuzzy soft expert set (FP-CMFSES), and investigate part of its fundamental properties. This FP-CMFSES model allows us to validate the information provided by an expert, at a given phase of time, using the properties of complex fuzzy sets. We then construct an algorithm based on this concept by converting it from the complex state to the real state. Eventually, we implement it to a decision-making problem to demonstrate the applicability of the suggested method. A comparison among FP-CMFSES and other existing methods is made to expose the dominance of the suggested method. Apart from that, we also propose the weighted fuzzy parameterized complex multi-fuzzy softexpert set and investigate its application to decision-making.

Keywords: complex multi-fuzzy set; complex multi-fuzzy soft expert set; fuzzy parameterized complex multi-fuzzy soft expert set; soft expert set; decision making.

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