Gong, Zengtai; **Zhang, Xiaoxia**

On characterization of fuzzy soft rough sets based on a pair of border implicators. (English)

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Summary: Fuzzy set theory, soft set theory and rough set theory are powerful mathematical tools for dealing with various types of uncertainty. This paper is devoted to define a broad family of soft fuzzy roughsets, each one of which, called an (I, J)-soft fuzzy rough set, is determined by a pair of border implicators (I, J). Alternatively, it shows that a fuzzy soft set can induce a T-equivalence fuzzy relation which is used to granulate the universe. In particular, we prove that (I, J)-fuzzy soft rough sets in our work are equivalent to (I, J)-fuzzy rough sets of *Y. Ouyang* et al. [Inf. Sci. 180, No. 4, 532–542 (2010; Zbl 1189.68131)] by using a T-equivalence fuzzy relation determined by a fuzzy soft set. Furthermore, basic properties of (I, J)-fuzzy soft rough sets are investigated. Meanwhile, an operator-oriented characterization of (I, J)-fuzzy soft rough sets is proposed. Finally, an example is given to illustrate the approach of present paper.

MSC:

68T37 Reasoning under uncertainty in the context of artificial intelligence
03E72 Theory of fuzzy sets, etc.

Keywords:

fuzzy set; rough set; soft set; fuzzy soft set; fuzzy logical operation; (I, J)-soft fuzzy rough set; (I, J)-fuzzy rough set

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