A METHOD OF FUZZY MULTIPLE ATTRIBUTE DECISION MAKING BASED ON ROUGH SETS

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ABSTRACT. *In this paper we present a method of fuzzy multi-attribute decision-making based on rough sets. The uniqueness, as well as the crucial part, is that we define rough sets under priority relationship. We also establish priority class using priority relationship $R^{\angle}$ as the categorization criteria. Then, we study the mathematical properties of the concepts, define the priority degree between two objects, and define the summary priority degree as well, by using inclusion degree-priority degree measurement. Using summarization method, we can get the evaluation value for a given object and thus study the multi-attribute decision making. Finally, we present the decision-making example given an attribute as interval number and suggest decision-making steps by using the method of rough sets, which helps give us an insight into the method of fuzzy multi-attribute decision-making based on rough sets.*
Keywords: Relation of superiority, Degree of superiority

1. **Introduction.** With the advancement of society and economy, people face more and more complex and uncertain environments. Coupled with the fuzzy nature of reasoning, a large amount of information is expressed in the form of interval number. To use such information in decision making, we need to establish an ordering method for the interval numbers. With such method in place, we can apply it for multi-attribute decision problem for decision making.

Due to the diversity and general nature of the multi-attribute decision-making problem using interval number, there is no universal solution for such problem. The key point in this problem is that the ordering of fuzzy number is not of order-complete relationship, but of partial-order under grid structure. In order to find a practical pattern/method, we can start with the interval number, the simplest form of fuzzy numbers. The ordering of interval numbers can be obtained by comparing the superiority degree of two interval numbers, establishing the concept of superiority degree, obtaining the base relationship matrix and calculating the synthesize superiority degree of each interval number in the end.

In addition, we choose the reality example. Furthermore, we think that multi-attribute decision-making method using superiority degree is a recommended.