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Normal Wiggly Hesitant Fuzzy Sets and Their Application to Environmental Quality Evaluation

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Abstract

Hesitant fuzzy set (HFS) has been a very popular and useful tool to express the uncertainty of decision makers (DMs) when they could not give a determination among several different values in the process of representing preferences. In this paper, we mainly focus on digging the potential/deeper uncertain information of the DMs when they use HFSs to express their evaluation information in the process of decision making. As a result, a new fuzzy information form called normal wiggly hesitant fuzzy set (NWHFS) is proposed to assist the DMs in expressing their evaluation information more completely and improve the rationality of the decision-making result. The NWHFS can keep the hesitant fuzzy information and the deeper uncertain information dug in the hesitant fuzzy information. After that, we propose a score function of normal wiggly hesitant fuzzy information to distinguish the NWHFSs. Moreover, to understand and apply the NWHFSs easily, we investigate some properties of the NWHFSs and propose two preliminary aggregation operators of the NWHFSs. Finally, we use a numerical example

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