

Hesitant Fuzzy Geometric Heronian Mean Operators and Their Application to Multi-Criteria Decision Making

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ABSTRACT. Aggregation is the process of fusing a large data in one representative value. This is done in different ways, through what may be called ‘operators’, every operator having special characteristics. Expanding study of vague phenomena, through hesitant fuzzy information of hesitant fuzzy set (HFS) theory and their applications has attracted useful aggregation techniques. Paper explores the geometric Heronian mean (GHM) under hesitant fuzzy environment and defines some new geometric Heronian mean operators such as the hesitant fuzzy generalized geometric Heronian mean (HFGGHM) operator and the weighted hesitant fuzzy generalized geometric Heronian mean (WHFGGHM) operator. Further, we give definition of hesitant fuzzy geometric Heronian element (HFGHE), which is a basic calculation unit in HFGGHM and reflects the conjunction between two aggregated arguments. Properties of the new aggregation operators are reported and their special cases are considered. Furthermore, based on the WHFGGHM operator, an approach to deal with multi-criteria decision-making problems under hesitant fuzzy environment is developed. Finally, a practical example is provided to illustrate the multi-criteria decision-making process.

Keywords: fuzzy sets; fuzzy multi-sets; intuitionistic fuzzy set; hesitant fuzzy sets.