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RESEARCH PAPER

Selecting the best alternatives of multi - criteria decision making problem based on fuzzy TOPSIS method

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ABSTRACT

In this paper, we propose Multi Criteria Decision Making (MCDM) problem is one of the famous different kind of decision making problem. In more cases in real situations, determining the exact values for MCDM problems is difficult or impossible. So, the value of alternatives with respect to the criteria or / and the values of weights, are considered as fuzzy values (fuzzy numbers). In such conditions, the conventional crisp approaches for solving MCDM problems tend to be less effective for dealing with the imprecise or vagueness nature of the linguistic assessment. In this situation, the fuzzy MCDM method are applied for solving MCDM problems. Here, fuzzy TOPSIS (Technique for order preference by similarity to ideal solution) method based on a fuzzy distance measure is used in which the distance from the Fuzzy Positive Ideal Solution (FPIS) and Fuzzy Negative Ideal Solution (FNIS) are calculated. The resulted distances were used to calculate the similarity to ideal solution. Later an optimal membership degree (Closeness co-efficient) of each alternative is computed to estimate to which extent an alternative belongs to both FPIS and FNIS. The closer the degree of membership of FPIS and the farther from FNIS the more preferred the alternative. The membership degree is obtained by the optimization of a defined objective function that measures the degree of which an alternative is similar / dissimilar to the ideal solutions. A numerical example is also demonstrate the procedure of the proposed fuzzy TOPSIS method in the decision making processes.

KEY WORDS : Single machine, Processing time, Customer due dates, Total penalty cost, Genetic algorithm (GA)

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