

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

**THE DISTANCES OF HESITANT FUZZY TO
SOLVE MCDM PROBLEMS BY USING VIKOR
METHOD**

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IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL

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ABSTRACT

VlseKriterijumska Optimizacija I Kompromisno Resenja (VIKOR) has been used to interpret distinct types of multiple criteria decision making (MCDM) problems in crisp and fuzzy sets. There are many researchers have used this method since it provides the best alternatives by examining differ scopes and weights of the criteria. MCDM usually refers to make decision for problems that have conflicting criteria. This problem frequently happened in daily life. In this paper, we focus on solving MCDM problems by using three different distances in the hesitant fuzzy set, which are Hesitant Normalized Manhattan distance, Hesitant Normalized Hamming distance and Hesitant Normalized Euclidean distance. We proposed the VIKOR method to solve the ranking in MCDM problems. Firstly, we determine the decision makers' risk preferences to extend the length of the shorter Hesitant Fuzzy Element. After that, we calculate the three distances by using the extended Hesitant Fuzzy decision matrix. Next, the distances are then applied to the VIKOR method to compare the ranking of multi-criteria decision making (MCDM). Later, the optimal solution of the MCDM problems can be obtained if the conditions have been fulfilled. The results from two examples of secondary data obtained shows that Hesitant Normalized Manhattan distance and Hesitant Normalized Hamming distance produce reliable solution to solve MCDM problems.