ABSTRACT

It is observed that decision making for a multi-criteria problem is easier and user friendly by using a fuzzy linguistic approach compared to the numeric scales. In this paper, the advantage of linguistic variables is utilised in a modification of Technique for Order Preference by Similarity to Ideal Solution (TOPSIS)-extension by reducing the \( \alpha \)-cuts from eleven to three levels. In the first place, the linguistic variables are quantified through triangular fuzzy numbers employed in both TOPSIS-extension and non-linear programming; afterwards the three \( \alpha \)-cuts, namely \( \alpha = 0 \), \( \alpha = 0.5 \), \( \alpha = 1.0 \), are calculated before the defuzzifying and ranking process was made to identify the best alternative under consideration. A hypothetical example in a multi-criteria decision-making problem is provided to demonstrate the applicability and practicability of the proposed modification method. Based on the numerical calculations, it is found that the method is beneficial to reduce the decision process complexity and is less time consuming, giving a similar result without loss of any originality.

Keywords: fuzzy numbers; linguistic variables; multi-criteria decision making; TOPSIS
**Rujukan**


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