Fuzzy VIKOR Method for Multiple Attributes Group Decision Making Problem

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The solution of the multiple attributes group decision making (MAGDM) problem implies the choice of one best of the possible alternatives or ranking of all the alternatives that are evaluated by the group of decision-makers (DMs) based on the multiple attributes. A complex MAGDM problem deals with both quantitative and qualitative factors that may be conflicting as well as contain incomplete and uncertain information. Among popular MAGDM methods the fuzzy VIKOR (VIsekriterijumska optimizacija i KOmpromisno Resenje - Multicriteria Optimization and Compromise Solution) method is well-known to cope with complex problems with conflicting factors. The method focuses on ranking and selecting from a set of alternatives in the presence of conflicting and non-commensurable attributes, and on finding one or more compromise solutions.

The current study proposes an application of the VIKOR method in the MAGDM problem under hesitant fuzzy environment. Linguistic terms are used to assess the values and weights of the all established attributes. These linguistic assessments can be expressed in triangular fuzzy numbers. VIKOR introduces the ranking index of alternatives based on the measure of "closeness" to the "ideal" solution. The method determines a compromise solution, providing a maximum of a "group utility" and a minimum of an "individual loss" of its attributes. An example of selecting the investment projects using fuzzy VIKOR method is presented to illustrate the application of the proposed approach.

Keywords: Multiple attributes group decision making, VIKOR method, ranking of alternatives, compromise solution.