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FUZZY MULTIPLE-CRITERIA DECISION-MAKING FOR RAILWAY PLANNING

GIOVANNI LEONARDI

Abstract

The paper presents a fuzzy multi-criteria decision-making (MCDM) approach for evaluating decision alternatives involving subjective judgements. In traditional modelling situations, variables are generally measured on an unambiguous scale. However in a multiple-criteria situation, where verbal responses are elicited from respondents and are used as evaluation metrics, there is a need to systematically cope with linguistic expressions that may be nuanced or have double or even triple meanings. Fuzzy set theory provides the mathematical technique for the systematic handling of imprecise data, for example overlapping responses such as "much greater than", "greater than", "approximately equal to" and so on. Fuzzy set analysis provides therefore another dimension to multiple criteria scaling and can be used as an alternative to some of the regular MCA approaches such as AHP or Regime analysis. This paper outlines an evaluation-framework which integrates fuzzy logic with multi-criteria decision-making in the context of an infrastructural project. The functionality of the proposed methodology is verified by analyzing a real decisional problem connected to the planning and construction of a new railway link.

Key Words: Decision making 90B50, Fuzzy logic 03B52, transportation 90B06