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**FALSCAL: a fuzzy multidimensional scaling algorithm.** (English) Zbl 1213.91129  
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**Summary:** The conventionally adopted Alternating Least squares SCALing (ALSCAL) procedure of multidimensional scaling (MDS) is a valuable mathematical scheme for analyzing data in areas where organized concepts and underlying dimensions are inadequately defined or developed. Fuzzy set theory (FST) attempts to formulate human reasoning and perceptions, therefore targeting problems in areas where human factors significantly impact the result of decision-making. To our knowledge, the FST and ALSCAL approaches have not yet been integrated. This study integrates and modifies the FST and ALSCAL procedures. Fuzzy data collected from fuzzy questionnaires are adopted as the input of the MDS, ensuring that the uncertainty of input data can be incorporated into the analysis. The conventionally adopted ALSCAL procedure is then modified to cope with fuzzy input data by adopting the notion of fuzzy distances, fuzzy disparities and fuzzy ranking to represent the similarities between fuzzy data. Related approximation operations of the triangular fuzzy number are also introduced to facilitate computation in fuzzy ALSCAL.

**MSC:**

**91C15** One- and multidimensional scaling in the social and behavioral sciences

**Keywords:**

Multidimensional scaling (MDS); ALSCAL; fuzzy numbers; fuzzy distance; fuzzy ranking

**Software:**

FALSCAL; ALSCAL

**Full Text:** [DOI](#)

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