

## **A Semi-linguistic Approach Based on Fuzzy Set Theory: Application to Expert Judgments Aggregation**

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### **Abstract**

In the present work, a semi-linguistic fuzzy algorithm is proposed to obtain the fuzzy weighting values for multi-criterion, multi-alternative performance evaluation problem, with application to the aggregated estimate in the aggregation process of multi-expert judgments. The algorithm framework proposed is composed of the hierarchical structure, the semi-linguistic approach, the fuzzy R-L type integral value, and the total risk attitude index. In this work, extending the Chang/Chen method for triangular fuzzy numbers, the total risk attitude index is devised for a trapezoidal fuzzy number system. To illustrate the application of the algorithm proposed, a case problem available in literature is studied in connection to the weighting value evaluation of three-alternative (i.e., the aggregation of three-expert judgments) under seven-criterion. The evaluation results such as overall utility value, aggregation weighting value, and aggregated estimate obtained using the present fuzzy model are compared with those for other fuzzy models based on the Kim/Park method, the Liou/Wang method, and the Chang/Chen method.