A Multigranular Linguistic ARAS Model in Group Decision Making

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Abstract : Most of the multi-criteria group decision making (MCGDM) problems dealing with qualitative criteria require consideration of the large background of expert information. It is common that experts have different degrees of knowledge for giving their alternative assessments according to criteria. So, it seems logical that they use different evaluation scales to express their judgment, i.e., multi granular linguistic scales. In this context, we propose the extension of the classical additive ratio assessment (ARAS) method to the case of a hierarchical linguistics term for managing multi granular linguistic scales in uncertain contexts where uncertainty is modeled by means in linguistic information. The proposed approach is called the extended hierarchical linguistics-ARAS method (ARAS-ELH). Within the ARAS-ELH approach, the DM can diagnose the results (the ranking of the alternatives) in a decomposed style, i.e., not only at one level of the hierarchy but also at the intermediate ones. Also, the developed approach allows a feedback transformation i.e the collective final results of all experts able to be transformed at any level of the extended linguistic hierarchy that each expert has previously used. Therefore, the ARAS-ELH technique makes it easier for decision-makers to understand the results. Finally, An MCGDM case study is given to illustrate the proposed approach.

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