A Contribution to the Multiple Criteria Preordering Problematique

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In Multi-Criteria Decision Aid methodology one may generally identify three main problematiques: choice, ranking and sorting. In the first case, the desired result is selecting the subset of best alternatives. In the second case, all the alternatives are put in a total order from the best to the worst. In the last problematique, the potential decision alternatives are sorted into a predefined set of ordered categories.

We propose a new problematique, we call preordering, where we search for directly preordering all the potential alternatives; a decision aid approach also called multicriteria ordered or relational clustering. This approach may be viewed either as a ranking problem where the order does not need to be strict, or, as a sorting problem, where the categories to which each alternative is assigned are not defined beforehand. We would like to mention here similar work done by Nemery and de Smet [3, 2].

Our method for preordering is based on the bipolar-valued outranking relation [1] constructed from the preferential information given by a decision maker over the set of alternatives evaluated on multiple incommensurable criteria of different types. The aim of the method is to propose a global preorder of the alternatives that minimizes the inconsistances with this outranking relation.

The problem of enumerating all potential ordered partitions being exponential in complexity, we make use of a metaheuristic that first finds a set of cluster cores in the crisp Condorcet outranking digraph and then, in a second step, expands them to form the final ordered partition. A local search algorithm is employed in the second step in order to refine the final preordering result.

We will present our results over some well known problem instances as well as over artificially created datasets.

References

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