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3 - **Techniques for solution set compression in multiobjective optimization**

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A major drawback of implicit enumeration algorithms for multiobjective combinatorial optimization problems is the large usage of memory resources that is required to store the set of potential solutions during the search process. In this work, we introduce several techniques and data structures that allow to compress a set of solutions during the run of an implicit enumeration algorithm for the particular case of the biobjective {0,1}-knapsack problem. Particular emphasis is given on understanding the trade-off between memory usage and computation time, both from a theoretical and practical point of view. The experimental results indicate that some of these techniques allow to have a high compression ratio with very small computational time overhead.

4 - **Multiple Objective Optimization for Multidimensional Knapsack Problems**

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In constrained optimization some of the constraints may be soft in the sense that a slight violation is acceptable, or even favorable, if the corresponding gain in the objective function is beneficial. The trade-off between constraint satisfaction on one hand and original objective value on the other hand can be analyzed by formulating an associated multiple objective optimization problem. As a concrete example, we consider multidimensional knapsack problems and relax one or several of the knapsack constraints. We apply this transformation on bidimensional knapsack problems (i.e., one objective and two knapsack constraints) and solve their associated biobjective counterparts using dynamic programming based algorithms. Numerical results suggest that in this way, trade-off information can be obtained at little extra cost. We also consider the tridimensional and the associated triobjective case, respectively, and discuss strategies for bound computations and for the selection of representative efficient solutions.

★ TU-2-λ-HS4

♦ Fuzzy Approaches, Decision Making under Fuzziness

Tuesday, 10:30–12:10 – Room HS 4

Session: Fuzzy Multiple Criteria Decision Making 3

Chair: Yu-Wang Chen

1 - **Additive fuzzy priorities obtained from additively reciprocal fuzzy pairwise comparison matrices**

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In multicriteria decision making methods based on pairwise comparisons, both the multiplicatively and additively reciprocal pairwise comparisons are used. Elements of multiplicatively reciprocal pairwise comparison matrices express how many times one object is preferred over another while the elements of additively reciprocal pairwise comparison matrices express the difference in preferences of two compared objects. Analogously, also the priorities of objects obtained from pairwise comparison matrices can be either multiplicative or additive. Most often, the multiplicatively reciprocal pairwise comparison matrices are used in the decision making, e.g. in Analytic Hierarchy Process, and the multiplicative priorities are computed from these matrices. However, the multiplicatively reciprocal pairwise comparison matrices and from them obtained multiplicative priorities are not suitable for every decision making problem. For some types of problems, as was already discussed in the literature, additively reciprocal pairwise comparison matrices and from them obtained additive priorities of objects are more appropriate.
The information about the problem is usually incomplete or vague in real decision making prob-