



Lorenz dominance based algorithms to solve a practical multiobjective problem

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Résumé en anglais The set of Pareto nondominated solutions obtained in some practical cases of multiobjective optimization problems can be huge, rendering decision making difficult. Applying Lorenz dominance instead of Pareto dominance during the optimization process can help to alleviate this difficulty. Lorenz dominance is a refinement of Pareto dominance that integrates fairness in multiobjective optimization when objectives are considered equal and can help select only the well located solutions. By introducing a partial order among a set of Pareto-nondominated solutions, Lorenz dominance reduces the size of the nondominated front by keeping only fair solutions. In this work, we investigate the use of the infinite order Lorenz dominance within three new methods to solve a practical case of the multiobjective knapsack problem, which involves elaborating efficient action plans in social and medico-social structures. We assess the proposed methods on large problem instances with up to 8 objectives and 500 candidate actions and show their effectiveness in comparison with four leading reference algorithms.

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