Constructive Duality in Multiobjective Optimization

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Abstract

We propose a general approach to establishing lower and upper bounds on Pareto optimal solutions to multiobjective problems. As classical approaches, based on constructing dual problems to the original (primal) ones, do not provide for the required generality, we propose a novel perspective on the potential, still unexplored, of *infeasibility*. We show how in the context of Multiobjective Optimization, infeasibility can serve the purpose in the framework we refer to as *constructive duality*.

The need for a shift in the perspective on infeasibility emerges immediately when, to cope with large-scale multiobjective, Pareto suboptimal variants become a necessary option to Pareto optimal ones. However, to be a reasonable replacement, the extent of suboptimality of Pareto suboptimal variants has to be rigidly controlled. In this work, we show constructively how to employ infeasibility for that task.

[1] Kaliszewski I., J. Miroforidis, D. Podkopaev, *Interactive Multiple Criteria Decision Making based on preference driven Evolutionary Multiobjective Optimization with controllable accuracy.* European Journal of Operational Research, 216, 2012, 188-199.

[2] Kaliszewski I., J. Miroforidis, *Infeasibility - a Curse or a Blessing.* Submitted.

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