A method to approximate the whole Pareto-optimal set of a linearly constrained convex multiobjective optimization problem

Gábor Lovics
Phd. Student, Department of Differential Equations,
Budapest University of Technology and Economics
Tibor Illés
Associate Professor, Head of Department of Differential Equations,
Budapest University of Technology and Economics

In economic and engineering application of mathematics sometimes we need to optimize more than one objective function at the same time. In this type of problems we need to find solutions, where one of the objectives can not be improved without worsen the other. These solutions are called Pareto-optimal solutions, and in since 1950's such methods are known that compute one of the Pareto-optimal solutions. Recently, for unconstrained mulitobjective optimization problems such algorithm has been developed by Oliver Schütze at al. (2003) that try to approximate the whole set of the Pareto-optimal solutions at the same time. In this talk we generalize the subdivision algorithm of Schütze and others for linearly constrained multiobjective problem. The objective functions in our case need to be differentiable convex functions. Further generalization of the more general class of problems (convex constrained and convex objective function for mineralization problem) seems to be possible. The main idea of the method to find joint decreasing direction, for the all objective function at the same time.

The results discussed above are supported by the grant TÁMOP - 4.2.2.B-10/1-2010-0009