

Speedup of lexicographic optimization by superiorization and its applications to cancer radiotherapy treatment

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Abstract

Multicriteria optimization problems occur in many real life applications, for example in cancer radiotherapy treatment and in particular in intensity modulated radiation therapy (IMRT). In this talk we focus on optimization problems with multiple objectives that are ranked according to their importance. We solve these problems numerically by combining lexicographic optimization with our recently proposed level set scheme, which yields a sequence of auxiliary convex feasibility problems; solved here via projection methods. The projection enables us to combine the newly introduced superiorization methodology with multicriteria optimization methods to speed up computation while guaranteeing convergence of the optimization.

This is a joint work with Esther Bonacker, Karl-Heinz Küfer and Philipp Süß (Optimization, Fraunhofer Institute for Industrial Mathematics, Kaiserslautern, Germany)