Solving Convex Program via Lagrangian Decomposition

Mathias Knobloch

Abstract: We consider general convex large-scale optimization problems in finite dimensions. Under usual assumptions concerning the structure of the constraint functions, the considered problems are suitable for decomposition approaches. Lagrangian-dual problems are formulated and solved by applying a well-known cutting-plane method of level-type. The proposed method is capable to handle infinite function values. Therefore it is no longer necessary to demand the feasible set with respect to the non-dualized constraints to be bounded.

The paper primarily deals with the description of an appropriate oracle. We first discuss the realization of the oracle under appropriate assumptions for generic convex problems. Afterwards we show that for convex quadratic programs the algorithm of the oracle is universally applicable.