

New sufficiency for global optimality and duality of mathematical programming problems via underestimators

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Abstract

We present new conditions for a Karush-Kuhn-Tucker point to be a global minimizer of a mathematical programming problem which may have many local minimizers that are not global. The new conditions make use of underestimators of the Lagrangian at the Karush-Kuhn-Tucker point. We establish that a Karush-Kuhn-Tucker point is a global minimizer if the Lagrangian admits an underestimator, which is convex or, more generally, has the property that every stationary point is a global minimizer. In particular, we obtain sufficient conditions by using the fact that the biconjugate function of the Lagrangian is a convex underestimator at a point whenever it coincides with the Lagrangian at that point. We present also sufficient conditions for weak and strong duality results in terms of underestimators.

Author keywords

Biconjugate functions; Karush-Kuhn-Tucker conditions; Strong duality; Sufficient optimality conditions; Underestimators