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Applying tangential subdifferentials in bilevel optimization

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Abstract

Bilevel programming is a prominent topic in optimization due to its wide range of applications and its inherent theoretical and numerical challenges. A bilevel problem consists of two hierarchical optimization problems in which the feasible set of the upper-level problem is implicitly determined by the solution set of the lower-level problem [1-3].

In this talk, we study a bilevel optimization problem with tangentially convex data. We employ a reformulation based on the optimal value function of the lower-level problem, which yields a fully equivalent single-level problem. Under the partial calmness property [4], we derive necessary optimality conditions via an appropriate constraint qualification expressed in terms of tangential subdifferentials [5]. These results provide new insights into the analysis of nonsmooth and nonconvex bilevel programs.

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