

Optimality Conditions for Convex Semi-infinite Programming Problems with Finitely Representable Compact Index Sets

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Abstract: In the present paper, we analyze a class of convex semi-infinite programming problems with arbitrary index sets defined by a finite number of nonlinear inequalities. The analysis is carried out by employing the constructive approach, which, in turn, relies on the notions of immobile indices and their immobility orders. Our previous work showcasing this approach includes a number of papers dealing with simpler cases of semi-infinite problems than the ones under

consideration here. Key findings of the paper include the formulation and the proof of implicit and explicit optimality conditions under assumptions, which are less restrictive than the constraint qualifications traditionally used. In this perspective, the optimality conditions in question are also compared to those provided in the relevant literature. Finally, the way to formulate the obtained optimality conditions is demonstrated by applying the results of the paper to some special cases of the convex semi-infinite problems.

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