Radial derivatives and their applications in set-valued optimization

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Abstract

Set-valued optimization (also called set optimization) is a rapidly developing branch of applied mathematics. It deals with optimization problems where the objectives and/or the constraints are defined by set-valued maps. Set-valued optimization has important applications both in mathematics and in other fields of knowledge. In the recent years, there has been a growing interest in studying higher-order necessary and sufficient optimality conditions in set-valued optimization. Such conditions are usually formulated in terms of different kinds of generalized derivatives of multivalued maps. One of them are radial derivatives which are particularly interesting because, contrary to classical derivatives, they lead to global sufficient conditions without any (generalized) convexity assumptions. So far, necessary and sufficient optimality conditions in set-valued optimization have been obtained for various versions of radial derivatives, including the mth-order outer and inner radial derivatives defined in [1]. In this talk, we use these derivatives to obtain a characterization of Q-minimal solutions for a set-valued optimization problem with an abstract set constraint, and also some new necessary and sufficient optimality conditions which are not characterizations. The preliminary version of these results will appear as [2]. We also compare our results with the ones obtained for other kinds of radial derivatives existing in the literature.

References

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