ICM 1998, Berlin, Aug. 18–27

Abstracts of Short Communications and Posters

Section:

17. Control Theory and Optimization

1991 MS Classification: 90C30, 90C34, 49M39
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On Generalized Semi-infinite Optimization Problems

In this lecture we consider a generalized semi-infinite optimization problem where the index set of the corresponding inquality constraints depends on the decision variables and all involved functions are assumed to be continuously differentiable. We derive first first order necessary optimality conditions for such problems by using bounds for the upper and lower directional derivatives of the corresponding optimal value function. In case that the optimal value function is directionally differentiable we present first order conditions based on linearization of the given problem.
The lecture is based on a joint paper with Alexander Shapiro (Atlanta).