Backward Penalty Schemes for Monotone Inclusion Problems

Abstract, to be held on the 13th EUROPT Workshop on Advances in Continuous Optimization

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March 27, 2015

Based on a common article of the authors, we are concerned with solving monotone inclusion problems expressed by the sum of a set-valued maximally monotone operator with a single-valued maximally monotone one and the normal cone to the nonempty set of zeros of another set-valued maximally monotone operator. Depending on the nature of the single-valued operator, we propose two iterative penalty schemes, both addressing the set-valued operators via backward steps. The single-valued operator is evaluated via a single forward step if it is cocoercive, and via two forward steps if it is monotone and Lipschitz continuous. The latter situation represents the starting point for dealing with complexly structured monotone inclusion problems from algorithmic point of view.

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