

Convex relaxation of hybrid discrete–continuous penalties

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joint work with *Kazufumi Ito* and *Karl Kunisch*

Abstract

This talk is concerned with infinite-dimensional optimization problems where a distributed function should only take on values from a set of allowed states. This property can be promoted with the aid of a L^0 -type penalty that is zero on the admissible set and one otherwise. Although functionals involving such binary terms are non-convex and lack weak lower-semicontinuity, application of Fenchel duality yields a formal primal-dual optimality system that admits a unique solution. This solution is in general only suboptimal, but the optimality gap can be characterized and shown to be zero under appropriate conditions. A regularized semismooth Newton method allows the numerical computation of (sub)optimal solutions. Numerical examples illustrate the effectiveness of the proposed approach.

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