

Conferencias Dpto. Estadística e Investigación Operativa

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The Exact Penalty Map for Nonsmooth and Nonconvex Optimization

Abstract. Augmented Lagrangian duality provides zero duality gap and saddle point properties for nonconvex optimization. On the basis of this duality, subgradient-like methods can be applied to the (convex) dual of the original problem. These methods usually recover the optimal value of the problem, but may fail to provide a primal solution. We prove that the recovery of a primal solution of such methods can be characterized in terms of (i) the differentiability properties of the dual function, and (ii) the exact penalty properties of the primal-dual pair. We also connect the property of finite termination with exact penalty properties of the dual pair. In order to establish these facts, we associate the primal-dual pair to a penalty map. This map, which we introduce here, is a convex and globally Lipschitz function, and its epigraph encapsulates information on both primal and dual solution sets.

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Finding Interpolating Curves Using Optimal Control

Abstract. We study the problem of finding an interpolating curve passing through prescribed points in the Euclidean space. The interpolating curve minimizes the pointwise maximum length, i.e., the L^∞ -norm, of its acceleration. We re-formulate the problem as an optimal control problem and employ simple but effective tools of optimal control theory. We characterize solutions associated with singular (of infinite order) and nonsingular controls. We reduce the infinite dimensional interpolation problem to an ensuing finite dimensional one and derive closed form expressions for interpolating curves. Consequently we devise numerical techniques for finding interpolating curves and illustrate these techniques on examples.

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