

A weak nonsmooth maximum principle and mixed constrained optimal control problems

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Abstract

A weak maximum principle involving unmaximized Hamiltonian type conditions was derived in 1995 for nonsmooth optimal control problems. It differs from classical weak nonsmooth maximum principles because it involves the joint subdifferential of the (pseudo) Hamiltonian with respect to both the state and the control. This result has been generalized to cover problems with state constraints and problems with mixed constraints. In this talk we will review its generalization to derive necessary conditions for regular mixed constrained optimal control with possibly nonsmooth data. Two cases of importance will be considered. The first case reports on problems with nonsmooth cost and dynamics and smooth mixed constraints. We will then consider regularity assumptions for nonsmooth mixed constraints and show how under such assumption the weak nonsmooth maximum principle can be derived.