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Optimal Switching Dirac Control for Stabilization of Time-Varying Linear Parabolic Equations

Thursday, August 15, 2024 11:00 AM (30 minutes)

This talk deals with infinite horizon optimal control problems governed by time-varying linear parabolic equations. We focus on controls represented by linear combinations of finitely many Dirac measures in the spatial domain, where only one measure is active at any time. This feature endows the problem with switching properties and thus transforms it into an infinite horizon nonsmooth nonconvex problem. To address this problem, we employ a receding horizon control (RHC) approach. This involves approximating the infinite-horizon problem with a sequence of finite-horizon ones over overlapping time intervals. We discuss the stabilizability and suboptimality of RHC and introduce a nonmonotone proximal gradient method to solve the nonsmooth nonconvex subproblem. We also present numerical experiments to validate the effectiveness of our approach in dealing with the complexity of infinite horizon optimal control with time-varying dynamics and switching properties.

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