On Time-Invariant Purified-Output-Based Discrete Time Control

A. Ben Tal, S. Boyd, and A. Nemirovski

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In an earlier paper, we have demonstrated that the family of all affine non-anticipative output-based control laws in a discrete time linear dynamical system affected by uncertain disturbances is equivalent, as far as state-control trajectories are concerned, to the family of all affine non-anticipative 'purified-output-based' control laws. The advantage of the latter representation of affine controls is, that both the states and the controls are affine in the initial state and the disturbances, the parameters of the control law being fixed, and are affine in the parameters of the control law, the disturbances and the initial state being fixed. This observation allows to reduce the synthesis of a finite-horizon affine control law satisfying, in a robust fashion, a list of linear constraints on system's trajectory, to solving an explicit convex program. In this follow-up note, we demonstrate that the outlined reducibility to an explicit convex program takes place for some control problems with infinite horizon.

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