Performance Bounds for Linear Stochastic Control

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- SCL paper
- Talk slides

We develop computational bounds on performance for causal state feedback stochastic control with linear dynamics, arbitrary noise distribution, and arbitrary input constraint set. This can be very useful as a comparison to the performance of suboptimal control policies, which we can evaluate using Monte Carlo simulation. Our method involves solving a semidefinite program (a linear optimization problem with linear matrix inequality constraints), a convex optimization problem which can be efficiently solved. Numerical experiments show that the lower bound obtained by our method is often close to the performance achieved by several widely-used suboptimal control policies, which shows that both are nearly optimal. As a by-product, our performance bound yields approximate value functions that can be used as control Lyapunov functions for suboptimal control policies.