

AI planning for nonlinear optimal control: application to switched systems

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We discuss AI-inspired, optimistic planning for seeking near-optimal sequences of actions in infinite-horizon, general nonlinear optimal control. The methods work like receding-horizon predictive control, but exploit insights from tree search in AI and bandit theory in reinforcement learning. We discuss discrete-action techniques for a single agent, or two competing agents. We explain how these techniques can be applied to switched systems, which switch their dynamics among a discrete set of modes. Analysis is complemented by experimental results, and the talk closes by illustrating extensions to e.g. stochastic problems in robotics.