Policies for Simultaneous Estimation and Optimization

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Policies for the joint identification and control of uncertain systems are presented. The discussion focuses on the case of a multiple input, single output linear system, with no dynamics and quadratic cost, and system parameters assumed to have a known Gaussian distribution. Extensions for multiple output, and for finite impulse response systems are straightforward. The policies proposed are heuristics, and an approximation of the optimal dynamic programming solution, that exploit convex optimization techniques. Numerical experiments are encouraging.