Adaptive Modulation with Smoothed Flow Utility

E. Akuiyibo and S. Boyd

- am_smoothed.pdf

- am_smoothed_globecomm.pdf

We consider the problem of choosing the data flow rate on a wireless link with randomly varying channel gain, to optimally trade off average transmit power and the average utility of the smoothed data flow rate. The smoothing allows us to model the demands of an application that can tolerate variations in flow over a certain time interval; we will see that this smoothing leads to a substantially different optimal data flow rate policy than without smoothing. We pose the problem as a convex stochastic control problem. For the case of a single flow, the optimal data flow rate policy can be numerically computed using stochastic dynamic programming. For the case of multiple flows on a single link, we propose an approximate dynamic programming approach to obtain suboptimal data flow rate policies. We illustrate, through numerical examples, that nearly optimal performance can be obtained with these approximate policies.