A STUDY OF THE IMPACT OF LONG-RANGE DEPENDENCE ON A CLASS OF THRESHOLD-TYPE STOCHASTIC CONTROL POLICIES

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Recently, the authors considered a class of general dynamic resource management problems where the goal was to determine the allocation level for each resource type in order to serve the uncertain demand in a way so as to maximize the expected profit over a time horizon of interest. They derived the optimal control policy within a singular stochastic optimal control setting and provided simple expressions for the dynamic threshold levels for each resource over time. In this presentation, we study the performance of the proposed policy in an alternate setting where the demand is assumed to be drawn from the set of stable distributions with Hurst parameter H. While it is clear that the proposed policy is no longer optimal in this setting, we are able to experimentally confirm that the policy continues to exhibit excellent properties in tracking the demand, and outperforms an interval-average based offline policy which has full information on demand. Further, the gap to optimality appears to have an interesting functional dependence on the Hurst parameter. We present some experimental and theoretical results to support and explain our findings.