ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

INVITATION TO THE DOCTORAL SEMINAR

Stochastic Optimal Control Problems for an Energy Storage

Ralf Wunderlich | Brandenburgische Technische Universität Cottbus – Senftenberg

Chaired by Michaela Hitz | Department of Statistics

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N.0.07

ABSTRACT

We address the valuation of an energy storage facility in the presence of stochastic energy prices as it arises in the case of a hydro-electric pump station. The valuation problem is related to the problem of determining the optimal charging/discharging strategy that maximizes the expected value of the resulting discounted cash flows over the lifetime of the storage.

We use a regime-switching model for the energy price which allows for a changing economic environment described by a finite state Markov chain. For the latter we consider the fully as well as the partially observed case. The valuation problem is formulated as a stochastic control problem with regimeswitching in continuous time. For this control problem we derive the associated Hamilton-Jacobi-Bellman (HJB) equation which is not strictly elliptic. Therefore we study the HJB equation using regularization arguments. We use numerical methods for computing approximations of the value function and the optimal strategy. Finally, we present some numerical results. The talk is based on the paper Shardin, A. A., Wunderlich, R.: Partially Observable Stochastic Optimal Control

Problems for an Energy Storage. Stochastics, 89(1):280-310, 2017.

We hope to see you there!