Buy it, Store it, Sell it: On the Optimality Gap of the Rolling Intrinsic Strategy

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Abstract

The growing penetration of renewable energy sources is associated with significant volatility in electricity prices, particularly on intraday markets. In this evolving environment, battery energy storage systems (BESS) have emerged as key assets, enabling operators to generate profit by buying low, storing energy, and selling high, while contributing to price smoothing. Among the various operational strategies used to determine charging and discharging schedules, the rolling intrinsic strategy is widely adopted in practice due to its simplicity and intuitive appeal. In this paper, we develop a quantitative framework to evaluate the performance of the rolling intrinsic strategy relative to optimal strategies derived from stochastic control formulations under varying degrees of risk aversion. Our results provide new insights into the optimality gap associated with the rolling intrinsic approach and highlight the importance of model risk in the design of the decision-making process of BESS operators.

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