

Gaussian Process Regression With Hybrid risk Measure for Dynamic Risk Management in Electricity Market

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In the context of electricity market risk management, this paper introduces a novel optimization framework that combines Gaussian Process Regression (GPR) predictions with an adaptive risk management strategy utilizing a hybrid risk measure. The proposed approach aims to minimize a hybrid risk measure integrating both Value at Risk (VaR) and Conditional Value at Risk (CVaR), providing a comprehensive evaluation of potential financial exposure. The model features an adaptive mechanism that updates risk management strategies in response to observed deviations from predictions, thereby enhancing responsiveness to evolving market conditions. By combining VaR and CVaR, the framework addresses both the likelihood and magnitude of potential losses, offering a more robust risk assessment. The approach also allows for real-time data integration for adjusting predictions and constraints, and accommodates dynamic risk tolerance levels.