



Option Pricing and Hedging with market friction using Reinforcement Learning

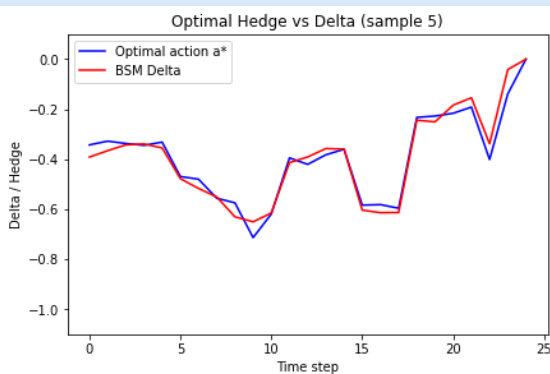
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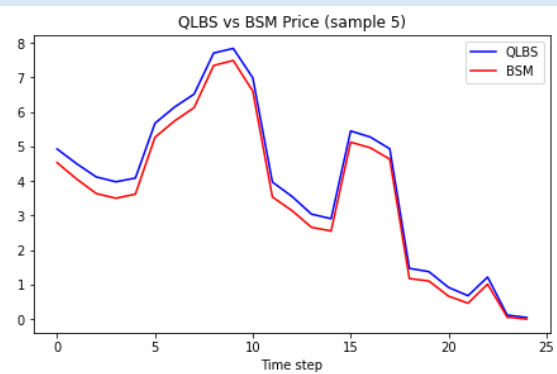
Project Objective

Derive optimal risk-adjusted option price and hedge using the Q-Learning in Reinforcement Learning (QLBS) model with consideration for real-world market friction such as the trader's risk aversion, transaction costs and market impact costs

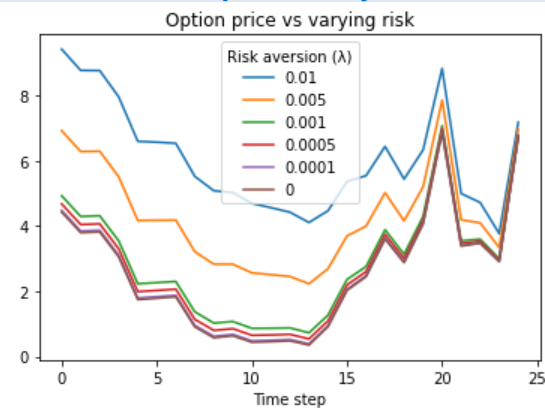
Hedging replication



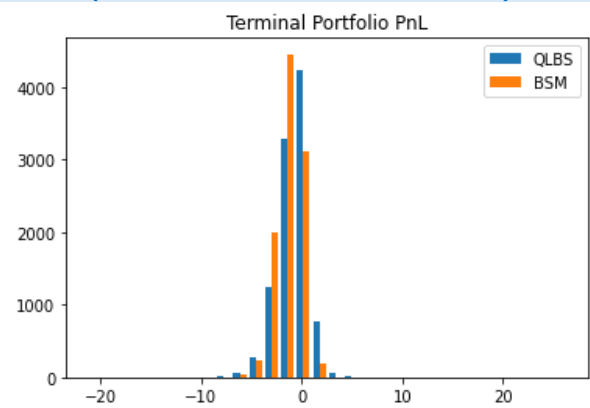
Pricing replication



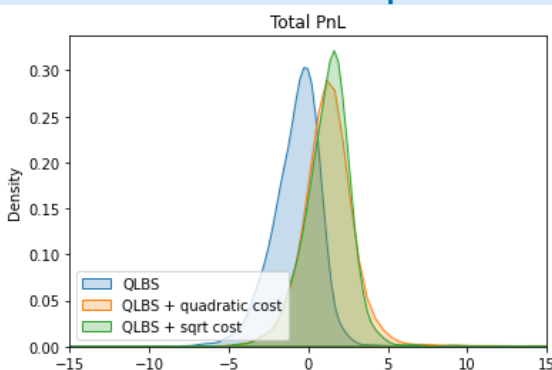
Risk aversion increases option premium exponentially



QLBS Portfolio PnL outperformance (vs Black Scholes benchmark)



Effect of different market impact and transaction cost models on portfolio PnL



Model performance

Model	Returns	Volatility	Sharpe
QLBS (raw)	-0.75	1.72	-0.44
+ Quadratic cost	1.40	2.86	0.49
+ Sqrt cost	1.23	1.71	0.72