

Functional Time Series Analysis for Limit Order Book Dynamics

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Abstract

In this study, we use a vector functional autoregressive model to analyze the supply and demand curves of a Limit Order Book (LOB) simultaneously. The supply and demand curves are represented by relevant multi-resolution B-spline basis functions. The corresponding coefficients of the basis functions are shown to follow a vector autoregressive model, which can be applied to the predictions of future demand and supply curves. By computing the areas under the predicted supply and demand curves, we propose a trading strategy based on the LOB data. An empirical study is conducted with the AAPL, MSFT and SPY stocks. Numerical results indicate that the proposed trading strategy has satisfactory investment performance.