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The Hong Kong Polytechnic University **Department of Applied Mathematics**

Seminar

Optimal Liquidation with Hidden Orders under Self-Exciting Dynamics

By

Dr. Chao ZHOU National University of Singapore

Abstract

Hidden orders are attracting higher usage in modern order-driven markets, providing exposure risk reduction and mitigating adverse selection costs. We develop an optimal liquidation strategy in a continuous-time framework, where a risk-neutral agent aims to maximize her terminal wealth with a combination of both hidden and display limit orders over a fixed period. All the remaining shares must be sold using market orders at termination. The agent controls the trading rate (order size) and order type (hidden and displayed) to balance execution cost and time pressure. When market order arrivals are modeled as a homogeneous Poisson process, we derive a closed-form solution that contains a switching time, at which the agent changes from a purehidden-order phase to a mixed-orders phase until termination. Under the Hawkes process with self-exciting dynamics, a numerical solution is provided. We show that the optimal strategy exhibits a similar two-phase pattern, except that the switching time becomes a function of the market order intensity. Simulation experiments show that the use of hidden order reduces liquidation cost, accompanied by an increase in liquidity. Given event-level limit order book data of 100 NASDAQ stocks, we implement the liquidation strategies. It shows that our strategy with mixed type under the self-exciting dynamics provides superior performance, with cost reduction up to 70% to the pure limit order strategy and 27% to the strategy with mixed type under the Poisson process. This is a joint work with Ying Chen, Zexin Wang and Ge Zhang.

Date: 29 November 2022 (Tuesday) Time: 17:15 - 18:15 (Hong Kong Standard Time GMT +8) Meeting ID: 998 3104 2449 (Passcode: 1129) Speaker: Dr. Chao Zhou, National University of Singapore Host: Dr. Guanxing Fu, The Hong Kong Polytechnic University Click to join: https://polyu.zoom.us/j/99831042449?pwd=WDIIaURhQ1hJcUNmdzRESWRBeENNZz09



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