Title: Optimal Liquidation in a Stochastic Market Impact Model

Abstract:
We describe a market model for trading a single risky asset, in which a large investor seeks to liquidate his position in an infinite time horizon, while maximizing expected proceeds. Trading large orders has an adverse effect on the asset's price, which is determined by the investor's current volume impact and is multiplicative in relation to the current price. The volume impact follows a mean-reverting Ornstein-Uhlenbeck process whenever no trade occurs. The martingale optimality principle suggests that the two dimensional state space of volume impact and number of held assets is separated by a free boundary into a wait- and a sell-region. We derive this free boundary using classical calculus of variations techniques in combination with local times of reflected diffusions along an elastic boundary. Verification of optimality is then reduced to showing certain analytic properties of Hermite functions, some of which remain to be fully proven.