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and **Rama Cont** (rama.cont@gmail.com) and **Rishi Talreja** (rt2146@columbia.edu). *A
Markov Model for the Dynamics of a Limit Order Book.*

We model a limit order book as a continuous-time Markov process that tracks the number of limit orders at each price level. Our model strikes a balance between three desirable features: its parameters are easily estimated from high-frequency data, it captures key empirical properties of order book dynamics and its analytical tractability allows for efficient computation of quantities of interest in applications. Laplace transform methods allow for fast numerical computation of conditional probabilities of various events: an increase in the mid-price, execution of an order at the bid before the ask quote moves, execution of both a buy and a sell order at the best quotes before the price moves. We describe a parameter estimation procedure based on high-frequency observations of the first k levels of bids and asks and illustrate the results on data from the Tokyo stock exchange. Simulations of the estimated model show a favorable comparison of various statistical properties with empirically observed ones. (Received September 15, 2008)