

PHD SEMINAR ANNOUNCEMENT
Department of Statistics

"Modelling the Stock Price Process as a Continuous Time Jump Process"

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Eckhart Hall, Room 110, 5734 S. University Avenue

Rituparna Sen
Department of Statistics, University of Chicago

ABSTRACT

An important aspect of the stock price process, which has often been ignored in the financial literature, is that prices on organized exchanges are restricted to lie on a grid. We consider continuous-time models for the stock price process with random waiting times of jumps and discrete jump size. We consider a class of jump processes that are "close" to the Black-Scholes model in the sense that as the jump size goes to zero, the jump model converges to geometric Brownian motion. We study the changes in pricing and hedging caused by discretization. The convergence, estimation, discrete time approximation, and uniform integrability conditions for this model are studied. Upper and lower bounds on option prices are developed. We study the performance of the model with real data.

In general, jump models do not admit self-financing strategies for derivative securities. Birth-death processes have the virtue that they allow perfect hedging of derivative securities. The effect of stochastic volatility is studied in this setting. A Bayesian filtering technique is proposed as a tool for risk neutral valuation and hedging. This emphasizes the need for using statistical information for valuation of derivative securities, rather than relying on implied quantities.