JOIN STATISTICS SEMINAR OF SCMS AND SDS

SHOT-NOISE COJUMPS: PERFECT SIMULATION AND OPTION PRICING

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Lecture

Time: 10:30-11:30, Thursday, Apr. 19, 2018

Venue: Room 2201, East Main Guanghua Tower, Handan Campus

Abstract: We consider a framework of parsimonious and highly analytically trackable jump-diffusion models for price dynamics with stochastic price volatilities and stochastic jump intensities in continuous time. They account for conditional heteroscedasticity and also incorporate key features appeared in financial time series of price volatilities and jump intensities, such as persistence of contemporaneous jumps (cojumps), mean reversion and feedback effects. More precisely, the stochastic variance and stochastic intensity are jointly modelled by a generalized bivariate shot-noise process sharing common jump arrivals with any non-negative jump-size distributions. This framework covers many classical and important models in the literature. We develop a very efficient scheme for its exact simulation based on perfect decomposition where neither numerical inversion nor acceptance/rejection scheme is required, which means that it is not only accurate but also the efficiency would not be sensitive to the parameter choice. Extensive numerical implementations and tests are reported to demonstrate the accuracy and effectiveness of this scheme. Moreover, we apply to unbiasedly estimate the prices of discrete-barrier European options to show the applicability and flexibility of our algorithms.