ROMAN MAKAROV, Wilfrid Laurier University

Pricing occupation-time derivatives

New simulation algorithms and analytical methods for pricing occupation-time derivatives under jump-diffusion processes and solvable nonlinear diffusion models are developed. A new efficient method for exact sampling from the distribution function of occupation times of a Brownian bridge is proposed. The method is applied to the exact pricing of continuously-monitored occupation-time derivatives under the double-exponential jump-diffusion process. In Monte Carlo methods for nonlinear solvable diffusion models, the occupation time is estimated using the Brownian bridge interpolation. In the second part of this talk, we consider a special family of occupation-time derivatives namely proportional step options introduced by Linetsky in [Math. Finance, 9, pp. 55-96 (1999)]. We develop new spectral expansion methods for pricing such options. Our approach is based on the application of the Feynman-Kac formula and the residue theorem. As an underlying asset price process we consider a solvable nonlinear diffusion model such as the constant elasticity of variance (CEV) diffusion model and state-dependent-volatility confluent hypergeometric diffusion processes.

This is joint work with Joe Campolieti and Karl Wouterloot.