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SEMINARIO

"Numerical Solution of Stochastic Differential Equations with Jumps in Finance: Predictor-Corrector Schemes"

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Abstract:

Event-driven uncertainties such as corporate defaults, operational failures or central bank announcements are key elements in the dynamics of financial quantities. Therefore, models that incorporate jumps as risk sources have become increasingly popular in financial modelling. Since the class of jump-diffusion stochastic differential equations (SDEs) that admits explicit solutions is rather limited, it is important to construct discrete time approximations.
Discrete time approximation of SDEs can be mainly divided into two classes; the class of strong approximations and that of weak approximations. Strong schemes provide pathwise approximations and are needed for problems such as scenario simulation, filtering and hedge simulation. Weak schemes provide probability approximations and are appropriate when approximating, by Monte Carlo simulation, moments, derivative prices, risk measures and expected utilities.
In this talk we discuss several strong and weak approximations for SDEs driven by Wiener processes and Poisson random measures. In particular, we present new predictor-corrector schemes and establish their order of convergence. Finally, numerical results on the accuracy of these schemes, when applied to the jump-diffusion Merton model, are reported. The results of this talk are drawn from Bruti-Liberati, Nikitopoulos-Sklibosios & Platen (2006) and Bruti-Liberati & Platen (2007a, 2007b, 2007c).