Abstract

It is well known today that Lévy processes show a better fit to market data than the geometric Brownian motion used in the Black-Scholes Model. Merton’s Jump Diffusion model, introduced in 1976, adds a Jump part to the Brownian component in order to take into account discontinuities in the log-returns. This mini course presents elements of the theory of Lévy processes in order to fully understand the later model and lead a robust presentation of pricing and hedging vanilla options.

After a quick reminder on Poisson processes, a model for the risky asset is presented. Along the way, the main characteristics of Lévy processes are introduced in the Jump Diffusion case: The Lévy Khintchine formula, Martingale conditions, Independence Lemmas, Admissible strategies.

References


