

Levy Processes, Stochastic Calculus and Applications

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Lecture 1

Infinite divisibility, the Levy-Khintchine formula, Levy processes, Brownian motion, Poisson random measures, stable processes, self-decomposability, subordinators, the Levy-Ito decomposition, Hilbert and Banach space extensions.

Lecture 2

Stochastic integration, Ito's formula, Ornstein-Uhlenbeck processes with jumps, stochastic exponentials, change of measure, martingale representation, stochastic differential equations (ordinary and partial).

Lecture 3

Chaos decomposition, Malliavin calculus, white noise, non-anticipating stochastic calculus, financial applications – pricing and hedging in incomplete markets, Esscher transforms, use of specific Levy processes such as hyperbolic and variance-gamma.