Talk 4: Louis-Amand Gérard (Université Paris 1)

Title: Path-dependent volatility from signatures: pricing and hedging with Fourier

Abstract. In this talk we introduce Signature volatility models, where the stochastic volatility is modeled by a (possibly infinite) linear combination of the path signature of the time augmented driving Brownian motion. First, we will discuss the universality of this framework by providing explicit series expansions to certain stochastic path-dependent integral equations in terms of this path signature, which encompasses a large class of stochastic linear Volterra and delay equations and in particular the fractional Brownian motion with a Hurst index $H \in (0, 1)$. Second, we will highlight the tractability of this class of models for Fourier pricing and hedging using the joint characteristic functional of the log-price and integrated variance known up to some infinite-dimensional Riccati equation. This is a joint work with Eduardo Abi Jaber (École Polytechnique, CMAP) and Yuxing Huang (NYU).