Universal signature-based models: theory and calibration

Universal classes of dynamic processes based on neural networks and signature methods have recently entered the area of stochastic modeling and Mathematical Finance. This has opened the door to robust and more data-driven model selection mechanisms, while first principles like no arbitrage still apply.

Here we focus on signature SDEs whose characteristics are linear functions of a primary underlying process, which can range from a (market-inferred) Brownian motion to a general multidimensional tractable stochastic process. The framework is universal in the sense that any classical model can be approximated arbitrarily well and that the model characteristics can be learned from all source of available data by simple methods. Indeed, we derive formulas for the expected signature in terms of the expected signature of the primary underlying process. These formulas enter directly in the calibration procedure to option prices, while time series data calibration just reduces to a simple regression.

The talk is based on a joint work with Christa Cuchiero and Sara Svaluto-Ferro.

Thursday, June 3 – at 15:00
The seminar will be online, using the Zoom software.

To participate in the event, please contact sara.sottile@unitn.it using an institutional e-mail address.