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Martingales, Likelihood, and Monte Carlo Methods for Continuous Time Models in Finance

We will discuss modelling continuous time processes using products and finite approximations to product integrals. These define a Radon-Nikodym derivative with respect to a base measure or process, chosen for its ease of simulation. Since Radon-Nikodym derivatives such as that of Girsanov are necessarily martingales, a related question is when such products form martingales. The goal is a general computational, likelihood-friendly framework for the construction and simulation of models for continuous-time processes, and parameter estimation. Examples of stochastic volatility models and jump diffusions are given. Parts of this talk are based on joint work with Carole Bernard and Zhenyu Cui.