Mathematics for New Technologies in Finance

Exercise sheet 10

Exercise 10.1 (Bonus Project) Pay attention when tokenizing the prices/volatility returns and the nan value.

(a) Generate a time series of K returns from a SABR model:

$$dS_t = \sigma_t dW_t^1, d\sigma_t = \nu\sigma_t dW_t^2$$

with correlation parameter $\rho \in [-1, 1]$ between the two Brownian motions W^1 and W^2.

(b) Replace some of the returns of S by nan values (with some independent Bernoulli random event). Try to generate with a nanoLLM the next return of the price. Goal is to make the LLM understand, that nan has no meaning.

(c) Do the same as in (b) with the time series of price returns and volatility returns, where the nan values are placed in the volatility time series. Try again to generate the next volatility return and price return.