

A multifractional option pricing formula

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Fractional Brownian motion has become a standard tool to address long-range dependence in financial time series. However, a constant memory parameter is too restrictive to address different market conditions. Here we model the price fluctuations using a multifractional Brownian motion assuming that the Hurst exponent is a time-deterministic function. Through the multifractional Ito calculus, both the related transition density function and the analytical European Call option pricing formula are obtained. The empirical performance of the multifractional Black-Scholes models is tested and appears superior to its fractional and standard counterparts.