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The Heston stochastic volatility model in Hilbert space

We extend the Heston stochastic volatility model to a Hilbert space framework. The tensor Heston stochastic variance process is defined as a tensor product of a Hilbert-valued Ornstein-Uhlenbeck process with itself. The volatility process is then defined by a Cholesky decomposition of the variance process. We define a Hilbert-valued Ornstein-Uhlenbeck process with Wiener noise perturbed by this stochastic volatility, and compute the characteristic functional and covariance operator of this process. This process is then applied to the modelling of forward curves in energy markets. Finally, we compute the dynamics of the tensor Heston volatility model when the generator is bounded, and study its projection down to the real line for comparison with the classical Heston dynamics.