

The Heston model with stochastic interest rates and pricing options with Fourier-cosine expansions

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Abstract

In this presentation we discuss the Heston model with stochastic interest rates driven by Hull-White or Cox-Ingersoll-Ross processes. We present approximations in the Heston-Hull-White hybrid model, so that a characteristic function can be derived and derivative pricing can be efficiently done using the Fourier Cosine expansion technique. This pricing method, called the COS method, is explained in some detail. We furthermore discuss the effect of the approximations in the hybrid model on the instantaneous correlations, and check the influence of the correlation between stock and interest rate on the implied volatilities.