

Option pricing in multivariate stochastic volatility models of OU type

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We present a multivariate stochastic volatility model with leverage, which is flexible enough to recapture the individual dynamics as well as the interdependencies between several assets while still being highly analytically tractable.

First we derive the characteristic function and give conditions that ensure its analyticity and absolute integrability in some open complex strip around zero. Therefore we can use Fourier methods to compute the prices of multi-asset options efficiently. To show the applicability of our results, we propose a concrete specification, the OU-Wishart model, where the dynamics of each individual asset coincide with the popular Gamma-OU BNS model. This model can be well calibrated to market prices, which we illustrate with an example using options on the exchange rates of some major currencies. Finally, we show that covariance swaps can also be priced in closed form.

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