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Articles

A versatile approach for stochastic correlation using hyperbolic functions

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Abstract

It is well known that the correlation between financial products or financial institutions, e.g. plays an essential role in pricing and evaluation of financial derivatives. Using simply a constant or deterministic correlation may lead to correlation risk, since market observations give evidence that correlation is not a deterministic quantity. In this work, we propose a new approach to model the correlation as a hyperbolic function of a stochastic process. Our general approach provides a stochastic correlation which is much more realistic to model real- world phenomena and could be used in many financial application fields. Furthermore, it is very flexible: any mean-reverting process (with positive and negative values) can be regarded and no additional parameter restrictions appear which simplifies the calibration procedure. As an example, we compute the price of a Quanto applying our new approach. Using our numerical results

we discuss concisely the effect of considering stochastic correlation on pricing the Quanto.

Keywords:

correlation risk | stochastic correlation | hyperbolic functions | stochastic process | Ornstein–Uhlenbeck process | Quanto | Fokker–Planck equation | stochastic correlation process

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Disclosure statement

No potential conflict of interest was reported by the authors.

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