Pricing European Spread Options in Lévy Markets With Stochastic Interest Rate Using Fourier Transform Method

Nyouky Philip ¹ and Ji-Hun Yoon²

¹) Department of Mathematics, Pusan National University, Busan 46241, KOREA
²) Department of Mathematics, Pusan National University, Busan 46241, KOREA

Corresponding Author: Nyouky Philip, pnyouky@yahoo.com

ABSTRACT

Valuation methods for Spread options in mathematical finance literature often do not account for the time varying nature of real market interest rate. Notwithstanding the equivocal position on the impact of stochastic interest rate dynamic on spread option valuation it is unrealistic to take the interest rate to be constant as is more often assumed. The main purpose of this talk is to present a stochastic interest rate augmented Fourier transform method for pricing European spread options. The price returns of the two underlying assets are modeled as exponential Levy processes and the instantaneous interest rate is allowed to evolve as a Cox, Ingersoll, and Ross (CIR) process. Under the assumption of independent correlation between the individual asset price processes and the instantaneous interest rate process, a joint application of the Fourier transform method and eigenfunction expansion method constitutes our valuation tool and applied to the variables corresponding to the asset price dynamics and the interest rate movements, respectively. We demonstrate our result by some illustrative examples.

REFERENCES


