Quantitative Finance > Pricing of Securities

Extra-Dimensional Approach to Option Pricing and Stochastic Volatility

Minh Q. Truong

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The generalized 5D Black-Scholes differential equation with stochastic volatility is derived. The projections of the stochastic evolutions associated with the random variables from an enlarged space or superspace onto an ordinary space can be achieved via higher-dimensional operators. The stochastic nature of the securities and volatility associated with the 3D Merton-Garman equation can then be interpreted as the effects of the extra dimensions. We showed that the Merton-Garman equation is the first excited state, i.e. n=m=1, within a family which contain an infinite numbers of Merton-Garman-like equations.

Comments:	Ease the time-independent restriction on the extra dimensional coordinates. Fixed typos and expand the conclusion
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