

Econophysics: The Use of Entropy Measures in Finance

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Abstract : Concepts of econophysics are usually used to solve problems related to uncertainty and nonlinear dynamics. In the theory of option pricing the risk neutral probabilities play very important role. The application of entropy in finance can be regarded as the extension of both information entropy and the probability entropy. It can be an important tool in various financial methods such as measure of risk, portfolio selection, option pricing and asset pricing. Gulko applied Entropy Pricing Theory (EPT) for pricing stock options and introduced an alternative framework of Black-Scholes model for pricing European stock option. In this article, we present solutions to maximum entropy problems based on Tsallis, Weighted-Tsallis, Kaniadakis, Weighted-Kaniadakis entropies, to obtain risk-neutral densities. We have also obtained the value of European call and put in this framework.

Keywords : option pricing, Black-Scholes model, Tsallis entropy, Kaniadakis entropy, weighted entropy, risk-neutral density

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