Pricing Options with Exponential Lévy Neural Network

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ABSTRACT

In this paper, we propose the exponential Lévy neural network (ELNN) for option pricing, which is a new non-parametric exponential Lévy model using artificial neural networks (ANN). The ELNN fully integrates the ANNs with the exponential Lévy model, a conventional pricing model. So, the ELNN can improve ANN-based models to avoid several essential issues such as unacceptable outcomes and inconsistent pricing of over-the-counter products. Moreover, the ELNN is the first applicable non-parametric exponential Lévy model by virtue of outstanding researches on optimization in the field of ANN. The existing non-parametric models are rather not robust for application in practice. The empirical tests with S&P 500 option prices show that the ELNN outperforms two parametric models, the Merton and Kou models, in terms of fitting performance and stability of estimates.