

1135-VF-941

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In this paper, we explore wavelet and machine learning based nonparametric methodologies for pricing call options. We first apply wavelet transform to remove noise from raw data. We then apply support vector regression as well as neural networks to predict call option prices. These methods, while being prominent in other fields of study, have not heavily been used for financial econometric applications. The accuracy of these methods are compared to the widely used Black Scholes Model. The empirical analysis has shown promising results for nonparametric methodologies to further accuracy in accommodating for the stochastic volatility of financial markets. (Received September 17, 2017)