EUROPEAN CALL OPTION ESTIMATION IN THE BLACK-SCHOLES MODEL USING ENSEMBLE KALMAN FILTER METHOD

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Abstract

Option is a financial contract that gives the holder or buyer the right to buy or sell the underlying asset with a certain price in a certain time. One of the model used to estimate option value is Black-Scholes model. Black-Scholes model cannot be used directly because it needs a volatility value which cannot be observed directly. Therefore the volatility estimation must be done before. In this final project Ensemble Kalman Filter method (EnKF) is used to estimate the price of European call option. Then, the result of European call option estimation using EnKF method is compared with the result of European call option estimation using Extended Kalman Filter method (EKF). EnKF method is selected because it is considerly compatible to be used in a nonlinear model. In the end of this final project, it is obtained that EnKF method is better than EKF method in estimating the price of European call option in the Black-Scholes model.

Keywords: Option, volatility, Black-Scholes model, Extended Kalman Filter, Ensemble Kalman Filter.