

Optimal forecasting of option prices using particle filters and neural networks

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Abstract

A novel online forecasting system on financial option prices is implemented in this paper by combining a particle filter with a neural network. The particle filter (PF) model is based on the Black-Sholes (BS) model for prediction, while the neural network is employed to capture the nonlinear residuals between the actual option prices and the PF predictions. Taking the transaction data of option prices on the Taiwan composite stock index (TWSI), we found that the forecasting performance of the hybrid model is superior to the traditional extended Kalman filter model and the PF model. Our results can help investors make a good hedge on their option positions.

Keywords: Online forecast, Extended Kalman filter, Particle filter, Neural network

1. Introduction

The valuation of financial assets and the pricing of financial derivatives are one of the most important areas in financial studies in recent years. Evidence of this importance can be found in the large number of publications. Option markets are among the most popular shares of

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