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ANFIS-BASED ADAPTIVE EXPECTATION MODEL FOR FORECASTING STOCK INDEX

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Abstract. *Stock market investors often make their short-term investment decisions according to recent stock information, such as the news before the market opened, yesterday's global stock indices' volatility, or the price fluctuations of the last two days. Greater accuracy by forecasting models is in demand because more accurate predictions will bring more profit to investors. Unfortunately, there are four drawbacks to the conventional time series models: (1) most statistical methods rely on some assumptions about the variables; (2) conventional forecasting models do not provide predicting rules for stock price indices; (3) the rules mined from genetic algorithms and artificial neural networks are not easily understandable, and most rule-based forecasting models generate too many predicting rules for a stock price index; and (4) stock market investors usually make short-term decisions based on recent price fluctuations (the last one or two periods), but most time series models use only the last period of stock price in forecasting. This paper addresses these drawbacks by proposing a new model using expectation equation joining to an adaptive-network-based fuzzy inference system (ANFIS) model [1] to forecast the Heng Seng stock index. To evaluate forecasting performance, three different models, (Chen's model [2], Yu's model [3], and the ANFIS model [1]) are used as comparison models. The experimental results indicate that the proposed model is superior to the listing methods in terms of root mean squared error.*

Keywords: Stock index forecasting, ANFIS, Adaptive learning

1. **Introduction.** Stock market investing is a serious and challenging monetary activity. Huge profits can be made when highly accurate predictions are given by a forecasting model, but violent fluctuations in stock market activity make forecasting a challenge. Therefore, forecasting accuracy is a major concern of many investors, highlighting the importance of building a more accurate forecasting model.

Time series has been used to forecast stock markets, and various models have been proposed [4]. In 1982, Engle [5] proposed the Autoregressive Conditional Heteroscedasticity, or ARCH(p), model; subsequently, Bollerslev [6] proposed the Generalized ARCH (GARCH) model to refine the ARCH model. In addition, Box and Jenkins [7] proposed the Autoregressive Moving Average (ARMA) model, which performs forecasting at linear stationary condition. Furthermore, under nonstationary conditions, the Autoregressive Integrated Moving Average (ARIMA)[7] model was proposed to describe such homogeneous nonstationary behavior. These conventional financial time series models are characterized by some statistical assumptions about data distributions. But the distributions