ABSTRACT

COMBINATION OF ARIMA AND FUZZY TIME SERIES MODELS WITH PARTICLE SWARM OPTIMIZATION (PSO) ALGORITHM TO IMPROVE STOCK FORECASTING ACCURACY

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In the modern era, the capital market has become a popular investment option due to its significant profit potential. However, stock price fluctuations influenced by economic and political factors pose challenges for investors. Forecasting analysis is essential to help make better investment decisions and manage risks. ARIMA models are used for forecasting time series with linear patterns, but are less optimal for data with nonlinear patterns. Fuzzy time series offers a solution to handle ambiguity and uncertainty in time series data, although it has the disadvantage of determining the optimal interval partition. Particle Swarm Optimization algorithm is used to overcome this weakness of FTS. This research aims to combine ARIMA and FTS models with PSO algorithm. This model combination is applied to stock data of PT Bank Rakyat Indonesia (Persero) Tbk. as a case study in this research. The results showed that the PSO algorithm in optimizing interval partitioning resulted in better forecasting accuracy. This model shows a lower MAPE value than the ARIMA or FTS model alone, which is 0.893% for insample data and 1.118% for outsample data. These findings suggest that the combination of ARIMA and FTS with the PSO algorithm is effective in improving stock price forecasting accuracy, providing a more reliable tool for investors in managing their portfolios.

Keywords: Particle Swarm Optimization Algorithm (PSO), fuzzy time series Cheng, ARIMA, interval partition