# STOCK PRICES FORECASTING BASED ON HISTORICAL DATA

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Equity investments are becoming widespread with the rapid development of the social economy and the continuous improvement of the stock market. Stock price forecasting methods based on numerical and textual data are at the forefront of data mining research.

Despite significant advances in stock market forecasting based on statistical models, the growing complexity of financial markets has led to the emergence of new data-driven forecasting technologies. Significant improvements in computing capabilities have made it possible to create modern forecasting methods, represented by machine learning and deep learning, as the main trends in stock market forecasting.

The goal of this paper is the stock price modelling and forecasting based on historical data. The initial data are the closing prices of companies stocks, one representative of each sector of the stock market. Data analysis, modelling and forecasting of time series dynamics are performed using the R language.

The paper investigates two types of forecasting models: ARIMA (Autoregressive Integrated Moving Average Model) [1] and BSTS (Bayesian Structural Time Series Model) [2], on the basis of which short-term (one work week) and medium-term (two work weeks) forecast values for the stock price of eleven companies representing all the stock market sectors are obtained. For each forecasting result obtained, a comparative analysis of both model types in terms of efficiency based on the MAPE (Mean Absolute Percentage Error) metric is performed.

The structures of the best ARIMA models, which were automatically selected using the AIC criterion, are quite diverse. The structures of BSTS models (specifications) consisted of one or two components; a larger number of components did not improve the quality of the model.

All the studied BSTS-model structures have shown satisfactory forecasting quality and, almost always, better efficiency compared to ARIMA models, so they can be recommended as a full-fledged tool for building short-term and medium-term forecasts for the stock price of companies with nonstationary and nonlinear time series.

The results obtained can be used to set up models and obtain short-term forecasts for similar time series, which will allow making informed decisions on business processes.

**References:**
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