# PERAMALAN INDEKS HARGA SAHAM GABUNGAN MENGGUNAKAN KOMBINASI METODE BOX-JENKINS DAN JARINGAN SARAF TIRUAN BACKPROPAGATION dengan *Optimizer* AMSGrad

***Stock Price Index Forecasting using Hybrid Method Box-Jenkins and Backpropagation Neural Network with AMSGrad Optimizer***

Diajukan untuk memenuhi salah satu syarat memperoleh derajat
Sarjana Matematika (S.Mat.)


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**SEMARANG**
**2023**

**SKRIPSI**

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**HALAMAN PENGESAHAN**

**LAPORAN TUGAS AKHIR**

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## *Abstract*

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*Box-Jenkins is one of the commonly forecasting methods in statistics because it has a basic model (ARIMA) that is flexible and interpretable, suitable for non-stationary data, and can capture linear patterns in time series data. While Artificial Neural Network (ANN) method commonly used for forecasting is the backpropagation neural network. This method is widely used because it is a very basic neural network architecture that capture non-linear patterns in data. The two forecasting methods are combined because in the original event, it is very rare for a time series data to have a purely linear or purely non-linear pattern. Because of the previous explanation, in this final project forecasting is done by combining the two forecasting methods. The combination of these two forecasting methods is optimized with the AMSGrad (Adaptive Moment Estimation Stochastic Gradient Descent) optimizer. AMSGrad was chosen because it has compatibility with complex models and data and has good generalization abilities. The best ARIMA model for forecasting was obtained using a combination of the Box-Jenkins method and backpropagation neural networks, namely ARIMA* $(3,1,1)$ *with accuracy value of RMSE of* $129{,}575$*, MAE of* $93{,}185$*, and MAPE of* $0{,}016$*.*



*Keywords: Forecasting, ARIMA, Artificial Neural Network, AMSGrad*