## TIME SERIES APPROACH FOR MODELING AND FORECASTING THE CONTRIBUTION OF HYDROELECTRICITY GENERATION IN SRI LANKA

## Thayasivam U. and Dayarathne K. P. N. S\*.

Department of Computer Science & Engineering, University of Moratuwa, Sri Lanka \*sanjeewa.22@cse.mrt.ac.lk

Hydroelectricity generation plays a major role in Sri Lanka's power generation. An accurate forecast of the contribution of hydroelectricity to national power generation would help to reduce vulnerability of power generation and save foreign currency used for thermal electricity generation. The main objective of this study is to develop a time series model to forecast the contribution of hydroelectricity in Sri Lanka. Autoregressive moving average (ARMA) and generalised autoregressive conditional heteroscedasticity (GARCH), EARCH, ARCH, AARCH and TGARCH models were applied to daily data for the period April 2021 to February 2024 and the model was validated using data from March 2024 to July 2024. Mean absolute error (MAE) and mean squared error (MSE) were employed to examine the accuracy of forecasting. Based on the results of this study, the ARMA (2,1) and TGARCH (1,1) models were identified as possible models for forecasting the contribution of hydroelectricity. However, the ARMA (2,1) model is not suitable for forecasting due to the presence of heteroscedasticity. Therefore, the TGARCH (1,1) model was selected as the best model for forecasting. The MAE and MSE for the fitted model are 0.1013 and 0.0129 respectively. The threshold component in the TGARCH model introduces asymmetry into the model, allowing for different effects on volatility depending on whether past shocks were positive or negative, and it is more suitable for forecasting the volatility or risk associated with a time series.

Keywords: ARIMA, Hydroelectricity, Sri Lanka, TGARCH, Time Series.