UNIVERSITY OF KWAZULU-NATAL
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CLASS ACTIVITY 18 MARCH 2025

COURSE & CODE: Time Series and Forecasting Econometrics & STAT602

Box-Jenkins methodology: Model Identification, Parameter Estimation, Diagnostic Checking & Forecasting.

1. The file viscosity.xlsx contains daily readings of the viscosity of the chemical product.

(a) Display a time series plot of the data. Comment on the time series plot.

(b) Perform the ADF test for stationarity on the data and comment.

(c) Plot ACF and PACF plots and suggest a tentative model for the data.

(d) Fit an AR (2) model to the data and comment. Is the model adequate? (Perform diagnostic tests).

(e) Using the model, forecast the next five values and plot the forecast together with the 95% forecast limits.

2. The file paper towel.xlsx contains weekly sales of paper towels.

(a) Display a time series plot of the data. Comment on the time series plot.

(b) Perform the ADF test for stationarity on the data and comment.

(c) Display a time series plot of the first differenced values. Does this plot suggest that a stationary model might be appropriate?

(d) Perform the ADF test for stationarity on the differenced data and comment.

(e) Plot ACF and PACF plots and suggest a tentative model for the differenced data.

(f) Fit an IMA (1,1) model to the data and comment. Is the model adequate?

(g) Fit an ARI (1,1) model to the data and comment. Is the model adequate?

(h) Using the best model, forecast the next ten values and plot the forecast together with the 95% forecast limits.
