

Activity: Box–Jenkins Forecasting

This activity aims to help you understand how to apply Box–Jenkins forecasting methods once a model has been fitted to a time series. The following model

$$X_t = 0.5X_{t-1} + Z_t - 0.8Z_{t-1} + 0.4Z_{t-2}$$

has been fitted to a series of 100 observations, for which $x_{100} = 3.24$, $z_{100} = 0.64$ and $z_{99} = 0.95$. The residual sum of squares for the fit is 44.89.

1. Forecast the values of the process at times 101, 102 and 103.
2. Find the (approximate) 95% prediction intervals for your forecasts in the previous part.
3. If $x_{101} = 1.60$, find $\hat{x}_{101}(1)$ and $\hat{x}_{101}(2)$.
4. What would happen here to our forecast value $\hat{x}_{101}(l)$ as l grows large?