Chapter 6 Model Specification

6.27 Simulate an AR(2) time series of length $n = 72$ with $\phi_1 = 0.7$ and $\phi_2 = -0.4$.
  - (a) Calculate and plot the theoretical autocorrelation function for this model. Plot sufficient lags until the correlations are negligible.
  - (b) Calculate and plot the sample ACF for your simulated series. How well do the values and patterns match the theoretical ACF from part (a)?
  - (c) What are the theoretical partial autocorrelations for this model?
  - (d) Calculate and plot the sample ACF for your simulated series. How well do the values and patterns match the theoretical ACF from part (a)?
  - (e) Calculate and plot the sample PACF for your simulated series. How well do the values and patterns match the theoretical ACF from part (c)?

6.29 Simulate a mixed ARMA(1,1) model of length $n = 60$ with $\phi = 0.4$ and $\theta = 0.6$.
  - (a) Calculate and plot the theoretical autocorrelation function for this model. Plot sufficient lags until the correlations are negligible.
  - (b) Calculate and plot the sample ACF for your simulated series. How well do the values and patterns match the theoretical ACF from part (a)?
  - (c) Calculate and interpret the sample EACF for this series. Does the EACF help you specify the correct orders for the model?
  - (d) Repeat parts (b) and (c) with a new simulation using the same parameter values and sample size.
  - (e) Repeat parts (b) and (c) with a new simulation using the same parameter values but sample size $n = 36$.
  - (f) Repeat parts (b) and (c) with a new simulation using the same parameter values but sample size $n = 120$.

6.36 The data file named robot contains a time series obtained from an industrial robot. The robot was put through a sequence of maneuvers, and the distance from a desired ending point was recorded in inches. This was repeated 324 times to form the time series.
  - (a) Display the time series plot of the data. Based on this information, do these data appear to come from a stationary or nonstationary process?
  - (b) Calculate and plot the sample ACF and PACF for these data. Based on this additional information, do these data appear to come from a stationary or non-stationary process?
  - (c) Calculate and interpret the sample EACF.
  - (d) Use the best subsets ARMA approach to specify a model for these data. Compare these results with what you discovered in parts (a), (b), and (c).

Pls submit your assignments before class on (Tuesday) 26 OCT