Assignment 3

4181 - Applied Time Series

To be Submitted on Blackboard by Thursday, March 10th (2:20 PM)

Your homework submission should contain your R code, outputs from the R code (as long as it's not too lengthy) and plots. Please clearly answer each question; your answers should contain more than just R code.

Solve questions 2 and 4(skip e) from Chapter 4 in *Introductory Time Series with R*. They are included here for your convenience:

1.a) Simulate time series of length 100 from an AR(1) model with α equal to -0.9, -0.5, 0.5, and 0.9. Estimate the parameter of each model and make predictions for 1 to 10 steps ahead.

1.b) Simulate time series of length 100 from an AR(1) model with α equal to 1.01, 1.02, and 1.05. Estimate the parameters of these models.

2.a) Simulate a time series of length 1000 for the following model, giving appropriate R code and placing the simulated data in a vector `x`:

$$x_t = \frac{5}{6}x_{t-1} - \frac{1}{6}x_{t-2} + w_t$$

2.b) Plot the correlogram and partial correlogram (`pacf`) for the simulated data. Comment on the plots.

2.c) Fit an AR model to the data in `x` giving the parameter estimates and order of the fitted AR process. (*Use AIC to determine the order*).

2.d) Construct 95% confidence intervals for the parameter estimates of the fitted model. Do the model parameters fall within the confidence intervals? Explain your results.

2.e) `Skipped`

2.f) Plot the correlogram of the residuals of the fitted model, and comment on the plot.