Assignment 4

4181 - Applied Time Series

To be Submitted on Blackboard by Tuesday, April 5th (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 subquestion; your answers should contain more than just R code.

Solve question 1 from Chapter 5 in *Introductory Time Series with R*. They are included here for your convenience:

a) Produce a time plot for $\{x_t : t = 1, ..., 100\}$, where

$$x_t = 70 + 2t + 0.03t^2 + z_t,$$

where $\{z_t\}$ is the AR(1) process given by

$$z_t = 0.5z_{t-1} + w_t,$$

and $\{w_t\}$ is white noise with standard deviation 25.

b) Fit a quadratic trend to the series $\{x_t\}$ using the `lm( )` function. Give the coefficients of the fitted model.

c) Find a 95% confidence interval for the parameters of the quadratic model, and comment.

d) Plot the correlogram of the residuals and comment.

e) Refit the model using GLS (use the `gls( )` function from the `nlme` package). Give the standard errors of the parameter estimates, and comment.