Homework 5

1. The TSA library contains the data set "milk", which contains the monthly U.S. milk production (in millions of pounds) from January, 1994 to December, 2005.

(a) Construct a time series plot for the data. Describe the appearance of the series.

(b) Plot the first differences, $\{\bigtriangledown Y_t\}$. Describe the appearance of this plot and how it compares with the plot of the original series.

(c) Use all of the model diagnostic checks we introduced in Chapter 3 on the difference process $\{\bigtriangledown Y_t\}$. Do the data differences resemble a normal zero mean white noise process?

2. Use R to simulate the AR(1) process $Y_t = e_t + 0.4Y_{t-1}$, where $n = 200$, and $e_t \sim iid\ N(0, 1)$. The series W_t are generated by $W_t = \exp(Y_t)$. Use set.seed(1) to generate the time series Y_t.

(a) Draw the time series plot and sample ACF for the series W_t.

(b) Use BoxCox.ar function to find the appropriate λ for an appropriate transformation for the series W_t.

(c) Apply corresponding transformation to the series W_t based on the proper λ obtained in (b). Draw the time series plot and sample ACF for the transformed series.