In-class Exercise 1 : Fitting Temperature Data with ARIMA

(due Fri 3/06/2015)

Name:

Use This file as a template for your assignment. Submit your code and comments together with (selected) output from R console. Your comments must be **BOLD FACED**.

First, load global temperature data from class web site using below R code.

D <- read.csv("http://gozips.uakron.edu/~nmimoto/pages/datasets/gtemp.txt")

X <- ts(D, start=c(1880), freq=1)

plot(X, type='o')

1. Use auto.arima and select the best ARIMA(p,d,q) model for this dataset. How did auto.arima came to the final model? Briefly explain.
2. Determine the adequacy of the model fit by residual analysis.
3. Check for parameter significance of the current model (trusting the asymptotic s.e. from auto.arima()).
4. Check for adequacy of value d selected by auto.arima(). Which method used as default? Use Stationarity.test() from the class website and check d=0, d=1, d=2 for its (non)stationarity. Do you agree with the choice made by auto.arima()?
5. Look for signs of under-difference (d too low) and over-difference (d too high). What are the signs? Do you see any from your fit?
6. State your final model using equation(s) with parameter values.
7. Use trace=TRUE option in auto.arima(), to see second and third lowest model from part(1). Use Arima() and repeat part (2) and (3) for those models. Is there any reason that they are better than model chosen by part (1)?
8. Perform 5-step prediction of global temperature using your final model.