**477/577 In-class Exercise 2 : Fitting AR(p) to Temp Data**

(due Mon 2/12/2018)

Name:

Use this file as a template for your report. Submit your code and comments together with (selected) output from R console.

* Your comments must be Arial font, and **BOLD FACED**.
* Your code must be Lucida Console font.

You must submit PRINTOUT of this file.

First, copy and paste below command in R console.

# Download dataset from the course web page

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

D1 <- ts(D, start=c(1880), freq=1) # turn D into time series object

D2 <- diff(D1) # Take monthly difference

plot(D1)

plot(D2)

Now your “D2” in R contains monthly difference of global temperature.

1. Plot the time series “D2”. Does it look (weakly) stationary? Briefly explain what you see in the plot of “D2” regarding the stationarity. Include the plot.

(Your code)

**(Your comment)**

1. How many observations does “D2” have? What is the overall mean and standard deviation of D2?

(Your code)

**(Your comment)**

1. Does “D2” look like White Noise? Or does it look like AR(p)? Examine plot of ACF and PACF and explain your thought briefly. Include the plots.

(Your code)

**(Your comment)**

1. Use ar() function to fit AR(p) model to D2. Use Yule-Walker estimator. Keeping default of demean=TRUE and aic=TRUE, select the best value of p based on Minimum AIC.

(Your code)

**(Your comment)**

1. Now compare p you got from (#4) with p you guessed in (#3). Are they consistent, or are they conflicting? Which one are you going with? Briefly explain.

(Your code)

**(Your comment)**

1. Test Yule-Walker estimate of the AR parameter from (#4) for significance. Quote the 95% CI result in 0.00 0.000 format for each parameter, and clearly state test conclusion.

(Your code)

**(Your comment)**

1. Now increase the order p by 1 from what was suggested in (#4). Force to fit AR with the increased order. Test the Y-W parameter estimates for significance. Quote the 95% CI result in 0.00 0.000 format for each parameter, and clearly state test conclusion. What is your final decision about order p?

(Your code)

**(Your comment)**

1. Use whatever the final AR(p) model you settled. Plot the residuals from your final model. How is the fit of your final model? Does the residual look like WN? Include ACF and PACF plot of residuals to support your conclusion. (hint: when using acf() function, include “na.action=na.pass” so that they will ignore NA values.)

(Your code)

**(Your comment)**