**477/577 In-class Exercise 4 :**

**Fitting Dow Jones with ARIMA(p,d,q)**

(due Mon 3/19)

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.

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

D1 <- ts(D, start=c(1), freq=1)

Now your “D1” in R contains daily price of Dow Jones Industrial Average in 1972.

1. Use **Stationarity.tests()** to test **D1, diff(D1)**, and **diff( diff(D1) )** for stationarity. Summarize your findings. If we are to fit ARIMA(p,d,q) model, what is your guess for the value of d?

(Your code)

**(Your comment and plots)**

1. Fit ARIMA(p,d,q) model to D1 using **auto.arima()** function. Use **stepwise=FALSE**, but do not force value of d. (Let **auto.arima()** pick.) State the best model found. Test parameter for significance, and perform residual analysis.

(Your code)

**(Your comment and plots)**

1. Use **Arima()** and look for better value of p and q while keeping d the same as found in #2. State the best model found. (After checking parameters for significance, and residual analysis).

(Your code)

**(Your comment and plots)**

1. Use **auto.arima()** with forced value of d. i.e. **auto.arima(D1, d=x, stepwise=FALSE).** The value of x should be 1 more than the value found in #2. State the model found. Check parameters for significance, and perform residual analysis.

(Your code)

**(Your comment)**

1. Do you see the sign of under-differencing in #2 and 3? Do you see sign of over-differencing in #4?

**(Your comment)**

1. Out of models found in #2,3,4, which one is your final pick? State the reason clearly.

**(Your comment)**

1. Write down your final model using equations. List all parameters with their estimated values.

**(Your comment)**