Assignment 6

3 Possible Points

This assignment's due date is Monday July 3rd, by 8:00 PM. The grading policy for late assignments can be found in the syllabus. You are strongly encouraged to work in groups of up to 4 students, but each of you must submit his/her own version of the assignment. Please put the names of your group members in a comment in the program.

Write a single text file that contains all of your work for this assignment. Name it ps6_[yourlastname].txt - for example, mine would be ps6_hoff.txt The text file should submit all of the commands necessary to answer the questions. Please put the answers to the **bold questions** in a comment line in your text file, even if you think the answer is readily apparent.

In this assignment you will forecast 3 data series. You will use ARIMA and the Box-Jenkins methodology to do so. The data can be found on the course website in a CSV file titled "ps6". Note that the first two models should not have an intercept, but an intercept may be appropriate for the third time series, $\{z3_t\}$.

Some math first...

(Chapter 7, problem 1) Identify each of the following as specific ARIMA models and state whether or not they are stationary.

1. $x_t = x_{t-1} - 0.25x_{t-2} + w_t + 0.5w_{t-1}$
2. $x_t = 2x_{t-1} - x_{t-2} + w_t$
3. $x_t = 0.5x_{t-1} + 0.5x_{t-2} + w_t - 0.5w_{t-1} + 0.25w_{t-2}$

(Chapter 7, problem 2) Identify the following as certain multiplicative seasonal ARIMA models and find out whether they are invertible and stationary.

1. $x_t = 0.5x_{t-1} + x_{t-4} - 0.5x_{t-5} + w_t - 0.3w_{t-1}$
2. $x_t = x_{t-1} + x_{t-12} - x_{t-13} + w_t - 0.5w_{t-1} - 0.5w_{t-12} + 0.25w_{t-13}$

Time Series $\{z3_t\}$

- Your goal is to fit the best model for the series $\{z1_t\}$. Your choice of model should be based on evidence and this evidence should be referenced in your write-up of why you choose the model that you did. You may want to discuss models that you tried, but are not the "best" model.
- Present a plot with the actual and predicted series.
- Both your write-up and graphs should be of professional quality.
- **Clearly list the order of your preferred model.**
- **What is the AIC_C of your preferred model?**

Time Series $\{z2_t\}$

- Repeat the work you did for $\{z1_t\}$ for the series $\{z2_t\}$.

Time Series $\{z3_t\}$

- Repeat the work you did for $\{z1_t\}$ for the series $\{z3_t\}$.