

Mid-Term Review
Eco 5375
Business and Economic Forecasting
Fall 2015

Our upcoming mid-term exam is on **Monday, October 26, 5:00 – 6:30 in 241 Lee**. The test is a closed notes test and thus you are not to have any notes in any form open during the test. Also you are not to use your phones during the exam.

I recommend that you review your notes, your quick quizzes (QQ1 – QQ7), and your exercises (EX1 – EX5). The Keys for the QQs and exercises are posted on the course website. The main subjects to be covered on this mid-term are **(1) Basic Time Series Decomposition: $Y = T + S + C + I$** , **(2) Non-Seasonal Box-Jenkins Time Series Models**, **(3) Unit Root Tests**, **(4) Distinction between Deterministic Trend and Stochastic trend prediction intervals**, **(5) Choice between log and level transformations of time series data and how to forecast with logged data**, **(6) Detection of Seasonality using Buys-Ballot Plots and the Deterministic Trend/Deterministic Seasonal (DTDS) model and how they can be used to detect and test for seasonality in time series data**. Read very carefully the pdf files that I am recommending that you take a look at. Also look at the comments in the SAS programs that I have demonstrated in class and that you have used in your exercises. You should be fluent in the interpretation of SAS output. This is the purpose of taking you through the SAS exercises. I am going to be holding office hours from 3:00 – 5:00 on Friday in case you have any last minute questions before the exam on Monday.

Basic Decomposition of Time Series into Trend, Season, Cycle, and Irregular Components

1) A Demonstration of Basic Additive Time Series Decomposition.pdf

Non-Seasonal B-J Models

- 1) You should understand the concept and definition of “stationarity” of a time series and some useful transformations of non-stationary time series to make them stationary. Be able to distinguish graphs of non-stationary time series versus stationary time series.
- 2) Take a look at A Beginner’s Guide to B-J Models.pdf (see the SAS program Real GDP.sas and run it.)
- 2) BJ_Notation.pdf
- 3) Stats.pdf
- 4) ACF_PACF_Table.pdf
- 5) See the many ACF/PACF plots on the class website like ARMA02a.pdf, etc. for practice on using the spiking and damping behavior of ACFs and PACFs to identify the orders of pure AR(p) and pure MA(q) models. These can be found in the ACF_PACF subdirectory in the class website.
- 6) Forecast Profiles.pdf

Unit Root Tests

- 1) ADF notes.pdf. For various cases see the SAS programs Learn Unit Root.sas and Learn_Unit_Roots_Graphs.sas. For examples of ADF tests computed on real data see the following programs: Leadunit.sas; lead_production.wf1; Dow.sas; Dow2.sas; Dow Jones.wf1. Run these programs and come to understand how to interpret the output they produce.
- 2) For the various Dickey-Fuller Distributions for Cases 1, 2, and 3 see the following SAS programs:
Dickey-Fuller Distribution_Case_1.sas; Dickey-Fuller Distribution_Case_2.sas; and Dickey-Fuller Distribution_Case_3.sas;
- 3) Be sure and know the null and alternative hypotheses of these unit root tests.

Distinction between Deterministic and Stochastic Trend Prediction Intervals

- 1) MCARLO_Det_Trend_Pred_Intervals.sas (Deterministic Trend is appropriate)
- 2) MCARLO_RW_Drift_Pred_Intervals.sas (Stochastic Trend is appropriate)

Choice Between Log and Level Transformations of Time Series Data

- 1) See SAS Help_%Logtest.pdf (for syntax of the SAS Macro)
- 1) mloglev1.sas (level is the correct transformation (None))
- 2) mloglev2.sas (log is the correct transformation)

Detection of Seasonality in Time Series

- 1) Buys Ballot Plots.pdf (See the SAS programs Airline_Jacob_Williamson.sas and Plano_Plot_Jacob_Williamson.sas for some Buys Ballot plots of time series data.)
- 2) Det Time Trend Model_v2.pdf. (A tutorial on using the Deterministic Trend/Deterministic Seasonal model to detect seasonality in time series data.)