Week4:

Exercises 3 (chapter 6 Textbook)

6. Consider the MA(1) process $y_t = \varepsilon_t - 0.12\,\varepsilon_{t-1}$ where $\varepsilon_t \sim WN(0, \sigma_\varepsilon^2)$
   a. Find the ACF of the process.
   b. Is the model stationary? Justify your answer.
   c. Is the model invertible? Justify your answer.
   d. Characterize the behavior of the Partial Autocorrelation Function of the process.

7. Consider the MA(2) process $y_t = 14 + \varepsilon_t - 0.1\,\varepsilon_{t-1} + 0.21\varepsilon_{t-2}$ where $\varepsilon_t \sim WN(0, \sigma_\varepsilon^2)$
   a. Find the ACF of the process.
   b. Is the model stationary? Justify your answer.
   c. Is the model invertible? Justify your answer.
   d. Characterize the behavior of the Partial Autocorrelation Function of the process.

8. Suppose that you have time series data of a given country's inflation denoted as y_t. With these data the following model was estimated :

Dependent Variable: INFL
Method: Least Squares
Date: 11/08/12 Time: 16:08
Sample: 1971M01 2011M12
Included observations: 492
Convergence achieved after 35 iterations
MA Backcast: 1970M10 1970M12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.000127	0.007137	140.1296	0.0000
MA(1)	0.372642	0.034864	10.68835	0.0000
MA(2)	-0.287517	0.036356	-7.908265	0.0000
MA(3)	-0.642579	0.035015	-18.35160	0.0000

R-squared	0.568424	Mean dependent var	1.002714
Adjusted R-squared	0.565771	S.D. dependent var	0.536875
S.E. of regression	0.353779	Akaike info criterion	0.767809
Sum squared resid	61.07791	Schwarz criterion	0.801943
Log likelihood	-184.8810	Hannan-Quinn criter.	0.781212
F-statistic	214.2467	Durbin-Watson stat	1.389038
Prob(F-statistic)	0.000000		

Inverted MA Roots	.85	-.61+.62i	-.61-.62i

a. Obtain the general theoretical expression for $E[y_t]$ and $Var(y_t)$

b. Using the Eviews output provide an estimate for $E[y_t]$ and $Var(y_t)$

Week 5:

Exercises 1, 5 and 6 (chapter 7 Textbook)

9. Consider the AR(2) process $y_t = 2 + 0.8y_{t-1} - 0.1y_{t-2} + \varepsilon_t$ where $\varepsilon_t \sim WN(0, \sigma_\varepsilon^2)$
   a. Is the process stationary?
   b. Compute the unconditional mean and variance of the process.
   c. Determine the PACF and describe the ACF of the process.

10. Suppose that you have time series data of a given country's inflation denoted as y_t. With these data the following model was estimated :

Dependent Variable: INFL
Method: Least Squares
Date: 11/07/12 Time: 14:02
Sample (adjusted): 1971M03 2011M12
Included observations: 490 after adjustments
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.999994	0.016895	59.18885	0.0000
AR(1)	1.006304	0.029335	34.30388	0.0000
AR(2)	-0.769362	0.029310	-26.24904	0.0000

R-squared	0.718467	Mean dependent var	1.000375
Adjusted R-squared	0.717311	S.D. dependent var	0.536716
S.E. of regression	0.285364	Akaike info criterion	0.336001
Sum squared resid	39.65768	Schwarz criterion	0.361681
Log likelihood	-79.32032	Hannan-Quinn criter.	0.346087
F-statistic	621.4079	Durbin-Watson stat	2.779603
Prob(F-statistic)	0.000000		

Inverted AR Roots	.50+.72i	.50-.72i

   a. Obtain the general theoretical expression for $E[y_t]$.
   b. Using the Eviews output provide an estimate for $E[y_t]$.
   c. Suppose that the inflation rate at November 2011 and December 2011 were 1 and 1.2 respectively. Obtain the optimal forecast estimate for the inflation rate according to this model for:
      i. January 2012
      ii. February 2012
   d. Provide estimates for the forecast uncertainty for:
      i. January 2012
      ii. February 2012