

IE 360 – Assignment 3

Spring'19

Due Date: 15.05.2019

1. For the MA(2) process with zero mean defined by $Y_t = \varepsilon_t + w_1\varepsilon_{t-1} + w_2\varepsilon_{t-2}$,
 - a. Show that the process is stationary for all values of w_1 and w_2 .
 - b. Calculate the mean and the variance of the process.
 - c. Calculate the auto-correlation function of the process (show all details).

2. We consider AR(1) process with $\mu = 10$, $\varphi = 0.7$ and $Y_{20} = 12.5$.
 - a. Calculate 1, 2 and 3 step ahead forecasts.
 - b. Calculate SEs for three forecasts of part a).

3. To obtain the data of the monthly recorded price index of plastic package material use the commands.

```
res<-read.csv("UKPlasticPrices.csv",skip=1,header=T)
```

```
x<-ts(res$Price.Index,freq=12,start=1996)
```

 - a. Find a good (S)ARIMA model for that time series. Clearly explain why you choose / do not choose models.
 - b. Find forecasts for the next 12 months and their 95 % prediction intervals.
 - c. Inspecting the plot of the data, you can observe an extreme event in the time series a long time ago. To increase the stability of the data you may obtain better forecasts if you remove the data till the extreme event from the time series before you try to find a model. Using these shortened data, build a model and calculate forecasts for the next 12 months. Compare the forecasts with those you obtained when using the full series.

While writing your assignment report, please try to follow the guidelines given in "Assignment Format.pdf" file, as much as possible. Write down all of your code and the necessary output.