AAEC 4984/5984 – Applied Economic Forecasting

Put your name here

Homework #1 – Spring 2020

The purpose of this assignment is to enhance your understanding of time series graphics and data pattern. It is intended to be rather straightforward and simple.

Instructions: In all cases, please ensure that your graphs and visuals have properly titles and axes labels, where necessary. Recall that you can use `help()` to find out about the data in each series. For your convenience, I have posted my R markdown file on our course website so that you can open and alter as you see fit. Refer to the output, whenever appropriate, when discussing the results

Question 1: Visualizing Time Series Data

Create time plots of the following time series: `bicoal`, `chicken`, `dole`, `usdeaths`, `lynx`, `goog`, `writing`, `fancy`, `a10`, `h02`.

- To allow multiple graphs on your page, please arrange your plots as grids. Below, I have provided the base code to achieve this (Note: you will need to install the **gridExtra** package before calling the **grid.arrange** command):

```
# To display your graphs, replace `eval = FALSE` with `include = TRUE`
#Please feel free to edit accordingly!
g1 <- autoplot(. . .) + ggtitle("_____") + labs(x ="" , y = "  ")
g2 <- autoplot(. . .) + ggtitle("_____") + labs(x ="" , y = "  ")
g3 <- autoplot(. . .)  + ggtitle("_____")+labs(x ="" , y = "  ")
g4 <- autoplot(. . .)  + ggtitle("_____") + labs(x ="" , y = "  ")
g5 <- autoplot(. . .)  + ggtitle("_____")+ labs(x ="" , y = "  ")
g6 <- autoplot(. . .) + ggtitle("_____") + labs(x ="" , y = "  ")
g7 <- autoplot(. . .)  + ggtitle("_____") + labs(x ="" , y = "  ")
g8 <- autoplot(. . .)  + ggtitle("_____") + labs(x ="" , y = "  ")
g9 <- autoplot(. . .) + ggtitle("_____") + labs(x ="" , y = "  ")
g10 <- autoplot(. . .)  + ggtitle("_____") + labs(x ="" , y = "  ")

gridExtra::grid.arrange(g1,g2,g3,g4,g5,g6,g7,g8,g9,g10, nrow=5,ncol=2,newpage=TRUE)
```

Question 2: Assessing Seasonality

i. Use the `ggseasonplot()`, `ggsubseriesplot()`, and `ggAcf`[1] functions to explore possible seasonality in the following time series: `writing`, `fancy`, `a10`, `h02`.

ii. What can you say about the seasonal patterns?

iii. Can you identify any unusual years?

Question 3: White Noise

`dj` contains 292 consecutive trading days of the Dow Jones Index.

i. Plot this series and its ACF. Comment on any pattern noticed in both. Does this series look like white noise?

ii. Now, use `ddj <- diff(dj)` to compute the daily changes in the index.

iii. Plot `ddj` and its ACF. Do the changes in the Dow Jones Index look like white noise?

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[1]It might be useful to set the max lag in the ACF to 36 so that you can see a fair bit of the patterns in the correlogram.