# DaigleInClassLabWk13D1.R

*2011home*

*Wed Apr 18 09:15:05 2018*

```
# Chris Daigle
# Econ5495 - R Programming
# Wk13D1 In Class Lab - Time Series

# Importing ####
setwd(
  '/Users/2011home/Library/Mobile Documents/com~apple~CloudDocs/Education/UConn/Spring 2018/R/DataSets'
)
gdp <- read.csv('GDP.csv')

# Structuring ####
head(gdp)
```

```
##         DATE     GDP
## 1 1947-01-01 243.080
## 2 1947-04-01 246.267
## 3 1947-07-01 250.115
## 4 1947-10-01 260.309
## 5 1948-01-01 266.173
## 6 1948-04-01 272.897
```

```
str(gdp)
```

```
## 'data.frame':    284 obs. of  2 variables:
##  $ DATE: Factor w/ 284 levels "1947-01-01","1947-04-01",..: 1 2 3 4 5 6 7 8 9 10 ...
##  $ GDP : num  243 246 250 260 266 ...
```

```
gdp$DATE <- as.Date(gdp$DATE)
gdp$Time <- format(gdp$DATE, format = '%y/%m')
gdp <- gdp[, c(3, 2)]

# 2017 - 1947
# 1947 + 35
# gdp1 <- mean(gdp[gdp$Time >= 82 / 01, 2])

# Time Setting ####
gdpX <-
  ts(
    gdp$GDP,
    start = c(1947, 1),
    end = c(2017, 4),
    frequency = 4
  ) # Setting this is confusing unless we lose the concept of months and adopt quarters

str(gdpX)
```

```
##  Time-Series [1:284] from 1947 to 2018: 243 246 250 260 266 ...
```

```r
start(gdpX)
```

```
## [1] 1947    1
```

```r
head(gdpX)
```

```
## [1] 243.080 246.267 250.115 260.309 266.173 272.897
```

```r
end(gdpX)
```

```
## [1] 2017    4
```

```r
tail(gdpX)
```

```
## [1] 18729.13 18905.54 19057.71 19250.01 19500.60 19754.10
```

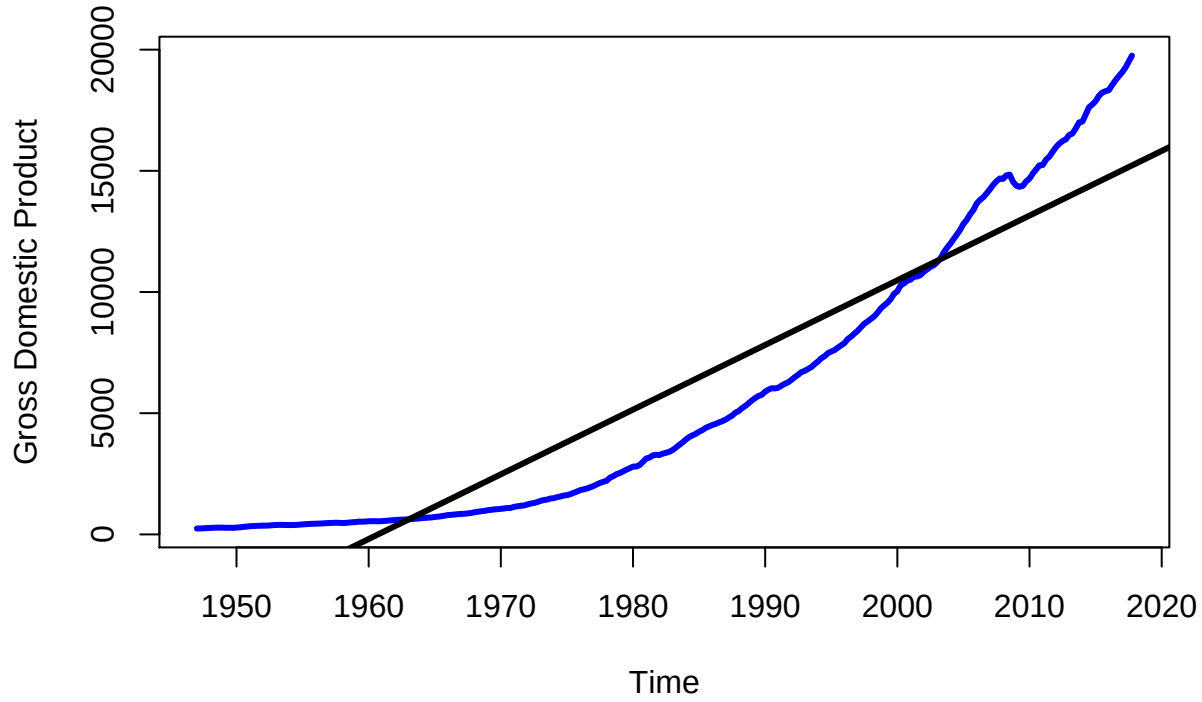
```r
frequency(gdpX)
```

```
## [1] 4
```

```r
summary(gdpX)
```

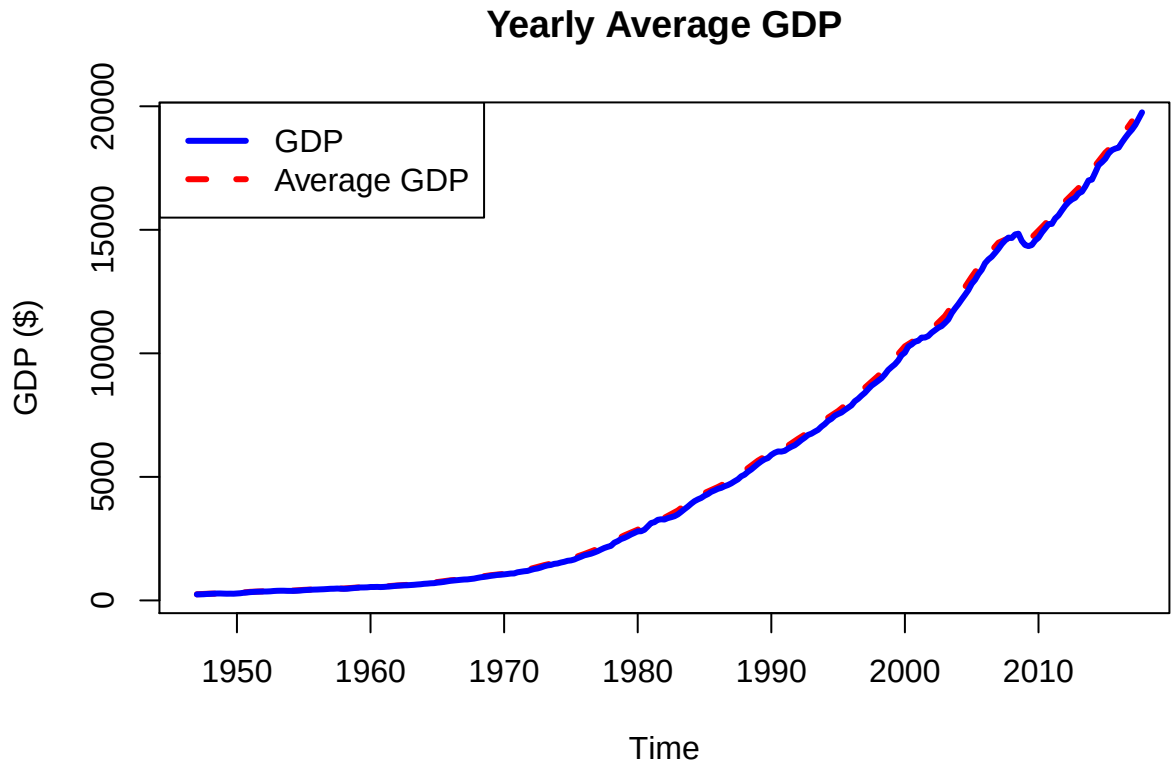
```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   243.1   697.0  3349.2  5781.1 10092.9 19754.1
```

```r
# Plotting ####
plot(gdpX,
     col = 'blue',
     lwd = 3,
     ylab = 'Gross Domestic Product')
abline(reg = lm(gdpX ~ time(gdpX)), lwd = 3)
```

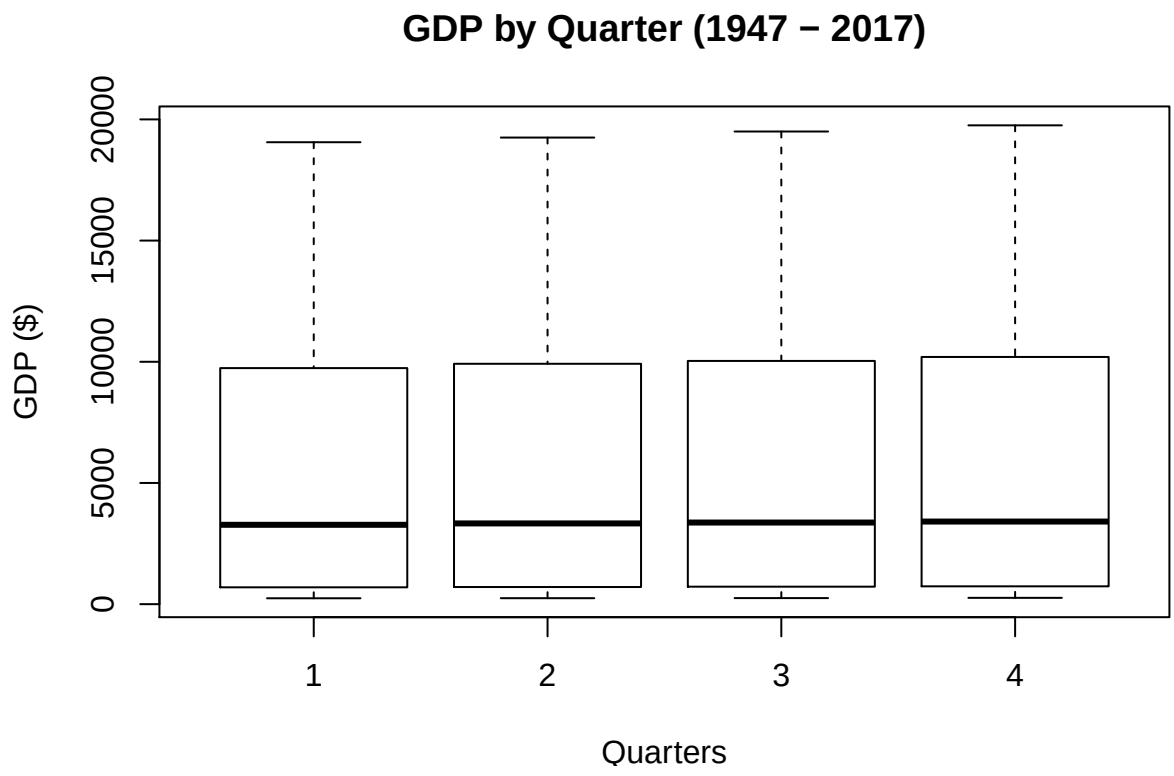



```r
plot(
  aggregate(gdpX, FUN = mean),
  col = 'red',
  lty = 2,
```

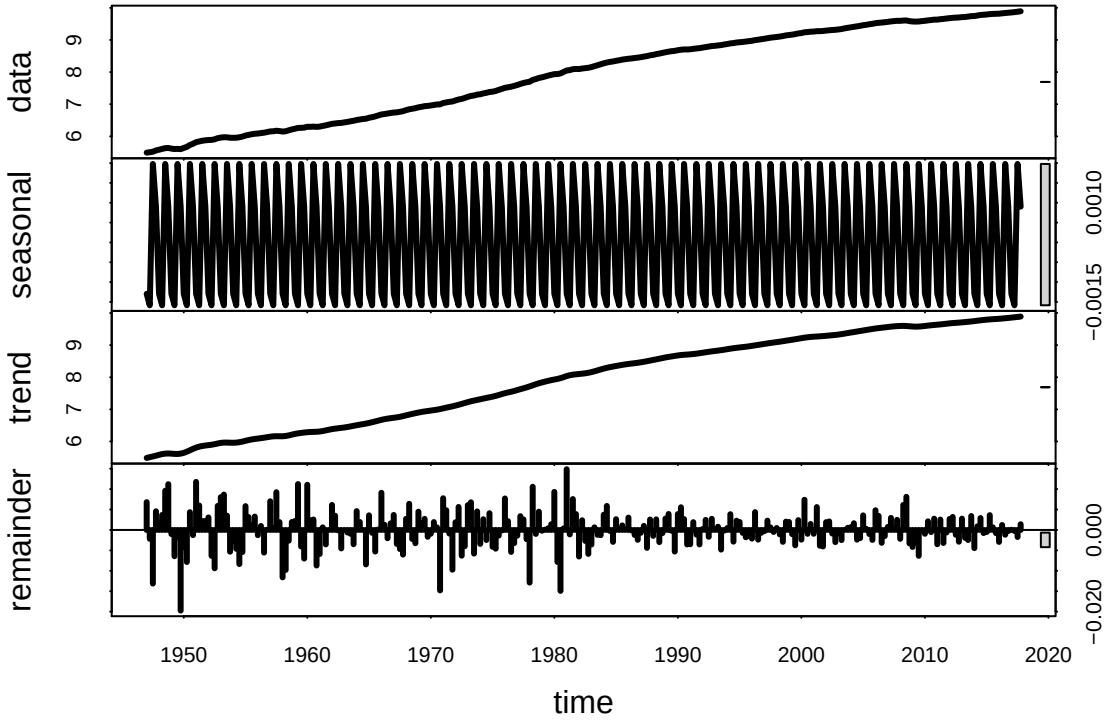
```
  lwd = 3,
  ylab = 'GDP ($)',
  main = 'Yearly Average GDP'
)
lines(gdpX, col = 'blue', lwd = 3)
legend(
  'topleft',
  legend = c('GDP', 'Average GDP'),
  col = c('blue', 'red'),
  lty = c(1, 2),
  lwd = 3
)
```




```
boxplot(gdpX ~ cycle(gdpX),
        xlab = 'Quarters',
        ylab = 'GDP ($)',
        main = 'GDP by Quarter (1947 - 2017)')
```




```
# Seasonal Decomposition ####
seasDecom <- stl(log(gdpX), s.window = 'period')
plot(seasDecom, lwd = 3)
```




```
summary(seasDecom)
```

```
##  Call:
```

```
##  stl(x = log(gdpX), s.window = "period")
##
##  Time.series components:
##     seasonal                trend            remainder
##  Min.   :-0.0015840491   Min.   :5.487876   Min.   :-0.019727059
##  1st Qu.:-0.0013675547   1st Qu.:6.551957   1st Qu.:-0.002470281
##  Median :-0.0001969831   Median :8.116413   Median :-0.000016329
##  Mean   : 0.0000000004   Mean   :7.908844   Mean   : 0.000023344
##  3rd Qu.: 0.0011705720   3rd Qu.:9.220832   3rd Qu.: 0.002644171
##  Max.   : 0.0019780168   Max.   :9.888819   Max.   : 0.014866533
##  IQR:
##      STL.seasonal STL.trend STL.remainder data
##      0.002538     2.668875  0.005114      2.672720
##    %   0.1         99.9       0.2         100.0
##
##  Weights: all == 1
##
##  Other components: List of 5
##  $ win  : Named num [1:3] 2841 7 5
##  $ deg  : Named int [1:3] 0 1 1
##  $ jump : Named num [1:3] 285 1 1
##  $ inner: int 2
##  $ outer: int 0
```