# Assignment 3

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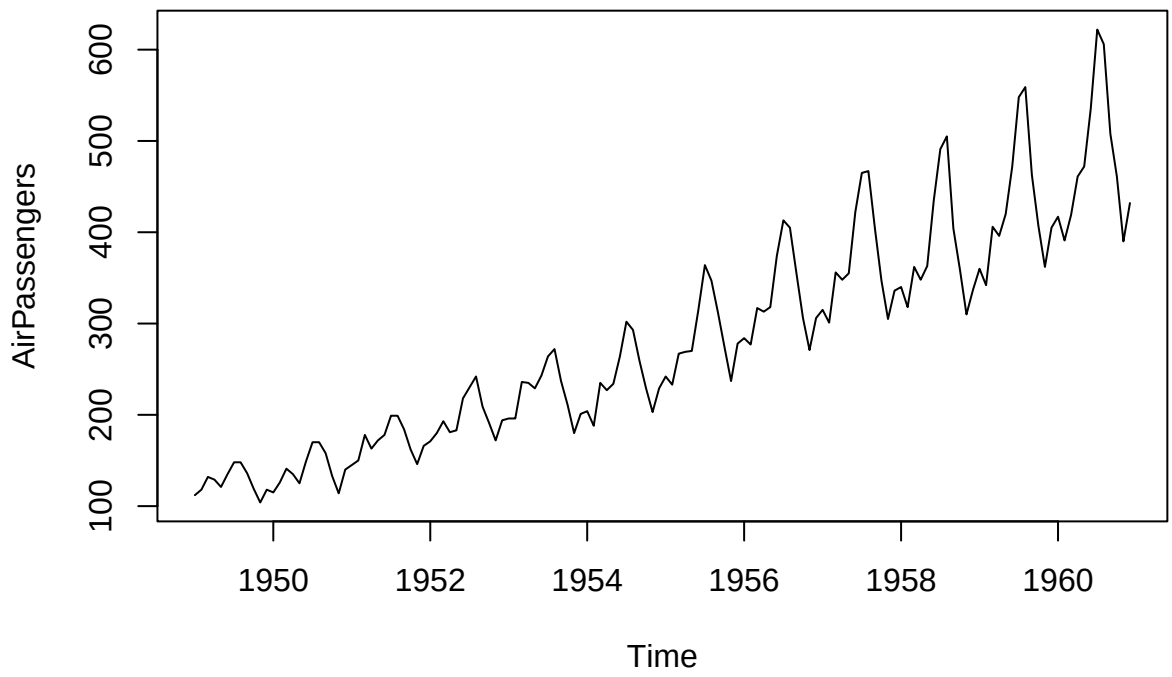
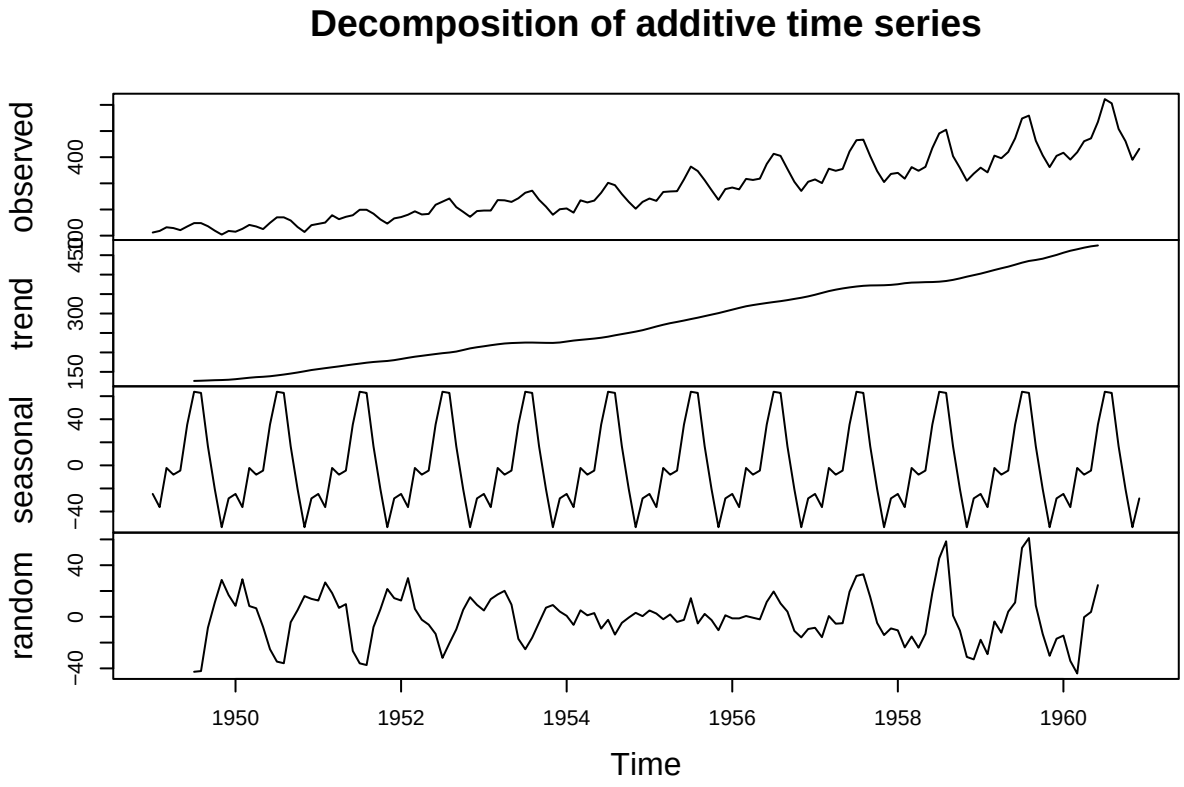
## Plot Airline Passenger data and its additive decomposition

```
data("AirPassengers")

plot(AirPassengers)
```

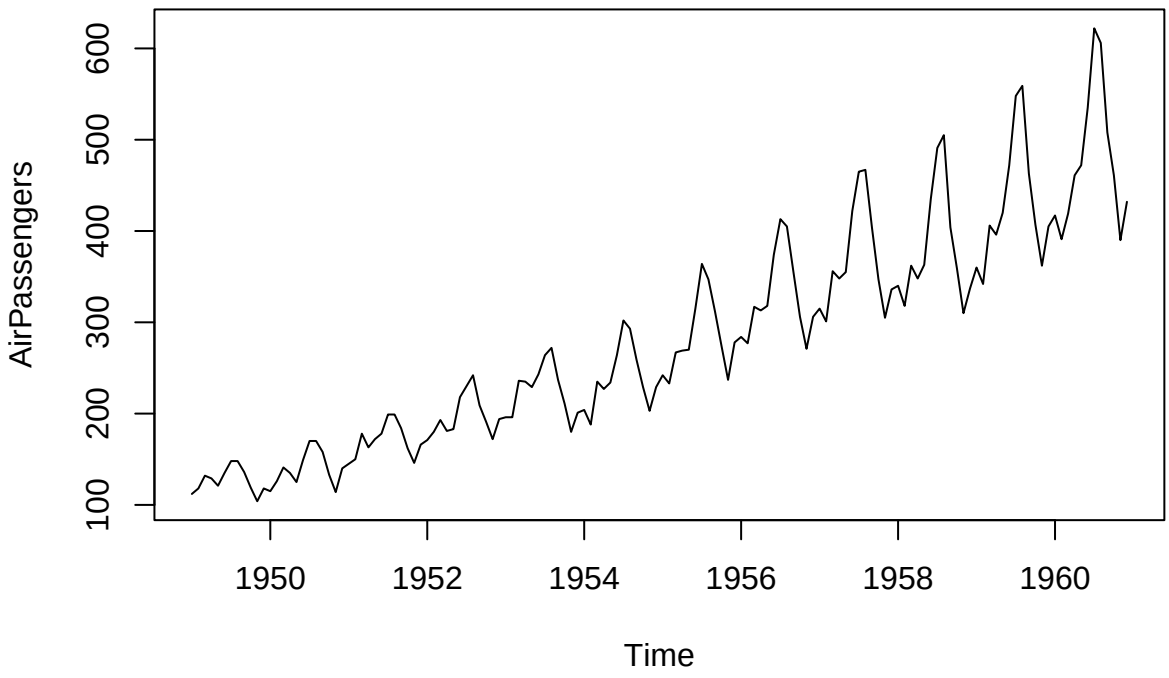



```
ourDecomposition <- decompose(AirPassengers, type="additive")

plot(ourDecomposition)
```

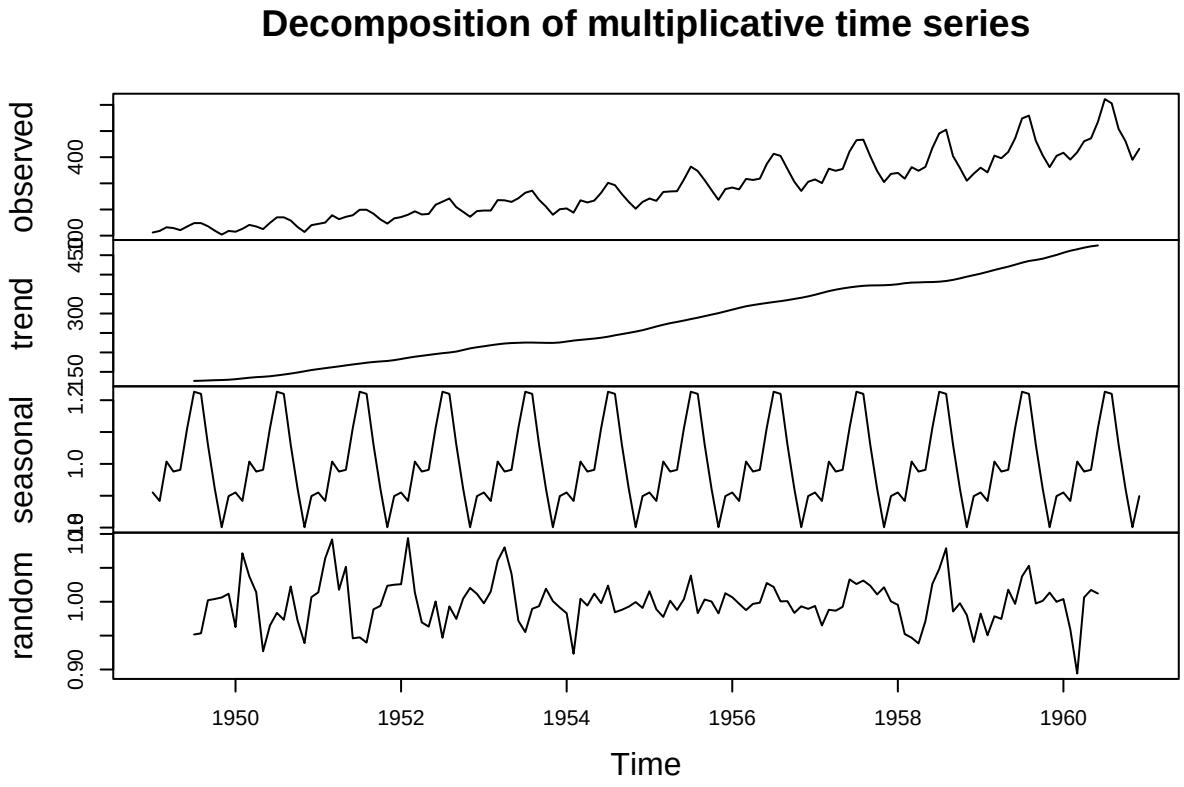



## Change additive to multiplicative to plot the multiplicative decomposition

```
data("AirPassengers")

plot(AirPassengers)
```




```
ourDecomposition <- decompose(AirPassengers, type="multiplicative")

plot(ourDecomposition)
```




## Plot the Electric Production and its decomposition

```
library(tidyverse)
```

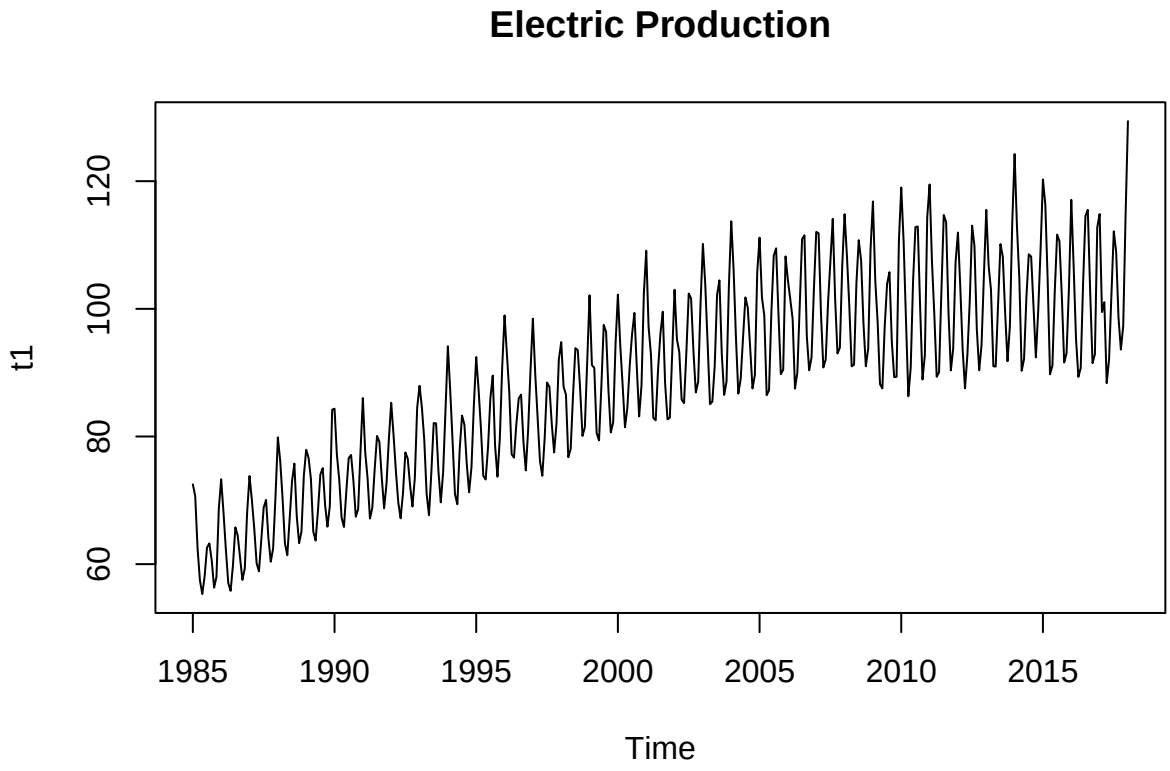
```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.3     v readr     2.1.4
## v forcats   1.0.0     v stringr   1.5.0
## v ggplot2   3.4.3     v tibble    3.2.1
## v lubridate 1.9.2     v tidyr     1.3.0
## v purrr     1.0.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
library(readr)
library(TTR)
df <- read_csv("https://bryantstats.github.io/math475/assignments/data/Electric_Production.csv")
```

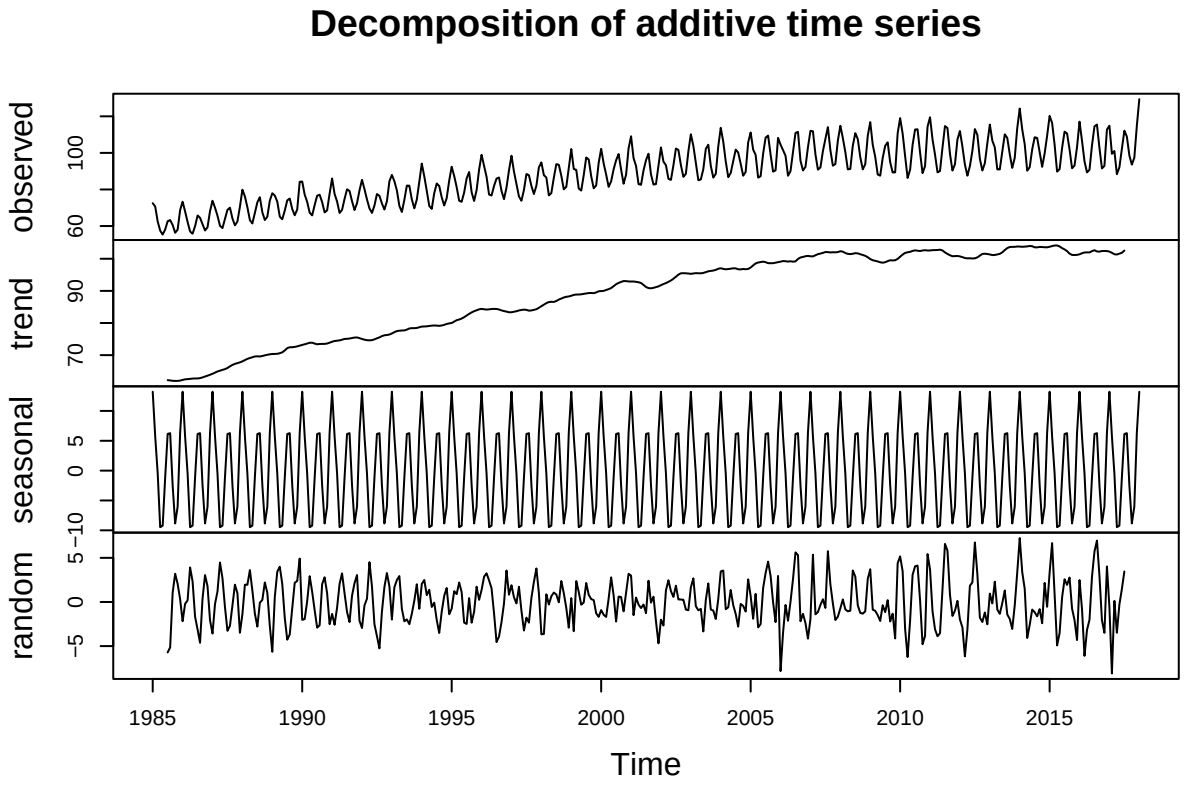
```
## Rows: 397 Columns: 2
## -- Column specification --------------------------------------------------------
## Delimiter: ","
```

```
## chr (1): DATE
## dbl (1): IPG2211A2N
##
## i Use ‘spec()‘ to retrieve the full column specification for this data.
## i Specify the column types or set ‘show_col_types = FALSE‘ to quiet this message.
```

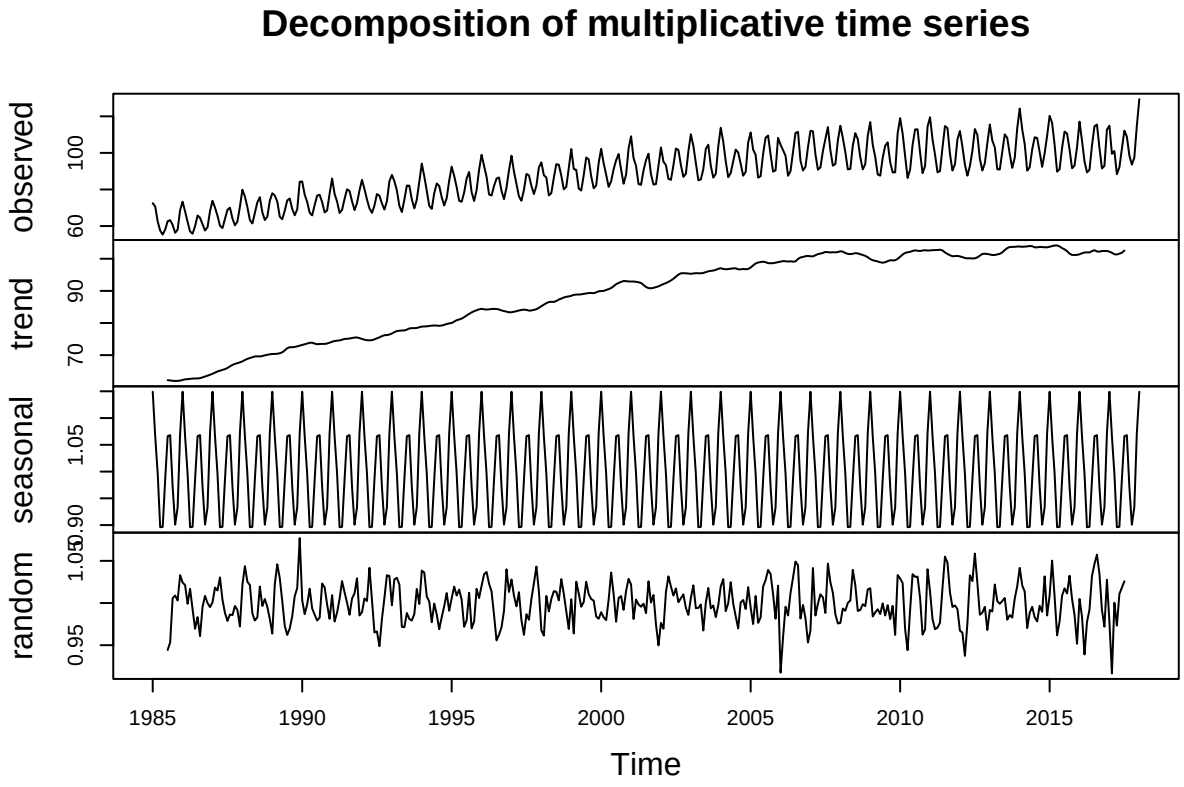
```r
#Create time series with data
t1 = ts(df$IPG2211A2N, start = 1985, frequency = 12)
plot(t1, main = paste0("Electric Production"))
```




```r
#Additive decomposition
ourDecomposition <- decompose(t1, type="additive")
plot(ourDecomposition)
```




```
#Multiplicative decomposition
ourDecomposition <- decompose(t1, type="multiplicative")
plot(ourDecomposition)
```

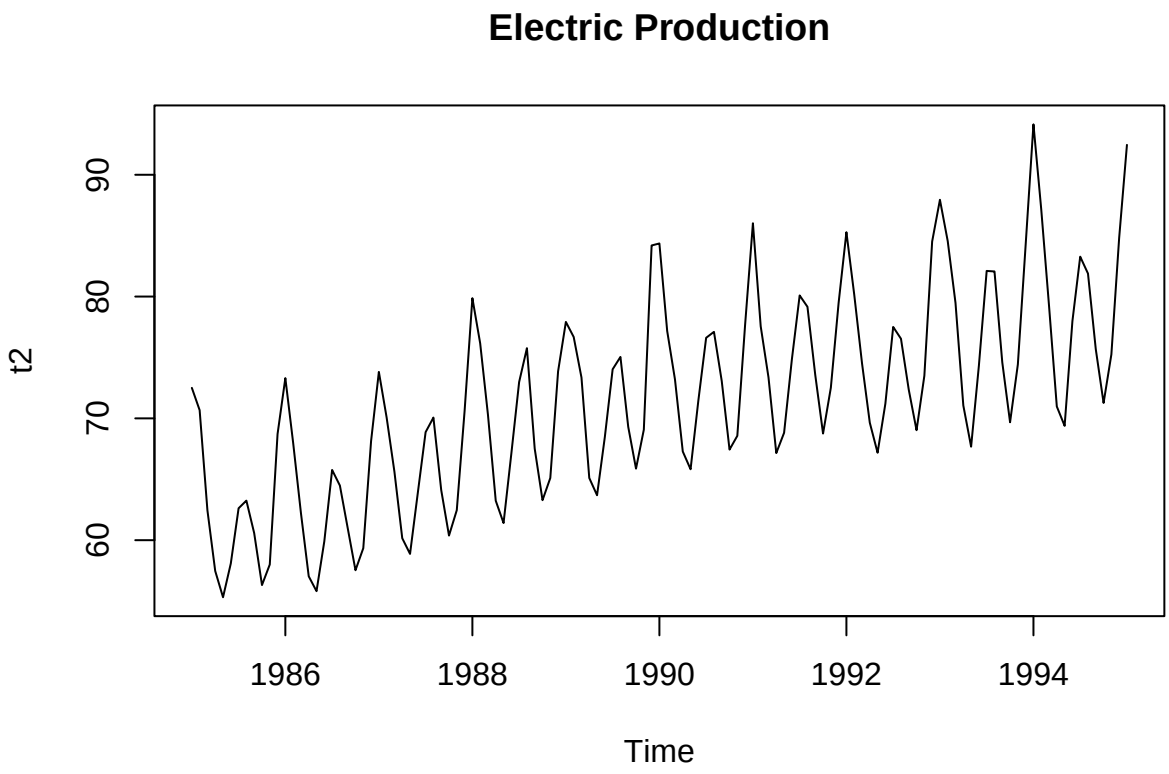



## Plot the Electric Production from 1985 to 1995 and its decomposition

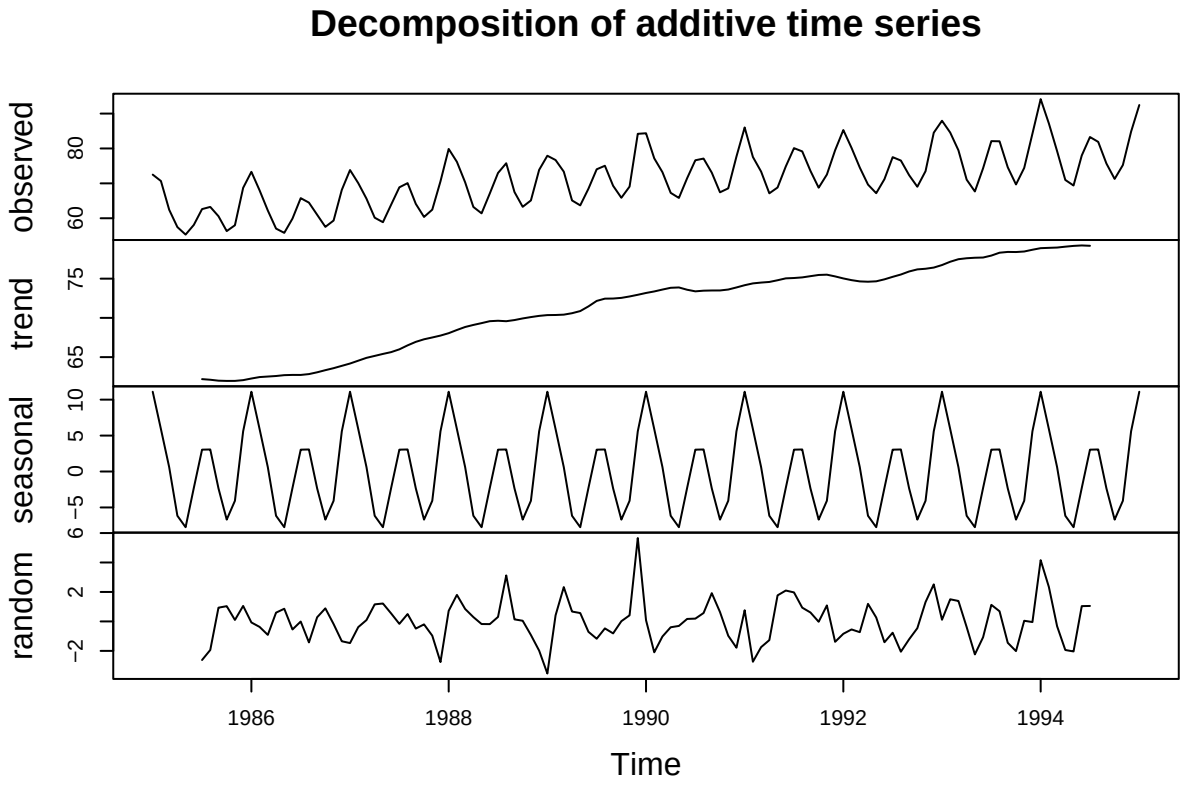
```
library(tidyverse)
library(readr)
library(TTR)
df <- read_csv("https://bryantstats.github.io/math475/assignments/data/Electric_Production.csv")
```

```
## Rows: 397 Columns: 2
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr (1): DATE
## dbl (1): IPG2211A2N
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

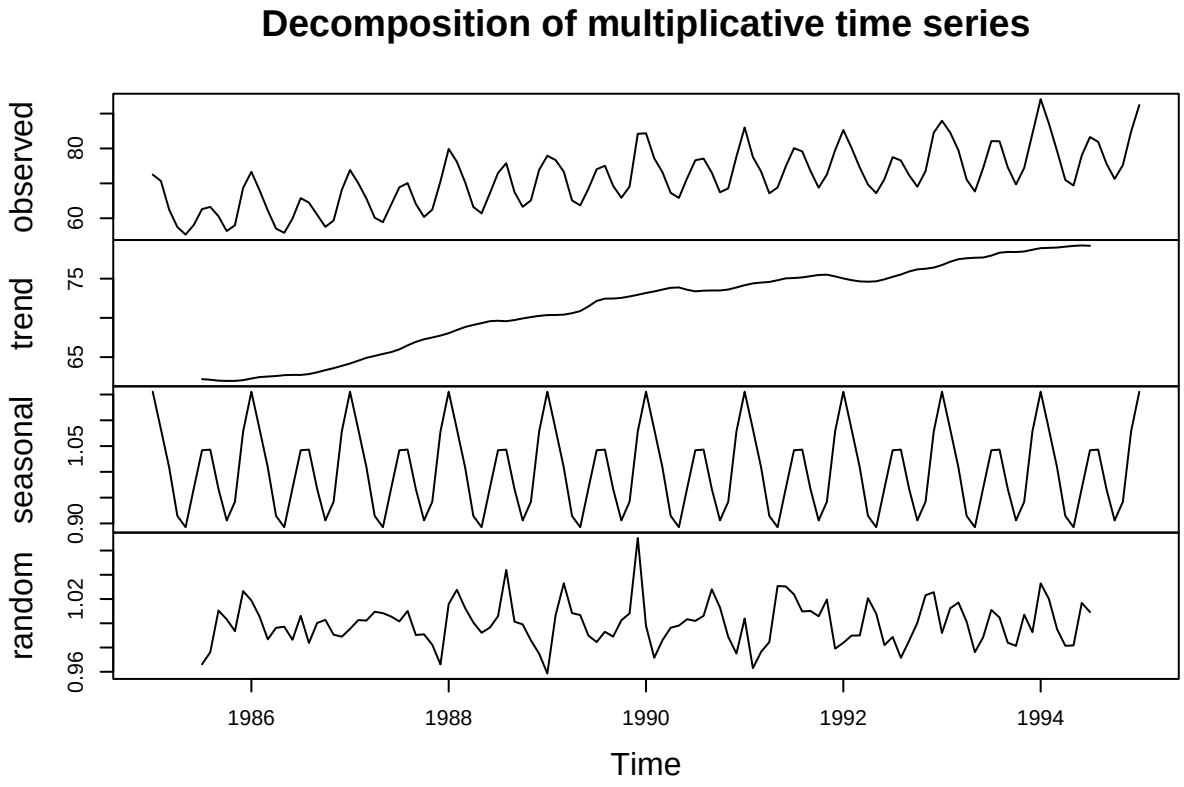
```
#Create time series with data from 1985-1995
t2 = ts(df$IPG2211A2N, start = 1985, end = 1995, frequency = 12)
plot(t2, main = paste0("Electric Production"))
```




```
#Additive decomposition
ourDecomposition <- decompose(t2, type="additive")
plot(ourDecomposition)
```




```
#Multiplicative decomposition
ourDecomposition <- decompose(t2, type="multiplicative")
plot(ourDecomposition)
```


Decomposition of multiplicative time series
observed
trend
seasonal
random
60
80
65
75
0.90
1.05
0.96
1.02
1986
1988
1990
1992
1994
Time