Assignment 4

Allison Tessman

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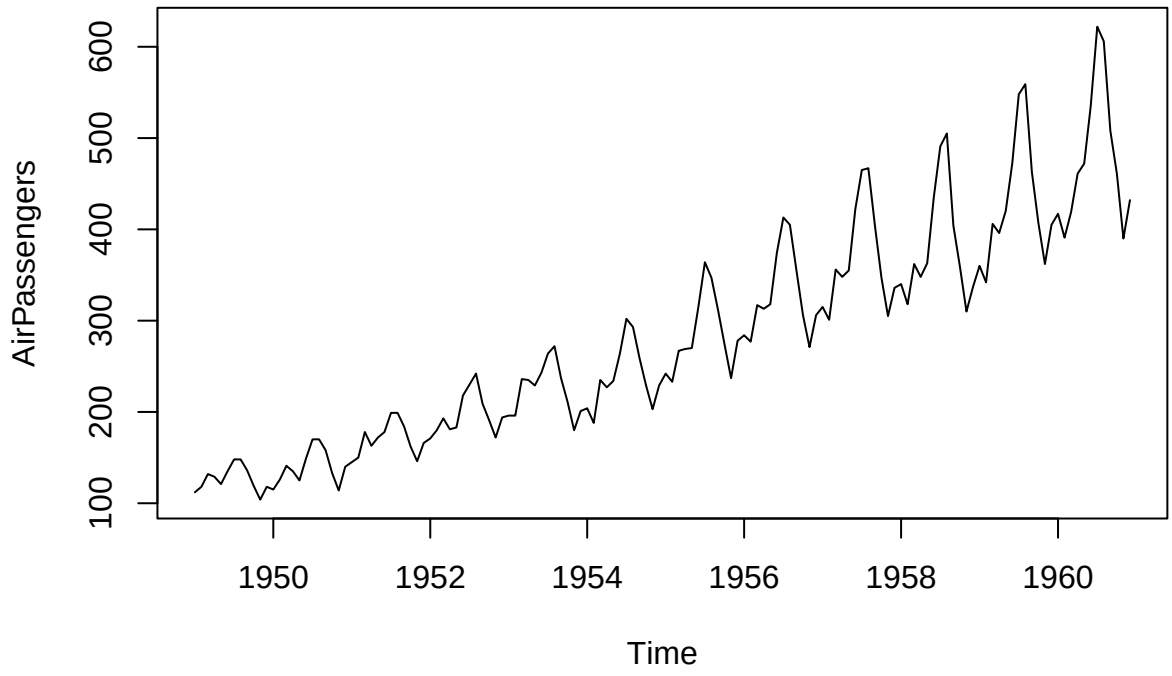
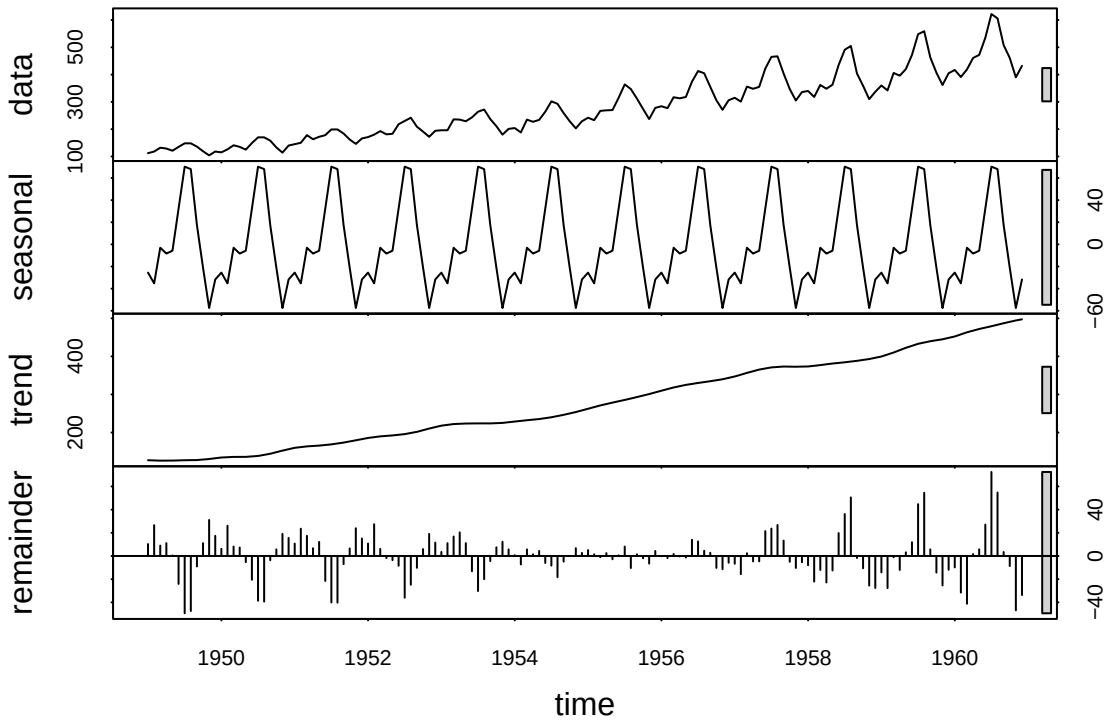
Plot the Airline Passenger data and its STL decomposition

```
data("AirPassengers")
plot(AirPassengers)
```

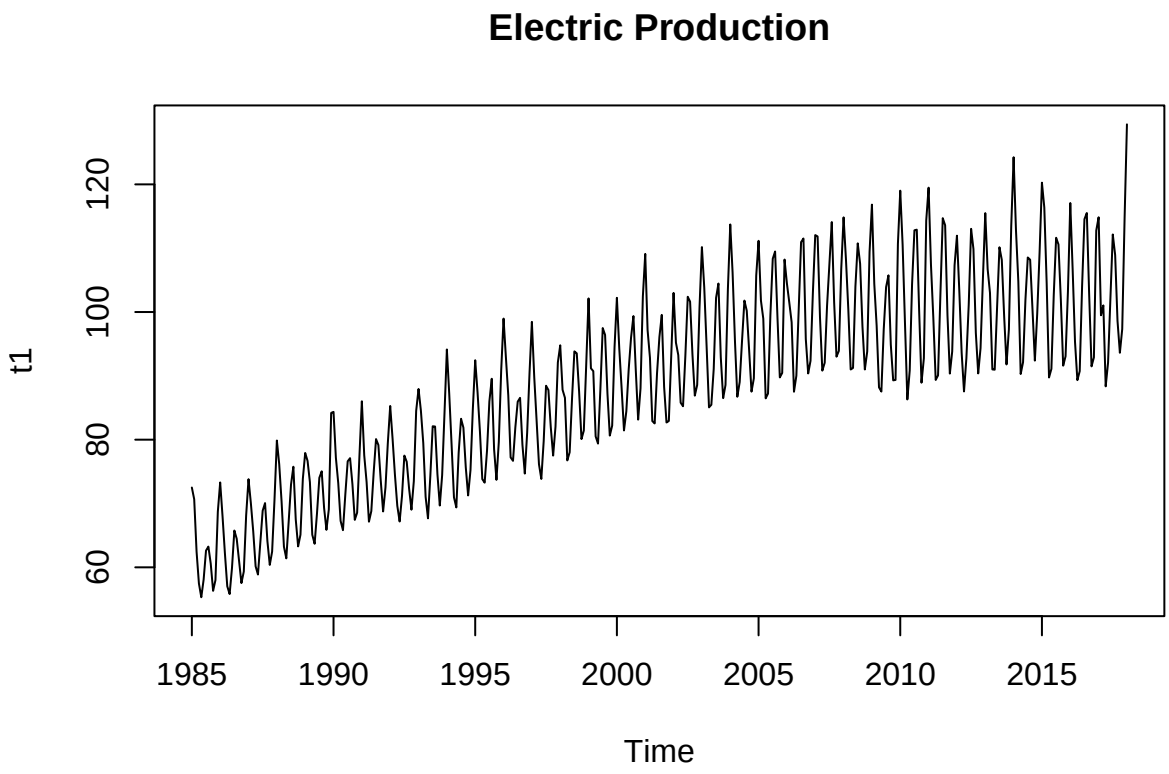



```
ourDecomposition <- stl(AirPassengers, s.window = "periodic")
plot(ourDecomposition)
```

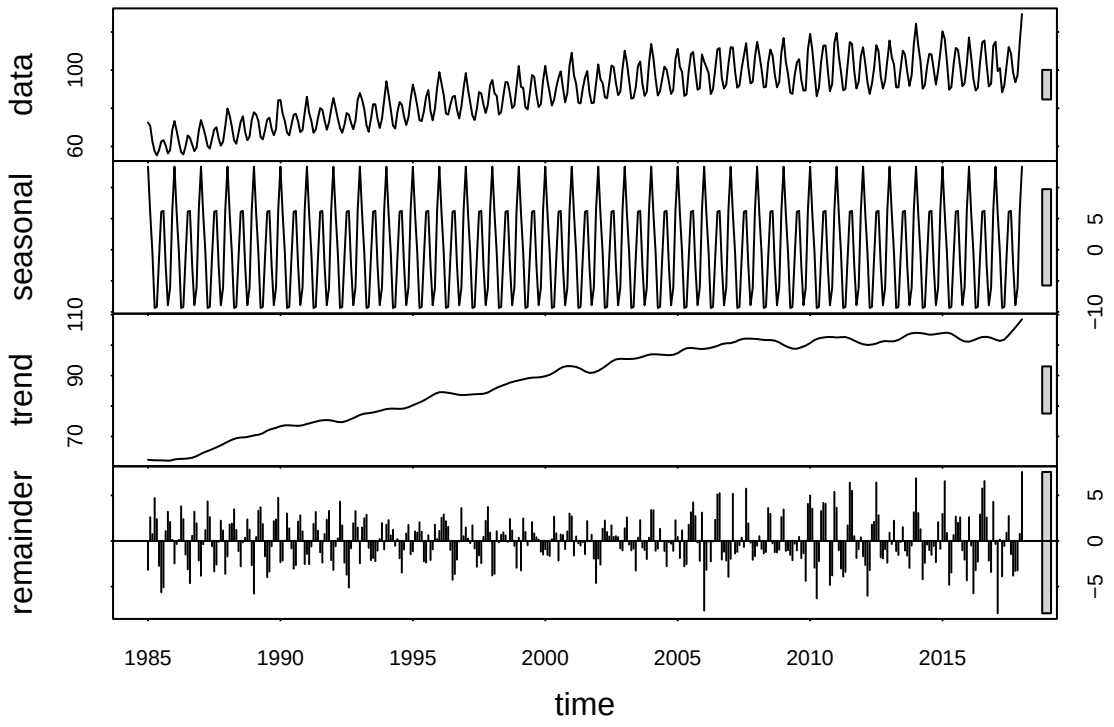


Plot the Electric Production and its stl decomposition

```
# read data
d <- read.csv('https://bryantstats.github.io/math475/assignments/data/Electric_Production.csv')

# frequency = 4 for quarterly data,
# frequency = 12 for monthly data,
# frequency = 1 for yearly data, by default frequency = 1

t1 = ts(d$IPG2211A2N, start = 1985, frequency = 12)

# plot the time series
plot(t1, main = paste0("Electric Production"))
```

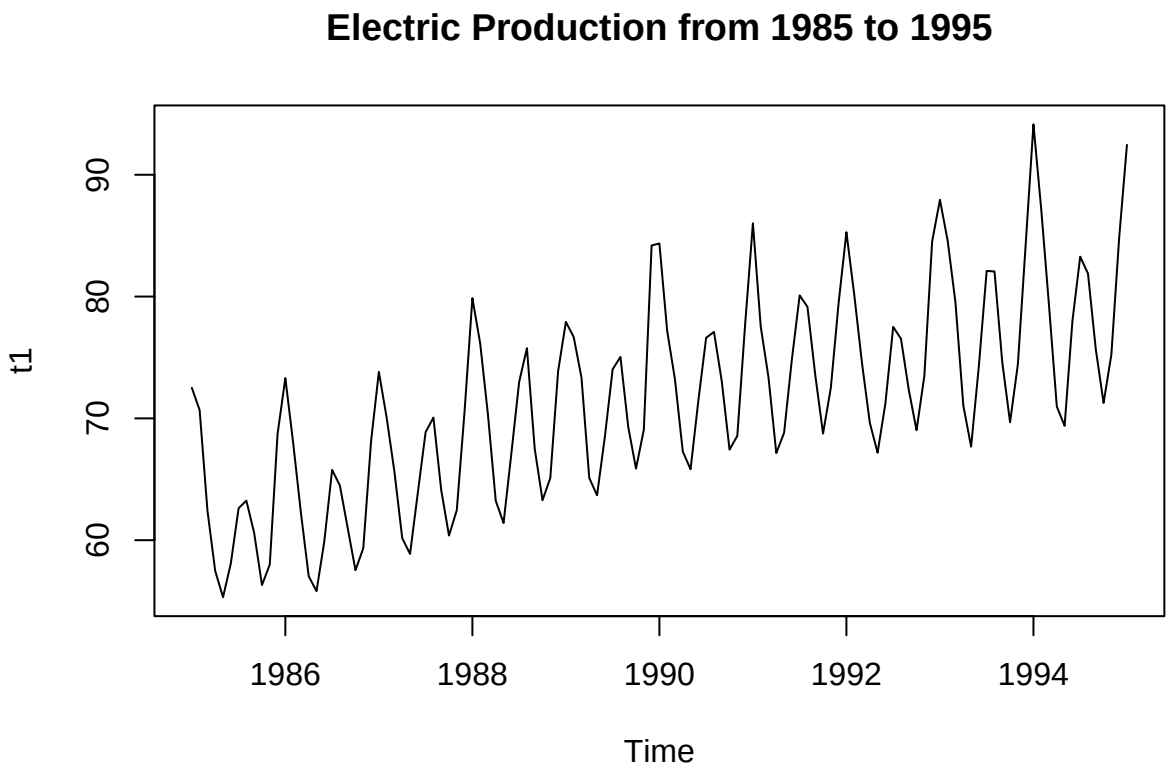



```
#stl decomposition
ourDecomposition2 <- stl(t1, s.window = "periodic")
plot(ourDecomposition2)
```

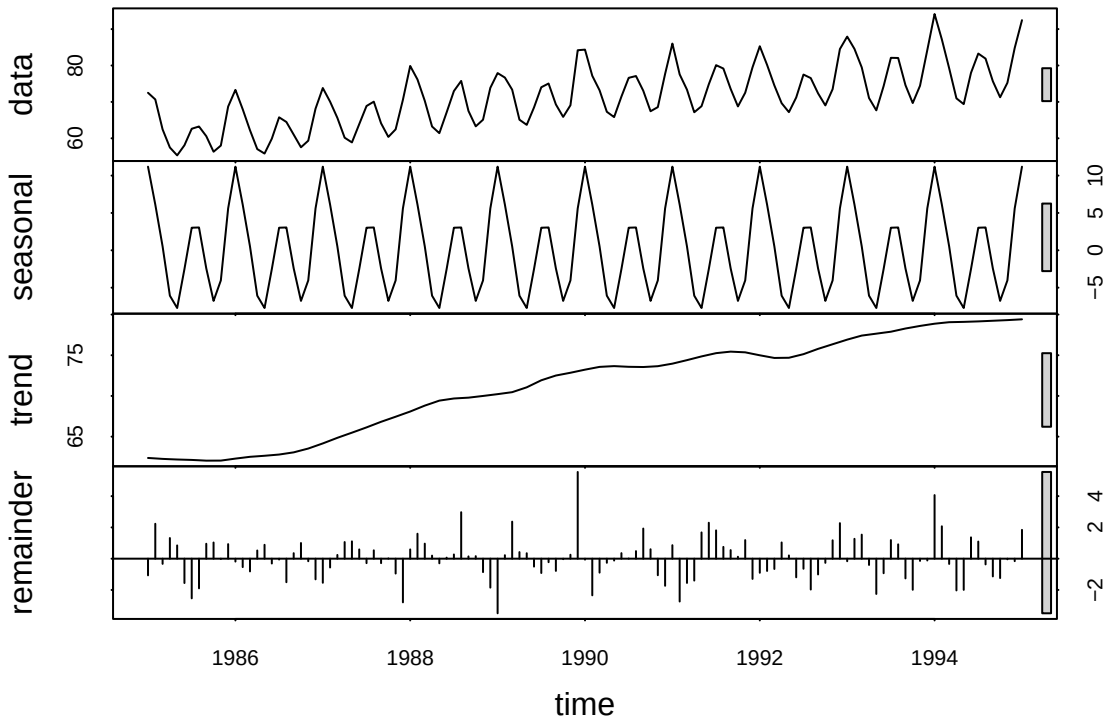


Plot the Electric Production from 1985 to 1995 and its stl decomposition

```
# read data
d <- read.csv('https://bryantstats.github.io/math475/assignments/data/Electric_Production.csv')

# frequency = 4 for quarterly data,
# frequency = 12 for monthly data,
# frequency = 1 for yearly data, by default frequency = 1

t1 = ts(d$IPG2211A2N, start = 1985, end = 1995, frequency = 12)

# plot the time series
plot(t1, main = paste0("Electric Production from 1985 to 1995"))
```



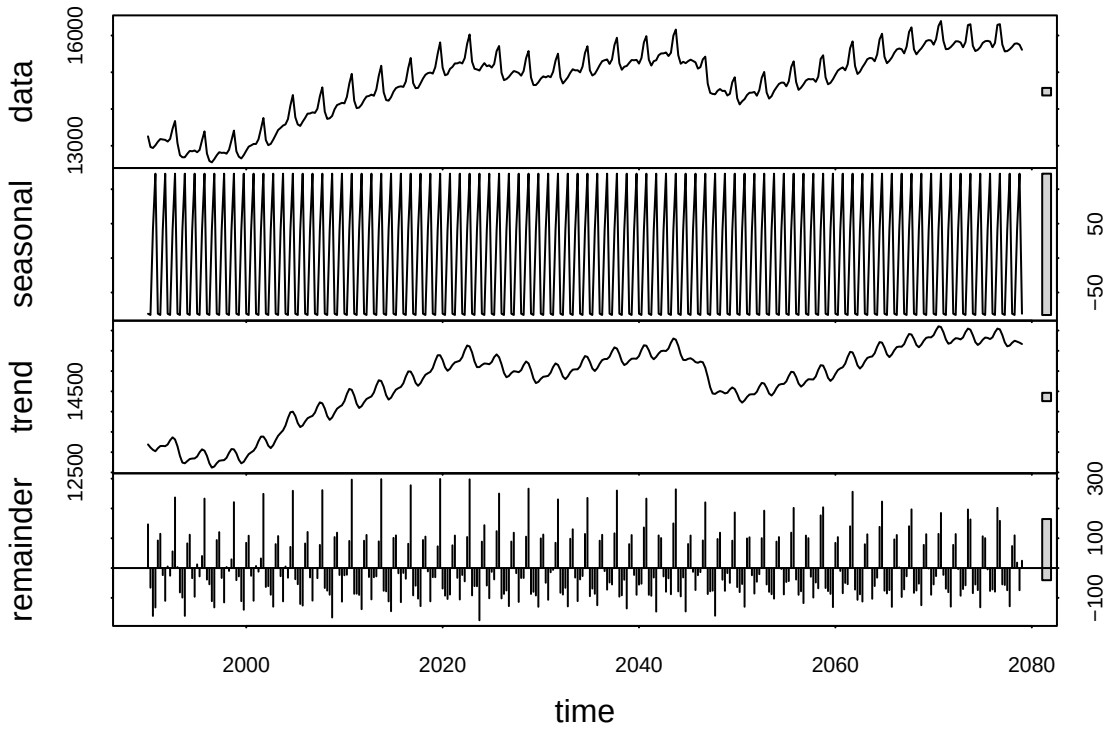

```
#stl decomposition
ourDecomposition3 <- stl(t1, s.window = "periodic")
plot(ourDecomposition3)
```



Plot the US Retail Employment and its STL decomposition

```
# read data
d <- read.csv('https://bryantstats.github.io/math475/assignments/data/us_retail_employment.csv')

# frequency = 4 for quarterly data,
# frequency = 12 for monthly data,
# frequency = 1 for yearly data, by default frequency = 1

t1 = ts(d$Employed, start = 1990, frequency = 4)

# plot the time series
plot(t1, main = paste0("US Retail Employment"))
```


```
#stl decomposition
ourDecomposition4 <- stl(t1, s.window = "periodic")
plot(ourDecomposition4)
```



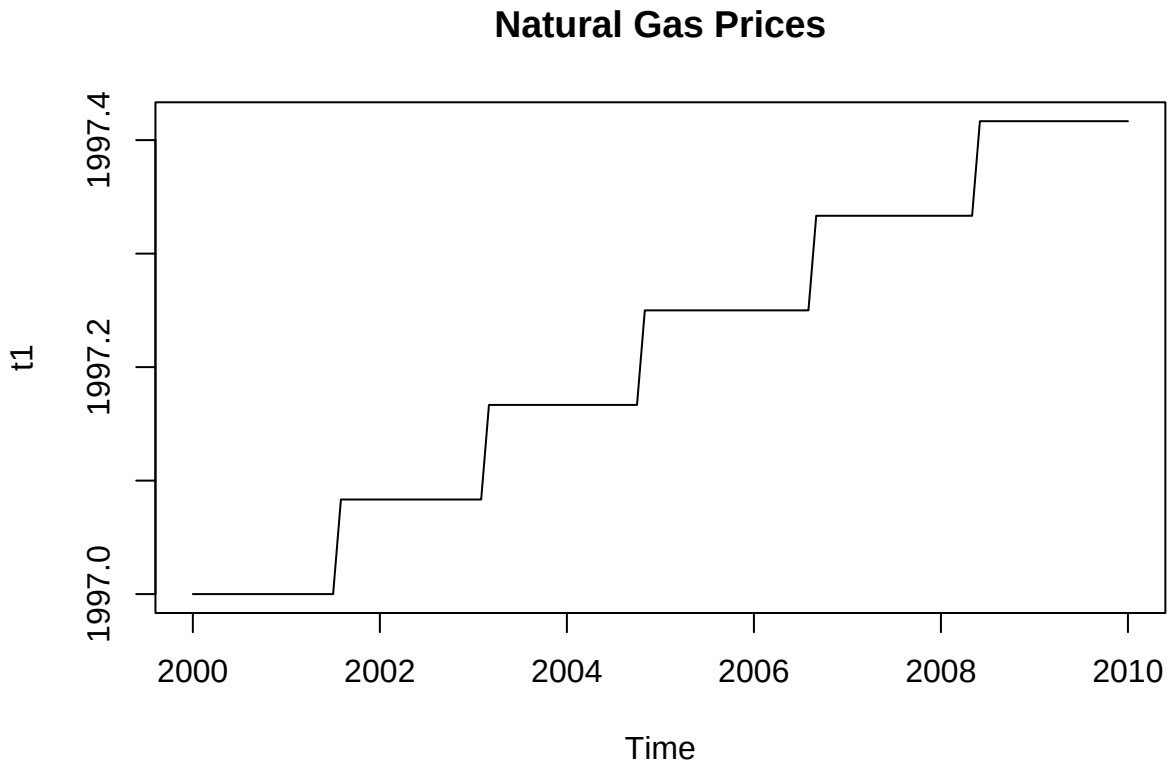
Find your own time series that has a seasonal component and plot the classical decomposition (as in Assignment 3) and the STL decomposition.

```
d <- read.csv("~/Applied Analystics SAS Prog/mymath475/daily_csv.csv")

library(zoo)
```

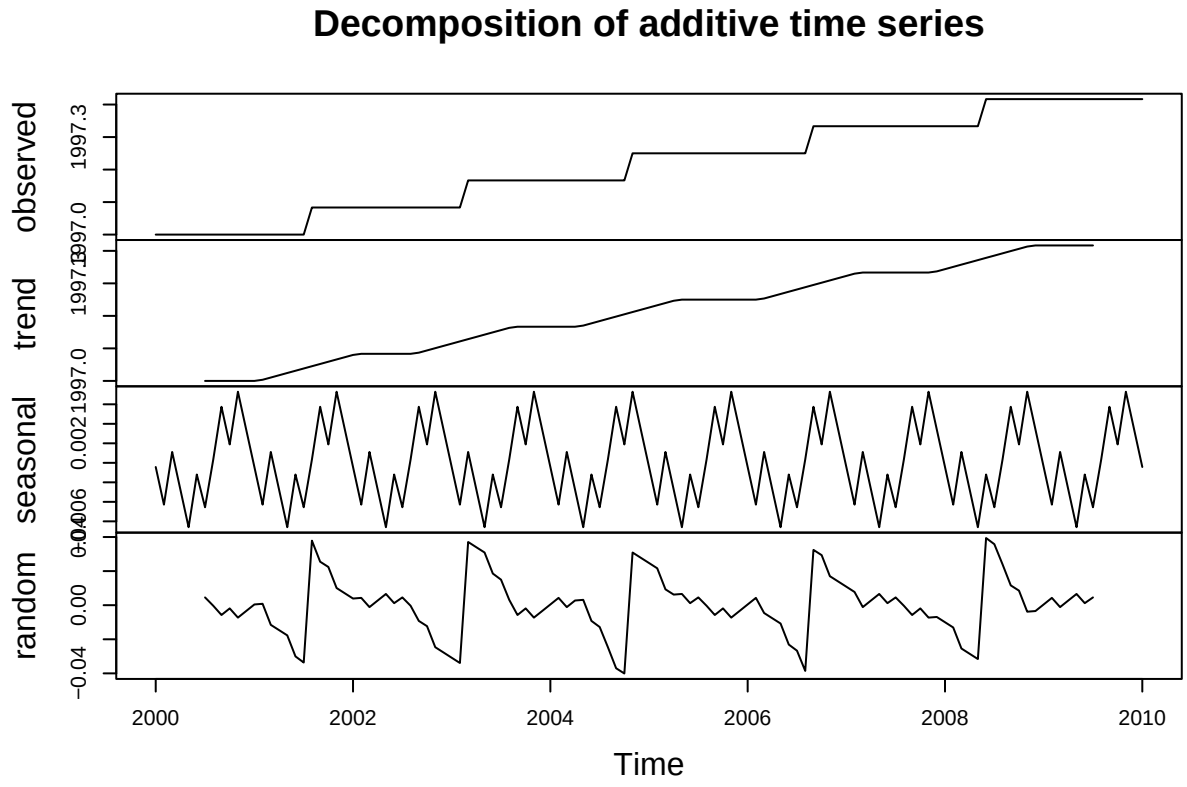
```
##
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric
```

```
d$month <- as.yearmon(d$Date)

d <- d[-c(1)]
d$Date <- d$month
d <- d[-c(2)]
```

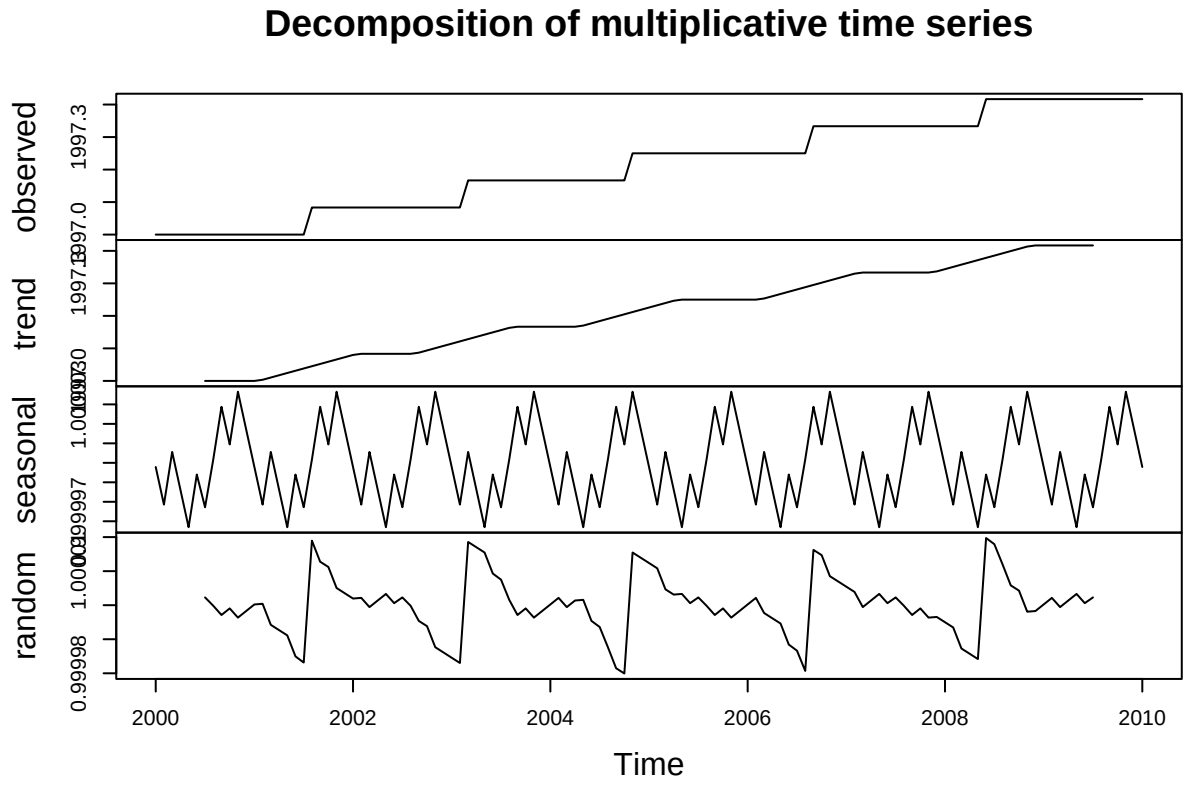
```r
#Create time series with data
t1 = ts(d$Date, start = 2000, end = 2010, frequency = 12)
plot(t1, main = paste0("Natural Gas Prices"))
```



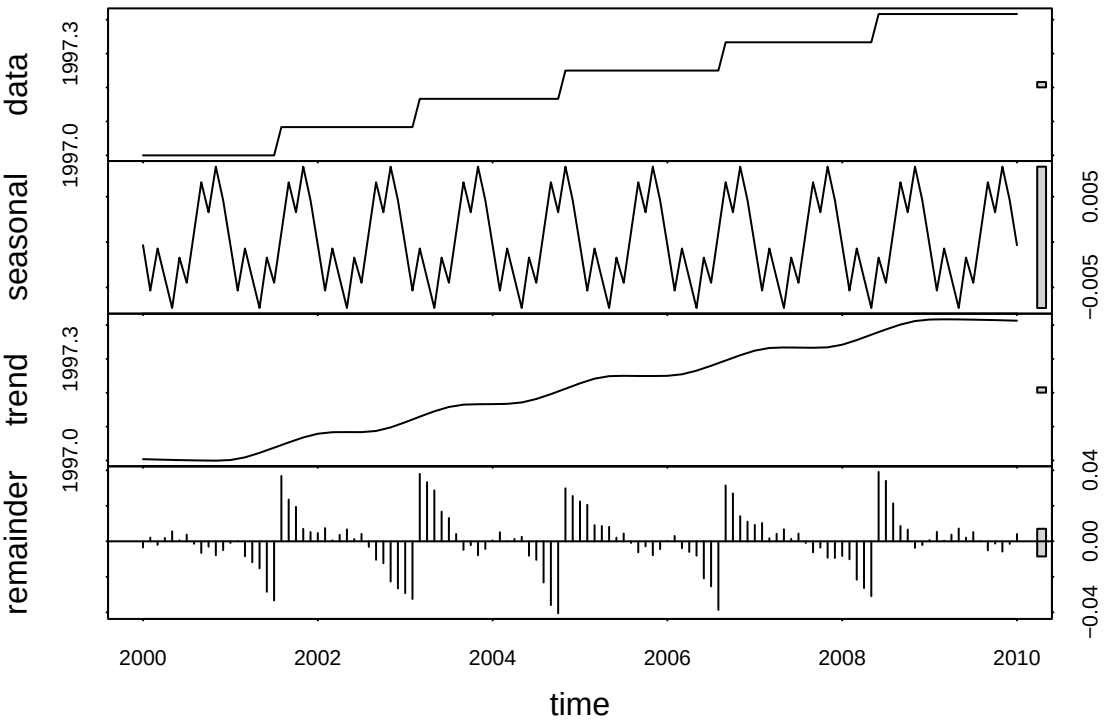

```r
#Additive decomposition
ourDecomposition <- decompose(t1, type="additive")
plot(ourDecomposition)
```




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




```r
#STL decomposition
ourDecomposition <- stl(t1, s.window = "periodic")
plot(ourDecomposition)
```


data
seasonal
trend
remainder
1997.3
1997.0
1997.3
1997.0
0.005
−0.005
0.04
0.00
−0.04
2000
2002
2004
2006
2008
2010
time