7.1

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```
data("AirPassengers")
str(AirPassengers)
```

```
##  Time-Series [1:144] from 1949 to 1961: 112 118 132 129 121 135 148 148
136 119 ...
```

```
class(AirPassengers)
```

```
## [1] "ts"
```

```
any(is.na(AirPassengers))
```

```
## [1] FALSE
```

```
start(AirPassengers)
```

```
## [1] 1949    1
```

```
end(AirPassengers)
```

```
## [1] 1960   12
```

```
frequency(AirPassengers)
```

```
## [1] 12
```
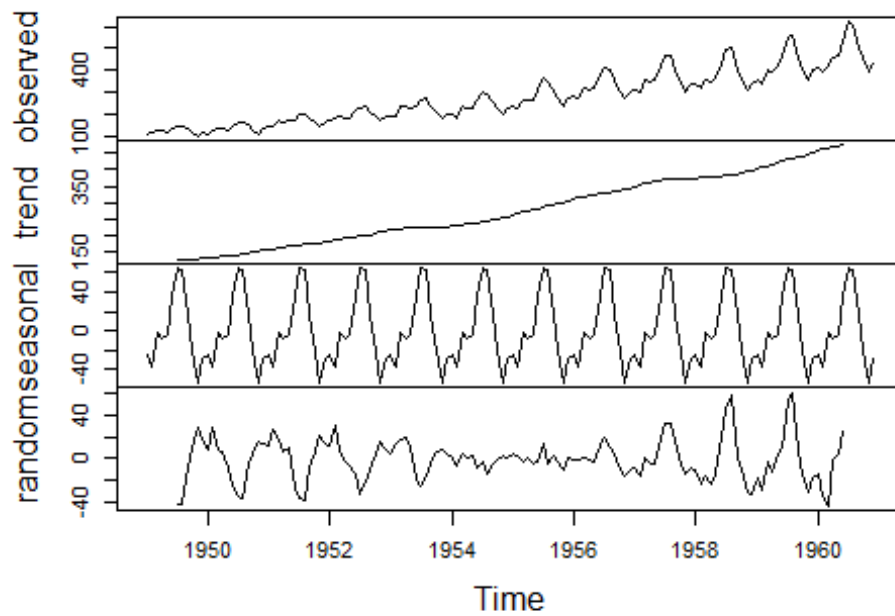
```
summary(AirPassengers)
```
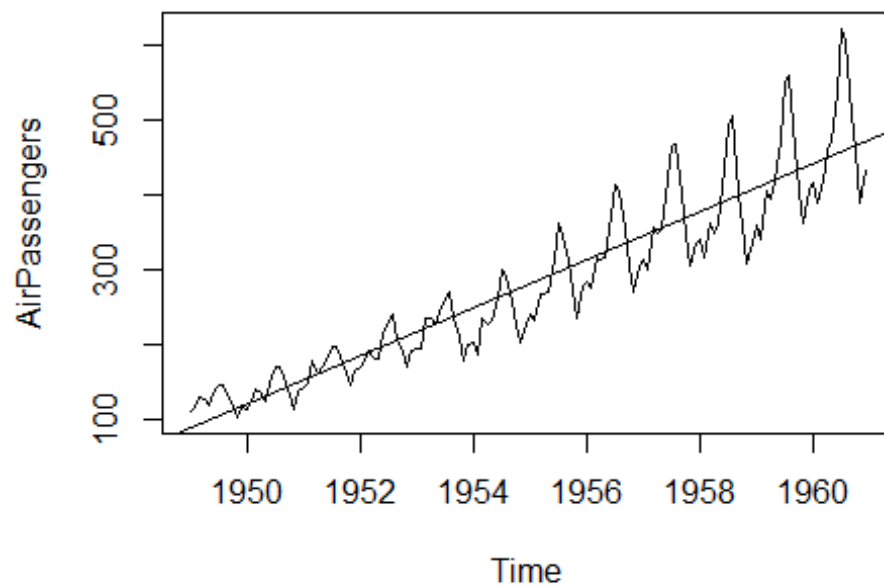
```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   104.0   180.0   265.5   280.3   360.5   622.0
```

```
decomposed_data <- decompose(AirPassengers)
plot(decomposed_data)
```
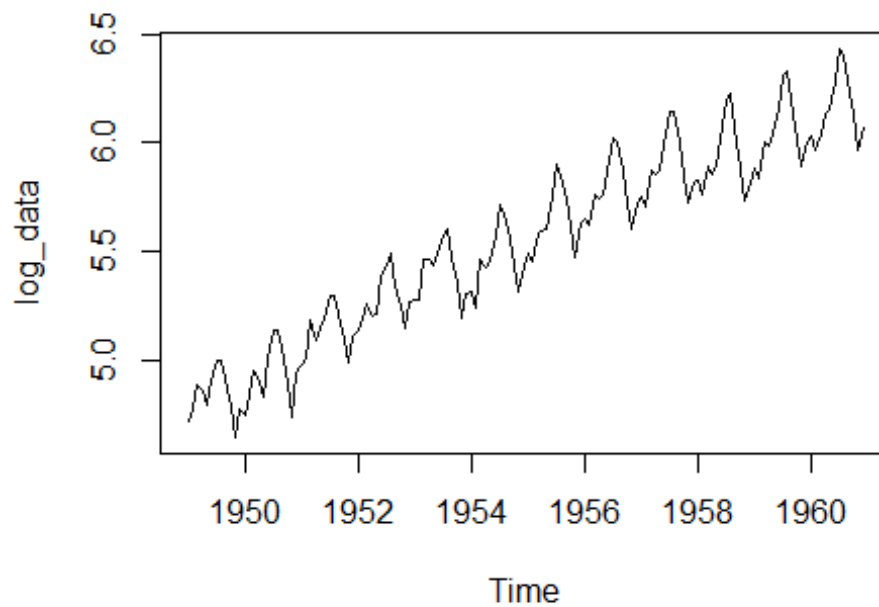
Decomposition of additive time series


```
plot(AirPassengers)
plot.ts(AirPassengers)
abline(lm(AirPassengers ~ time(AirPassengers)))
```
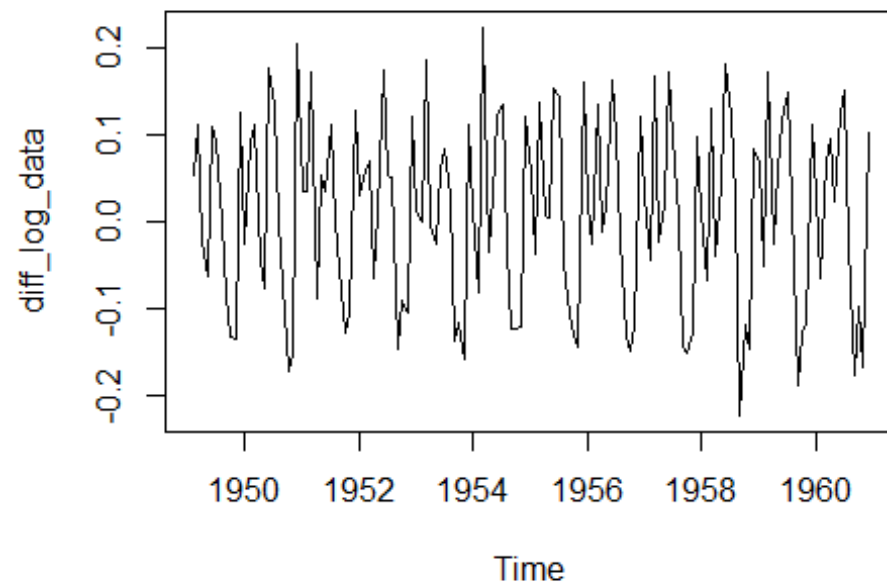
```
cycle(AirPassengers)

##      Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
## 1949  1   2   3   4   5   6   7   8   9  10  11  12
## 1950  1   2   3   4   5   6   7   8   9  10  11  12
## 1951  1   2   3   4   5   6   7   8   9  10  11  12
## 1952  1   2   3   4   5   6   7   8   9  10  11  12
## 1953  1   2   3   4   5   6   7   8   9  10  11  12
## 1954  1   2   3   4   5   6   7   8   9  10  11  12
## 1955  1   2   3   4   5   6   7   8   9  10  11  12
## 1956  1   2   3   4   5   6   7   8   9  10  11  12
## 1957  1   2   3   4   5   6   7   8   9  10  11  12
## 1958  1   2   3   4   5   6   7   8   9  10  11  12
## 1959  1   2   3   4   5   6   7   8   9  10  11  12
## 1960  1   2   3   4   5   6   7   8   9  10  11  12

log_data <- log(AirPassengers)
plot(log_data)
```



```
diff_log_data <- diff(log_data)
plot(diff_log_data)
```

```r
boxplot(AirPassengers ~ cycle(AirPassengers), xlab="Month",
ylab="Passengers")
```