PSTAT 174 Lab 4

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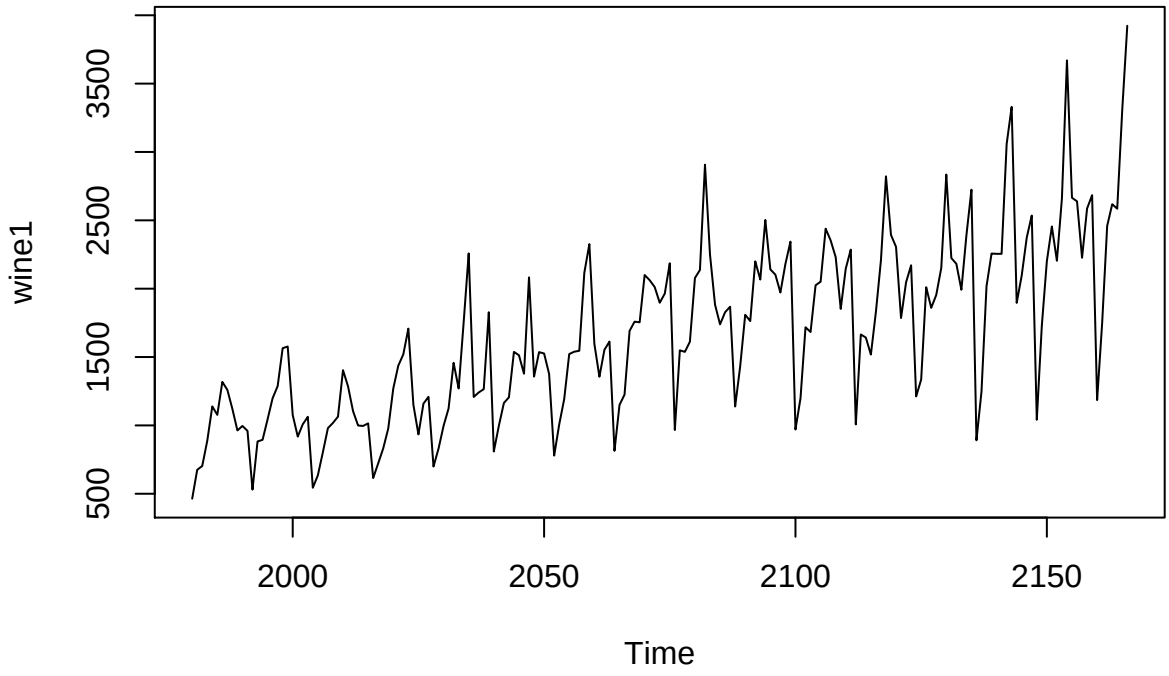
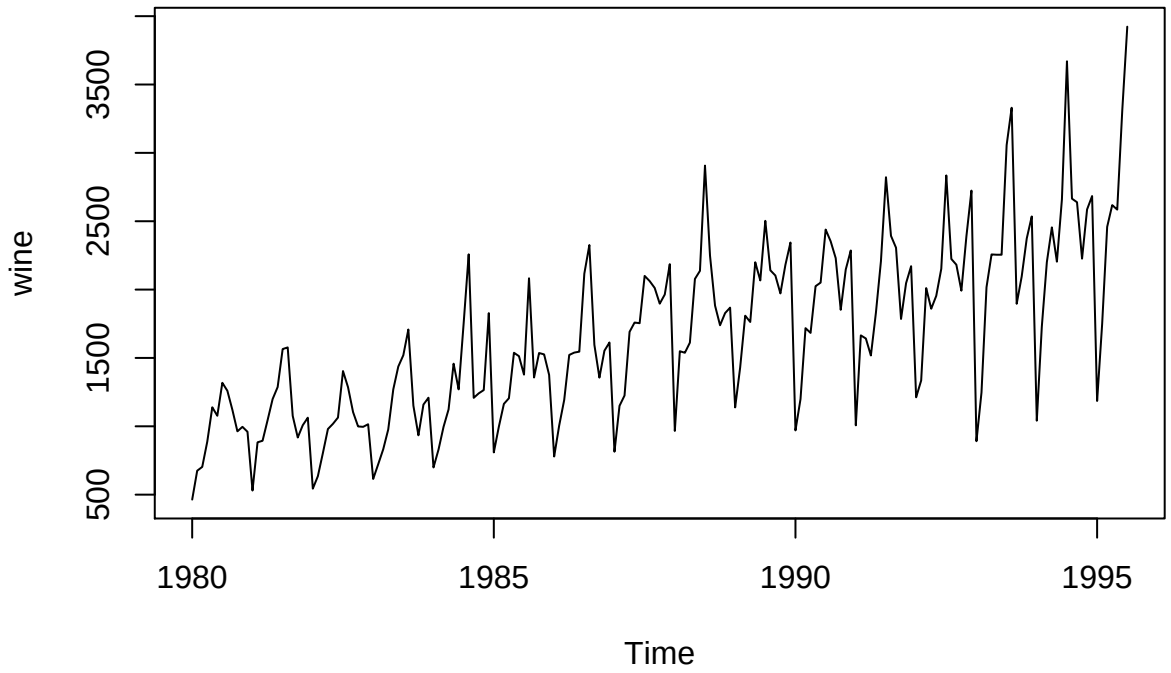
** 1 Data Import ** 1. Compare the plots of the series wine1 and wine defined below, and state why we use 'frequency=12' in the lab material.

```
wine_df <- read.table("aus-wine.csv", sep = ",", header = FALSE, skip = 1, nrows= 187)

wine1 <- ts(wine_df[,2], start = c(1980,1))
wine <- ts(wine_df[,2], start = c(1980,1), frequency = 12)

#plots of the series wine1 and wine
ts.plot(wine1)
```




```
ts.plot(wine)
```



The plots wine1 and wine vary by the time (in yrs), where wine has a time series from 1980 to 1996 and wine1 has a time series from 1980 to 2166. Frequency = 12 tells R that these are monthly data starting from January of 1980.

2. If you have a daily data of wine sales, for example from Jan 1, 1981 to Dec 31,1983. What value would you put in frequency = so that the plot shows the correct year index on x-axis?

frequency = 365 for daily

** 2 Data Tranformation ** Plot Box-Cox, log and square root transformed data.

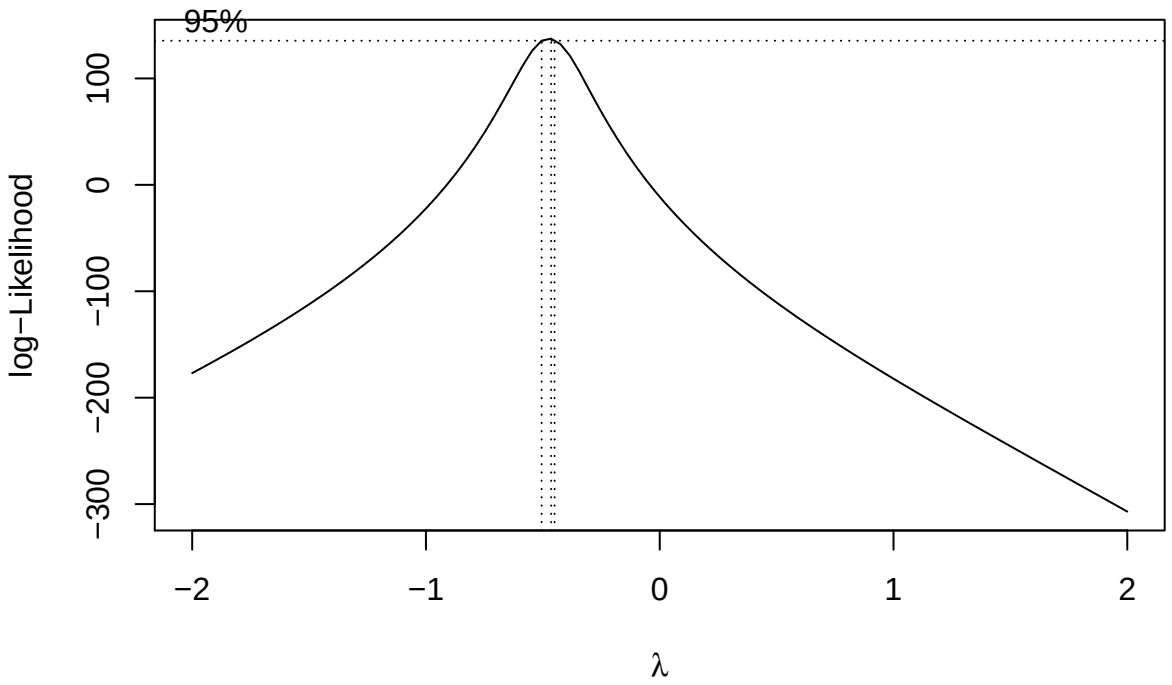
```
library(tsdl)
library(forecast)
```

```
## Registered S3 method overwritten by 'quantmod':
##   method            from
##   as.zoo.data.frame zoo
```

```
meta_tsdl$description[[1]]
```

```
## [1] "Quarterly Iowa nonfarm income (1948 - 1979)"
```

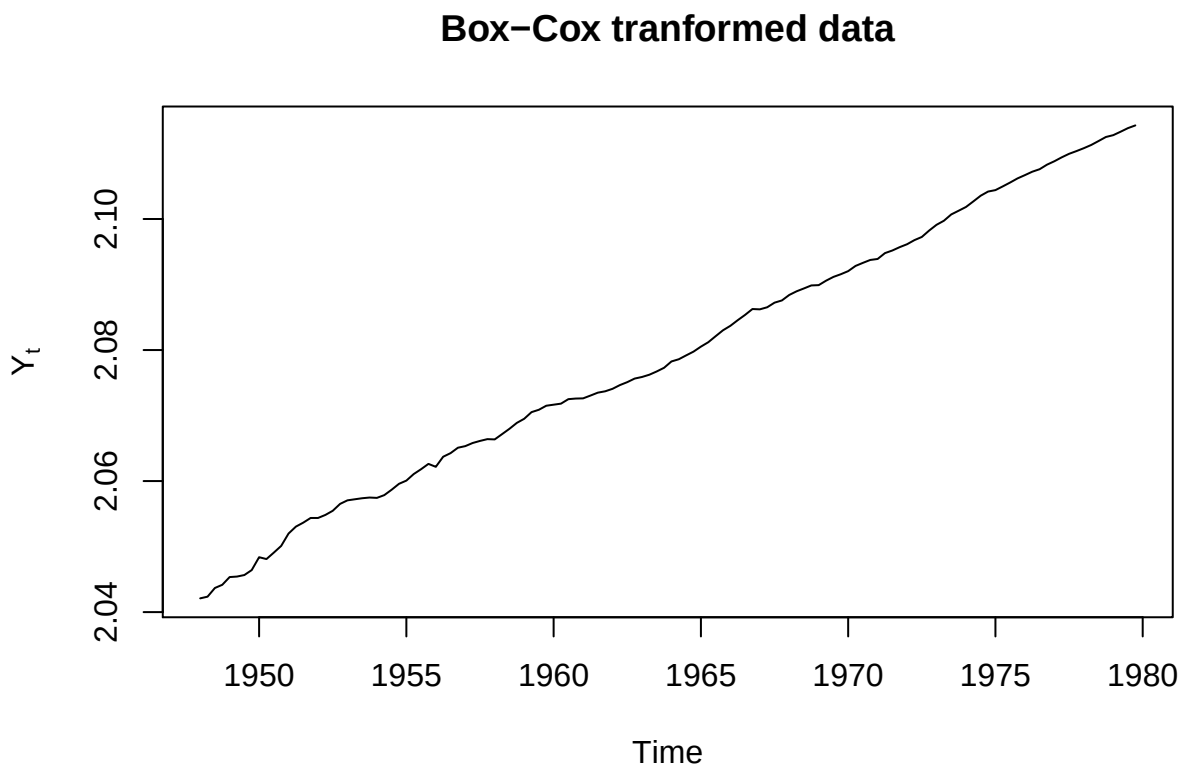
```
iowa_ts <- tsdl[[1]]

#Box-Cox
library(MASS)
t <- 1:length(iowa_ts)
fit <- lm(iowa_ts ~ t)
bcTransform <- boxcox(iowa_ts ~ t,plotit = TRUE)
```




```
lambda <- bcTransform$x[which(bcTransform$y == max(bcTransform$y))]
lambda
```

```
## [1] -0.4646465
```

```
iowa_bc <- (1/lambda)*(iowa_ts^lambda - 1)
ts.plot(iowa_bc,main = "Box-Cox tranformed data", ylab = expression(Y[t]))
```



```r
#log transform
iowa_log <- log(iowa_ts)

# square root transform
iowa_sqrt <- sqrt(iowa_ts)

#Plot Box-Cox, log and square root transformed data
par(mfrow=c(2,2))
ts.plot(iowa_bc, main = "Box-Cox Transform")
ts.plot(iowa_log, main = "Log Transform")
ts.plot(iowa_sqrt, main = "Square Root Transform")
```