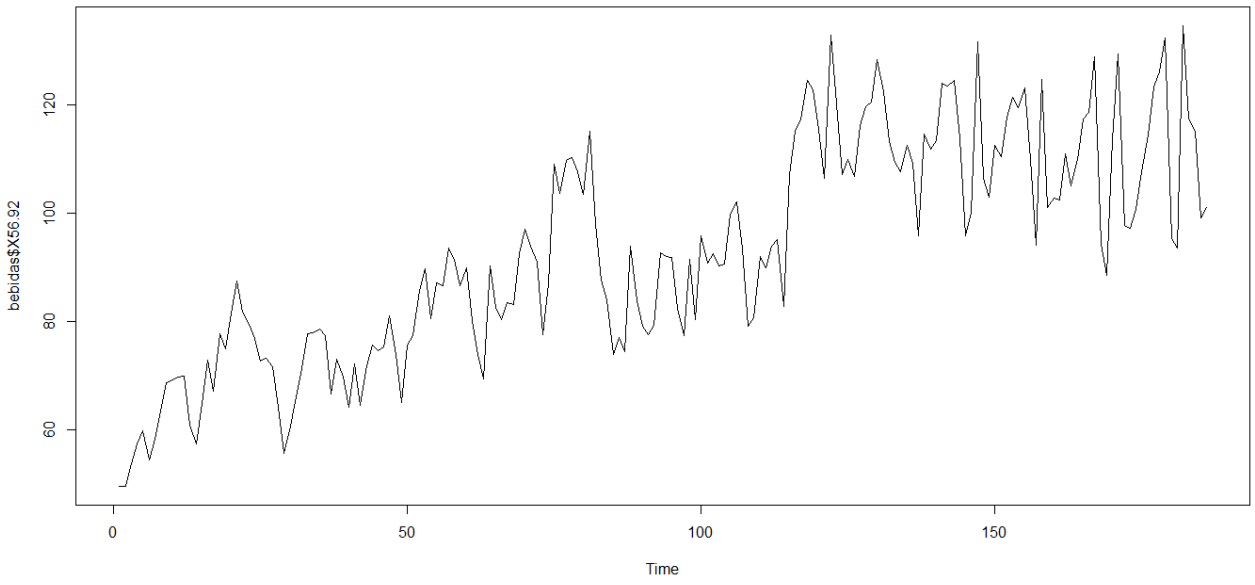
Leonardo de Oliveira Ribas

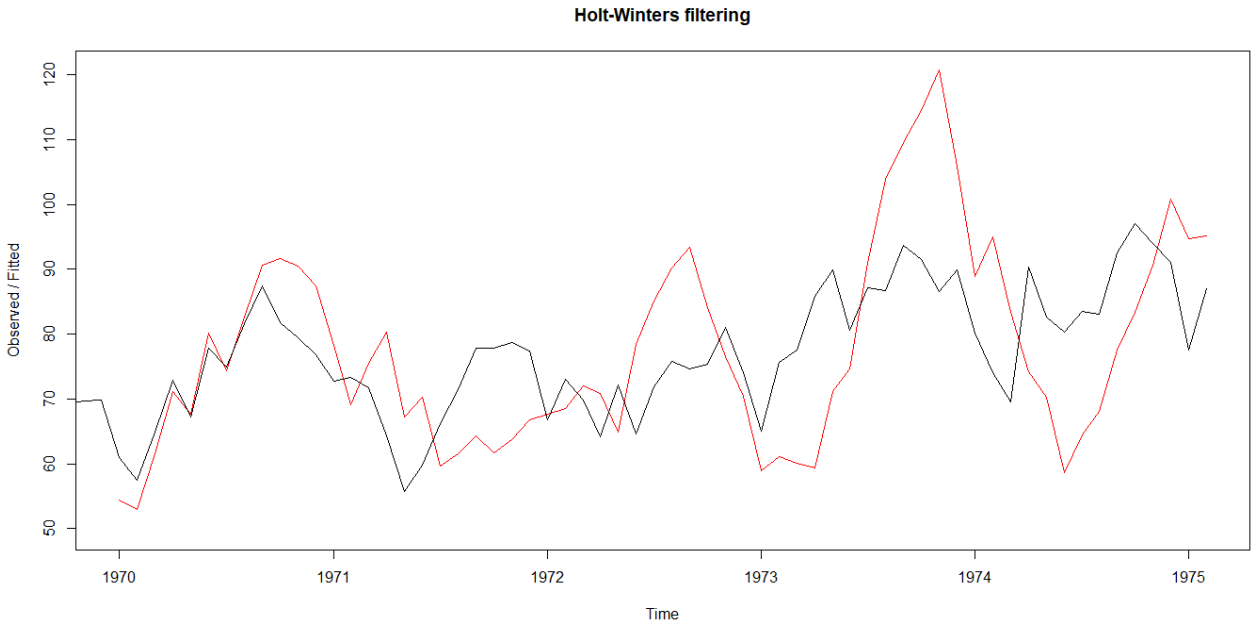
Trabalho 2

```
#carregando as bibliotecas
library(tidyverse)
library(ggpmisc)
library(knitr)
library(kableExtra)
library(lubridate)
library(httr)
library(xlsx)
library(fpp2)
library(forecast)
library(tsibble)
library(TTR)
library(forecast)

#Carreganado os dados
setwd("D:/Diretorios/Downloads/Analise de série temporais")
bebidas<- read.csv("bebidas.csv")

#Convertendo para dataframe
bebidas<- as.data.frame(bebidas$X56.92)
plot.ts(bebidas)
```

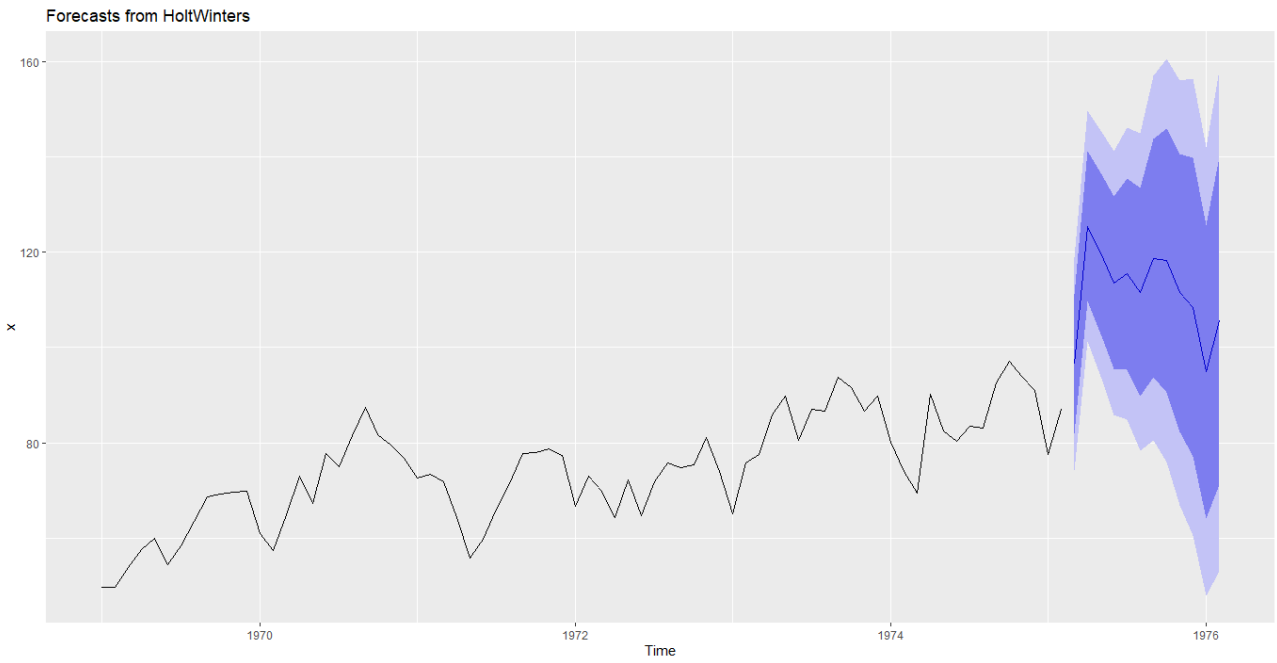



```
#Como podemos observar, a série temporal tem o comportamento de crescimento com sazonalidade
#Neste caso usaremos o terceiro método de predição HoltWinters
#fazendo a divisão e convertendo para série temporal
x <- ts(bebidas$`bebidas$X56.92`[1:74], start = c(1969,1), frequency = 12)
y <- bebidas$`bebidas$X56.92`[175:186]
plot(x)
```

```
#Metodo de hilt winters
alpha.val = seq(0.1,0.9, by=0.05)
beta.val = seq(0.1,0.9, by=0.05)
gamma.val = seq(0.1,0.9, by=0.05)

alphaBetaGamma.grid = expand.grid(alpha.val,beta.val, gamma.val)

MSE = list()

for(i in 1:nrow(alphaBetaGamma.grid )){
  HW= HoltWinters(x, beta=alphaBetaGamma.grid[i,2], gamma=alphaBetaGamma.grid[i,3],
alpha=alphaBetaGamma.grid[i,1],
                  seasonal = c("multiplicative"))
  MSE[[i]]=  mean( c(as.vector(forecast(HW,h=12)$mean) - y)^2)
}

alphaBetaGamma.opt = alphaBetaGamma.grid[ which.min(unlist(MSE)), ]

head(data.frame(alphaBetaGamma.opt, round(unlist(MSE),2)))

mod <- HoltWinters(x, alpha =alphaBetaGamma.opt[1,1], gamma = alphaBetaGamma.opt[1,3],
beta = alphaBetaGamma.opt[1,2], seasonal=c("multiplicative"))

plot(mod)
```




```
lines(fitted(mod)[,1], col = 3)
forecast(mod, h=12) %>% autoplot
```


Forecasts from HoltWinters
160
120
80
x
1970
1972
1974
1976
Time