Forecast.R

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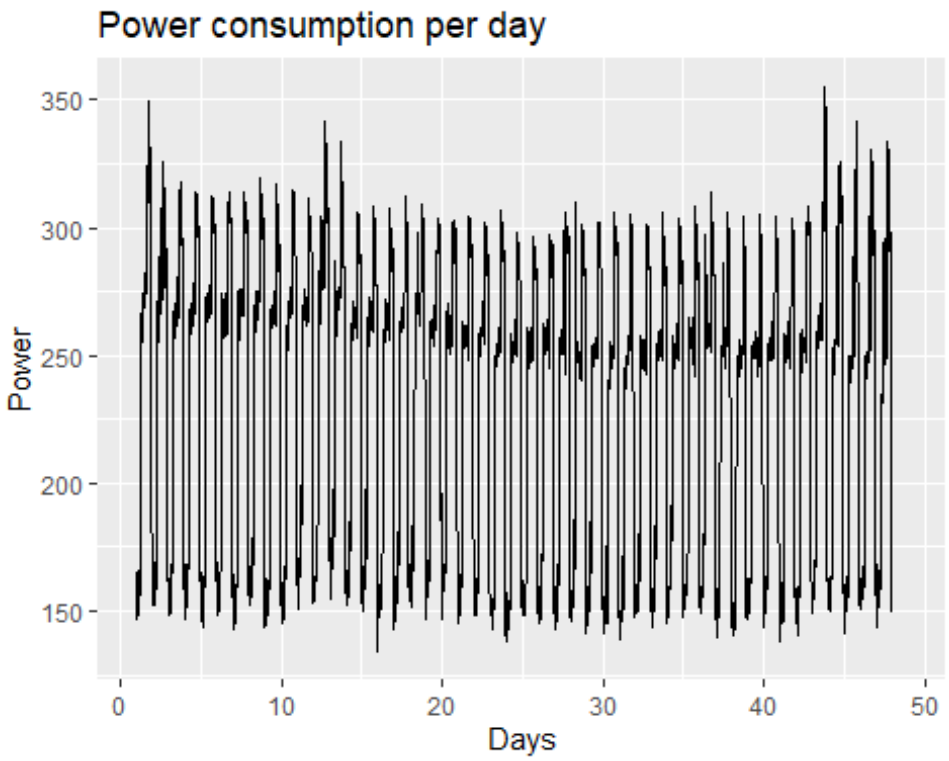
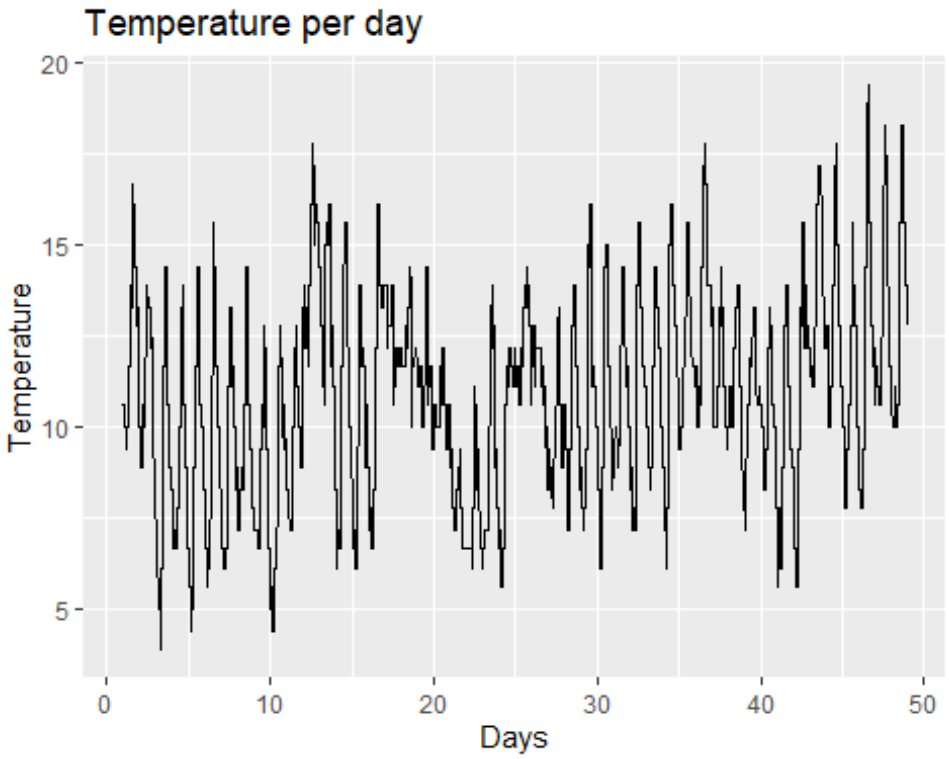
```
## Importing packages
library(readr)

library(plyr)
library(astsa)
library(ggplot2)

library(xts)

library(forecast)

library(fGarch)

library(fpp)

library(tidyverse)

library(Metrics)

library(knitr)

getwd()

## [1] "C:/Users/Kuanysh/Documents/GitHub/Time-Series-in-R/Exam"

setwd("C:/Users/Kuanysh/Documents/GitHub/Time-Series-in-R/Exam")
data <- read.csv("C:/Users/Kuanysh/Documents/GitHub/Time-Series-in-R/Exam/Elec-
train.csv")

#1.Preprocessing

#Rename
names(data)[2]<-"Power"
names(data)[3]<-"Temperature"

#Date format
data$Timestamp <- as.POSIXct(data$Timestamp, format ="%m/%d/%Y %H:%M", tz =
"GMT")
power.ts <- ts(data$Power, frequency = 96)
data$time <- as.numeric(time(power.ts))
temperature.ts <- ts(data$Temperature, frequency = 96)

#Plot
autoplot(power.ts)+
  ggtitle('Power consumption per day')+
```

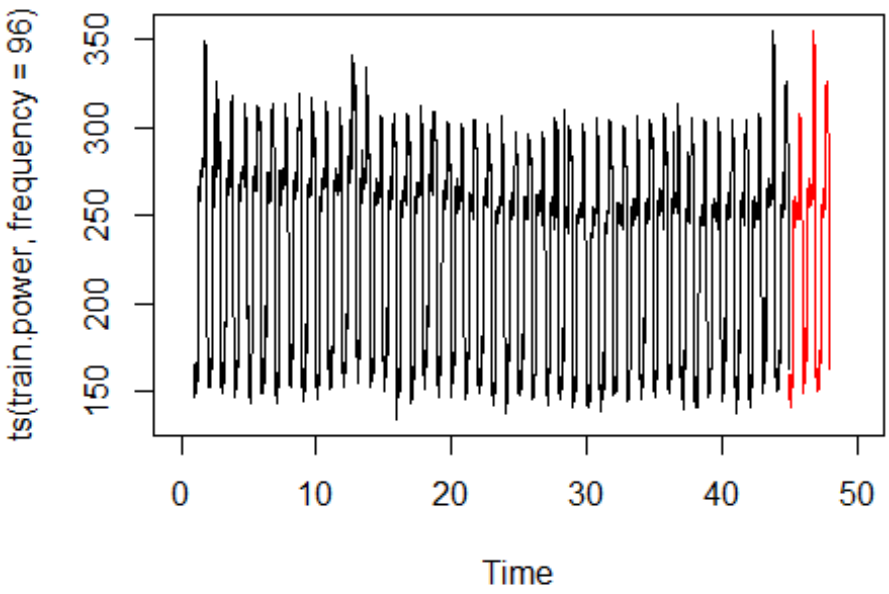
```
  xlab('Days')+
  ylab('Power')
```



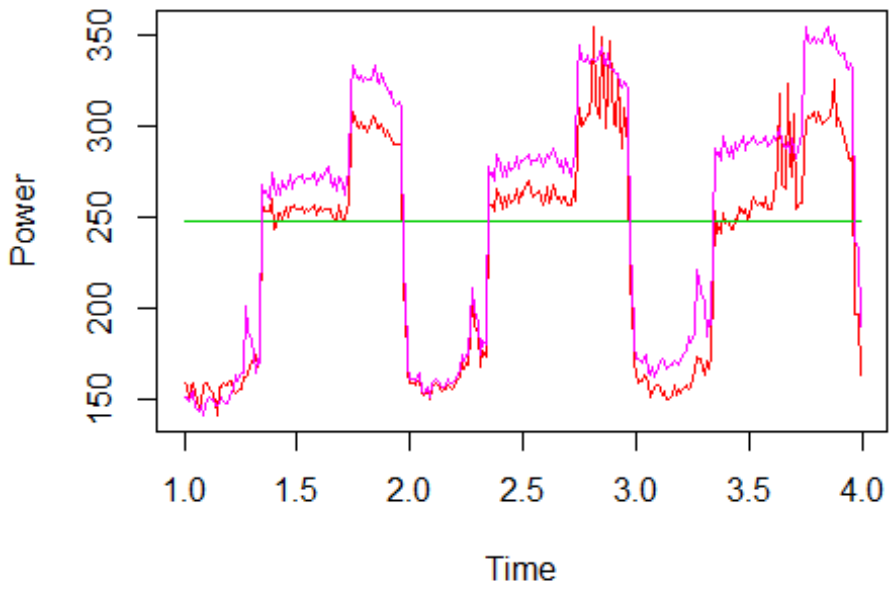

```
autoplot(temperature.ts)+
  ggtitle('Temperature per day')+
  xlab('Days')+
  ylab('Temperature')
```




```r
#2.Splitting data
nvaldays <- 3

test.power <- tail(data$Power, 96)
full.train.power <- head(data$Power, -96)
train.power <- head(full.train.power, -nvaldays*96)
val.power <- tail(train.power,nvaldays*96)


val.time <- tail(as.numeric(time(ts(full.train.power, frequency = 96))),
nvaldays*96)

plot(ts(train.power, frequency = 96),xlim=c(0,50))
par(new=TRUE)
lines(val.time, val.power, col="red", xlim=c(0,50))
```




```
#3. Forecast

# simple ES with only alpha
Power<-ts(val.power, frequency = 96)
plot(Power,col="red")
SES=HoltWinters(Power,alpha=NULL,beta=FALSE,gamma=FALSE)
p1<-predict(SES,n.ahead=nvaldays*96)
par(new=TRUE)
plot(ts(as.numeric(p1),frequency = 96),col=3,ann=FALSE,axes=FALSE)
rmse(val.power, as.numeric(p1))

## [1] 88.22327

# full ES with alpha beta gamma
#plot(ts(val.power, frequency = 96),col="red")
SES=HoltWinters(Power,alpha=NULL,beta=NULL,gamma=NULL)

## Warning in HoltWinters(Power, alpha = NULL, beta = NULL, gamma = NULL):
## optimization difficulties: ERROR: ABNORMAL_TERMINATION_IN_LNSRCH

p1<-predict(SES,n.ahead=nvaldays*96)
par(new=TRUE)
plot(ts(as.numeric(p1),frequency = 96),col=6,ann=FALSE,axes=FALSE)
```




```
rmse(val.power, as.numeric(p1))
```

```
## [1] 14.03703
```