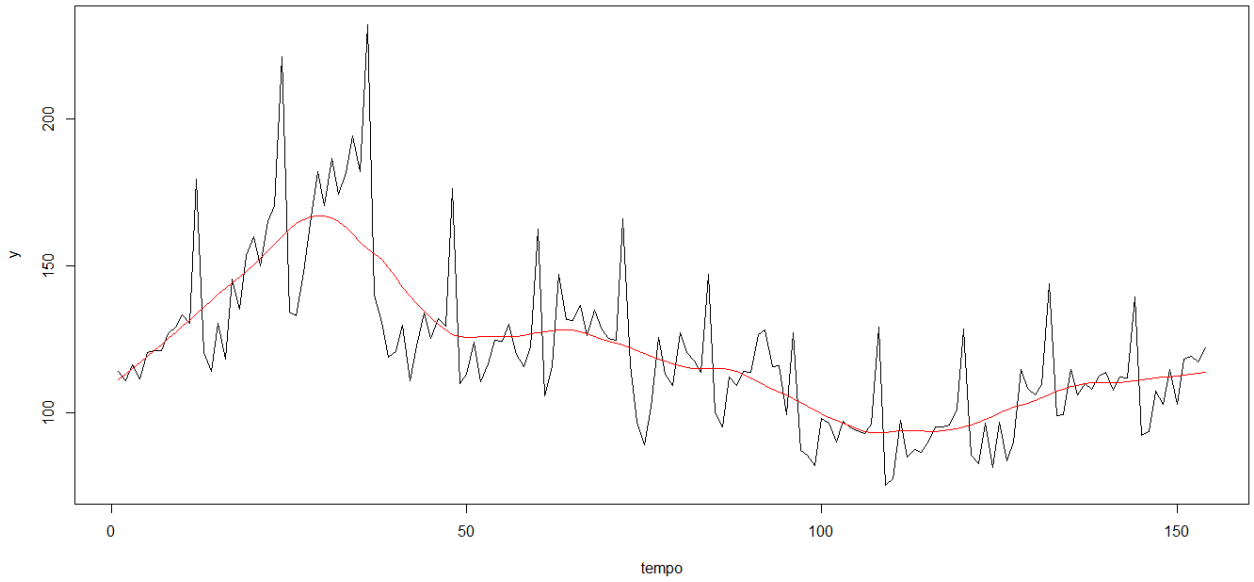
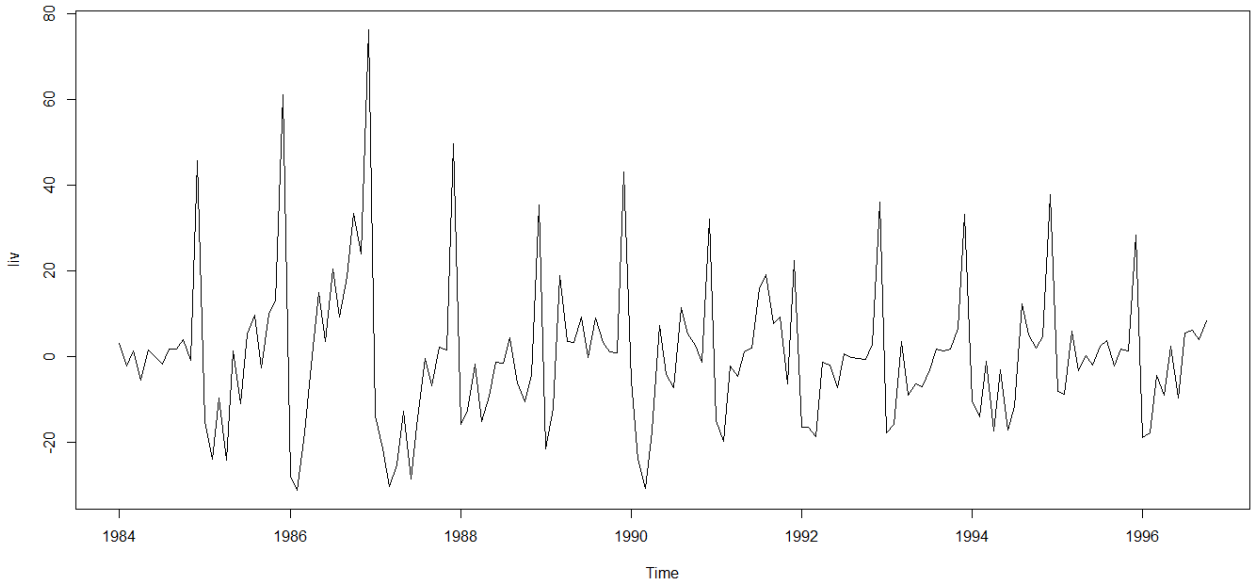
```
setwd("D:/Diretorios/Downloads/Analise de série temporais/IME0024-ANALISE-DE-SERIES-TEMPORAIS-master/Aulas/Trabalho_1")
df<-read.csv("consumo.csv", header = TRUE)
x = ts(df$consumo, start=c(1984,1), frequency=12)

tempo = 1:length(x)
y = as.vector(x)

# a. Estimar componente de Tendencia
loessMod02 <- loess(x~tempo, span=0.2, degree = 1)
smoothed02 <- predict(loessMod02)
plot(tempo,y,type = "l")
lines(tempo,smoothed02, col = "red")
```



#b Livre de tendencia
liv<- x - smoothed02
plot(liv)



# c. Estimar componete de sazonalidade
dat<-read.csv("consumo.csv", header = TRUE)
dados = ts(dat$consumo,frequency=12, start=c(1984,1))

Tt = ma(dados, order = 6, centre = TRUE)
Yt = dados - Tt
media_meses = tapply(c(Yt), INDEX =tempo,
FUN = mean, na.rm = TRUE)
names(media_meses) = c("jan","fev","mar", "abr","mai","jun","jul","ago","set","out","nov","dez")
round(media_meses,3)

media_geral = mean(media_meses, na.rm=TRUE)
round(media_geral,3)

comp_sazonal = media_meses - media_geral
names(comp_sazonal) = c("jan","fev","mar", "abr","mai","jun","jul","ago","set","out","nov","dez")
round(comp_sazonal,3)

#série livre de szonalidade
lt<- dados - comp_sazonal
plot(1:length(dados),dados,lty=1,type="l")