Séries Temporais - Lista 3

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1:Dezesseis observações sucessivas de uma ST estacionária são as seguintes:

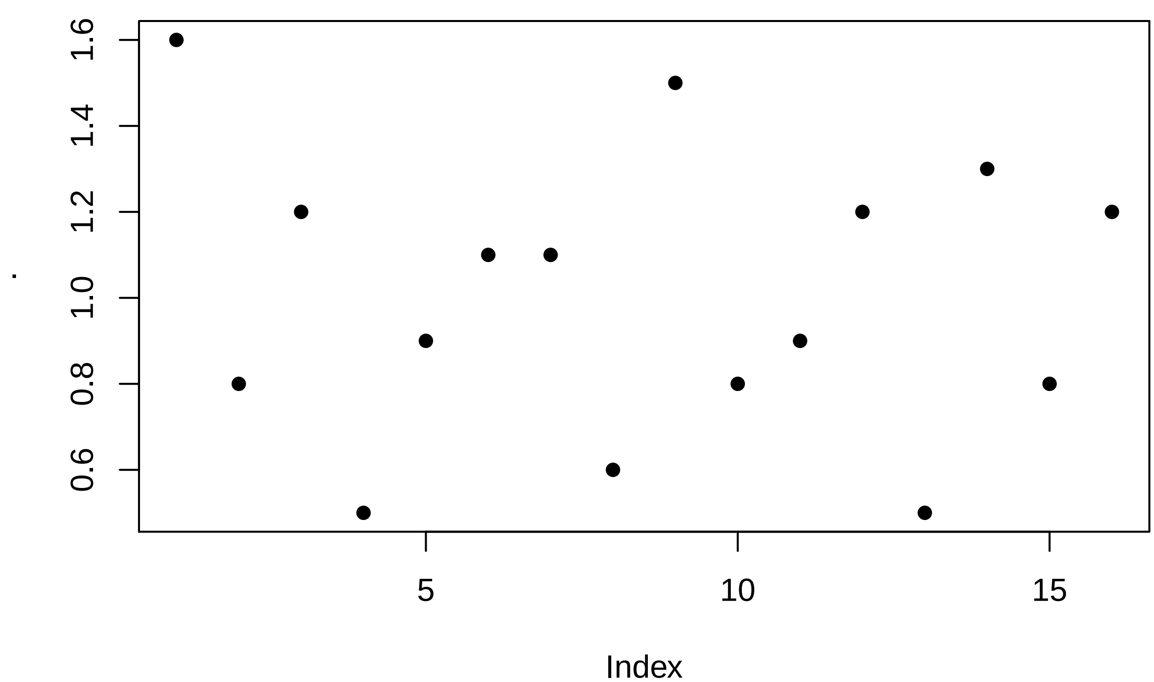
```
x<-c(1.6,0.8,1.2,0.5,0.9,1.1,1.1,0.6,1.5,0.8,0.9,1.2,0.5,1.3,0.8,1.2)
```

a) Plot as observações.

```
library(dplyr)
```

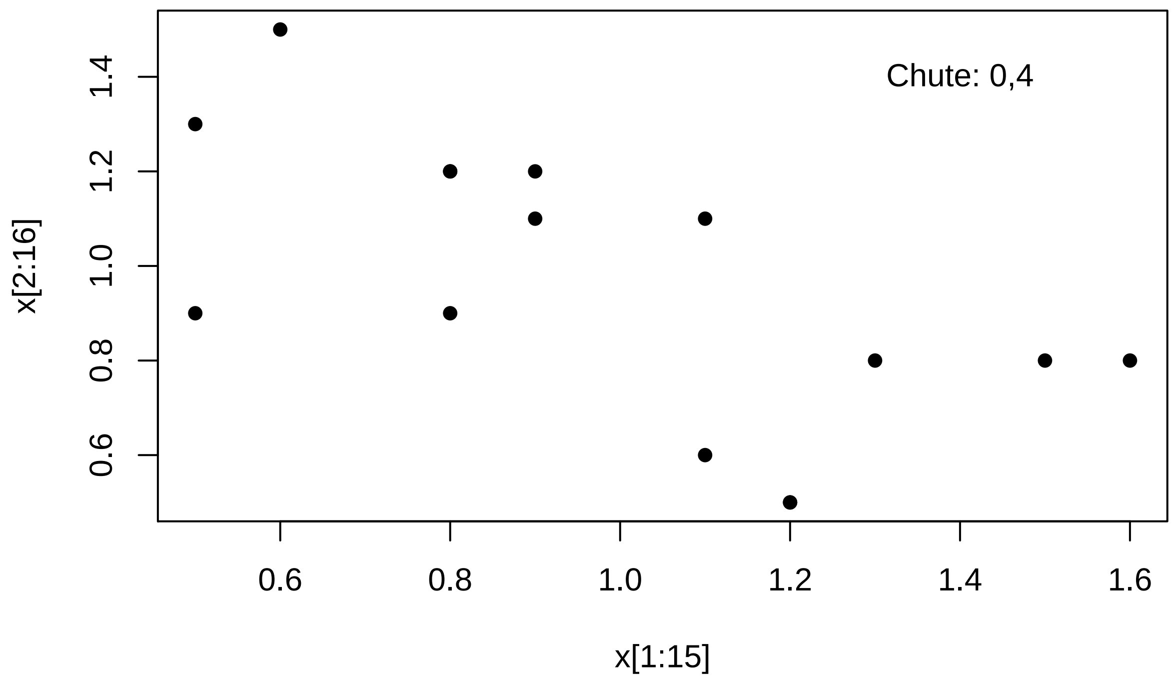
```
##
## Attaching package: 'dplyr'
## The following objects are masked from 'package:stats':
##
##     filter, lag
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
x %>% plot(pch=16)
```



b) Plot x_t contra $x_t + 1$. A partir desse gráfico, tente adivinhar o valor de r_1.

```
plot(x[1:15],x[2:16],pch=16)
text(1.4,1.4,labels = "Chute: 0,4")
```



c) Calcule r_1.

```
(sum((x[1:15]-mean(x))*(x[2:16]-mean(x))))/(sum((x[1:15]-mean(x))^2))
```

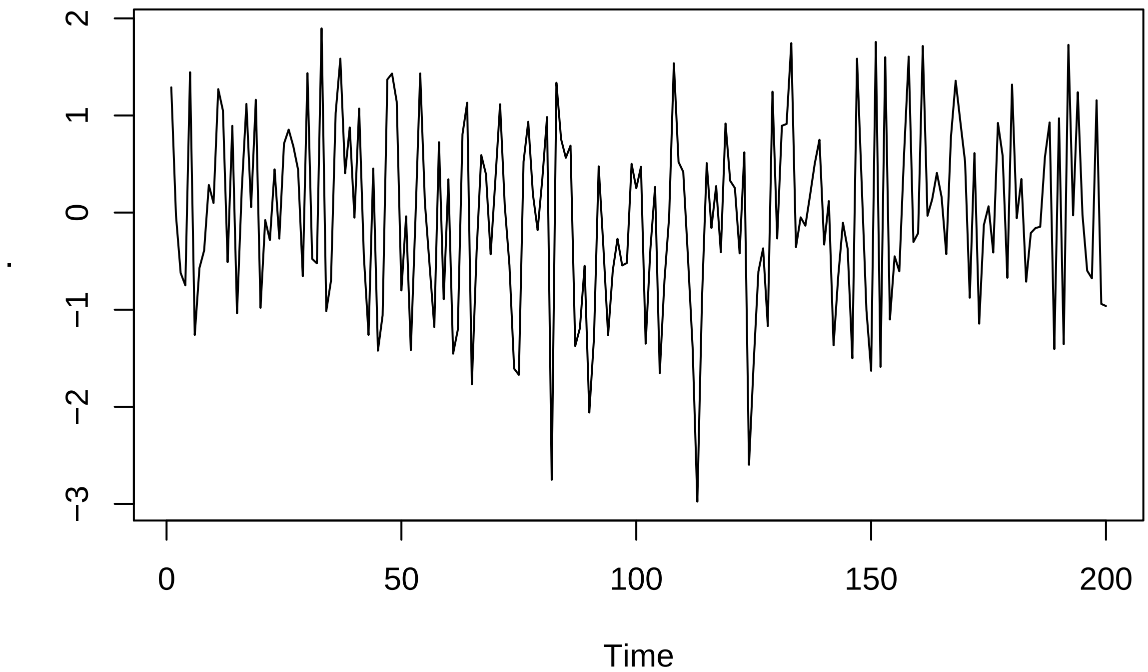
```
## [1] -0.5625
```

2: Para cada um dos processos abaixo gere 200 observações. Faça um gráfico da série e do correlograma.

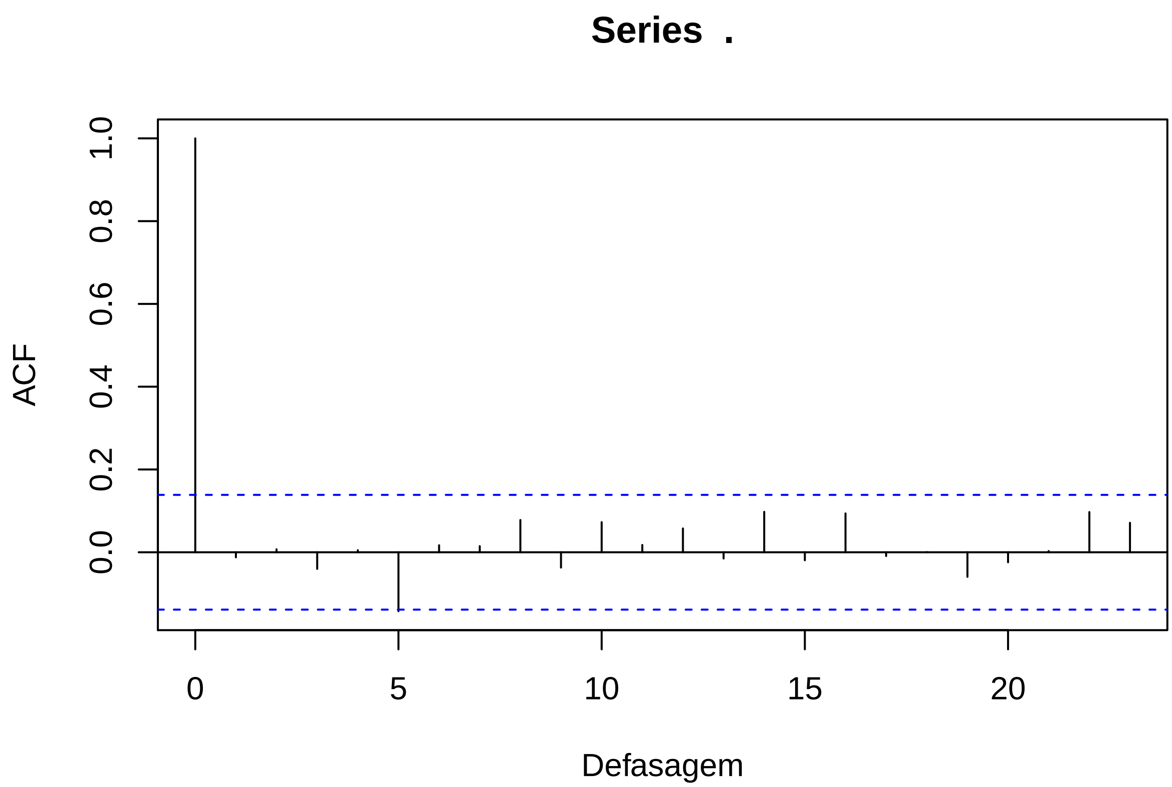
a) Série aleatória, observaçõoes iid da distribuição N(0,1).

```
x=rnorm(200,0,1) %>%
  ts

x %>% plot
```

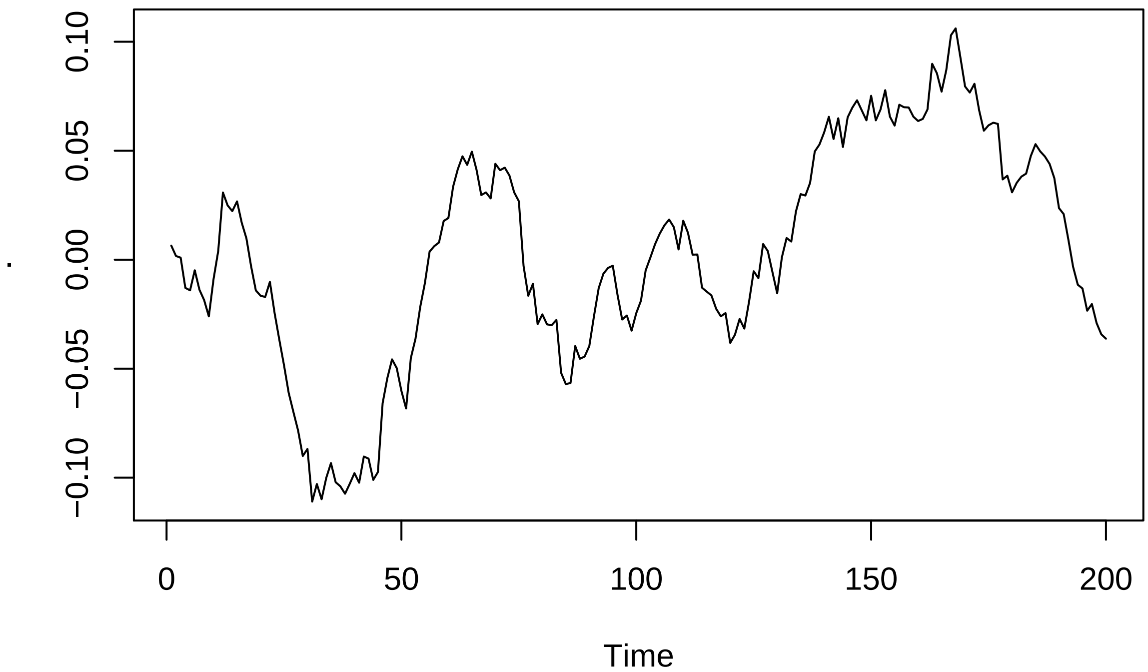



```
x %>% acf(xlab='Defasagem')
```

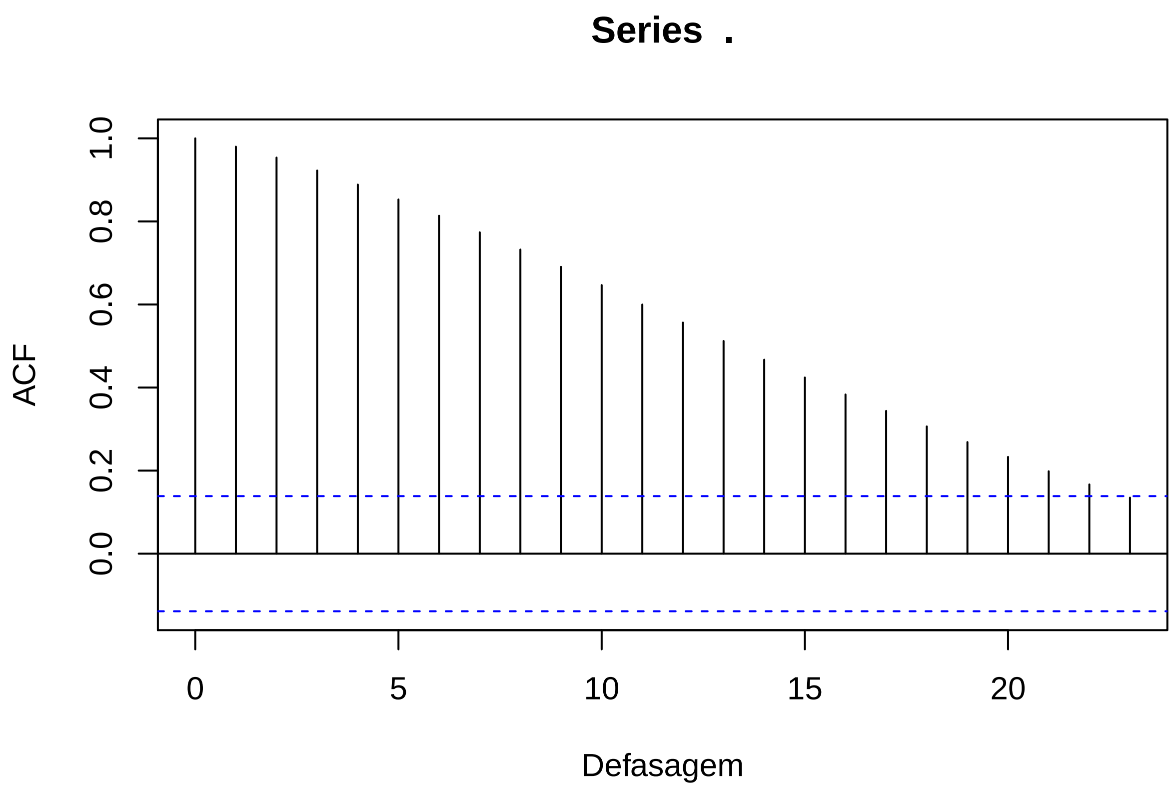


b) Série com tendencia estocástica $x_t = x_{t-1} + e_t, e_t \sim N(0, (0,1)^2)$

```
q<-rnorm(200,0,0.1^2)
x<-cumsum(q)
ts(x) %>%
plot()
```




```r
ts(x) %>%
acf(xlab='Defasagem')
```

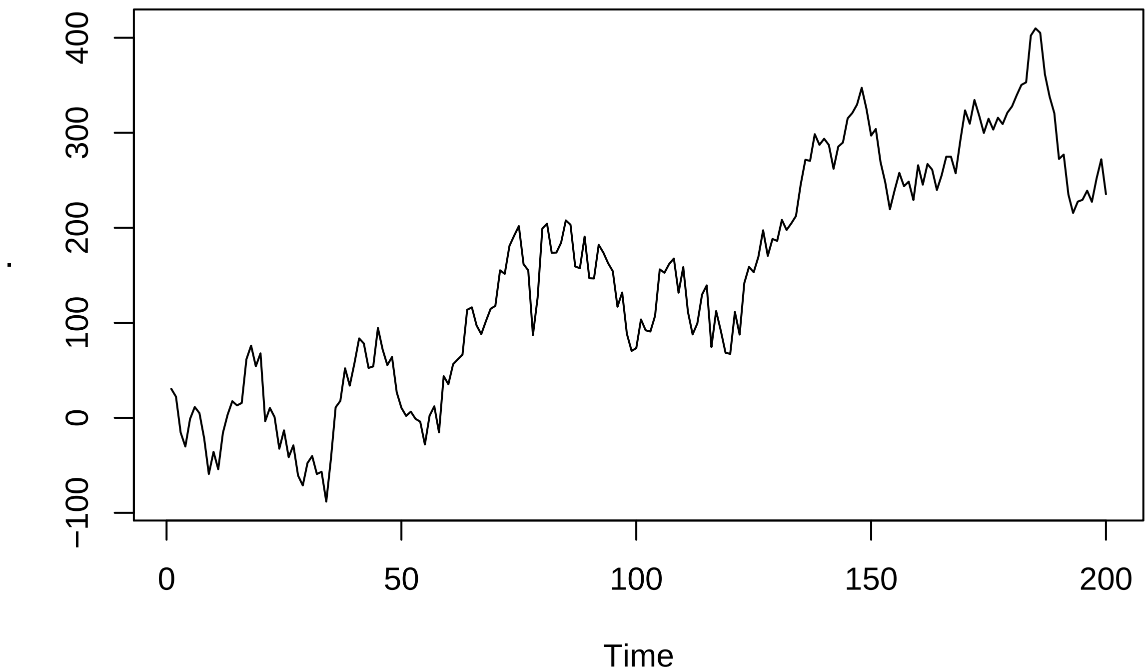


c) Outra série com tendencia estocástica $x_t = x_{t-1} + e_t, e_t \sim N(0, 5^2)$

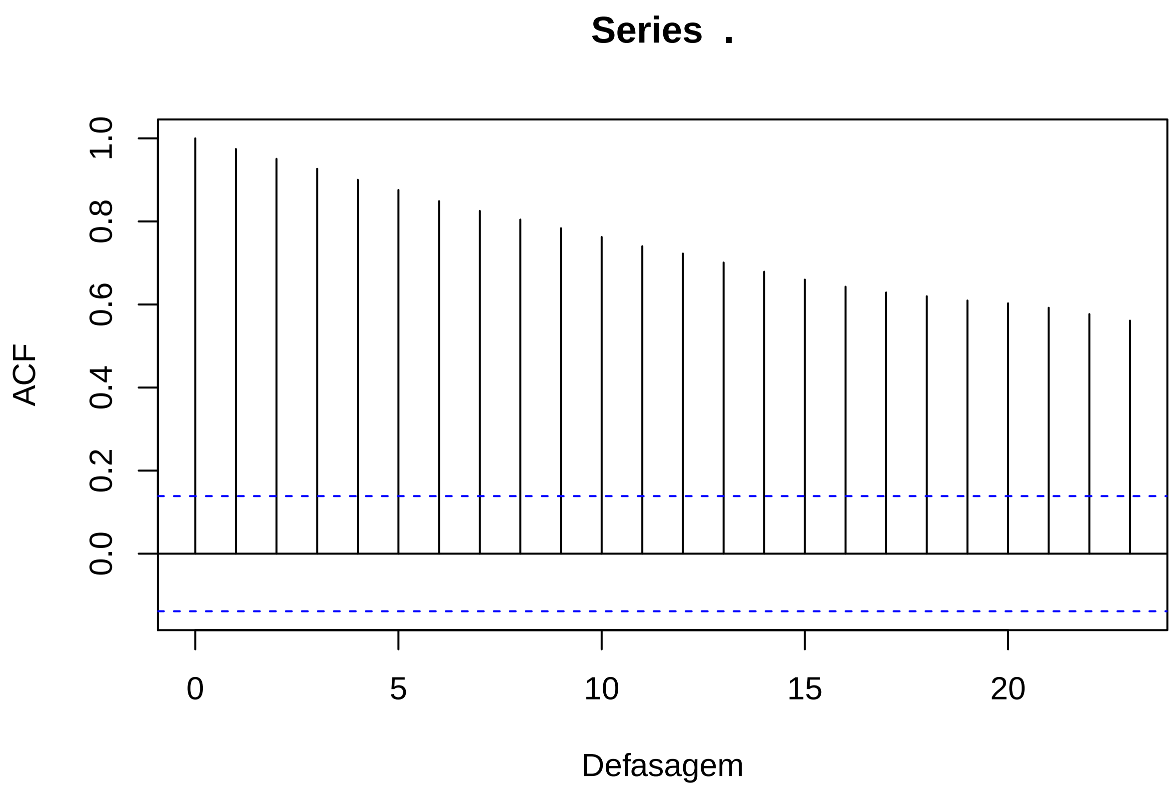
```
q<-rnorm(200,1,25)

x<-cumsum(q)

ts(x) %>%
plot()
```

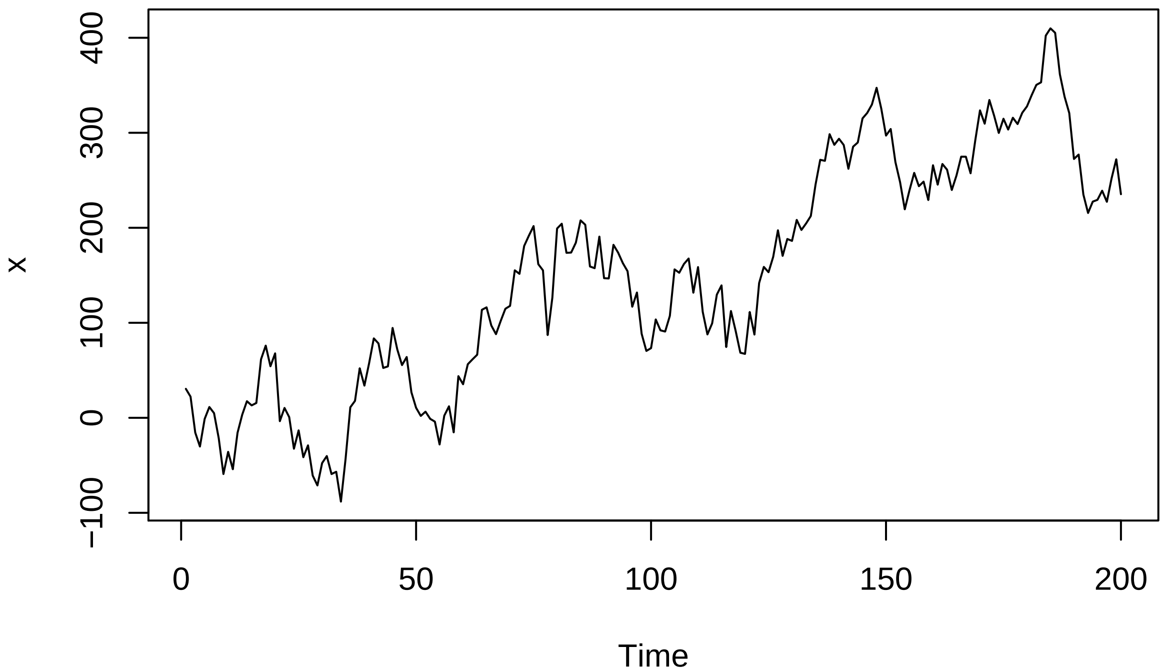



```
ts(x)%>%
acf(xlab='Defasagem')
```

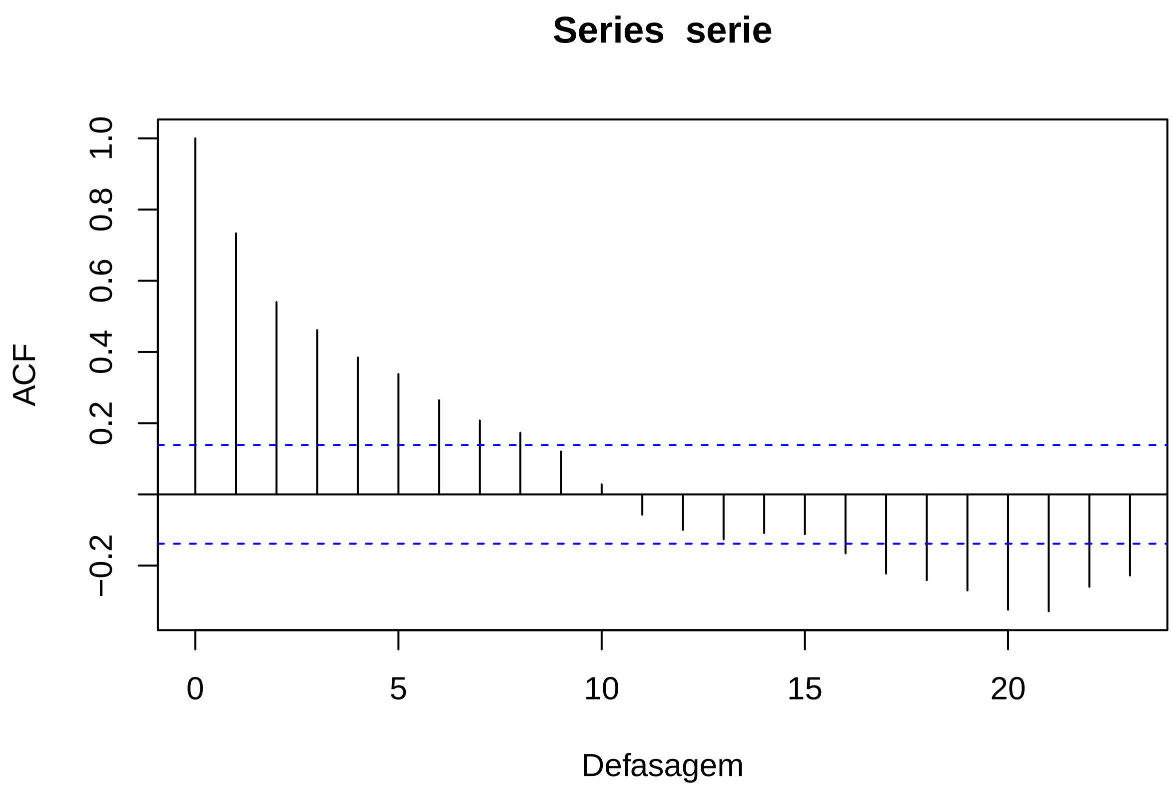


d) Série com correlação de curto-prazo $x_t = 0,7x_{t-1} + e_t, e_t \sim N(0,1)$

```
serie = arima.sim(n = 200, list(ar = 0.7))
plot.ts(x,type='l')
```

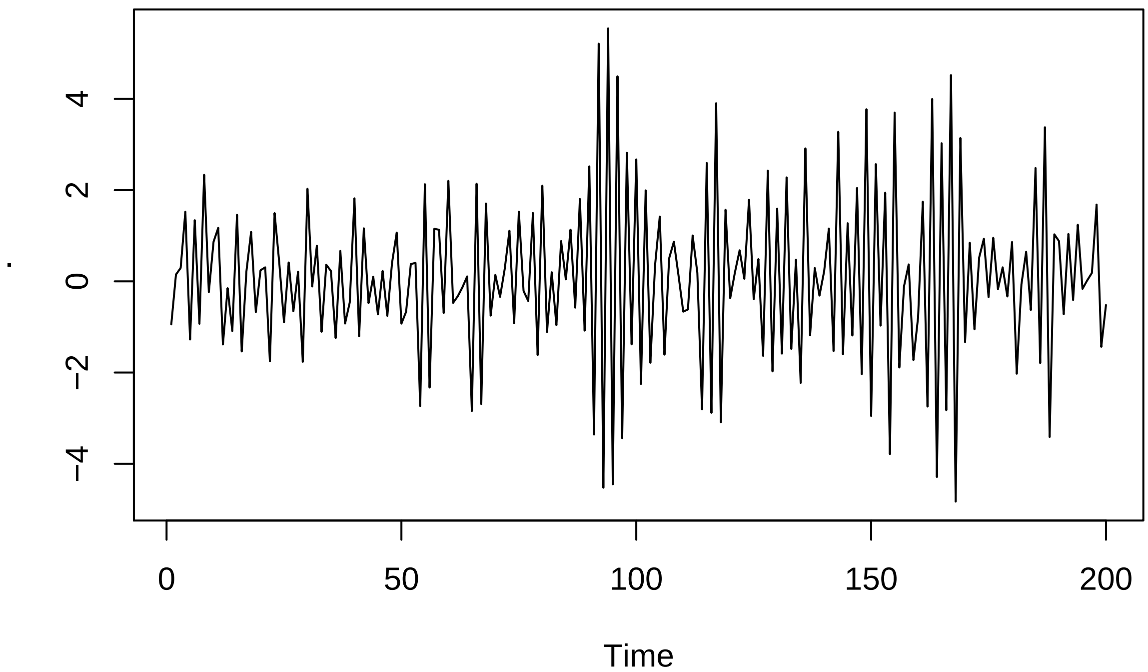



```r
acf(serie,xlab='Defasagem')
```

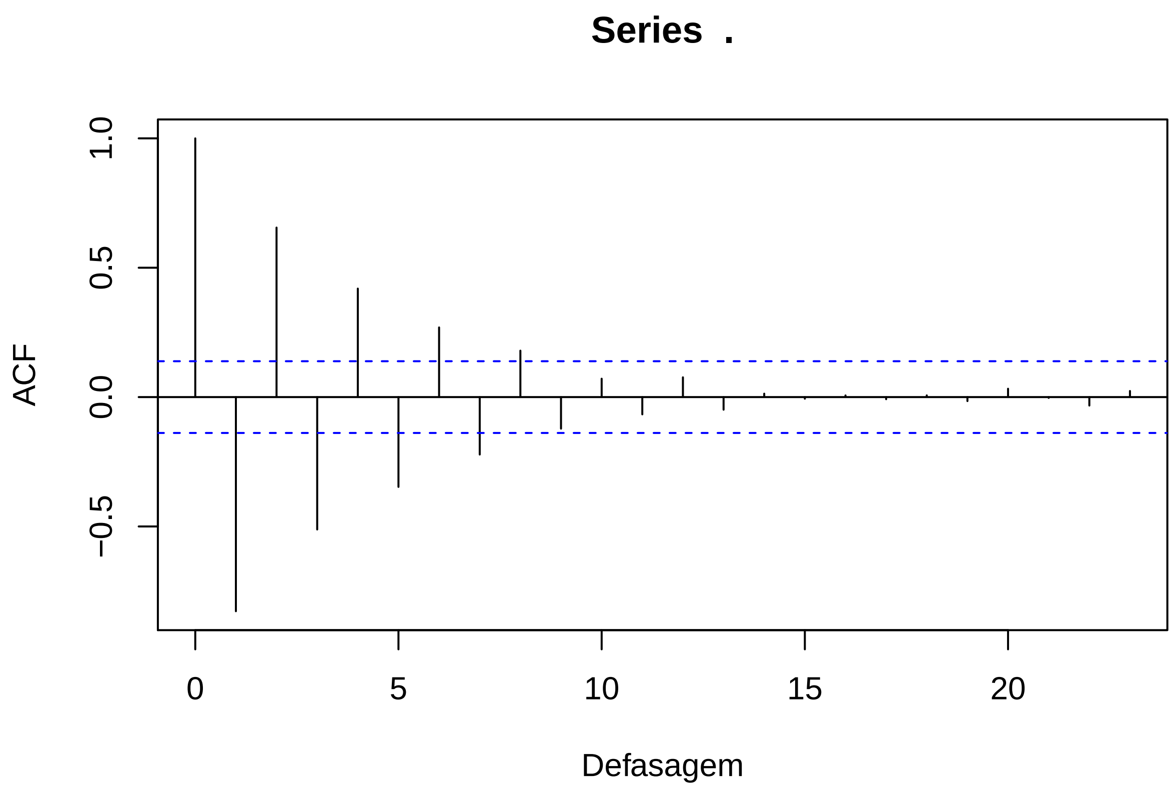


e) Série com correlações negativas $x_t = -0,8x_{t-1} + e_t, e_t \sim N(0,1)$

```
x = arima.sim(n = 200, list(ar = -0.8))
x %>% plot.ts(type='l')
```

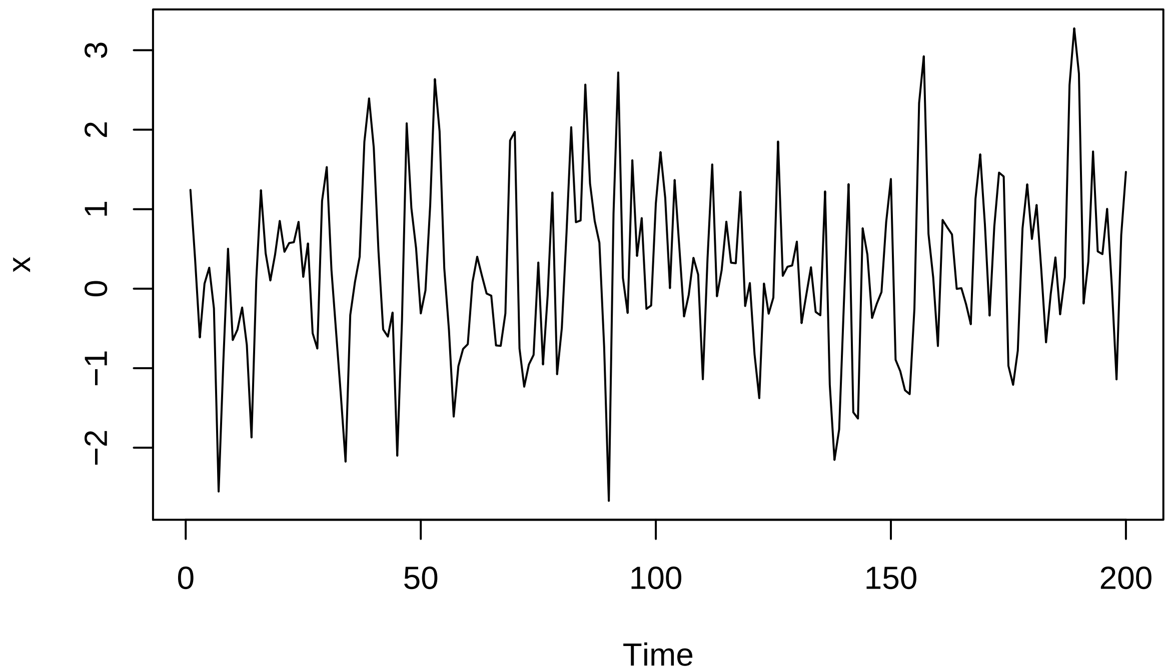



```r
x %>% acf(xlab='Defasagem')
```

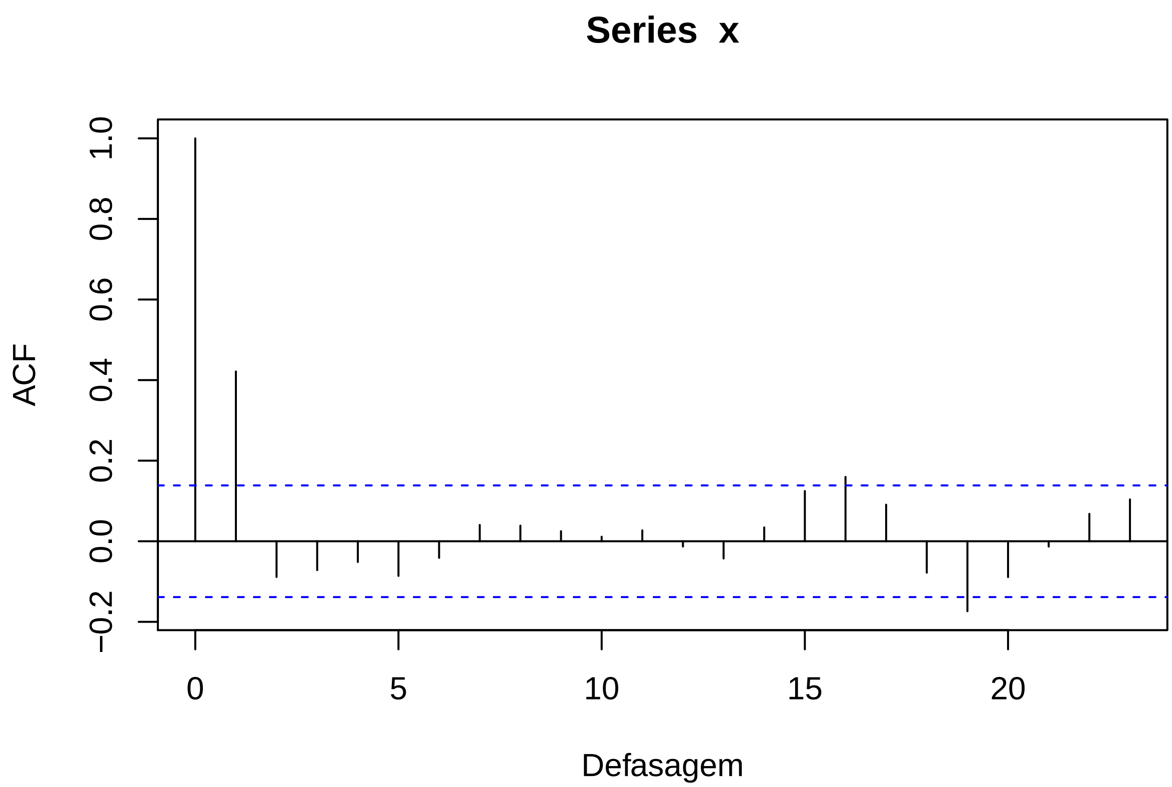


f) Médias móveis $x_t = e_t + 0,6e_{t-1}, e_t \sim N(0,1)$

```
x = arima.sim(n = 200, list(ma = 0.6))
plot.ts(x,type='l')
```




```r
acf(x,xlab='Defasagem')
```



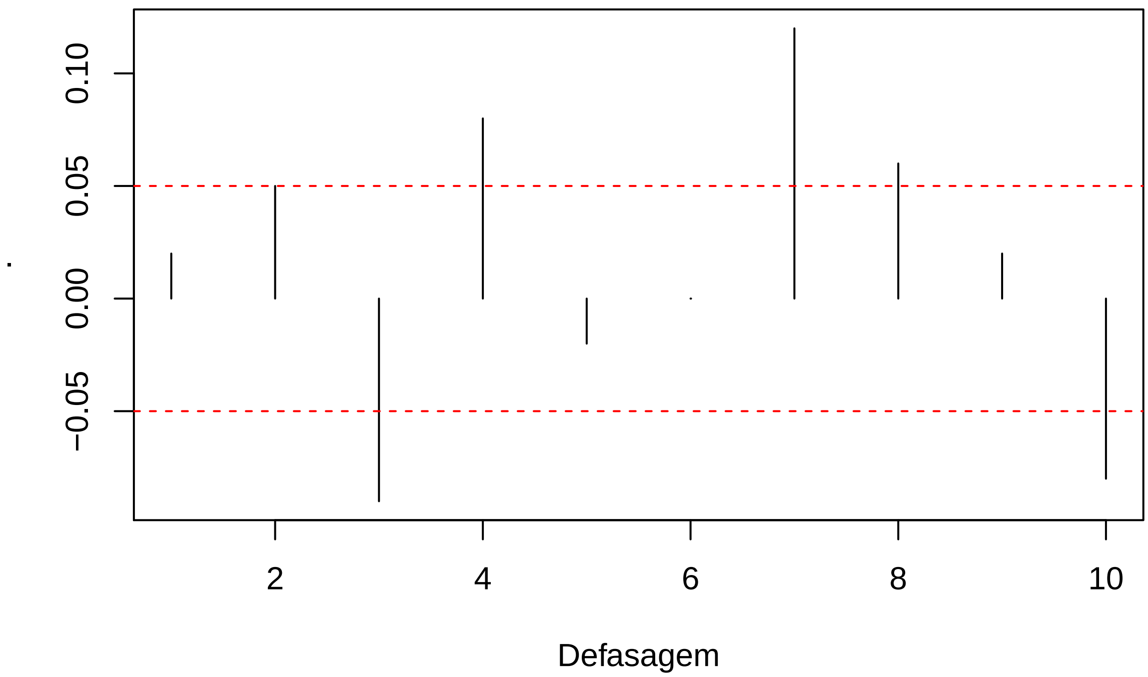
Exercício 3: Os 10 primeiros coeficientes de autocorrelação amostral de 400 números "aleatórios" são r1 = 0.02, r2 = 0.05, r3 = -0.09, r4 = 0.08, r5 = -0.02, r6 = 0.00, r7 = 0.12, r8 = 0.06, r9 = 0.02, r10 = -0.08. Existe evidência de não-estacionariedade?

```
1/sqrt(400)
```

```
## [1] 0.05
```

```
autocor=c(0.02,0.05,-.09,.08,-.02,0,.12,.06,.02,-.08)

autocor %>%
  plot(pch=16,type="h",xlab="Defasagem") %>%
  abline(h=c(-.05,.05),col=2,lty=2)
```



Como existem valores fora das bandas de 95% confiança,há evidências de não estacionaridade.