Act 4

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```
install.packages("BSDA")
```

```
## Installing package into 'C:/Users/anaca/AppData/Local/R/win-library/4.3'
## (as 'lib' is unspecified)
```

```
## package 'BSDA' successfully unpacked and MD5 sums checked
##
## The downloaded binary packages are in
##  C:\Users\anaca\AppData\Local\Temp\Rtmp4WTuGu\downloaded_packages
```

```
data <- read.csv("El marcapasos.csv")
```

```
sinMP <- subset(data, data$Marcapasos == "Sin MP")
conMP <- subset(data, data$Marcapasos == "Con MP")
```

```
#Periodo entre pulsos SIN Marcapasos
x <- sinMP$Periodo.entre.pulsos
d = sd(x)
n = length(x)
m = mean(x)
alfa = 0.05
z = abs(qnorm(alfa/2))
```

```
#Intervalo de confianza
E = z*d/sqrt(n)
L1 = m - E
LS = m + E
```

```
library(BSDA)
```

```
## Loading required package: lattice
```

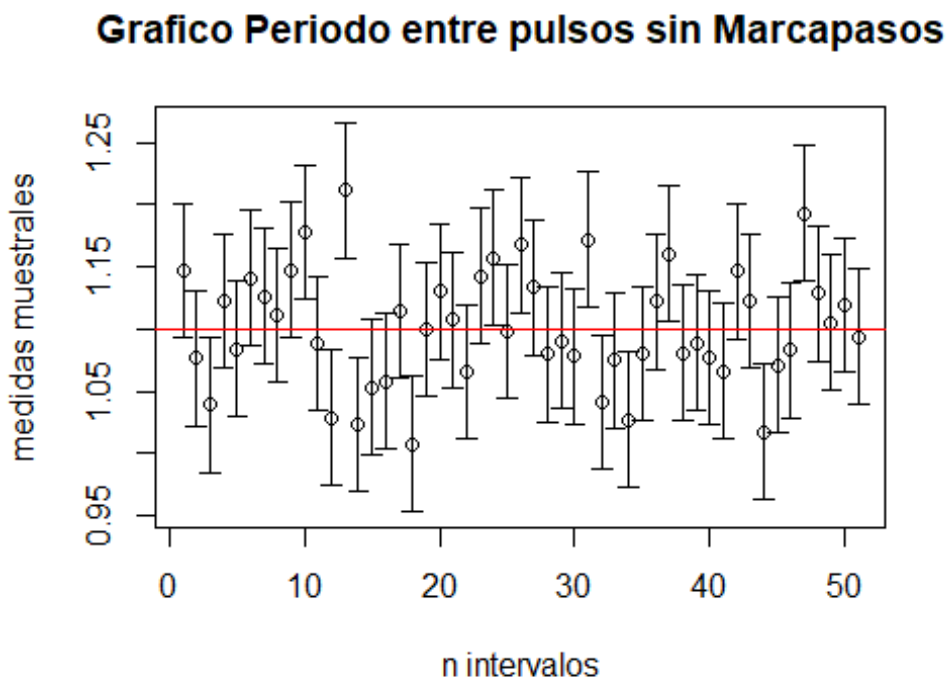
```
##
## Attaching package: 'BSDA'
```

```
## The following object is masked from 'package:datasets':
##
##     Orange
```

```
g1 = z.test(x,conf.level = 0.95, sigma.x = sd(x))
print(g1)
```

```
##
##  One-sample z-Test
##
## data:  x
## z = 20.51, p-value < 2.2e-16
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  1.005521 1.218009
## sample estimates:
## mean of x
##  1.111765
```

```r
ErrorEst = d/sqrt(n)
X_ = rnorm(n, m, ErrorEst)

library(plotrix)
plotCI(1:n,X_, ErrorEst, main="Grafico Periodo entre pulsos sin Marcapasos",
xlab = "n intervalos", ylab ="medidas muestrales")
abline(h = 1.10, col="red")
```

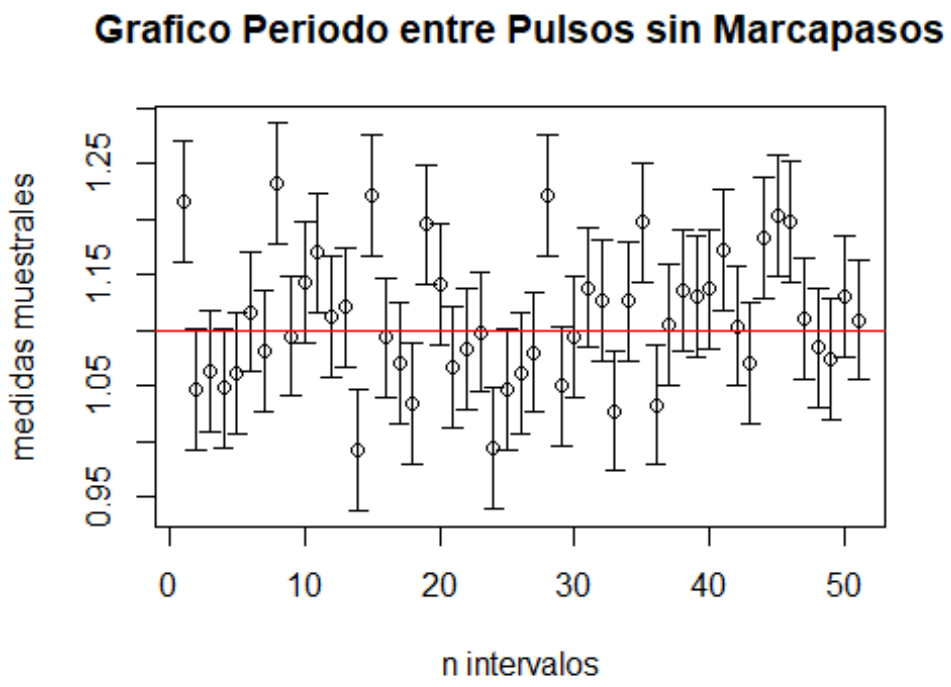



```r
#Periodo rntre pulsos SIN Marcapasos
x <- sinMP$Periodo.entre.pulsos
d = sd(x)
n = length(x)
m4 = mean(x)
alfa = 0.05
t = abs(qt(alfa/2,n-1))
```

```r
#Intervalo de confianza
E = z*d/sqrt(n)
LI4 = m4 - E
LS4 = m4 + E

library(BSDA)
g2 = t.test(x,conf.level = 0.95)
print(g2)
```

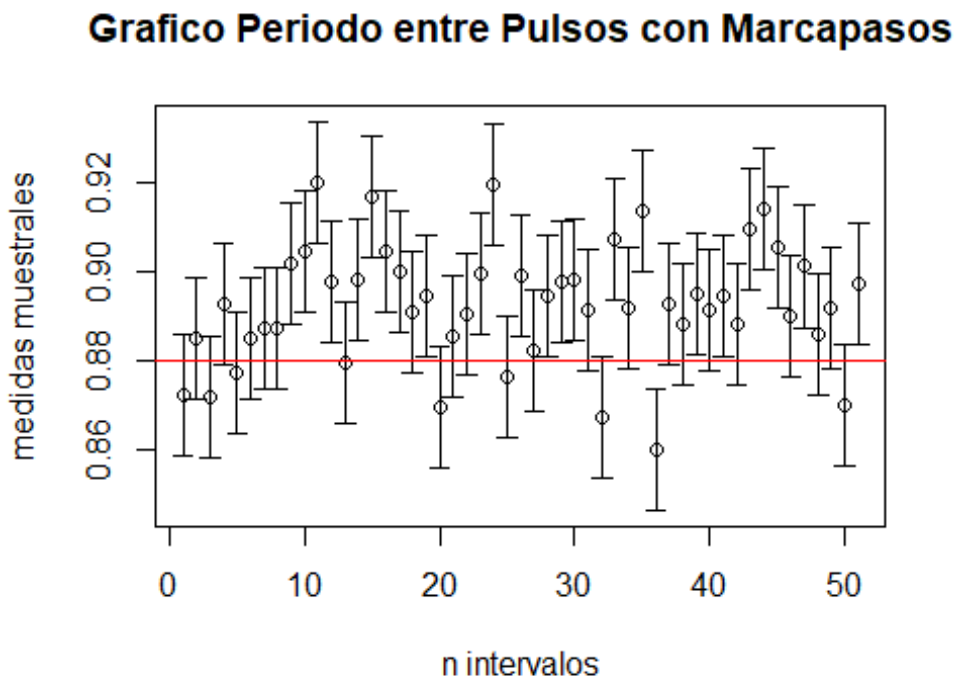
```
##
##  One Sample t-test
##
## data:  x
## t = 20.51, df = 50, p-value < 2.2e-16
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  1.002887 1.220643
## sample estimates:
## mean of x
##  1.111765
```

```r
ErrorEst = d/sqrt(n)
X_ = rnorm(n, m4, ErrorEst)

library(plotrix)
plotCI(1:n,X_, ErrorEst, main="Grafico Periodo entre Pulsos sin Marcapasos",
xlab = "n intervalos", ylab ="medidas muestrales")
abline(h = 1.10, col="red")
```



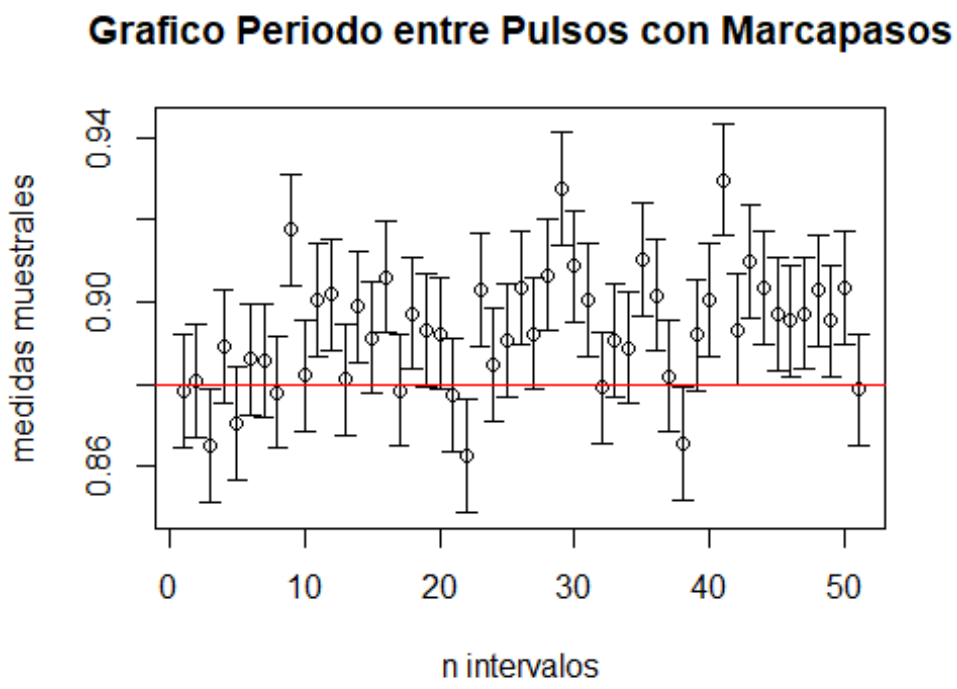

```r
#Periodo rntre pulsos CON Marcapasos
x <- conMP$Periodo.entre.pulsos
d = sd(x)
n = length(x)
m = mean(x)
alfa = 0.05
z = abs(qnorm(alfa/2))


#Intervalo de confianza
E = z*d/sqrt(n)
L1 = m - E
LS = m + E

library(BSDA)
g3 = z.test(x,conf.level = 0.95, sigma.x = sd(x))
print(g3)

##
##  One-sample z-Test
##
## data:  x
## z = 65.37, p-value < 2.2e-16
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  0.8644566 0.9178964
```

```
## sample estimates:
## mean of x
## 0.8911765

ErrorEst = d/sqrt(n)
X_ = rnorm(n, m, ErrorEst)

library(plotrix)
plotCI(1:n,X_, ErrorEst, main="Grafico Periodo entre Pulsos con Marcapasos",
xlab = "n intervalos", ylab ="medidas muestrales")
abline(h = 0.88, col="red")
```



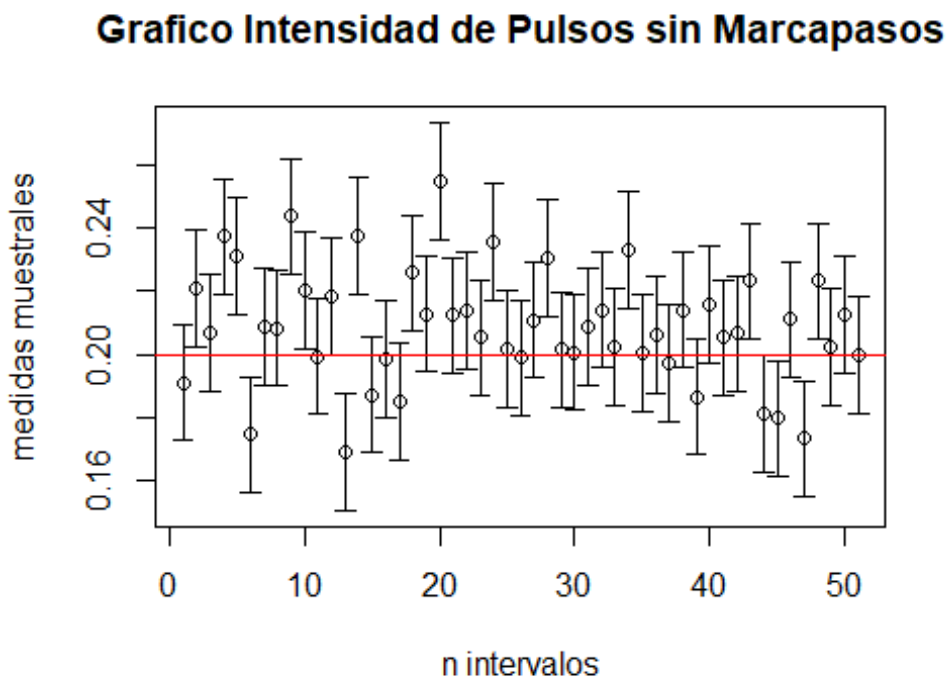

```
#Periodo rntre pulsos SIN Marcapasos
x <- conMP$Periodo.entre.pulsos
d = sd(x)
n = length(x)
m3 = mean(x)
alfa = 0.05
z = abs(qt(alfa/2,n-1))


#Intervalo de confianza
E = z*d/sqrt(n)
LI3 = m3 - E
LS3 = m3 + E

library(BSDA)
```

```r
g4 = t.test(x,conf.level = 0.95)
print(g4)

##
##  One Sample t-test
##
## data:  x
## t = 65.37, df = 50, p-value < 2.2e-16
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  0.8637941 0.9185589
## sample estimates:
## mean of x
## 0.8911765

ErrorEst = d/sqrt(n)
X_ = rnorm(n, m3, ErrorEst)

library(plotrix)
plotCI(1:n,X_, ErrorEst, main="Grafico Periodo entre Pulsos con Marcapasos",
xlab = "n intervalos", ylab ="medidas muestrales")
abline(h = 0.88, col="red")
```



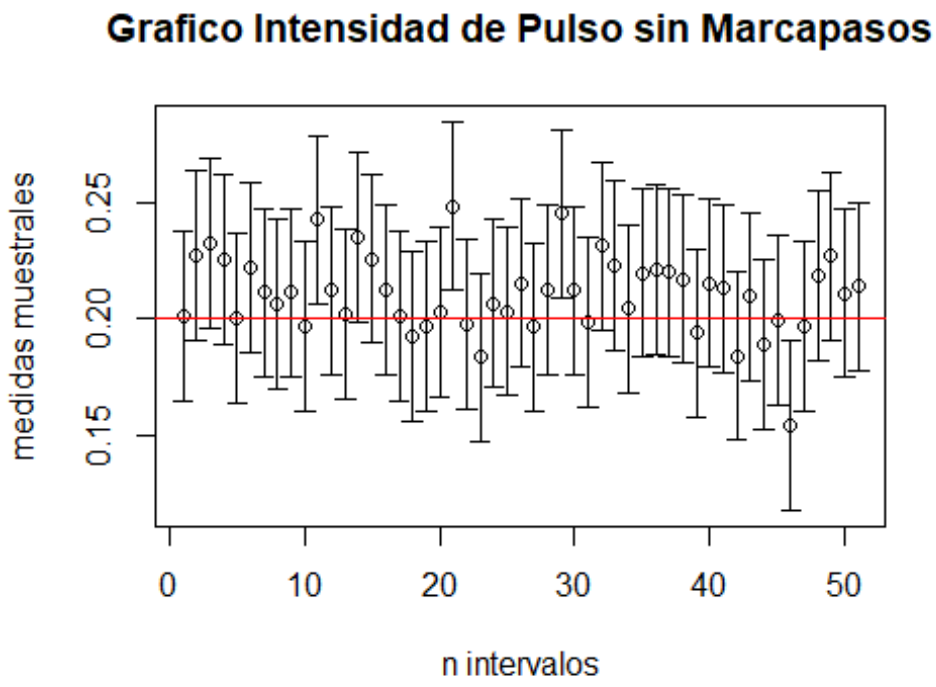
```r
#Intensidad.de.pulso SIN Marcapasos
x <- sinMP$Intensidad.de.pulso
```

```r
d = sd(x)
n = length(x)
m = mean(x)
alfa = 0.05
z = abs(qnorm(alfa/2))


#Intervalo de confianza
E = z*d/sqrt(n)
L1 = m - E
LS = m + E

library(BSDA)
z.test(x,conf.level = 0.95, sigma.x = sd(x))

##
##  One-sample z-Test
##
## data:  x
## z = 11.192, p-value < 2.2e-16
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  0.1708292 0.2433669
## sample estimates:
## mean of x
##  0.207098

ErrorEst = d/sqrt(n)
X_ = rnorm(n, m, ErrorEst)

library(plotrix)
plotCI(1:n,X_, ErrorEst, main="Grafico Intensidad de Pulsos sin Marcapasos",
xlab = "n intervalos", ylab ="medidas muestrales")
abline(h = 0.20, col="red")
```




```r
#Intensidad.de.pulso CON Marcapasos
x <- sinMP$Intensidad.de.pulso
d = sd(x)
n = length(x)
m1 = mean(x)
alfa = 0.05
t = abs(qt(alfa/2,n-1))


#Intervalo de confianza
E = z*d/sqrt(n)
LI1 = m1 - E
LS1 = m1 + E

library(BSDA)
t.test(x,conf.level = 0.95)

##
##  One Sample t-test
##
## data:  x
## t = 11.192, df = 50, p-value = 3.182e-15
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  0.1699300 0.2442661
## sample estimates:
```

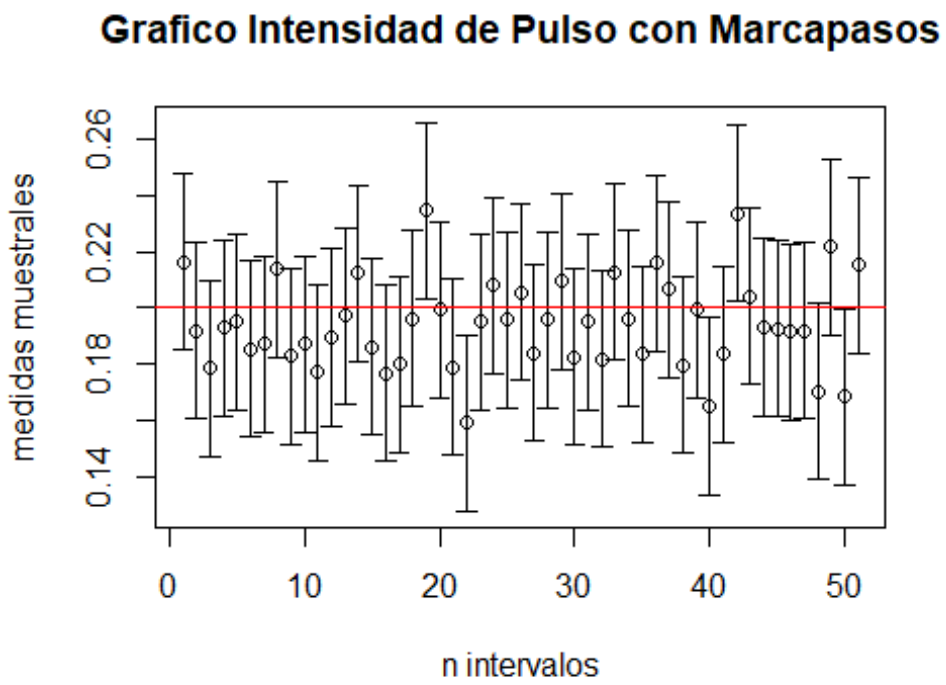
```
## mean of x
##  0.207098

ErrorEst = d/sqrt(n)
X_ = rnorm(n, m1, ErrorEst)

library(plotrix)
plotCI(1:n,X_, E, main="Grafico Intensidad de Pulso sin Marcapasos", xlab =
"n intervalos", ylab ="medidas muestrales")
abline(h = 0.20, col="red")
```




```
#Intensidad.de.pulso CON Marcapasos
x <- conMP$Intensidad.de.pulso
d = sd(x)
n = length(x)
m = mean(x)
alfa = 0.05
z = abs(qnorm(alfa/2))


#Intervalo de confianza
E = z*d/sqrt(n)
L1 = m - E
LS = m + E

library(BSDA)
z.test(x,conf.level = 0.95, sigma.x = sd(x))
```

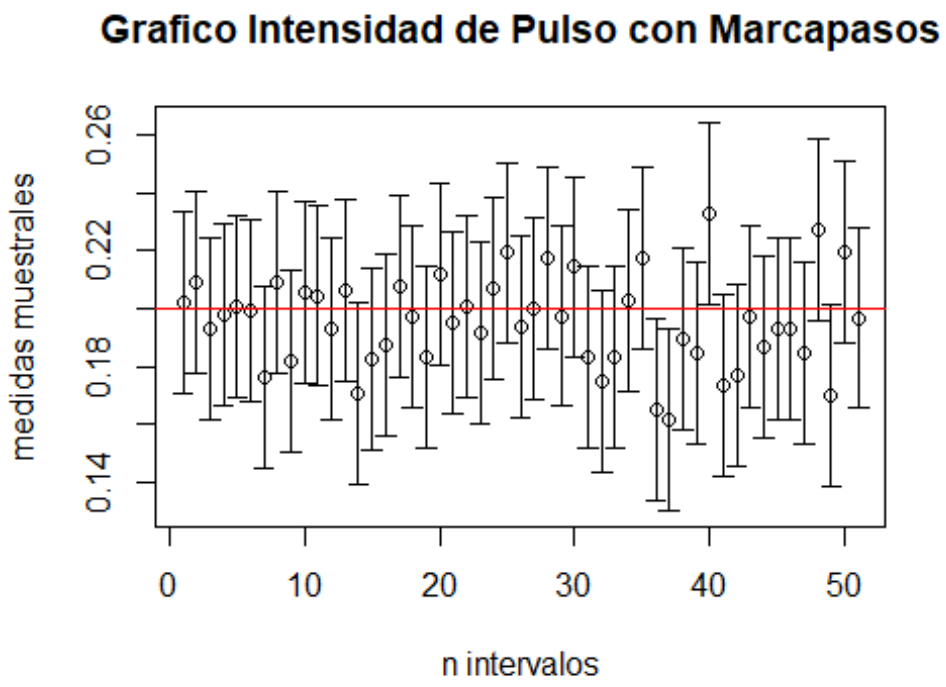
```
##
##  One-sample z-Test
##
## data:  x
## z = 12.246, p-value < 2.2e-16
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  0.1645811 0.2273013
## sample estimates:
## mean of x
## 0.1959412
```

```r
ErrorEst = d/sqrt(n)
X_ = rnorm(n, m, ErrorEst)

library(plotrix)
plotCI(1:n,X_, E, main="Grafico Intensidad de Pulso con Marcapasos", xlab =
"n intervalos", ylab ="medidas muestrales")
abline(h = 0.20, col="red")
```



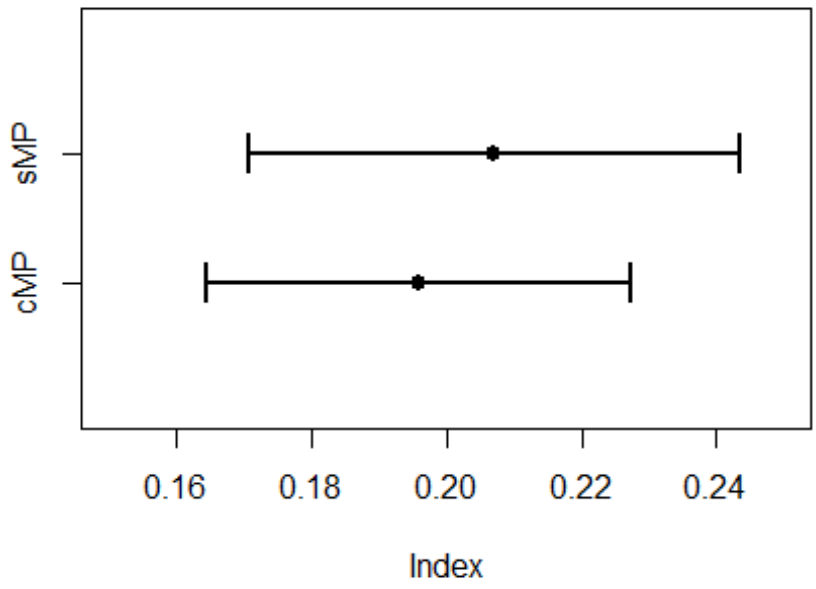

```r
#Intensidad.de.pulso CON Marcapasos
x <- conMP$Intensidad.de.pulso
d = sd(x)
n = length(x)
m2 = mean(x)
alfa = 0.05
t = abs(qt(alfa/2,n-1))
```

```r
#Intervalo de confianza
E = z*d/sqrt(n)
LI2 = m2 - E
LS2 = m2 + E

library(BSDA)
t.test(x,conf.level = 0.95)

##
##  One Sample t-test
##
## data:  x
## t = 12.246, df = 50, p-value < 2.2e-16
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  0.1638035 0.2280788
## sample estimates:
## mean of x
## 0.1959412

ErrorEst = d/sqrt(n)
X_ = rnorm(n, m2, ErrorEst)

library(plotrix)
plotCI(1:n,X_, E, main="Grafico Intensidad de Pulso con Marcapasos", xlab =
"n intervalos", ylab ="medidas muestrales")
abline(h = 0.20, col="red")
```

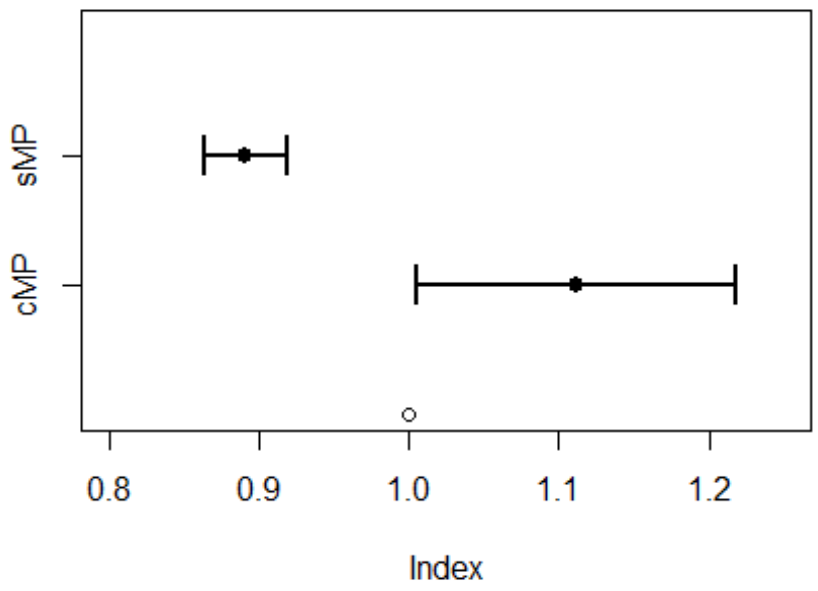


3. GRafica los intervalos. En un gráfico la intensidad de pulso con y sin marcapasos y en otro gráfico el periodo entre pulso con y sin marcapasos. Interpreta el resultado.

```
# Intensidad de pulsos con y sin Marcapasos


plot(0, ylim=c(0,3), xlim=c(0.15,0.25), yaxt="n", ylab="")
axis(2, at=c(1,2), labels=c("cMP", "sMP"))

arrows(LI2, 1, LS2, 1, angle=90, code=3, length = 0.1, lwd = 2)
arrows(LI1, 2, LS1, 2, angle=90, code=3, length = 0.1, lwd = 2)

points(m1, 2, pch=19, cex=1.1)
points(m2, 1, pch=19, cex=1.1)
```




```r
# Periodos entre Pulsos con y sin Marcapasos

plot(0, ylim=c(0,3), xlim=c(0.80,1.25), yaxt="n", ylab="")
axis(2, at=c(1,2), labels=c("cMP", "sMP"))

arrows(LI4, 1, LS4, 1, angle=90, code=3, length = 0.1, lwd = 2)
arrows(LI3, 2, LS3, 2, angle=90, code=3, length = 0.1, lwd = 2)

points(m3, 2, pch=19, cex=1.1)
points(m4, 1, pch=19, cex=1.1)
```


sMP
cMP
0.8
0.9
1.0
1.1
1.2
Index