# Relatorio

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## Carregar arquivo de dados

```r
# Cargamos el fichero de datos
# Debe tener una estructura igual a este, es decir,
# que las coordenadas X e Y estan en las columnas 3 y 5
# (la X) y 4 y 6 (la Y)
# Nombre del fichero de datos
fichero <- "Estatistica_8PCT.csv"
dados <- read.csv(fichero, header=TRUE, sep=";", dec=",")
dados[,2] <- 0
```

## Calcular os erros em X e Y

```r
puncontrol <- list()
for (i in 1:100) {
  x <- (i-1)*35+1
  puncontrol[[i]] <- dados[x:(x+33), ]
  # Calculamos los errores en X e Y
  puncontrol[[i]]$E_X <- puncontrol[[i]][,5]- puncontrol[[i]][,3]
  puncontrol[[i]]$E_Y <- puncontrol[[i]][,6]- puncontrol[[i]][,4]
}
```

## EstatÃsticas BÃ¡sicas

```r
basicStats(puncontrol[[params$j]]$E_X)
```

```
##              X..puncontrol..params.j...E_X
## nobs                             34.000000
## NAs                               0.000000
## Minimum                          -0.186200
## Maximum                           1.295900
## 1. Quartile                      -0.016750
## 3. Quartile                       0.015300
## Mean                              0.029235
## Median                            0.004850
## Sum                               0.994000
## SE Mean                           0.039032
## LCL Mean                         -0.050177
## UCL Mean                          0.108647
## Variance                          0.051800
## Stdev                             0.227596
```

```
## Skewness                     5.035166
## Kurtosis                     25.243953
```

```r
basicStats(puncontrol[[params$j]]$E_Y)
```

```
##                 X..puncontrol..params.j...E_Y
## nobs                         34.000000
## NAs                           0.000000
## Minimum                      -0.375000
## Maximum                       0.186000
## 1. Quartile                   0.005250
## 3. Quartile                   0.055750
## Mean                          0.022941
## Median                        0.038000
## Sum                           0.780000
## SE Mean                       0.013922
## LCL Mean                     -0.005383
## UCL Mean                      0.051266
## Variance                      0.006590
## Stdev                         0.081178
## Skewness                     -3.223084
## Kurtosis                     14.504655
```

```r
hist(puncontrol[[params$j]]$E_X, main="X", xlab="Errores en X", ylab="Frecuencia")
hist(puncontrol[[params$j]]$E_Y, main="Y", xlab="Errores en Y", ylab="Frecuencia")
```
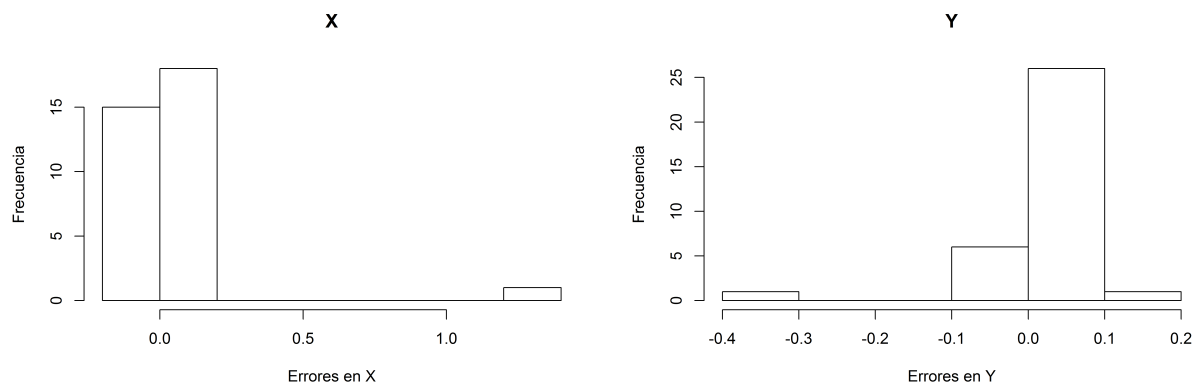


```r
plot(puncontrol[[params$j]][,3], puncontrol[[params$j]][,4] ,
     main="Distribución  espacial de los puntos de evaluación",
     xlab="X", ylab="Y")
```

**DistribuciÃ³n espacial de los puntos de evaluaciÃ³n**



```r
# Cambia este factor segÃºn necesites
fescala <- 1000
plot(puncontrol[[params$j]][,3], puncontrol[[params$j]][,4],
     main="Campo de errores ", xlab="X", ylab="Y")
arrows(puncontrol[[params$j]][,3],
       puncontrol[[params$j]][,4],
       puncontrol[[params$j]][,3] + fescala*puncontrol[[params$j]]$E_X,
       puncontrol[[params$j]][,4] + fescala* puncontrol[[params$j]]$E_Y,
       col= 'dark red', length = 0.1, angle = 15)
```

**Campo de errores**
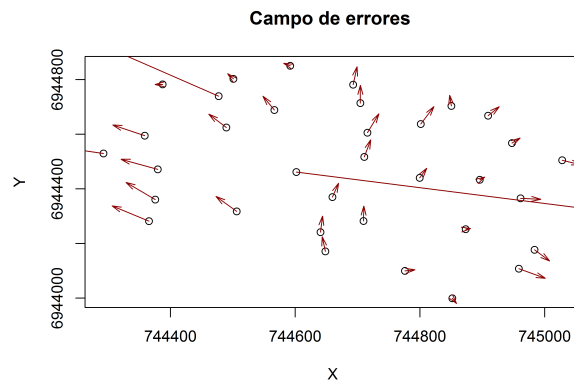


```r
# Cambia el factor de escala circular segÃºn necesites
fescalaCir <- 2
datos_cir2d <- circular(atan2(puncontrol[[params$j]]$E_Y, puncontrol[[params$j]]$E_X))
modulo2d <- sqrt(puncontrol[[params$j]]$E_X^2+puncontrol[[params$j]]$E_Y^2)
plot.circular(datos_cir2d)
title(main="DistribuciÃ³n circular de erores", xlab="X", ylab="Y")
segments(0, 0,
         fescalaCir*puncontrol[[params$j]]$E_X,
         fescalaCir* puncontrol[[params$j]]$E_Y,
         col= 'dark red')
```

**DistribuciÃ³n circular de erores**
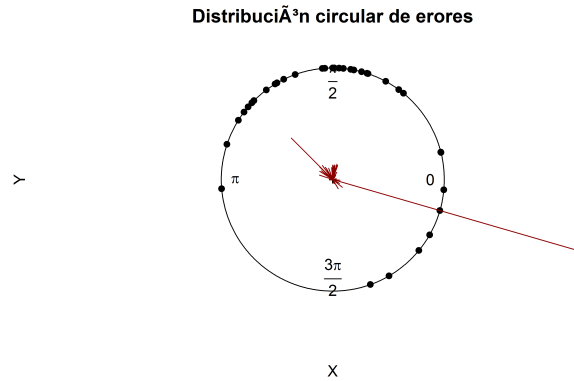


```
QCoH_RANDOMNESS(puncontrol[[params$j]][c(7,8)])
```

```
## [1] "El resultado del test de aleaoriedad para X: "
##
##   Runs Test
##
## data:  errorespos[, 1]
## statistic = -3.8315, runs = 7, n1 = 17, n2 = 17, n = 34, p-value =
## 0.0001274
## alternative hypothesis: nonrandomness
##
## [1] "El resultado del test de aleaoriedad para Y: "
##
##   Runs Test
##
## data:  errorespos[, 2]
## statistic = -2.4382, runs = 11, n1 = 17, n2 = 17, n = 34, p-value
## = 0.01476
## alternative hypothesis: nonrandomness
```

```
QCoH_OUTLIERS(puncontrol[[params$j]][c(7,8)])
```

```
## [1] "El nÃºmero de casos fuera de rango en X es:  1"
## [1] "El nÃºmero de casos fuera de rango en Y es:  0"
```
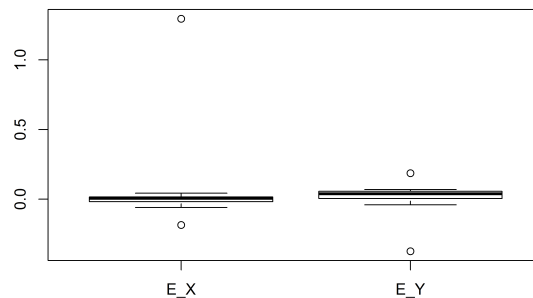


```
QCoH_NORMALITY_G(puncontrol[[params$j]][c(7,8)])
```

|  X  |  Y  |
|:---:|:---:|
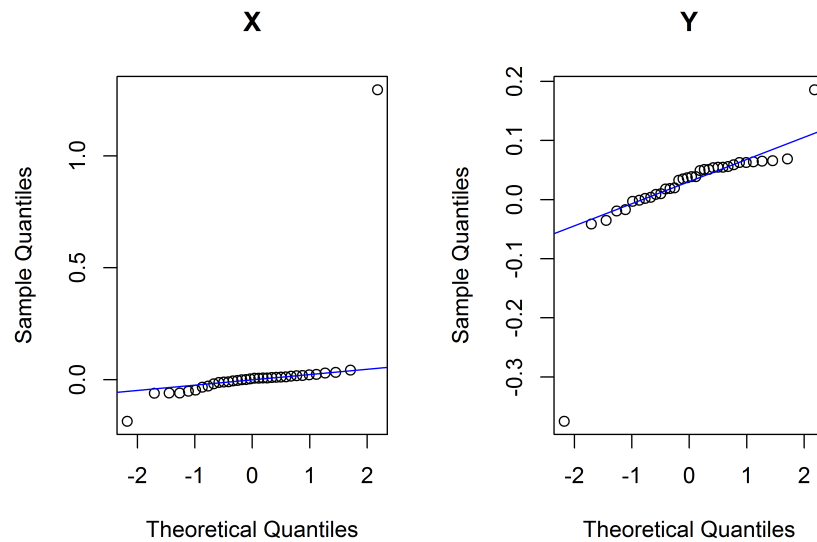


```
QCoH_NORMALITY_A_KS(puncontrol[[params$j]][c(7,8)])
```

```
## Warning in ks.test(x, "pnorm", alternative = "two.sided"): ties should not
## be present for the Kolmogorov-Smirnov test

## Warning in ks.test(x, "pnorm", alternative = "less"): ties should not be
## present for the Kolmogorov-Smirnov test

## Warning in ks.test(x, "pnorm", alternative = "greater"): ties should not be
## present for the Kolmogorov-Smirnov test

##
## Title:
##  Normality test
##
## Test Results:
##    STATISTIC:
##      D: 0.4536
##    P VALUE:
##      Alternative Two-Sided: 6.539e-07
##      Alternative       Less: 5.257e-07
##      Alternative    Greater: 3.27e-07
##
## Description:
##  X coordinate
##
##
## Title:
##  Normality test
##
## Test Results:
##    STATISTIC:
##      D: 0.4542
##    P VALUE:
##      Alternative Two-Sided: 1.613e-06
##      Alternative       Less: 8.066e-07
```
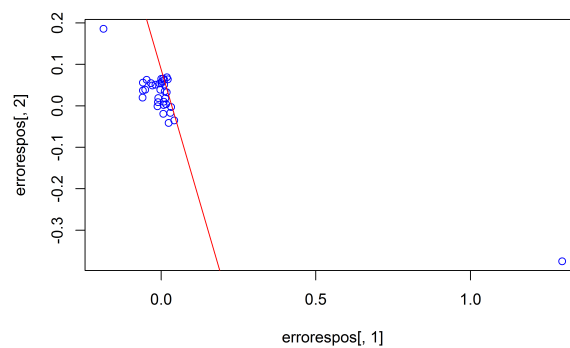
```
##      Alternative   Greater: 1.593e-06
##
## Description:
##   Y coordinate
```

```
QCoH_HOMOCEDAS_BAR(puncontrol[[params$j]][c(7,8)])
```

```
##
## Title:
##   Bartlett Test for Homogeneity of Variances
##
## Test Results:
##    STATISTIC:
##      Bartlett's Chi-squared: 29.7464
##    P VALUE:
##      4.924e-08
##
## Description:
##   Thu Jul 18 14:59:26 2019
```

```
QCoH_CORRELATION_G(puncontrol[[params$j]][c(7,8)])
```



```
QCoH_CORRELATION_A(puncontrol[[params$j]][c(7,8)])
```

```
##             E_X        E_Y
## E_X   1.0000000 -0.9139178
## E_Y  -0.9139178  1.0000000
```

```
QCoH_CORRELATION_A_SPR(puncontrol[[params$j]][c(7,8)])
```

```
## Warning in cor.test.default(errorespos[, 1], errorespos[, 2], method =
## "spearman"): Cannot compute exact p-value with ties
```

```
##
##   Spearman's rank correlation rho
##
## data:  errorespos[, 1] and errorespos[, 2]
## S = 9300.8, p-value = 0.01314
## alternative hypothesis: true rho is not equal to 0
## sample estimates:
##         rho
## -0.4210607
```