# Relatorio

*Luiz Fernando Palin Droubi*

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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                             -0.182800
## Maximum                              1.301900
## 1. Quartile                         -0.016500
## 3. Quartile                          0.015000
## Mean                                 0.031885
## Median                               0.005050
## Sum                                  1.084100
## SE Mean                              0.039030
## LCL Mean                            -0.047522
## UCL Mean                             0.111293
## Variance                             0.051794
## Stdev                                0.227583
```

```
## Skewness                           5.079540
## Kurtosis                          25.548273
```

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

```
##            X..puncontrol..params.j...E_Y
## nobs                        34.000000
## NAs                          0.000000
## Minimum                     -0.374000
## Maximum                      0.173000
## 1. Quartile                  0.009250
## 3. Quartile                  0.058500
## Mean                         0.024500
## Median                       0.036500
## Sum                          0.833000
## SE Mean                      0.013611
## LCL Mean                    -0.003191
## UCL Mean                     0.052191
## Variance                     0.006298
## Stdev                        0.079362
## Skewness                    -3.511479
## Kurtosis                    16.086325
```

```
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")
```
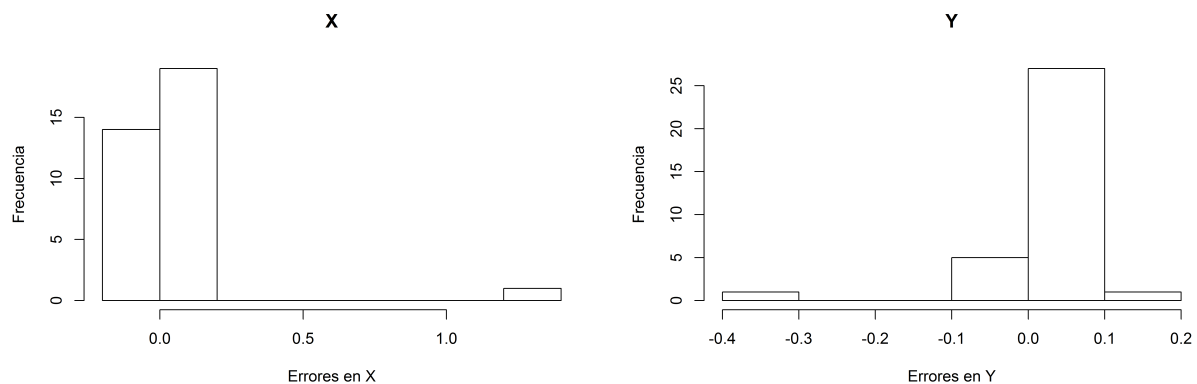


```
plot(puncontrol[[params$j]][,3], puncontrol[[params$j]][,4] ,
     main="Distribución  espacial de los puntos de evaluación",
     xlab="X", ylab="Y")
```

**DistribuciÃ³n espacial de los puntos de evaluaciÃ³n**



```
# 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**
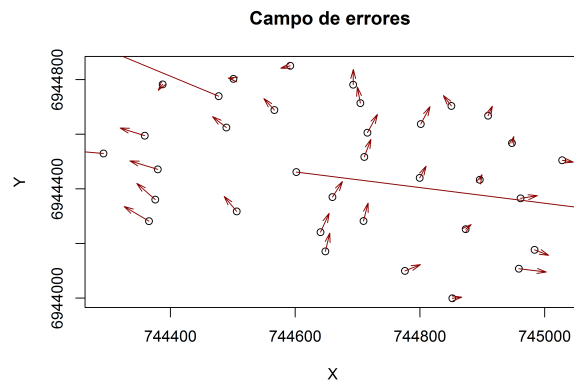


```
# Cambia el factor de escala circular segÃºn necesites
fescalaCir <- 2
datos_cir2d <- circular(atan2(puncontrol[[params$j]]$E_Y, puncontrol[[params$j]]$E_X))
modulo2d <- sqrt(puncontrol[[params$j]]$E_X^2+puncontrol[[params$j]]$E_Y^2)
plot.circular(datos_cir2d)
title(main="DistribuciÃ³n circular de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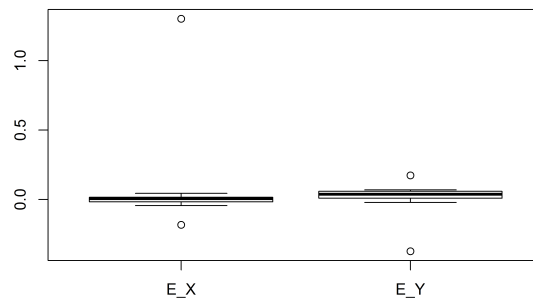
**DistribuciÃ³n circular de erores**
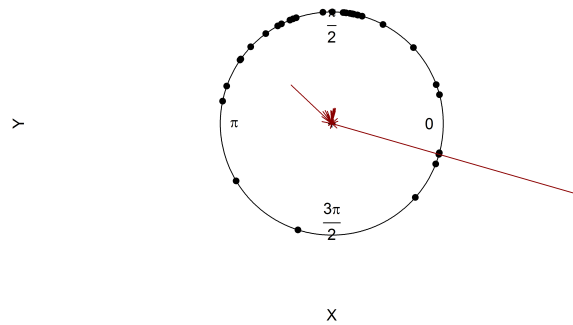
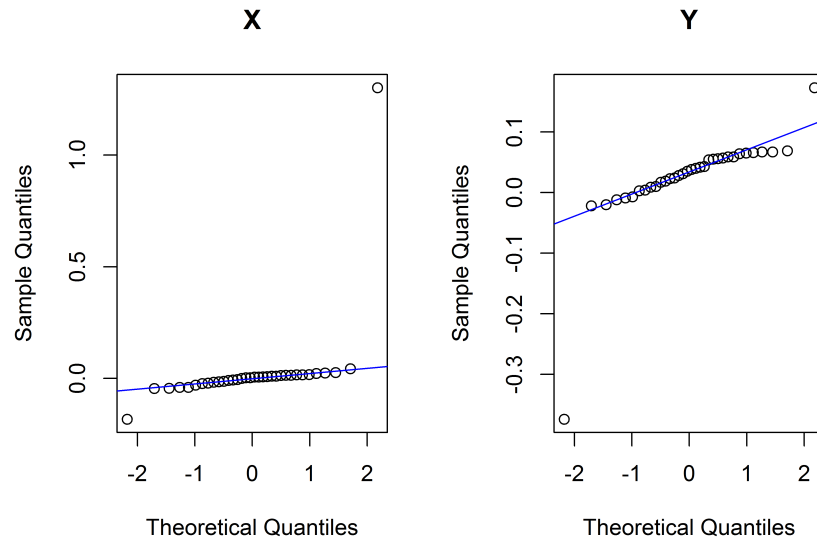

```
QCoH_RANDOMNESS(puncontrol[[params$j]][c(7,8)])
```

```
## [1] "El resultado del test de aleaoriedad para X: "
##
##  Runs Test
##
## data:  errorespos[, 1]
## statistic = -3.1348, runs = 9, n1 = 17, n2 = 17, n = 34, p-value =
## 0.001719
## alternative hypothesis: nonrandomness
##
## [1] "El resultado del test de aleaoriedad para Y: "
##
##  Runs Test
##
## data:  errorespos[, 2]
## statistic = -3.1348, runs = 9, n1 = 17, n2 = 17, n = 34, p-value =
## 0.001719
## 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** |

Sample Quantiles (X axis: Theoretical Quantiles)

Sample Quantiles (Y axis: Theoretical Quantiles)

```r
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

## 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: 0.453
##   P VALUE:
##     Alternative Two-Sided: 1.737e-06
##     Alternative      Less: 8.855e-07
##     Alternative   Greater: 8.683e-07
## 
## Description:
##  X coordinate
## 
## 
## Title:
```

```
##   Normality test
##
## Test Results:
##    STATISTIC:
##      D: 0.4618
##    P VALUE:
##      Alternative Two-Sided: 1.006e-06
##      Alternative      Less: 5.031e-07
##      Alternative   Greater: 1.593e-06
##
## Description:
##   Y coordinate
```

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

```
##
## Title:
##   Bartlett Test for Homogeneity of Variances
##
## Test Results:
##    STATISTIC:
##      Bartlett's Chi-squared: 30.8889
##    P VALUE:
##      2.732e-08
##
## Description:
##   Thu Jul 18 14:59:51 2019
```

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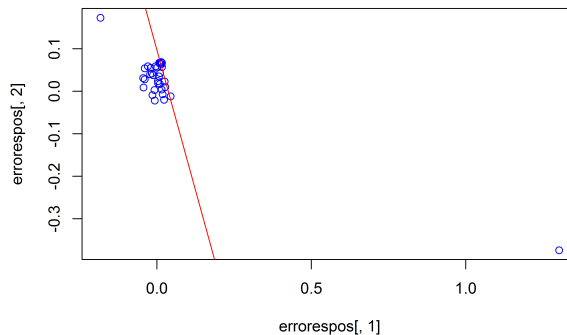


```r
QCoH_CORRELATION_A(puncontrol[[params$j]][c(7,8)])
```

```
##            E_X        E_Y
## E_X  1.0000000 -0.9207061
## E_Y -0.9207061  1.0000000
```

```r
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
```

6

```
## 
## data:  errorespos[, 1] and errorespos[, 2]
## S = 7935.2, p-value = 0.2278
## alternative hypothesis: true rho is not equal to 0
## sample estimates:
##        rho
## -0.2124083
```