

Melhores Playoffs

2024-05-03

```
source("dados_playoffs.R")
```

```
## -- Attaching core tidyverse packages ----- tidyverse 2.0.0 --
## v dplyr      1.1.4      v readr      2.1.5
## v forcats    1.0.0      v stringr   1.5.1
## v lubridate  1.9.3      v tibble    3.2.1
## v purrr      1.0.2      v tidyr     1.3.1
## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()     masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
## Loading required package: splines
##
## Loading required package: gamlss.data
##
##
## Attaching package: 'gamlss.data'
##
##
## The following object is masked from 'package:datasets':
##
##     sleep
##
##
## Loading required package: gamlss.dist
##
## Loading required package: nlme
##
##
## Attaching package: 'nlme'
##
##
## The following object is masked from 'package:dplyr':
##
##     collapse
##
## Loading required package: parallel
##
## ***** GAMLSS Version 5.4-22 *****
##
## For more on GAMLSS look at https://www.gamlss.com/
##
## Type gamlssNews() to see new features/changes/bug fixes.
##
```

```
##
## Loading required package: carData
##
##
## Attaching package: 'car'
##
##
## The following object is masked from 'package:dplyr':
##
##      recode
##
##
## The following object is masked from 'package:purrr':
##
##      some
##
##
## Loading required package: zoo
##
##
## Attaching package: 'zoo'
##
##
## The following objects are masked from 'package:base':
##
##      as.Date, as.Date.numeric

##### Regressão linear #####
modelo_forwp <- lm(formula = WINP ~ PlusMinus + DREB, data = dados_regressaop)
modelo_forwp

##
## Call:
## lm(formula = WINP ~ PlusMinus + DREB, data = dados_regressaop)
##
## Coefficients:
## (Intercept)      PlusMinus          DREB
##    0.345213      0.025682      0.004033

coef(modelo_forwp)

## (Intercept)      PlusMinus          DREB
## 0.345212858 0.025681939 0.004033267

anova(modelo_forwp)

## Analysis of Variance Table
##
## Response: WINP
##           Df Sum Sq Mean Sq F value Pr(>F)
## PlusMinus   1  7.3972   7.3972 681.7284 < 2e-16 ***
## DREB         1  0.0299   0.0299   2.7587 0.09805 .
## Residuals 237  2.5716   0.0109
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

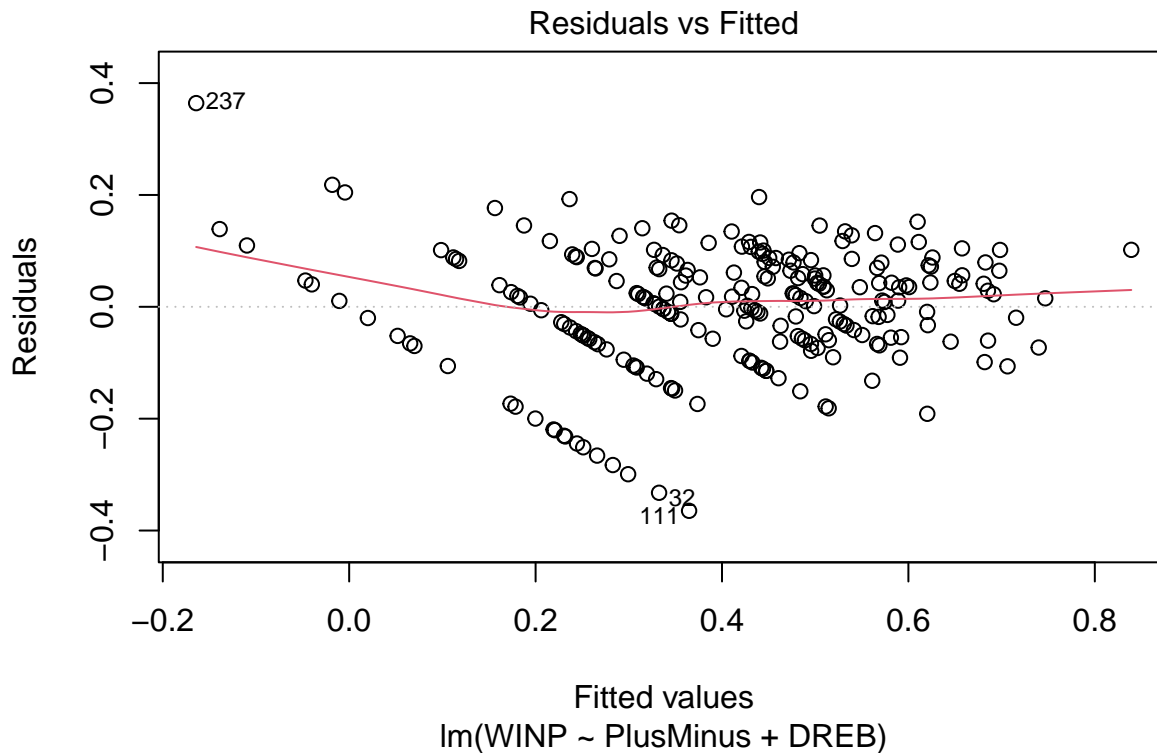
```
summary(modelo_forwp) #Adjusted R-squared: 0.7406
```

```
##
## Call:
## lm(formula = WINP ~ PlusMinus + DREB, data = dados_regressaop)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.36469 -0.05721  0.01300  0.07160  0.36417
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.345213   0.078459   4.400 1.64e-05 ***
## PlusMinus    0.025682   0.001049  24.490 < 2e-16 ***
## DREB         0.004033   0.002428   1.661  0.098 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1042 on 237 degrees of freedom
## Multiple R-squared:  0.7428, Adjusted R-squared:  0.7406
## F-statistic: 342.2 on 2 and 237 DF,  p-value: < 2.2e-16
AIC(modelo_forwp)
```

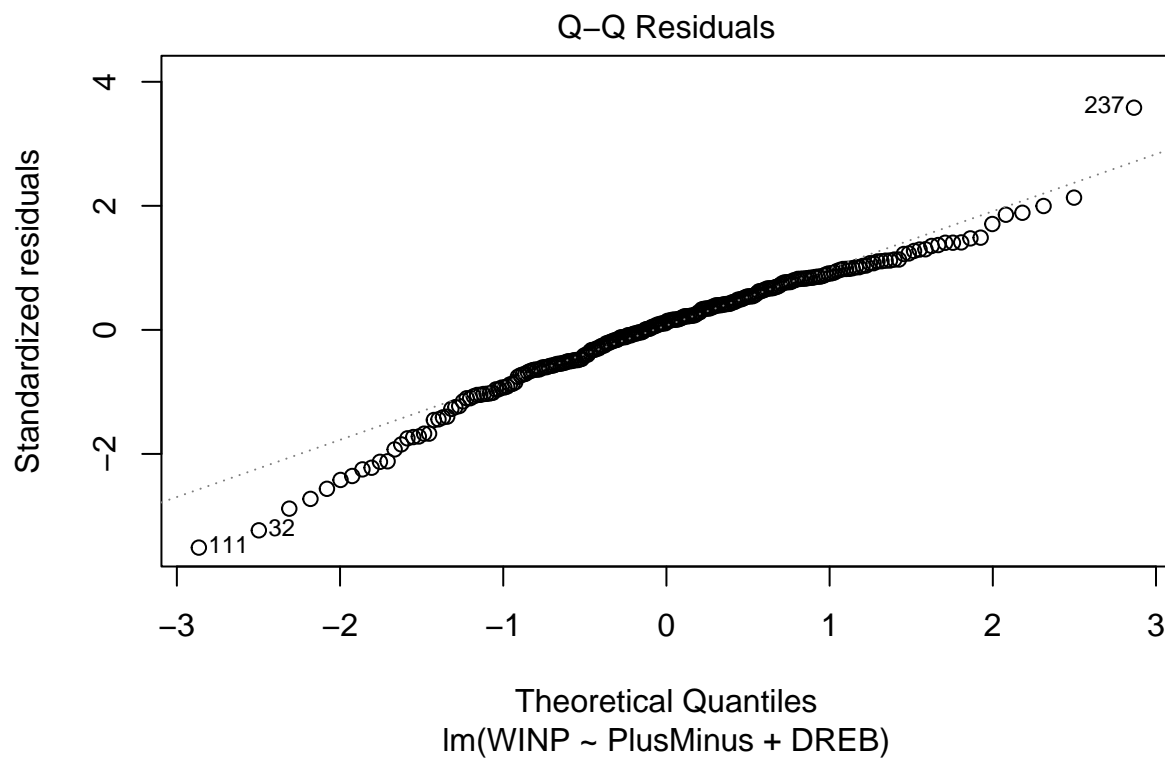
```
## [1] -399.576
```

```
#### Resíduos Forward ####
```

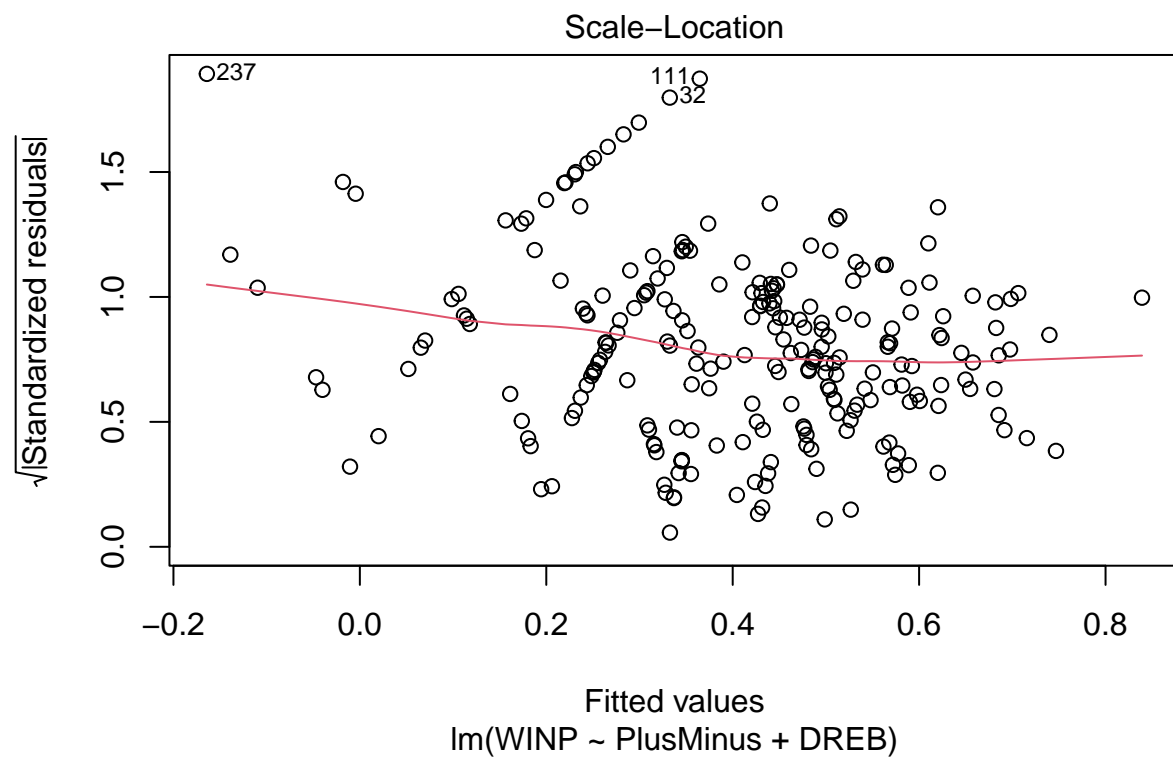
```
plot(modelo_forwp, which = 1)
```



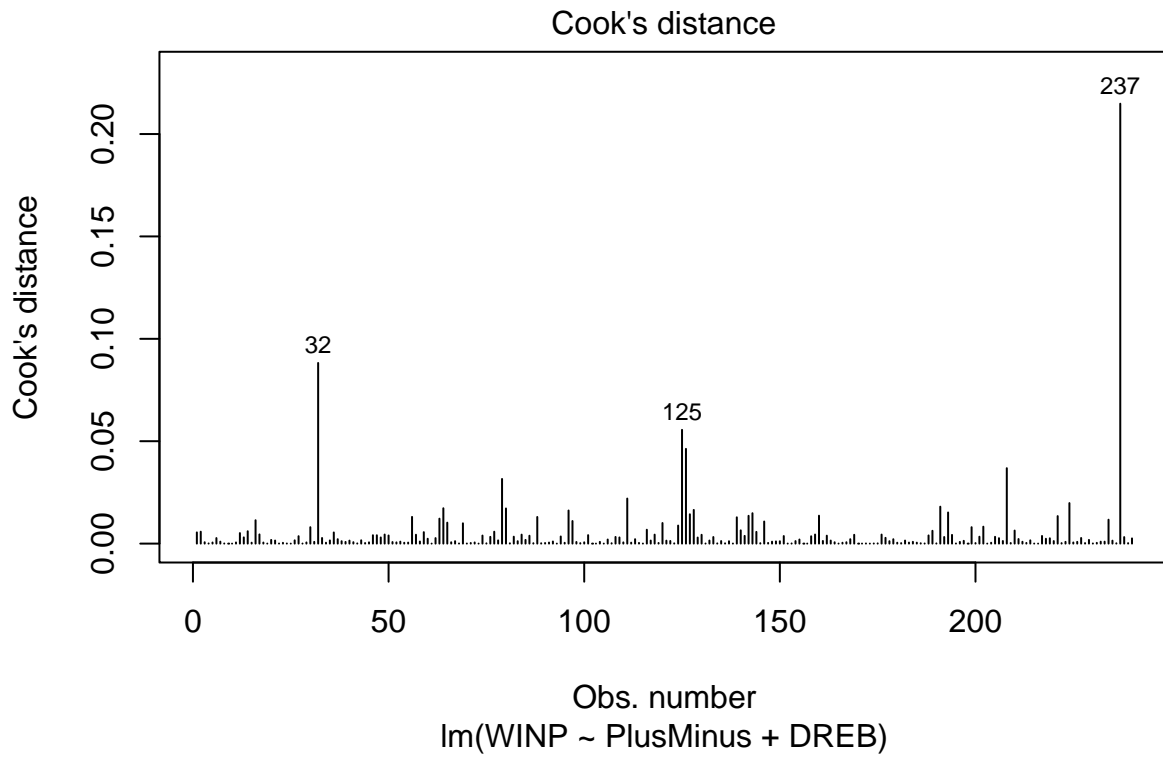
```
plot(modelo_forwp, which = 2)
```



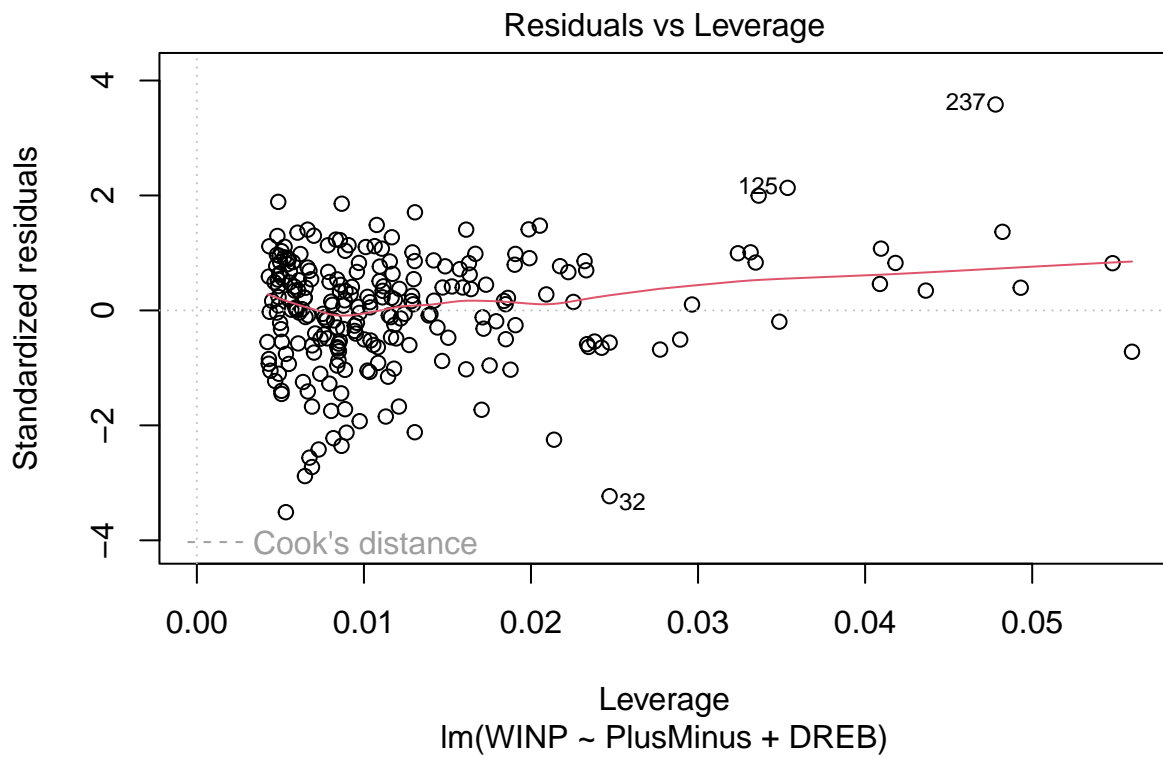
```
plot(modelo_forwp, which = 3)
```



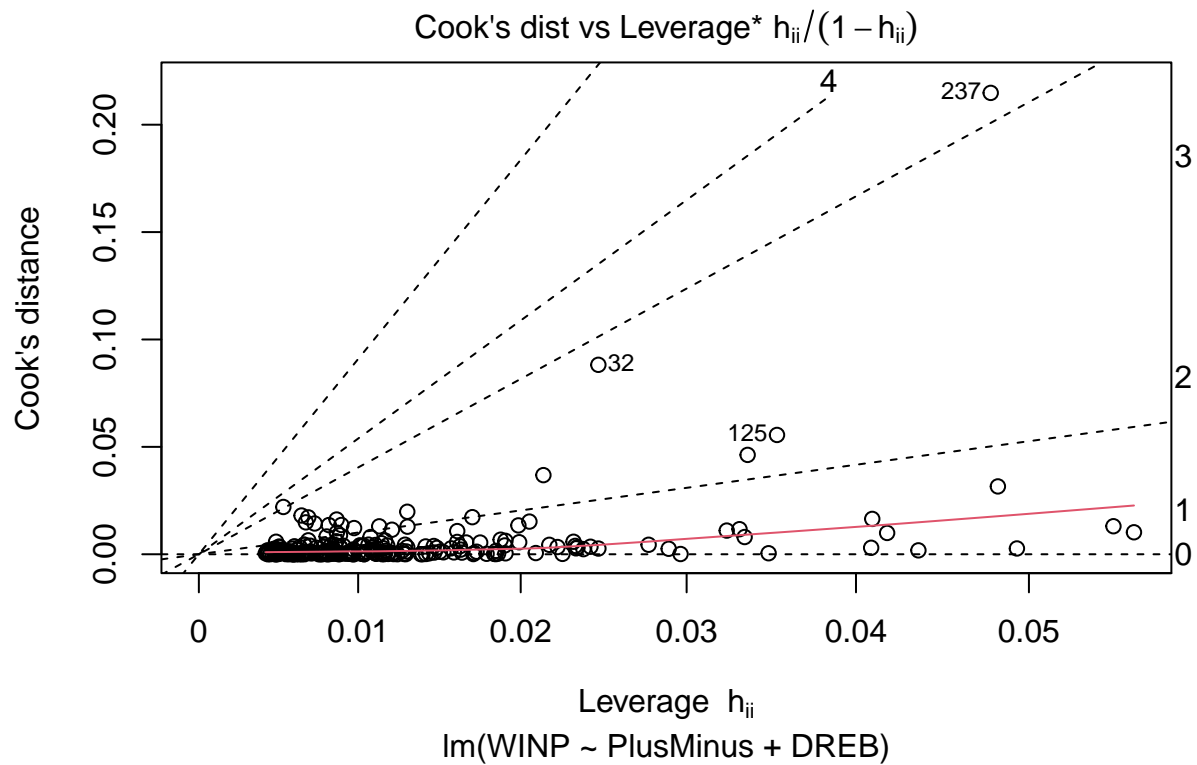
```
plot(modelo_forwp, which = 4)
```



```
plot(modelo_forwp, which = 5)
```



```
plot(modelo_forwp, which = 6)
```



```
shapiro.test(modelo_forwp$residuals) #p-value = 0.1997, normal
```

```
##
## Shapiro-Wilk normality test
##
## data:  modelo_forwp$residuals
## W = 0.96952, p-value = 5.082e-05
```

```
#Teste de durbin watson para independencia
```

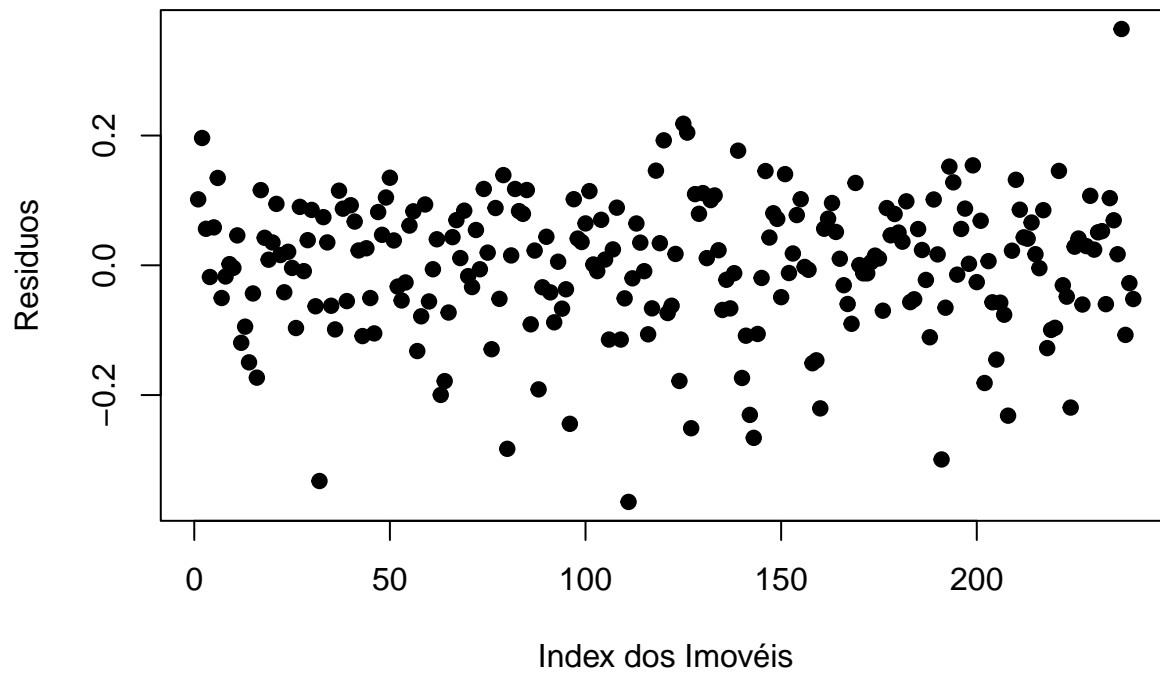
```
library(lmtest)
dwtest(modelo_forwp) #p-value = 0.07378
```

```
##
## Durbin-Watson test
##
## data:  modelo_forwp
## DW = 1.8195, p-value = 0.07378
## alternative hypothesis: true autocorrelation is greater than 0
```

```
#Independência
```

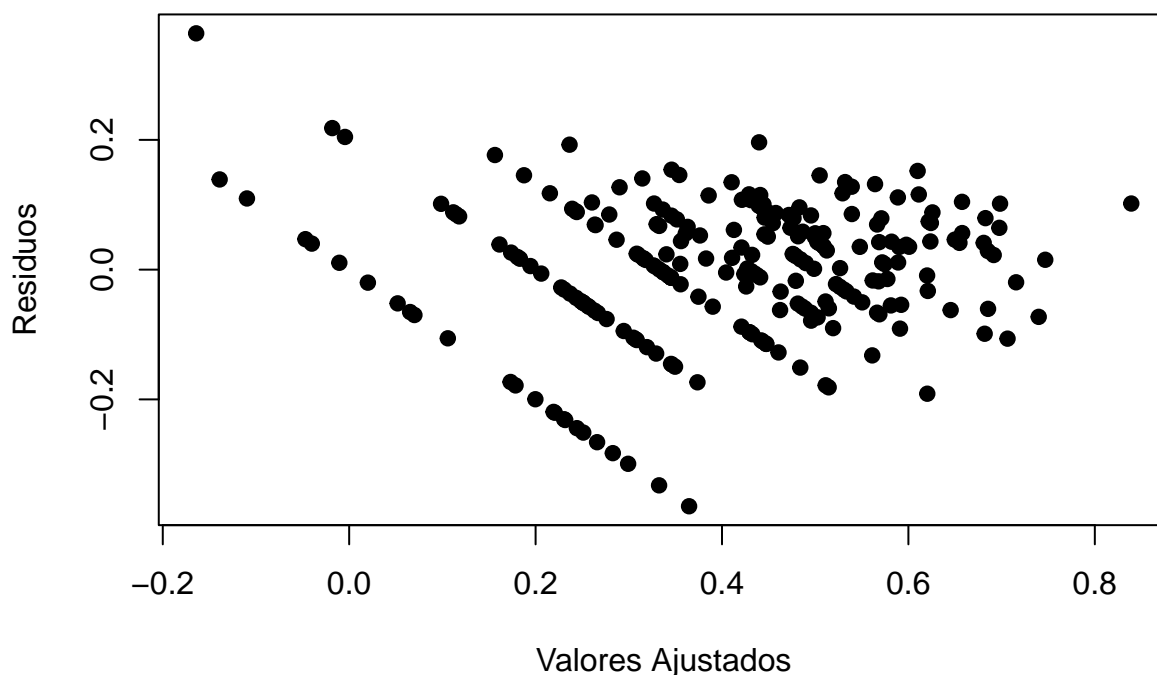
```
plot(modelo_forwp$residuals,
      ylab = "Resíduos",
      xlab = "Index dos Imóveis",
      main = "Suposição de independência",
      pch = 19)
```

Suposição de independência



```
#Homocedasticidade  
plot(modelo_forwp$fitted.values, modelo_forwp$residuals,  
      xlab = "Valores Ajustados",  
      ylab = "Resíduos",  
      pch = 19,  
      main = "Suposição de homocedasticidade"  
)
```

Suposição de homocedasticidade



```
#Breusch_Pagan para homocedasticidade
```

```
bptest(modelo_forwp) #p-value = 1.981e-05, heterocedasticidade
```

```
##
```

```
## studentized Breusch-Pagan test
```

```
##
```

```
## data: modelo_forwp
```

```
## BP = 21.659, df = 2, p-value = 1.981e-05
```

```
##### Betareg #####
```

```
### Logito #####
```

```
modelo_betaptftp <- betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus, data = playoffs_transf)
```

```
modelo_betaptftp
```

```
##
```

```
## Call:
```

```
## betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus, data = playoffs_transformado)
```

```
##
```

```
## Coefficients (mean model with logit link):
```

```
## (Intercept)      FTP      REB    PlusMinus
```

```
##   -2.70112    0.01822    0.02605    0.14844
```

```
##
```

```
## Phi coefficients (precision model with identity link):
```

```
## (phi)
```

```
## 8.628
```

```
summary(modelo_betaptftp)
```

```
##
```

```
## Call:
```

```
## betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus, data = playoffs_transformado)
```



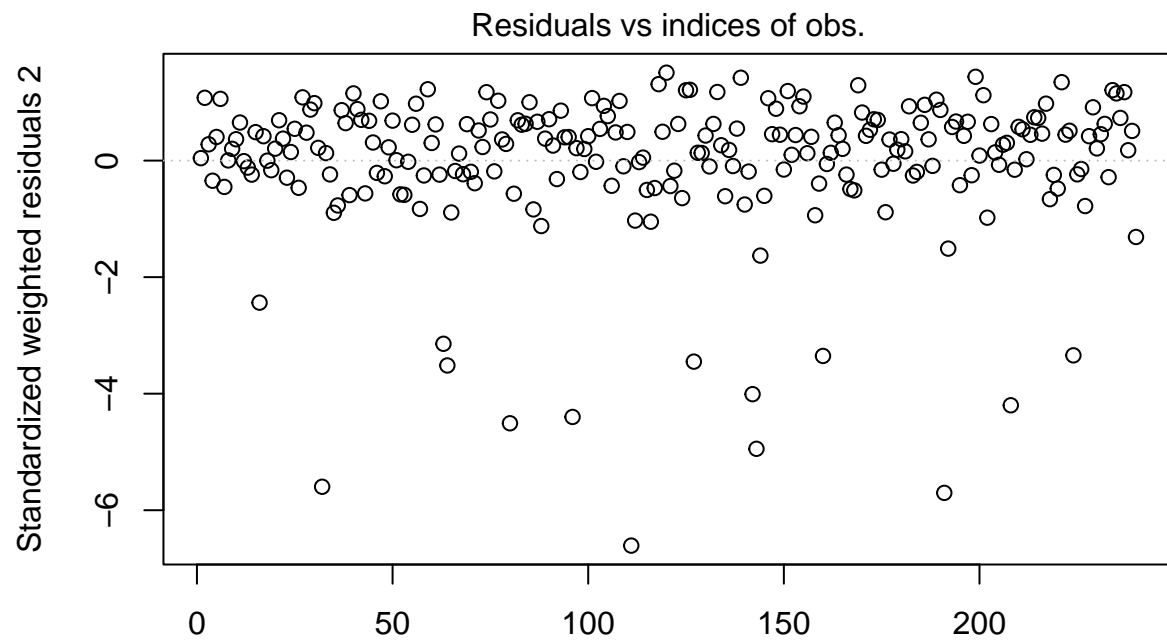
```

##
## Standardized weighted residuals 2:
##      Min      1Q  Median      3Q      Max
## -6.6072 -0.2417  0.2460  0.6519  1.5089
##
## Coefficients (mean model with logit link):
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) -2.701118   0.960492  -2.812  0.00492 **
## FTP          0.018224   0.009515   1.915  0.05546 .
## REB          0.026050   0.013738   1.896  0.05793 .
## PlusMinus    0.148440   0.008141  18.233 < 2e-16 ***
##
## Phi coefficients (precision model with identity link):
##              Estimate Std. Error z value Pr(>|z|)
## (phi)        8.6276      0.7677  11.24  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Type of estimator: ML (maximum likelihood)
## Log-likelihood: 168.6 on 5 Df
## Pseudo R-squared: 0.5202
## Number of iterations: 18 (BFGS) + 3 (Fisher scoring)
car::Anova(modelo_betapt_ftp)

## Analysis of Deviance Table (Type II tests)
##
## Response: WINP_transformado
##              Df      Chisq Pr(>Chisq)
## FTP            1    3.6683   0.05546 .
## REB            1    3.5957   0.05793 .
## PlusMinus     1 332.4251   < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
coef(modelo_betapt_ftp)

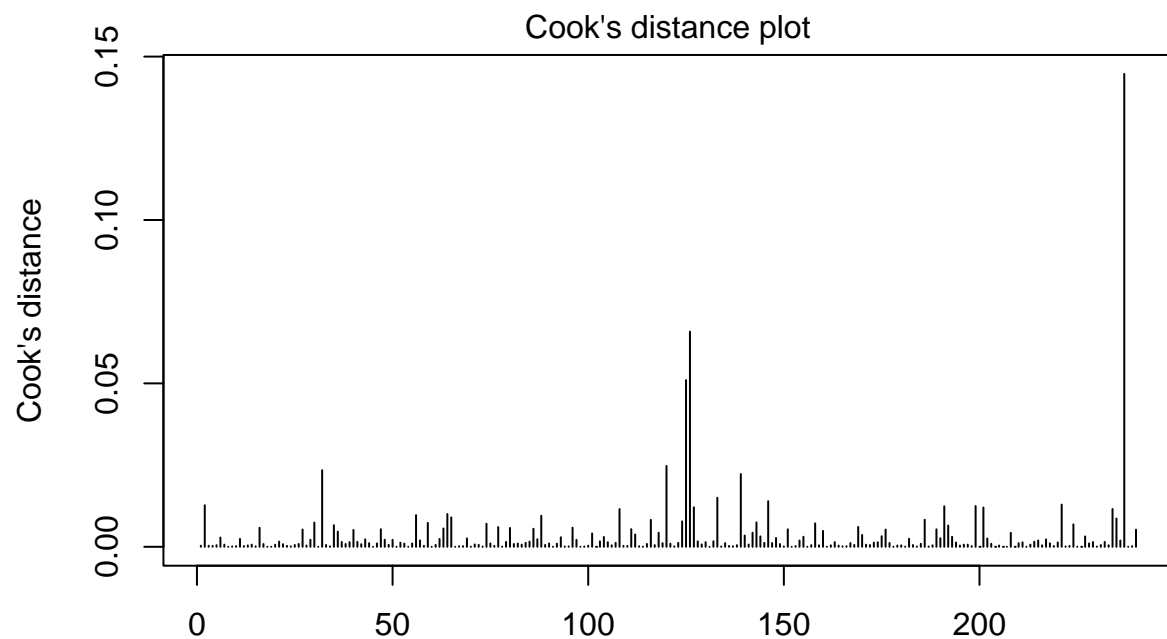
## (Intercept)      FTP      REB  PlusMinus      (phi)
## -2.70111757  0.01822447  0.02605043  0.14844007  8.62758070
# Resíduos logito #
plot(modelo_betapt_ftp, which = 1)

```



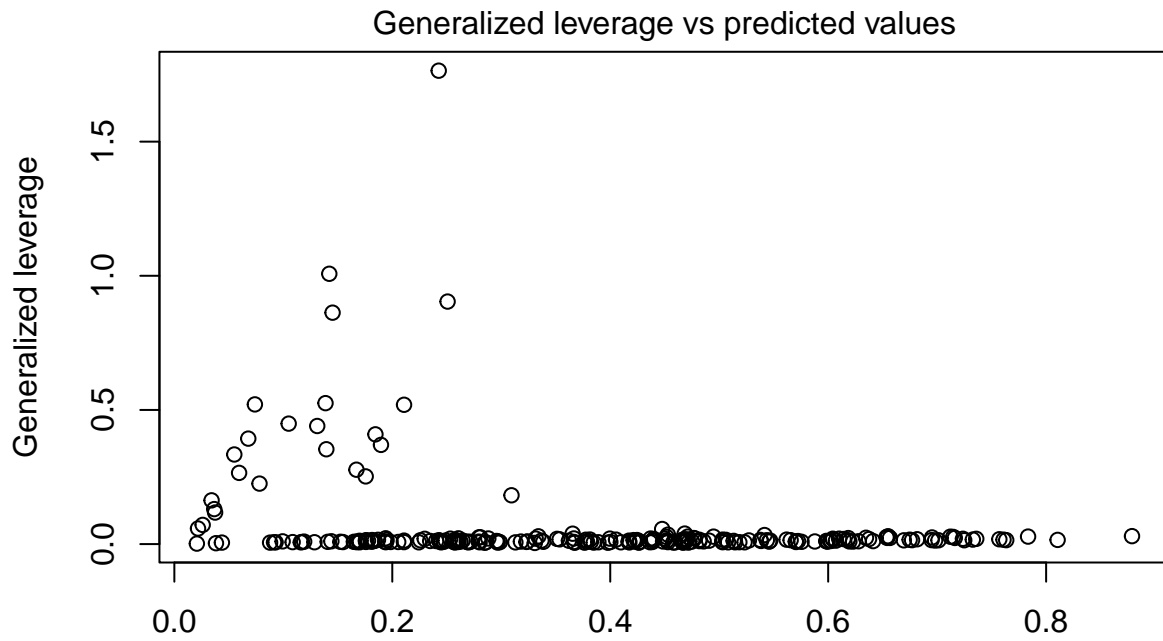
```
betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus,
data = playoffs_transformado)
```

```
plot(modelo_betapt_ftp, which = 2)
```



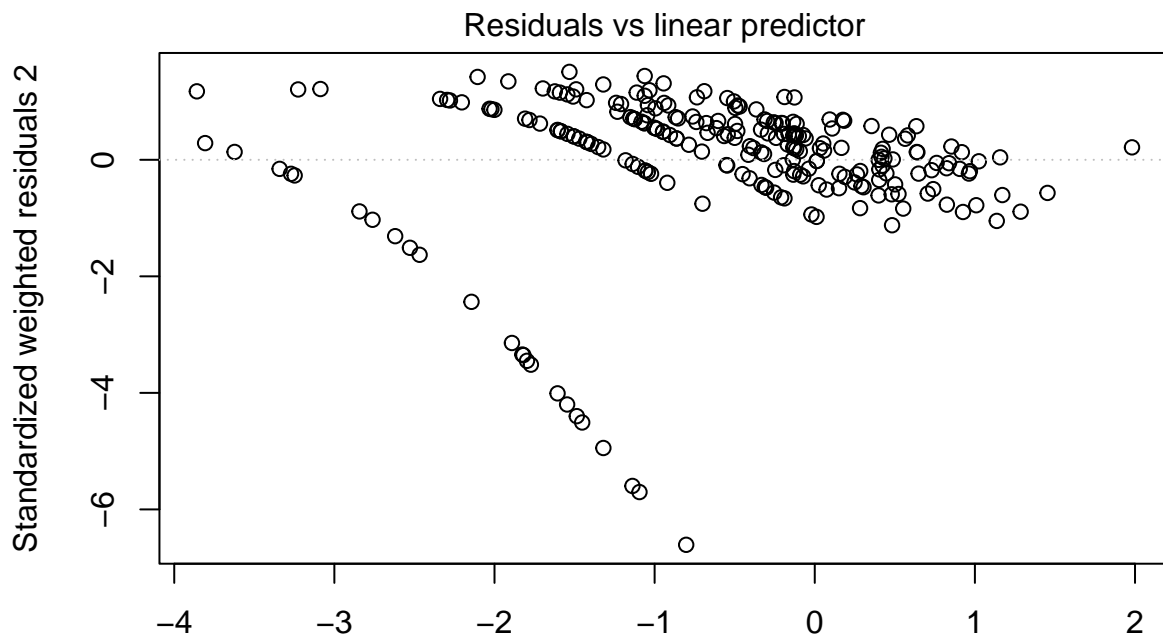
```
betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus,
data = playoffs_transformado)
```

```
plot(modelo_betapt_ftp, which = 3)
```



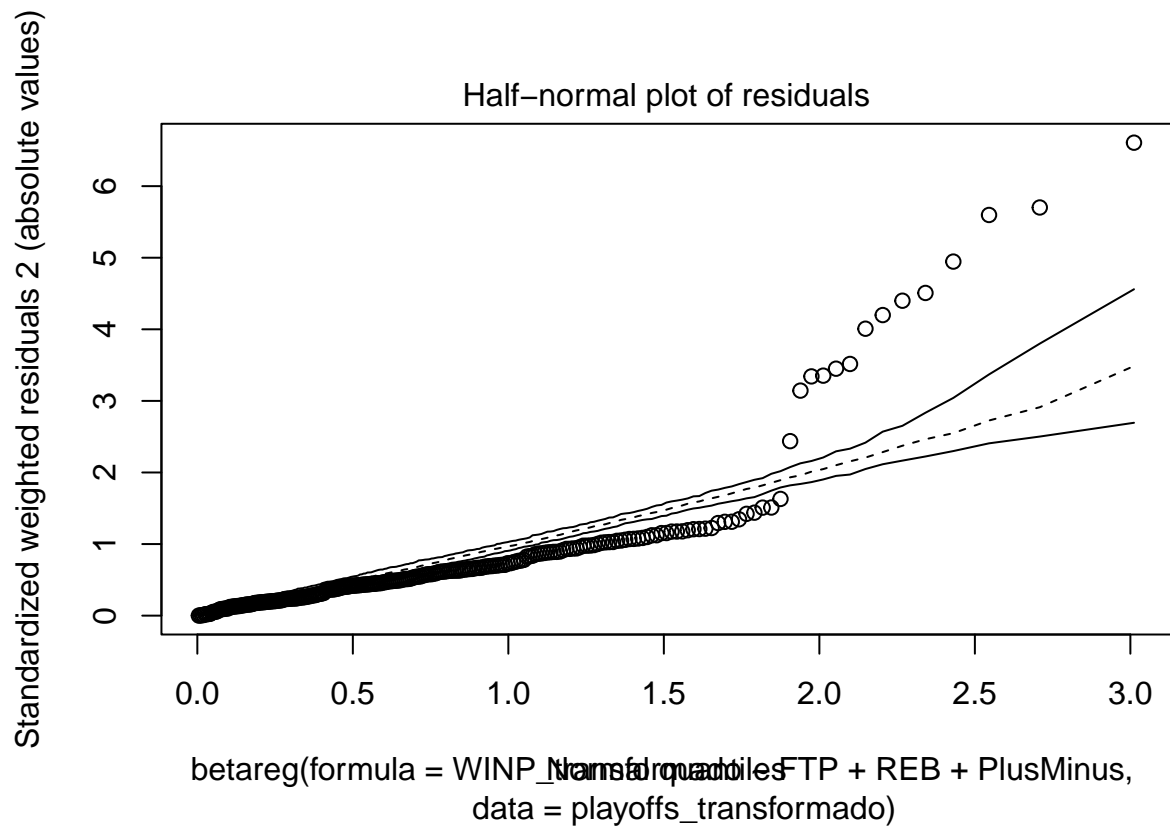
```
betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus,
data = playoffs_transformado)
```

```
plot(modelo_betapt_ftp, which = 4)
```

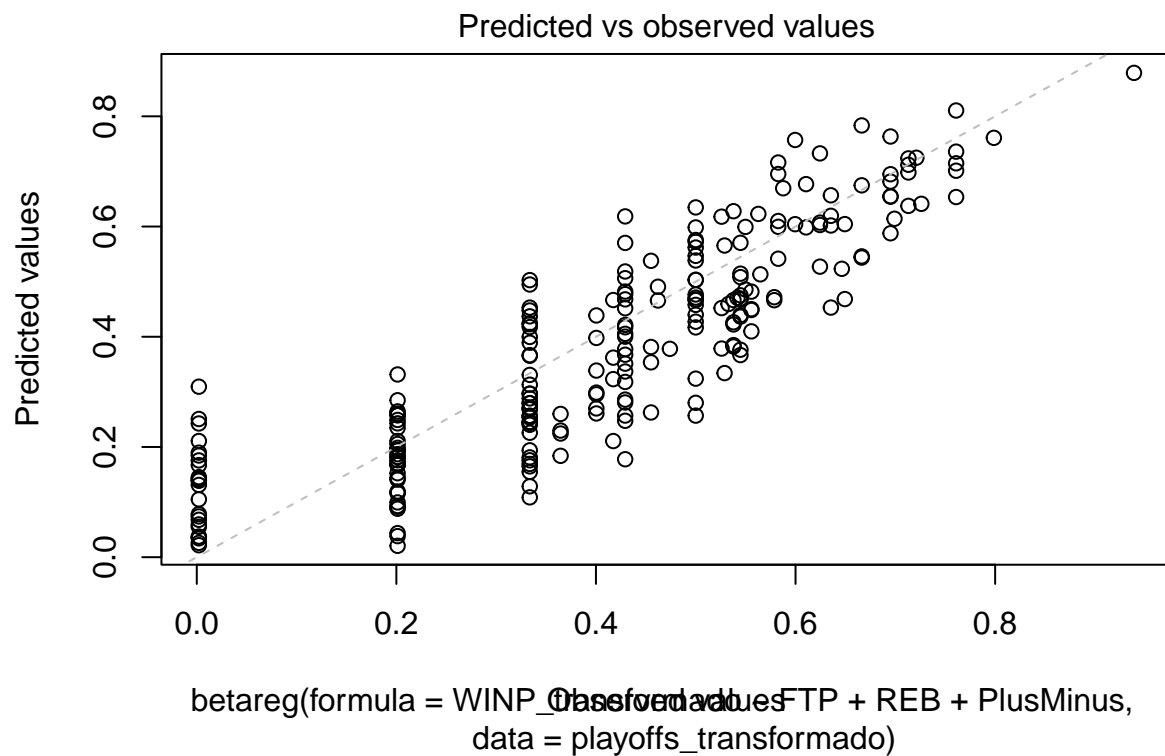


```
betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus,
data = playoffs_transformado)
```

```
plot(modelo_betapt_ftp, which = 5) #QQplot não foi muito bom
```



```
plot(modelo_betapt_ftp, which = 6)
```



```
shapiro.test(modelo_betapt_ftp$residuals) #p-value = 0.7859, normal
```

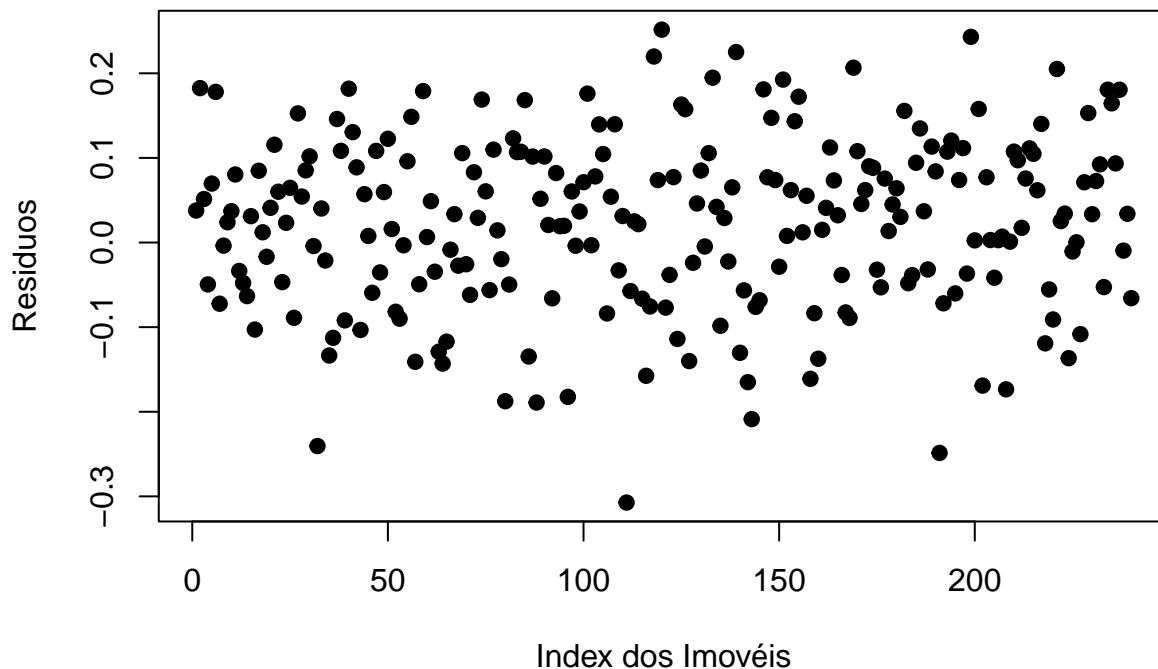
```
##  
## Shapiro-Wilk normality test  
##  
## data:  modelo_betapt_ftp$residuals  
## W = 0.99086, p-value = 0.1381
```

```
#Teste de durbin watson para independencia  
library(lmtest)  
dwtest(modelo_betapt_ftp) #p-value = 0.05838
```

```
##  
## Durbin-Watson test  
##  
## data:  modelo_betapt_ftp  
## DW = 1.8033, p-value = 0.05838  
## alternative hypothesis: true autocorrelation is greater than 0
```

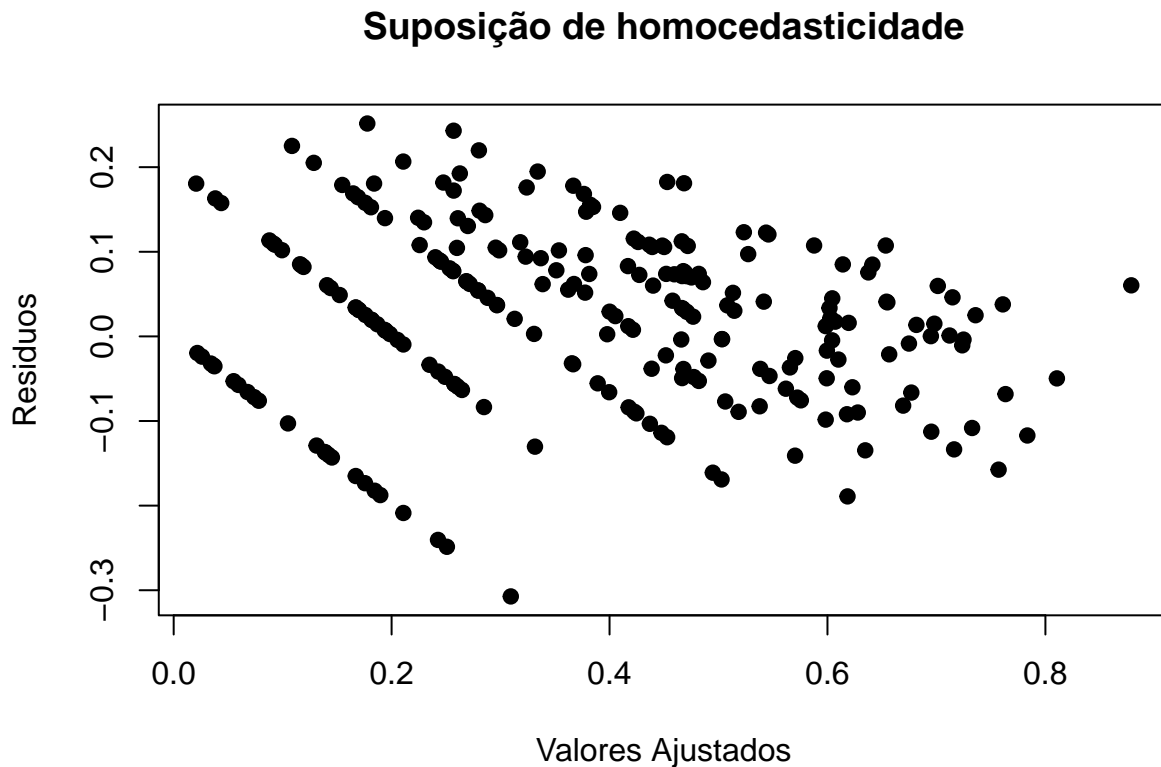
```
#Independência  
plot(modelo_betapt_ftp$residuals,  
      ylab = "Resíduos",  
      xlab = "Index dos Imóveis",  
      main = "Suposição de independência",  
      pch = 19)
```

Suposição de independência



```
#Homocedasticidade  
plot(modelo_betapt_ftp$fitted.values, modelo_betapt_ftp$residuals,  
      xlab = "Valores Ajustados",  
      ylab = "Resíduos",  
      pch = 19,
```

```
main = "Suposição de homocedasticidade"
)
```



```
#Breusch_Pagan para homocedasticidade
bptest(modelo_betapt_ftp) #p-value = 0.0001505 heterocedasticidade
```

```
##
## studentized Breusch-Pagan test
##
## data: modelo_betapt_ftp
## BP = 20.252, df = 3, p-value = 0.0001505
```

```
### loglog ####
```

```
modelop_loglog_reb <- betareg(formula = WINP_transformado ~ REB + PlusMinus, data = playoffs_transformado,
modelop_loglog_reb
```

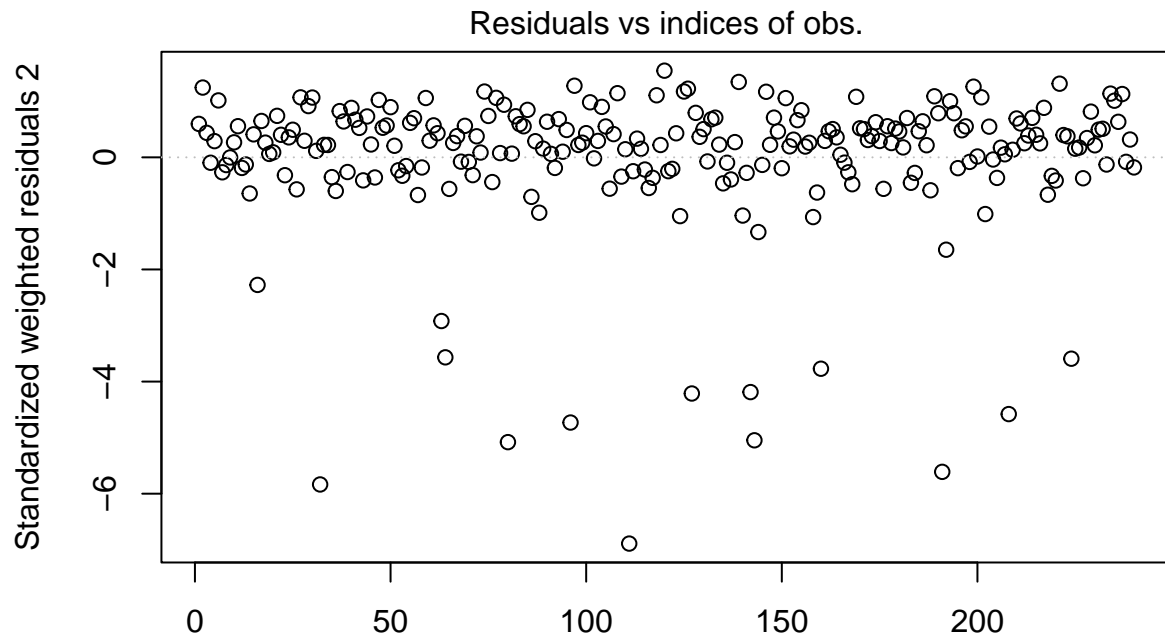
```
##
## Call:
## betareg(formula = WINP_transformado ~ REB + PlusMinus, data = playoffs_transformado,
## link = "loglog")
##
## Coefficients (mean model with loglog link):
## (Intercept) REB PlusMinus
## -0.64302 0.02108 0.08192
##
## Phi coefficients (precision model with identity link):
## (phi)
## 8.439
```

```
summary(modelop_loglog_reb)
```

```
##
## Call:
## betareg(formula = WINP_transformado ~ REB + PlusMinus, data = playoffs_transformado,
## link = "loglog")
##
## Standardized weighted residuals 2:
##      Min      1Q  Median      3Q      Max
## -6.8898 -0.1969  0.2649  0.6177  1.5457
##
## Coefficients (mean model with loglog link):
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) -0.643022   0.325933  -1.973  0.04851 *
## REB          0.021083   0.007695   2.740  0.00615 **
## PlusMinus    0.081916   0.003444  23.784 < 2e-16 ***
##
## Phi coefficients (precision model with identity link):
##              Estimate Std. Error z value Pr(>|z|)
## (phi)      8.4390      0.7512   11.23  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Type of estimator: ML (maximum likelihood)
## Log-likelihood: 162.3 on 4 Df
## Pseudo R-squared: 0.6689
## Number of iterations: 15 (BFGS) + 1 (Fisher scoring)
car::Anova(modelop_loglog_reb)

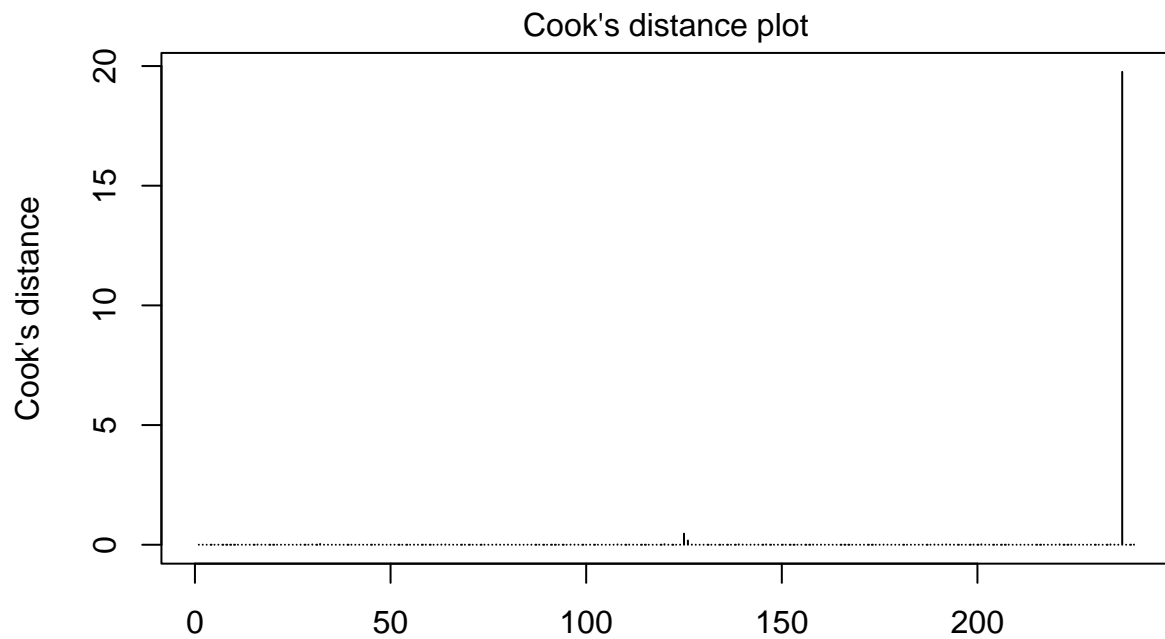
## Analysis of Deviance Table (Type II tests)
##
## Response: WINP_transformado
##              Df      Chisq Pr(>Chisq)
## REB           1    7.5065  0.006148 **
## PlusMinus     1 565.6606 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
coef(modelop_loglog_reb)

## (Intercept)      REB    PlusMinus      (phi)
## -0.64302232  0.02108259  0.08191571  8.43898300
# Resíduos logito #
plot(modelop_loglog_reb, which = 1)
```



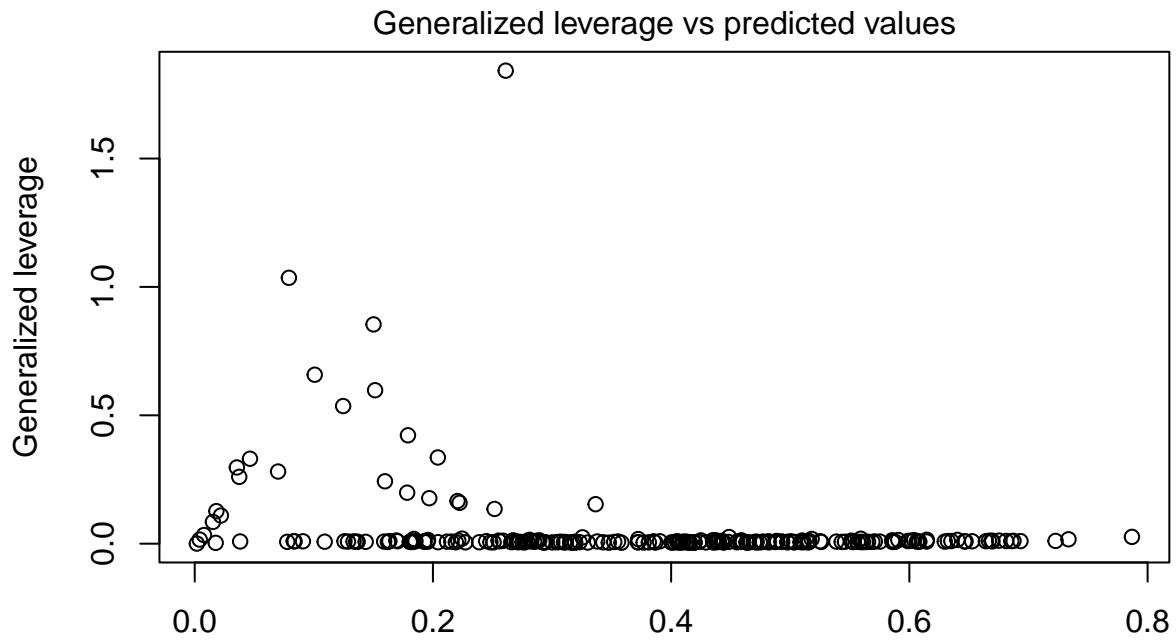
```
betareg(formula = WINP_transformadoObsEBinPlusMinus, data = playoffs_transformadoObsEBinPlusMinus,
link = "loglog")
```

```
plot(modelop_loglog_reb, which = 2)
```



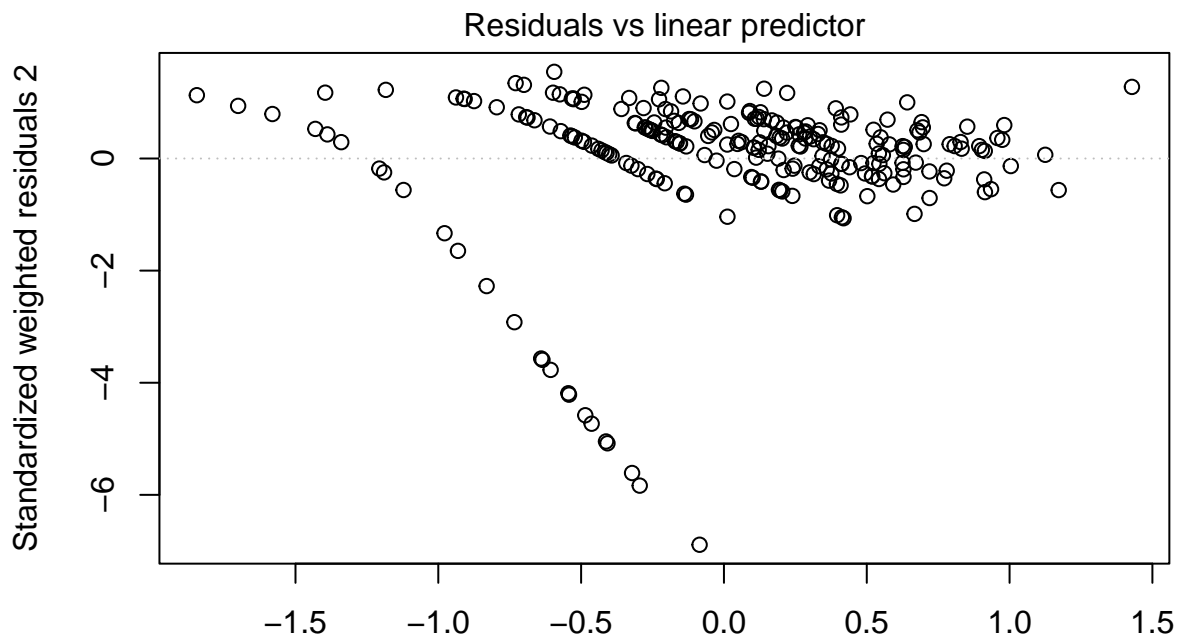
```
betareg(formula = WINP_transformadoObsEBinPlusMinus, data = playoffs_transformadoObsEBinPlusMinus,
link = "loglog")
```

```
plot(modelop_loglog_reb, which = 3)
```

```
betareg(formula = WINP_transformado ~ REB + PlusMinus, data = playoffs_transformado,
link = "loglog")
```

```
plot(modelop_loglog_reb, which = 4)
```

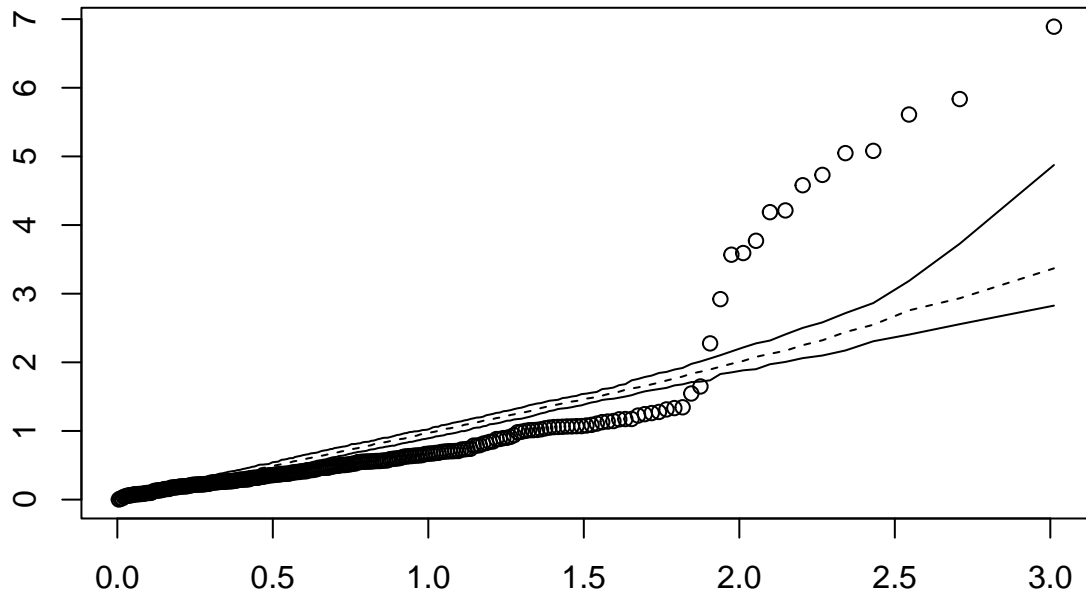


```
betareg(formula = WINP_transformado ~ REB + PlusMinus, data = playoffs_transformado,
link = "loglog")
```

```
plot(modelop_loglog_reb, which = 5) #QQplot não foi muito bom
```

Standardized weighted residuals 2 (absolute values)

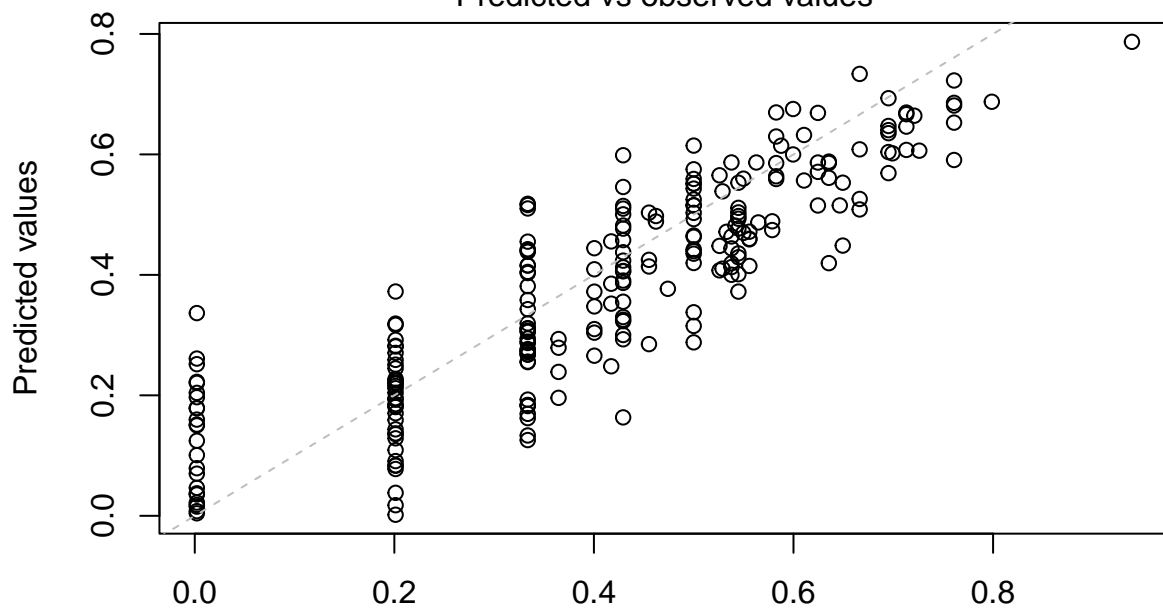
Half-normal plot of residuals



```
betareg(formula = WINP_transformedNormalQuantilesMinus, data = playoffs_transformedNormalQuantilesMinus, link = "loglog")
```

```
plot(modelop_loglog_reb, which = 6)
```

Predicted vs observed values



```
betareg(formula = WINP_transformedObservedValuesMinus, data = playoffs_transformedObservedValuesMinus, link = "loglog")
```

```
shapiro.test(modelop_loglog_reb$residuals) #p-value = 0.005181, normal
```

```
##  
## Shapiro-Wilk normality test  
##  
## data: modelop_loglog_reb$residuals  
## W = 0.98276, p-value = 0.005181
```

```
#Teste de durbin watson para independencia
```

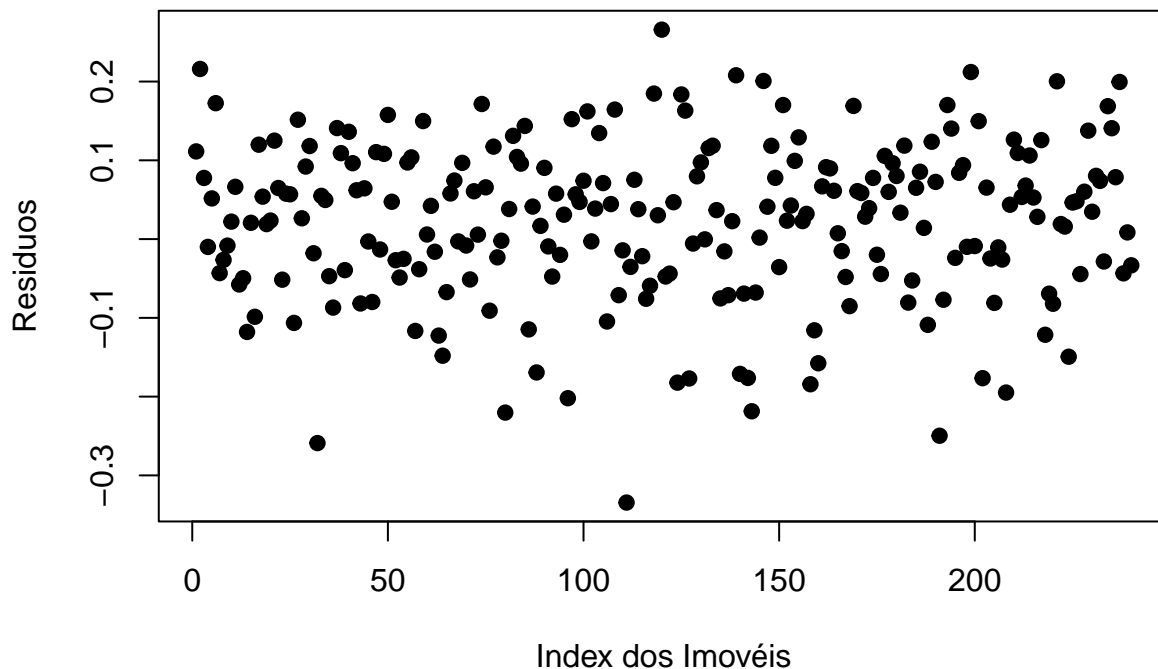
```
library(lmtest)  
dwtest(modelop_loglog_reb) #p-value = 0.07596
```

```
##  
## Durbin-Watson test  
##  
## data: modelop_loglog_reb  
## DW = 1.8197, p-value = 0.07596  
## alternative hypothesis: true autocorrelation is greater than 0
```

```
#Independência
```

```
plot(modelop_loglog_reb$residuals,  
      ylab = "Resíduos",  
      xlab = "Index dos Imóveis",  
      main = "Suposição de independência",  
      pch = 19)
```

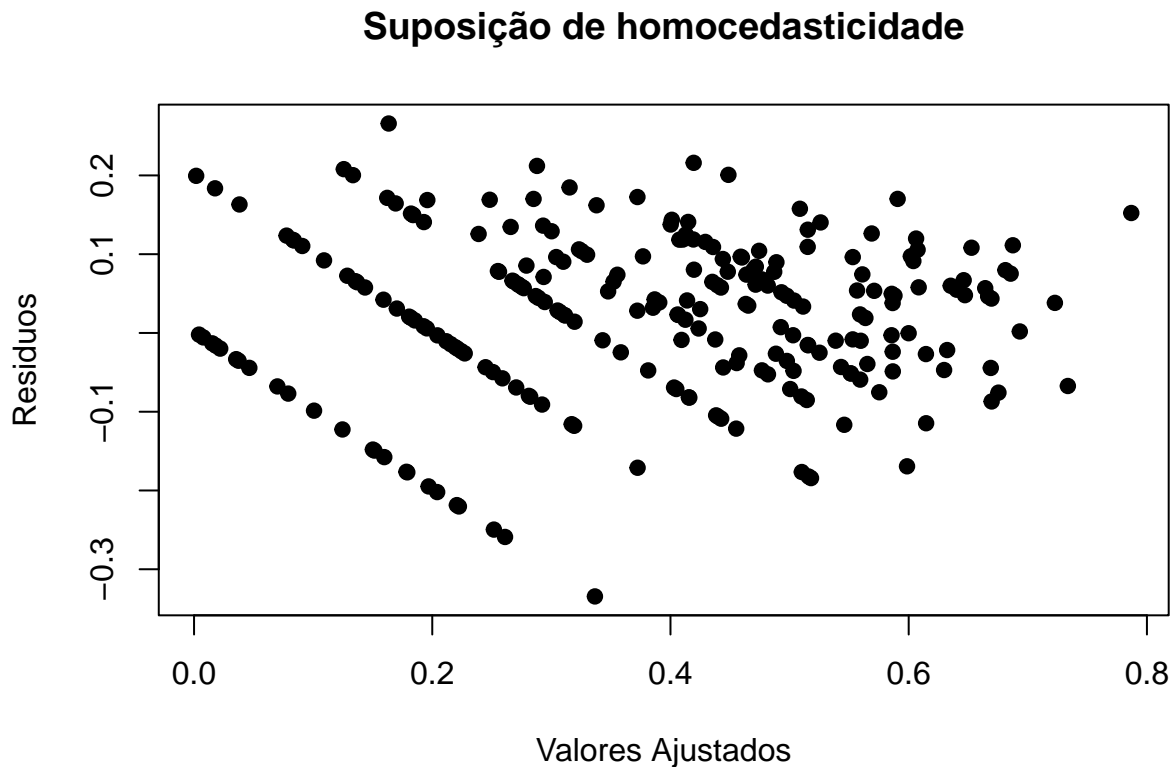
Suposição de independência



```
#Homocedasticidade
```

```
plot(modelop_loglog_reb$fitted.values, modelop_loglog_reb$residuals,  
      xlab = "Valores Ajustados",  
      ylab = "Resíduos",  
      pch = 19,
```

```
main = "Suposição de homocedasticidade"
)
```



```
#Breusch_Pagan para homocedasticidade
bptest(modelop_loglog_reb) #p-value = 4.637e-05 heterocedasticidade

##
## studentized Breusch-Pagan test
##
## data: modelop_loglog_reb
## BP = 19.958, df = 2, p-value = 4.637e-05

#### Probit #####
modelop_probit_ftp <- betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus, data = playoffs_transf,
                             link = "probit")
modelop_probit_ftp

##
## Call:
## betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus, data = playoffs_transformado,
## link = "probit")
##
## Coefficients (mean model with probit link):
## (Intercept)      FTP      REB  PlusMinus
##   -1.61947    0.01013    0.01697    0.08691
##
## Phi coefficients (precision model with identity link):
## (phi)
## 8.695
```

```
summary(modelop_probit_ftp)
```

```
##
## Call:
## betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus, data = playoffs_transformado,
##         link = "probit")
##
## Standardized weighted residuals 2:
##      Min      1Q  Median      3Q      Max
## -6.7399 -0.2532  0.2570  0.6393  1.5064
##
## Coefficients (mean model with probit link):
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) -1.619472   0.557171  -2.907  0.00365 **
## FTP          0.010132   0.005527   1.833  0.06679 .
## REB          0.016972   0.008038   2.111  0.03475 *
## PlusMinus    0.086908   0.004332  20.061 < 2e-16 ***
##
## Phi coefficients (precision model with identity link):
##              Estimate Std. Error z value Pr(>|z|)
## (phi)      8.6950      0.7759   11.21  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Type of estimator: ML (maximum likelihood)
## Log-likelihood: 168.2 on 5 Df
## Pseudo R-squared: 0.5897
## Number of iterations: 18 (BFGS) + 2 (Fisher scoring)
```

```
car::Anova(modelop_probit_ftp)
```

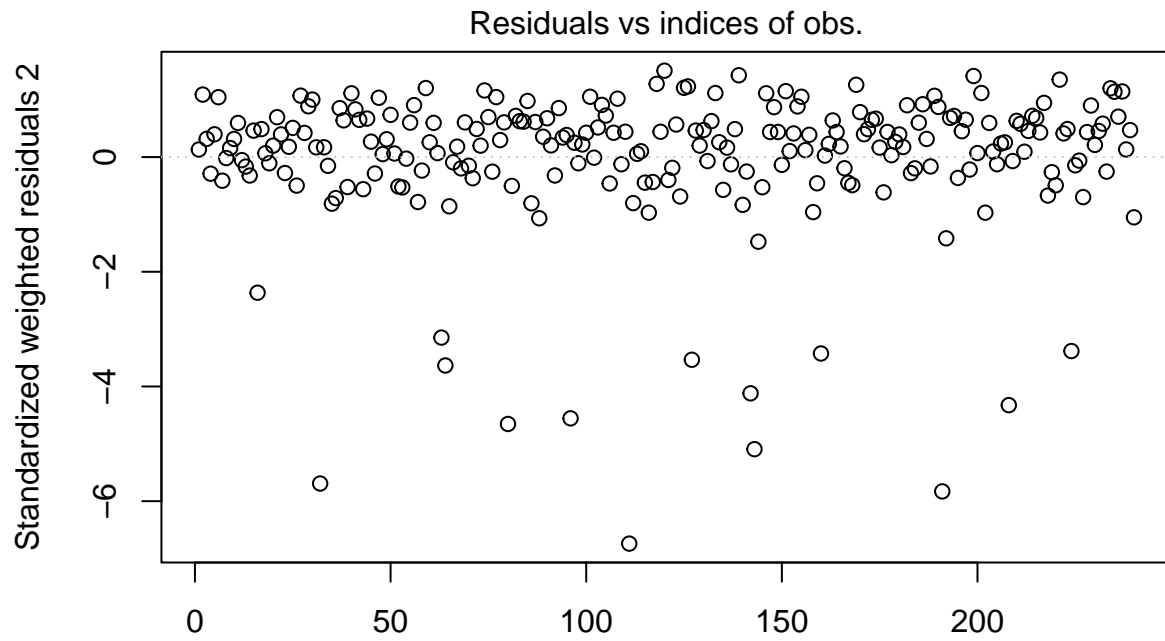
```
## Analysis of Deviance Table (Type II tests)
##
## Response: WINP_transformado
##              Df      Chisq Pr(>Chisq)
## FTP            1    3.3603   0.06679 .
## REB            1    4.4576   0.03475 *
## PlusMinus     1 402.4243   < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
coef(modelop_probit_ftp)
```

```
## (Intercept)      FTP      REB  PlusMinus      (phi)
## -1.61947183  0.01013154  0.01697157  0.08690779  8.69502494
```

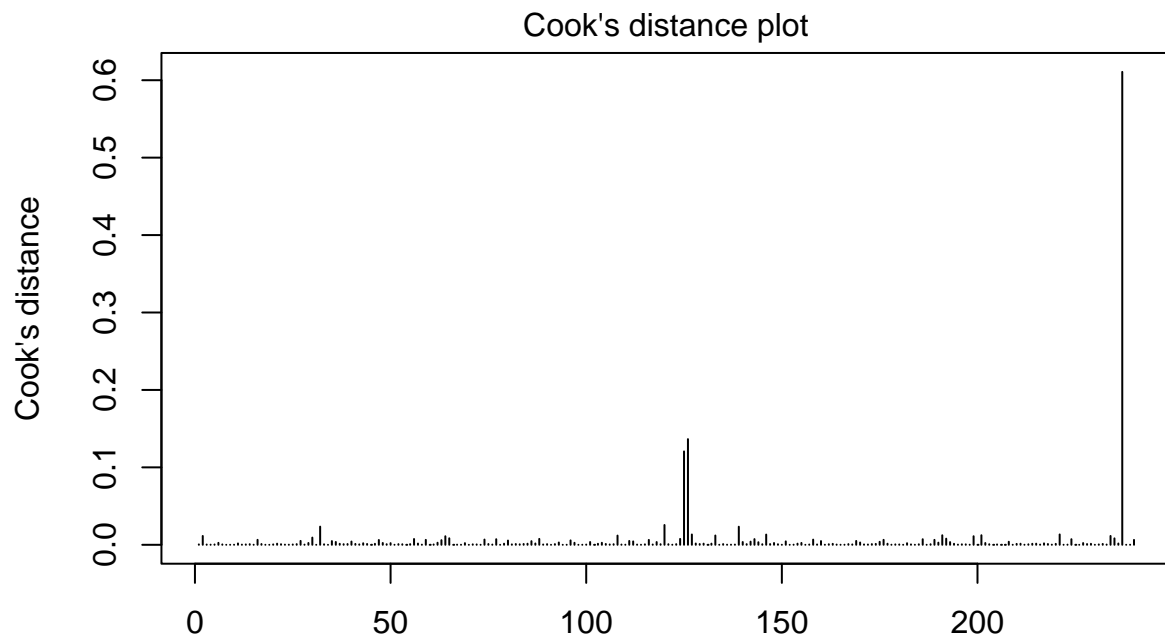
```
# Resíduos logito #
```

```
plot(modelop_probit_ftp, which = 1)
```



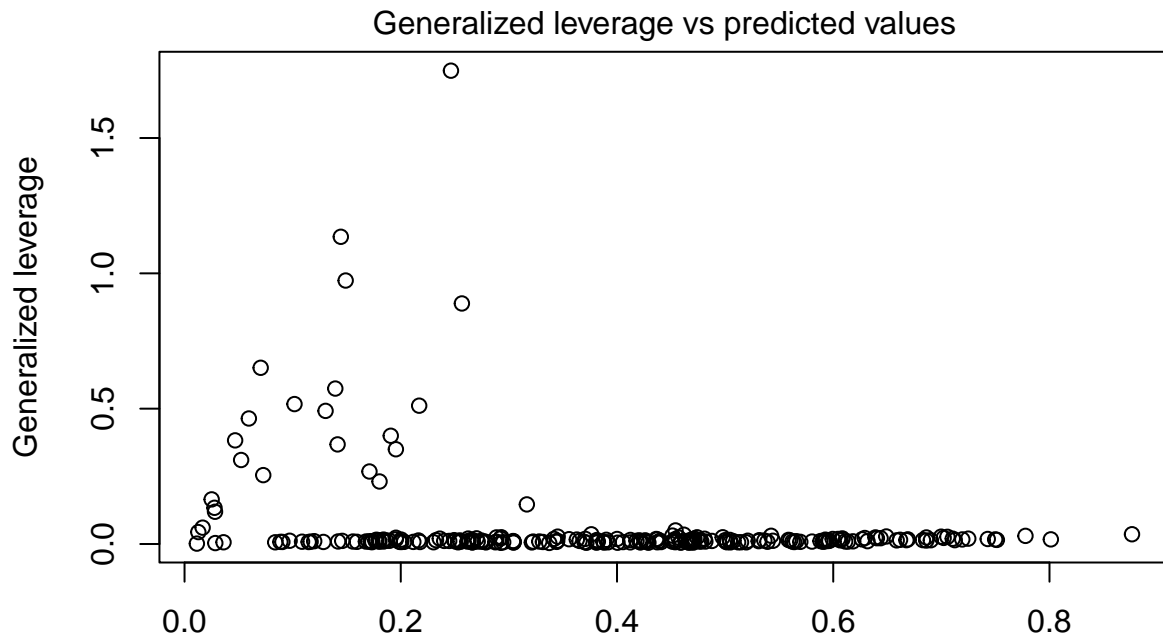
```
betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus,
data = playoffs_transformado, link = "probit")
```

```
plot(modelop_probit_ftp, which = 2)
```



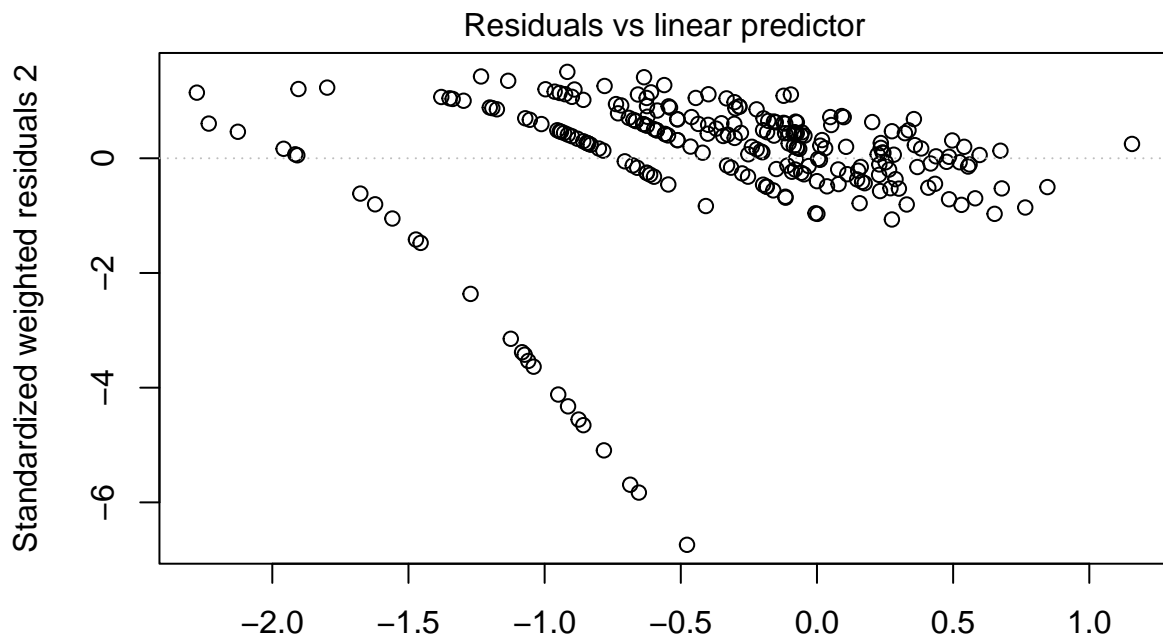
```
betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus,
data = playoffs_transformado, link = "probit")
```

```
plot(modelop_probit_ftp, which = 3)
```



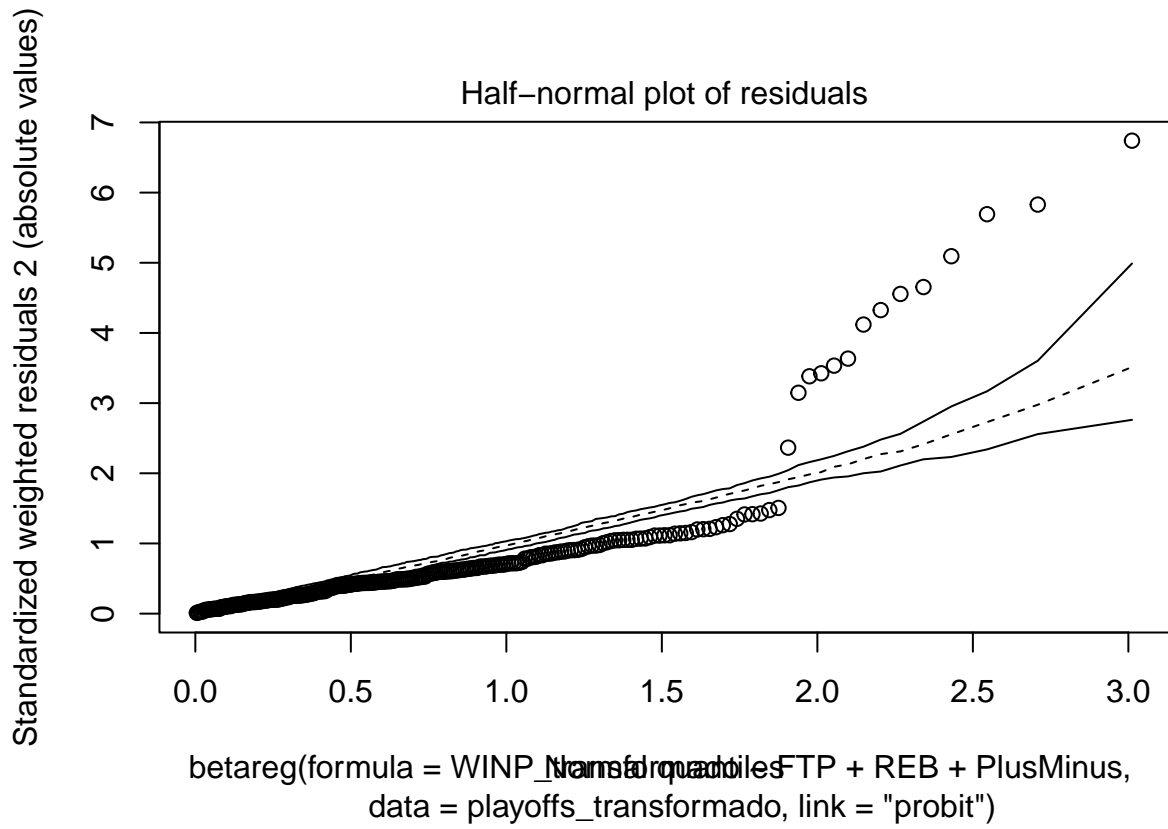
```
betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus,
data = playoffs_transformado, link = "probit")
```

```
plot(modelop_probit_ftp, which = 4)
```

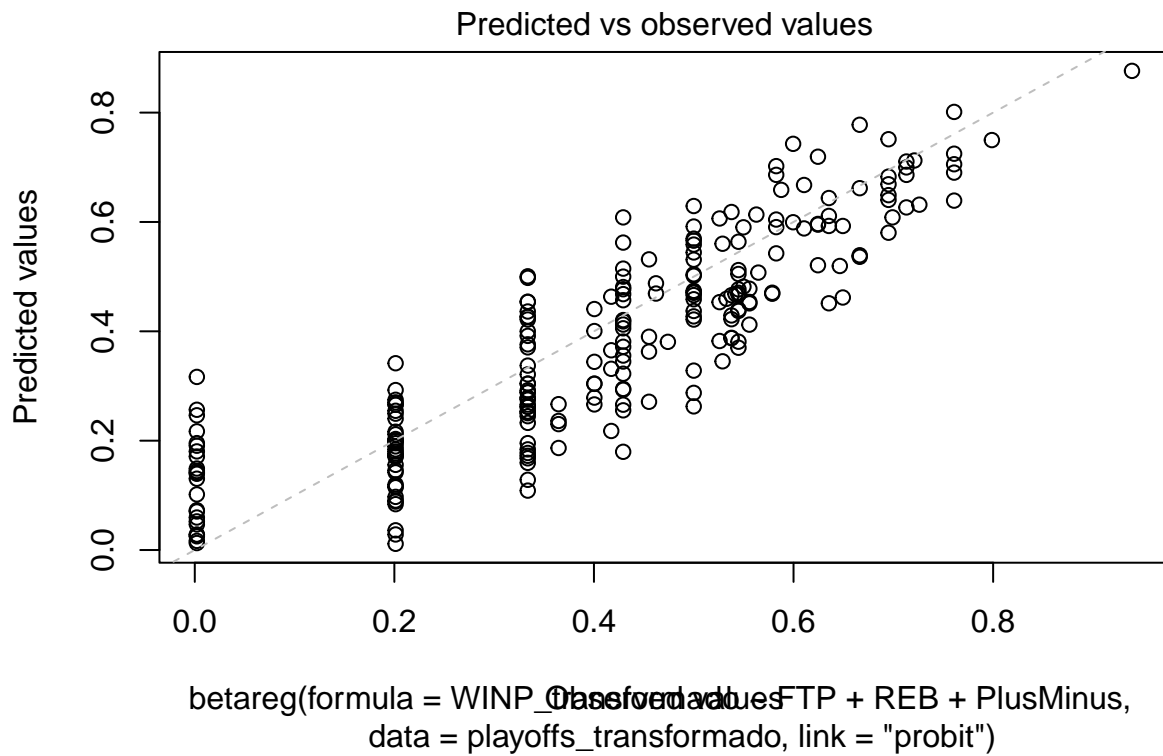


```
betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus,
data = playoffs_transformado, link = "probit")
```

```
plot(modelop_probit_ftp, which = 5) #QQplot não foi muito bom
```



```
plot(modelop_probit_ftp, which = 6)
```




```
shapiro.test(modelop_probit_ftp$residuals) #p-value = 0.08389, normal
```

```
##  
## Shapiro-Wilk normality test  
##  
## data: modelop_probit_ftp$residuals  
## W = 0.98965, p-value = 0.08389
```

```
#Teste de durbin watson para independencia
```

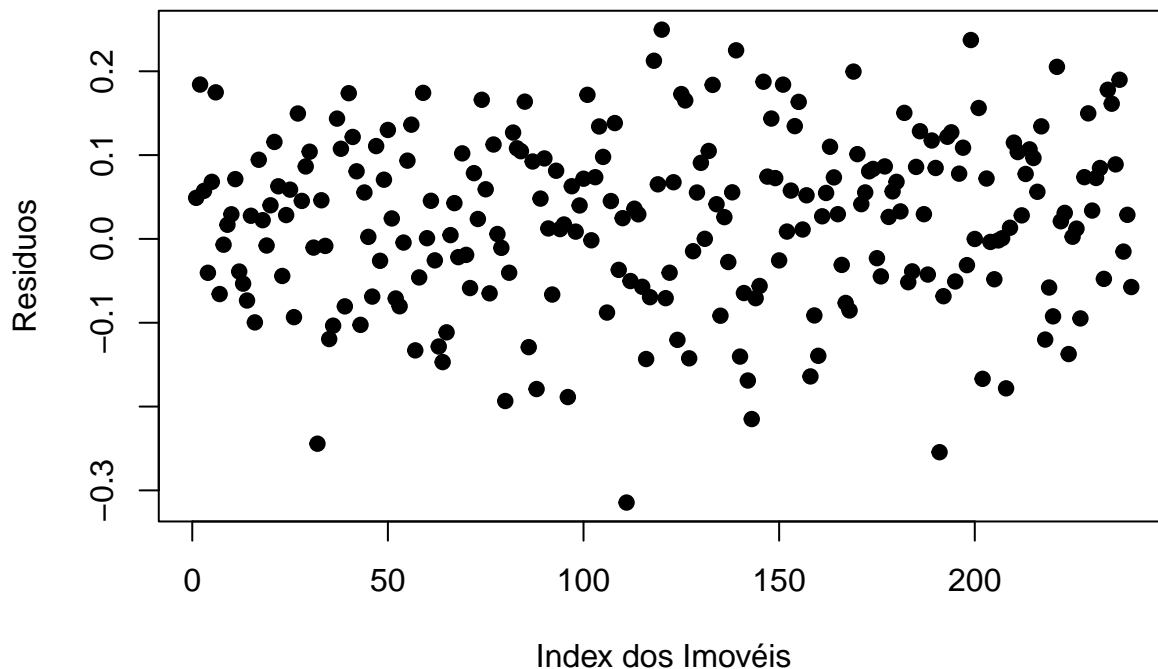
```
library(lmtest)  
dwtest(modelop_probit_ftp) #p-value = 0.05838
```

```
##  
## Durbin-Watson test  
##  
## data: modelop_probit_ftp  
## DW = 1.8033, p-value = 0.05838  
## alternative hypothesis: true autocorrelation is greater than 0
```

```
#Independência
```

```
plot(modelop_probit_ftp$residuals,  
      ylab = "Resíduos",  
      xlab = "Index dos Imóveis",  
      main = "Suposição de independência",  
      pch = 19)
```

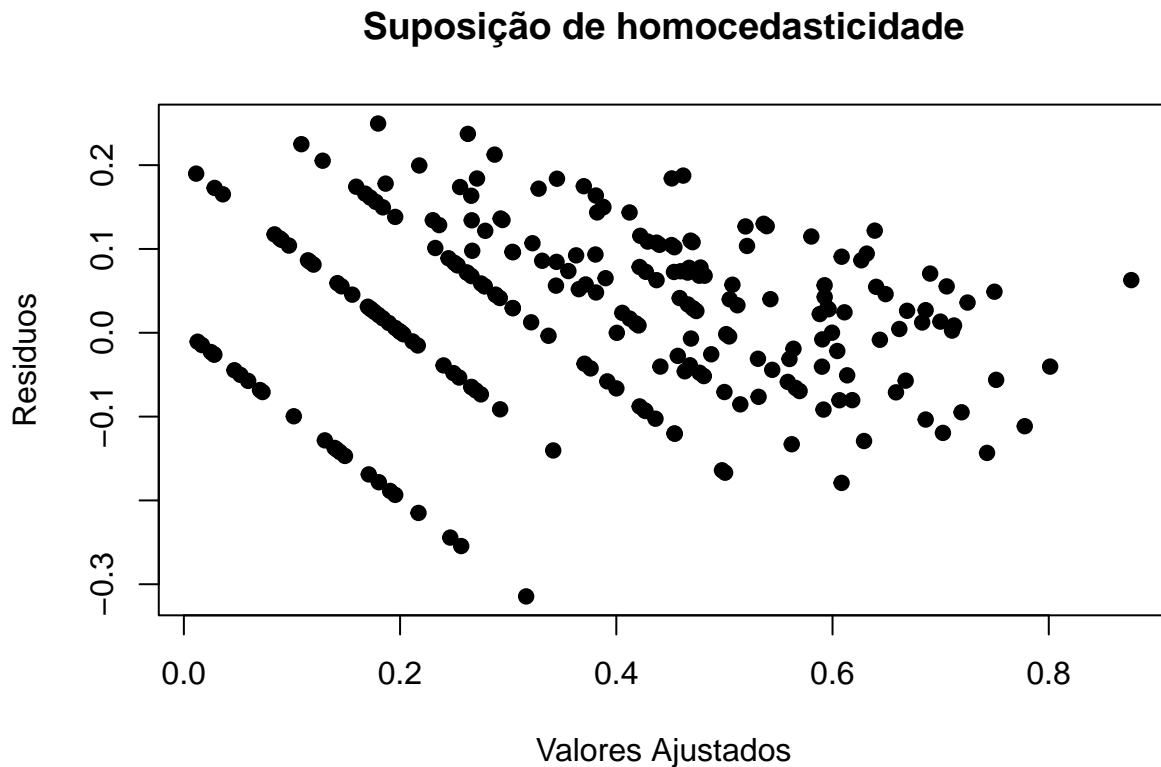
Suposição de independência



```
#Homocedasticidade
```

```
plot(modelop_probit_ftp$fitted.values, modelop_probit_ftp$residuals,  
      xlab = "Valores Ajustados",  
      ylab = "Resíduos",  
      pch = 19,
```

```
main = "Suposição de homocedasticidade"
)
```



```
#Breusch_Pagan para homocedasticidade
bptest(modelop_probit ftp) #p-value = 0.0001505 heterocedasticidade

##
## studentized Breusch-Pagan test
##
## data: modelop_probit ftp
## BP = 20.252, df = 3, p-value = 0.0001505

### cloglog ####
modelo_betat_cloglog ftp <- betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus, data = playoffs,
link = "cloglog")
modelo_betat_cloglog ftp

##
## Call:
## betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus, data = playoffs_transformado,
## link = "cloglog")
##
## Coefficients (mean model with cloglog link):
## (Intercept)      FTP      REB    PlusMinus
##   -2.51458    0.01496    0.01872    0.11192
##
## Phi coefficients (precision model with identity link):
## (phi)
## 8.037
```

```
summary(modelo_betat_cloglog_ftp)

##
## Call:
## betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus, data = playoffs_transformado,
## link = "cloglog")
##
## Standardized weighted residuals 2:
##      Min      1Q  Median      3Q      Max
## -6.2025 -0.2494  0.3180  0.7076  1.4128
##
## Coefficients (mean model with cloglog link):
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) -2.514577   0.766704  -3.280  0.00104 **
## FTP          0.014962   0.007520   1.989  0.04665 *
## REB          0.018717   0.010768   1.738  0.08218 .
## PlusMinus    0.111920   0.006211  18.021 < 2e-16 ***
##
## Phi coefficients (precision model with identity link):
##              Estimate Std. Error z value Pr(>|z|)
## (phi)      8.0370      0.7113    11.3 <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Type of estimator: ML (maximum likelihood)
## Log-likelihood: 162.2 on 5 Df
## Pseudo R-squared: 0.4689
## Number of iterations: 19 (BFGS) + 1 (Fisher scoring)

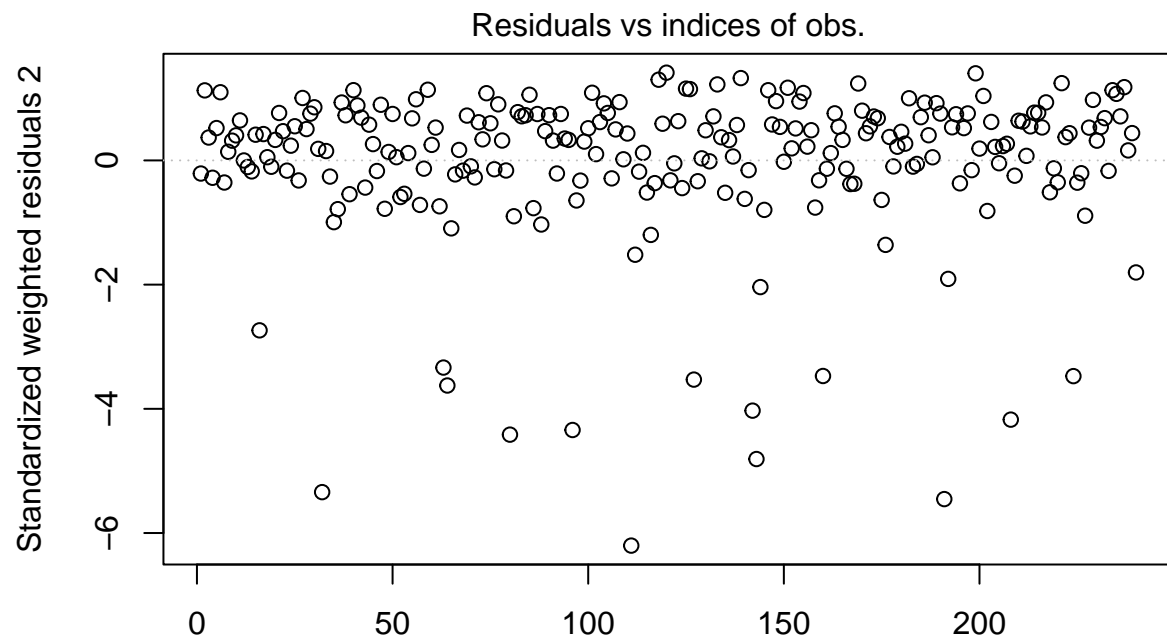
car::Anova(modelo_betat_cloglog_ftp)

## Analysis of Deviance Table (Type II tests)
##
## Response: WINP_transformado
##              Df      Chisq Pr(>Chisq)
## FTP            1   3.9579   0.04665 *
## REB            1   3.0212   0.08218 .
## PlusMinus     1 324.7531   < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

coef(modelo_betat_cloglog_ftp)

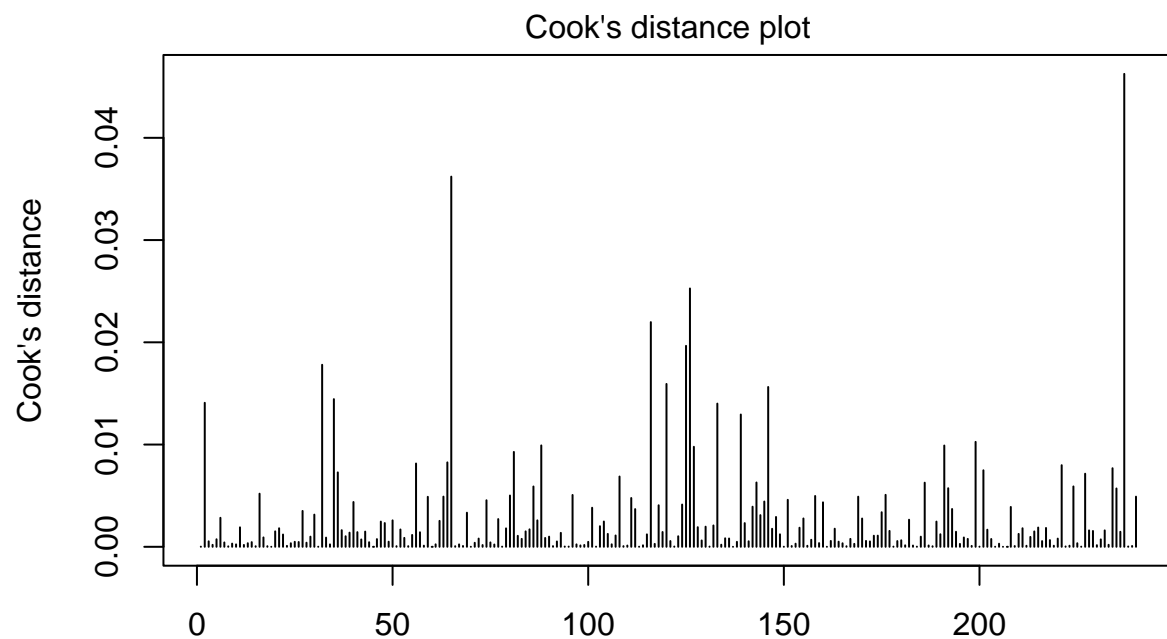
## (Intercept)      FTP      REB  PlusMinus      (phi)
## -2.51457700  0.01496152  0.01871662  0.11191991  8.03696860

# Resíduos logito #
plot(modelo_betat_cloglog_ftp, which = 1)
```



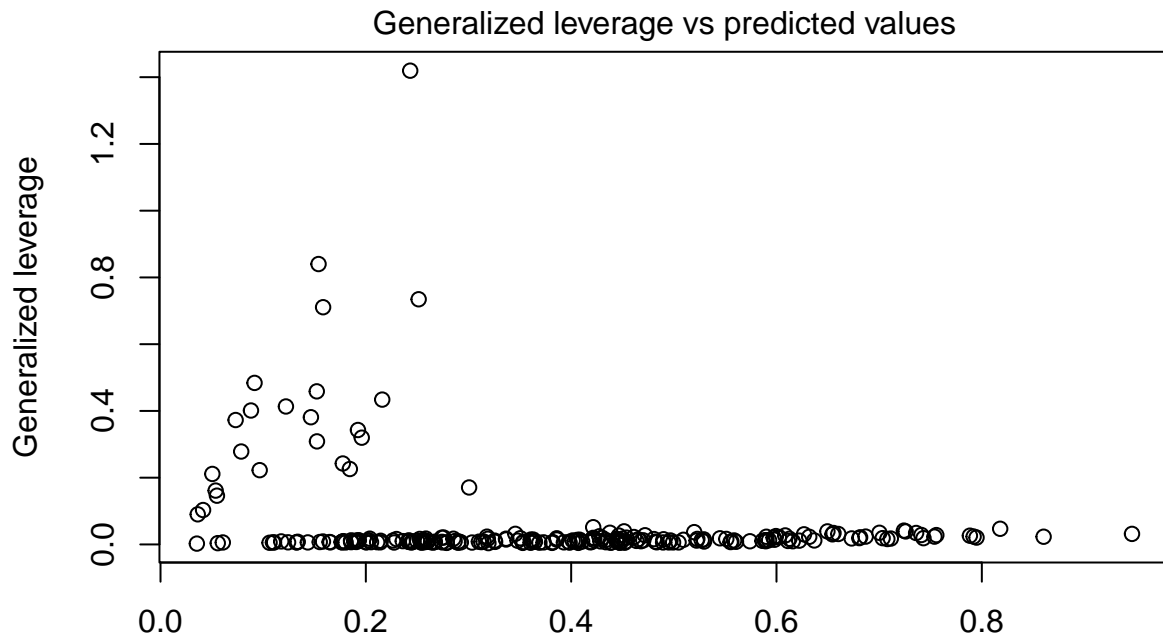
```
betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus,
data = playoffs_transformado, link = "cloglog")
```

```
plot(modelo_betat_cloglog_ftp, which = 2)
```



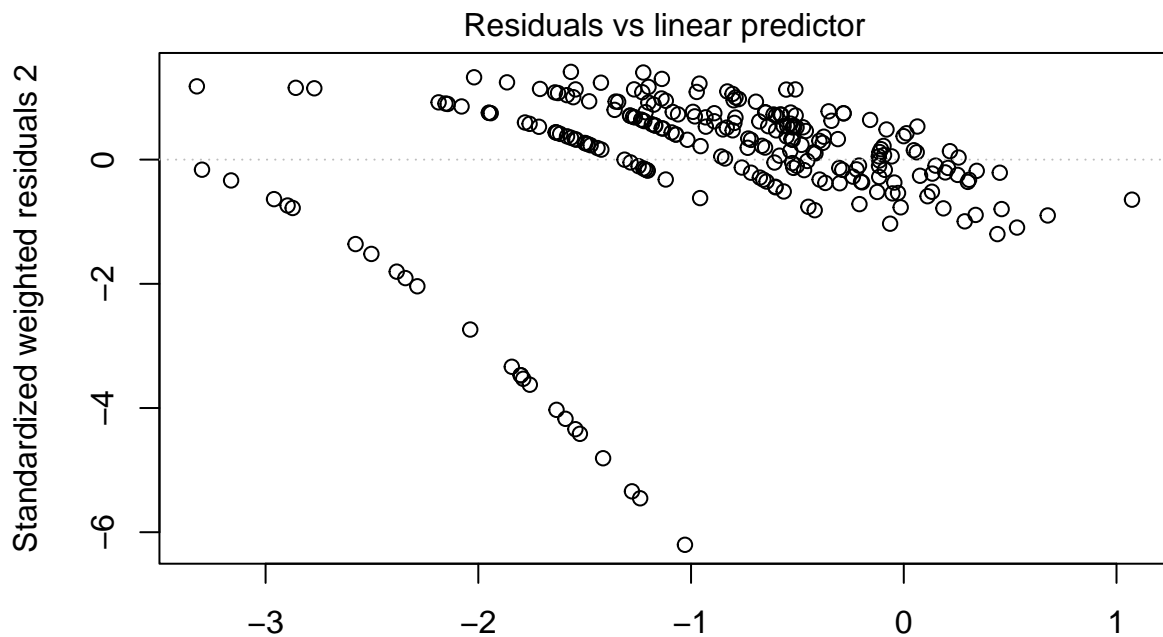
```
betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus,
data = playoffs_transformado, link = "cloglog")
```

```
plot(modelo_betat_cloglog_ftp, which = 3)
```



```
betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus,
data = playoffs_transformado, link = "cloglog")
```

```
plot(modelo_betat_cloglog_ftp, which = 4)
```

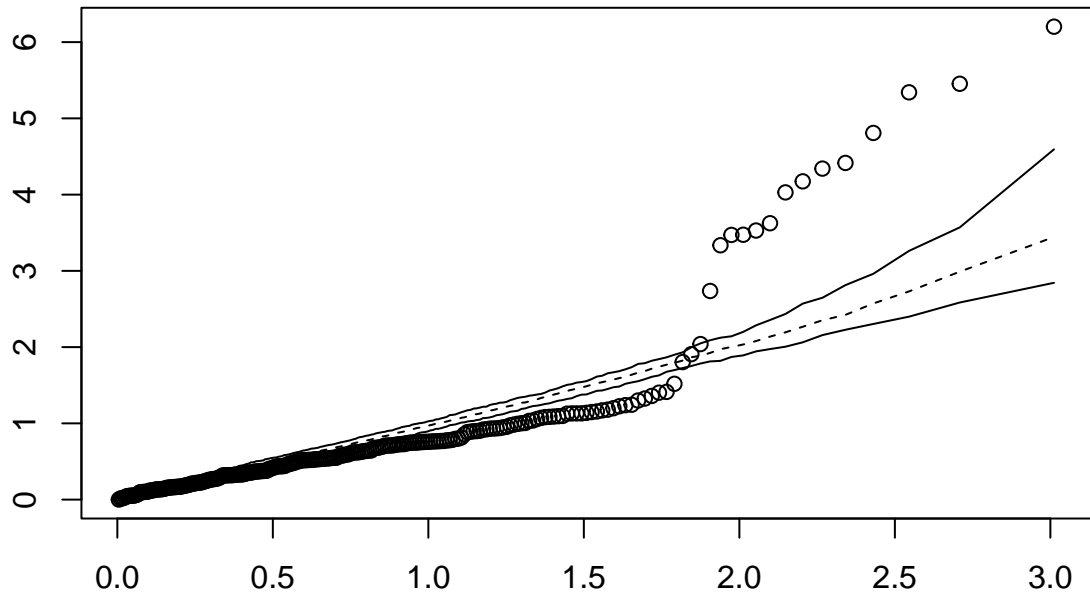


```
betareg(formula = WINP_transformado ~ FTP + REB + PlusMinus,
data = playoffs_transformado, link = "cloglog")
```

```
plot(modelo_betat_cloglog_ftp, which = 5) #QQplot não foi muito bom
```

Standardized weighted residuals 2 (absolute values)

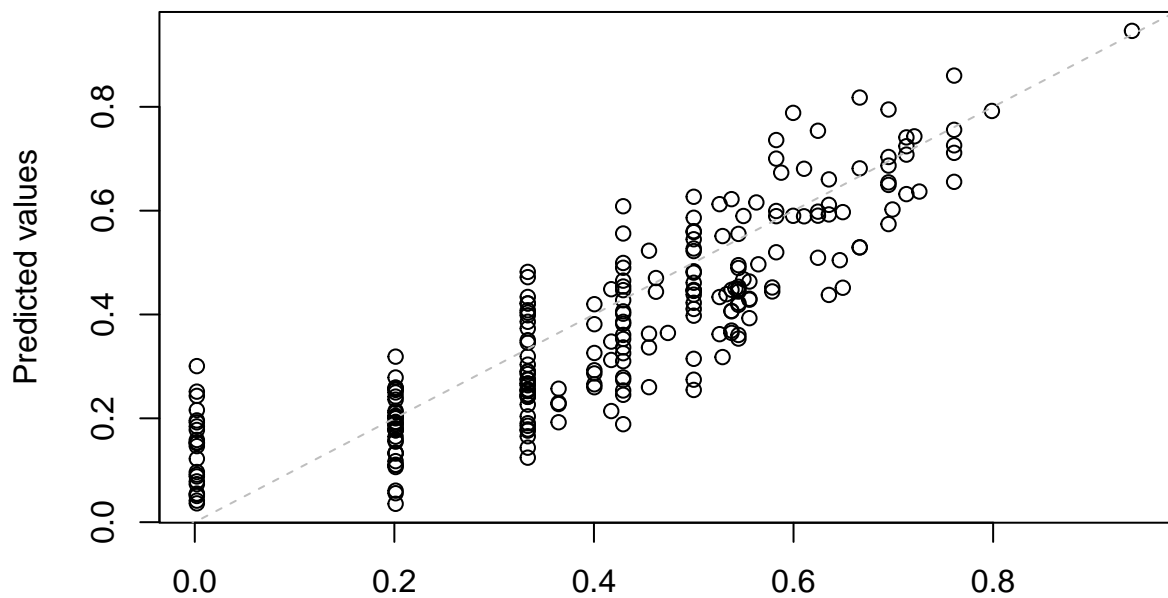
Half-normal plot of residuals



betareg(formula = WINP_NormalizedFTP + REB + PlusMinus,
data = playoffs_transformado, link = "cloglog")

```
plot(modelo_betat_cloglog_ftp, which = 6)
```

Predicted vs observed values



betareg(formula = WINP_NormalizedFTP + REB + PlusMinus,
data = playoffs_transformado, link = "cloglog")

```
shapiro.test(modelo_betat_cloglog_ftp$residuals) #p-value = 0.08389, normal
```

```
##  
## Shapiro-Wilk normality test  
##  
## data:  modelo_betat_cloglog_ftp$residuals  
## W = 0.987, p-value = 0.02824
```

```
#Teste de durbin watson para independencia
```

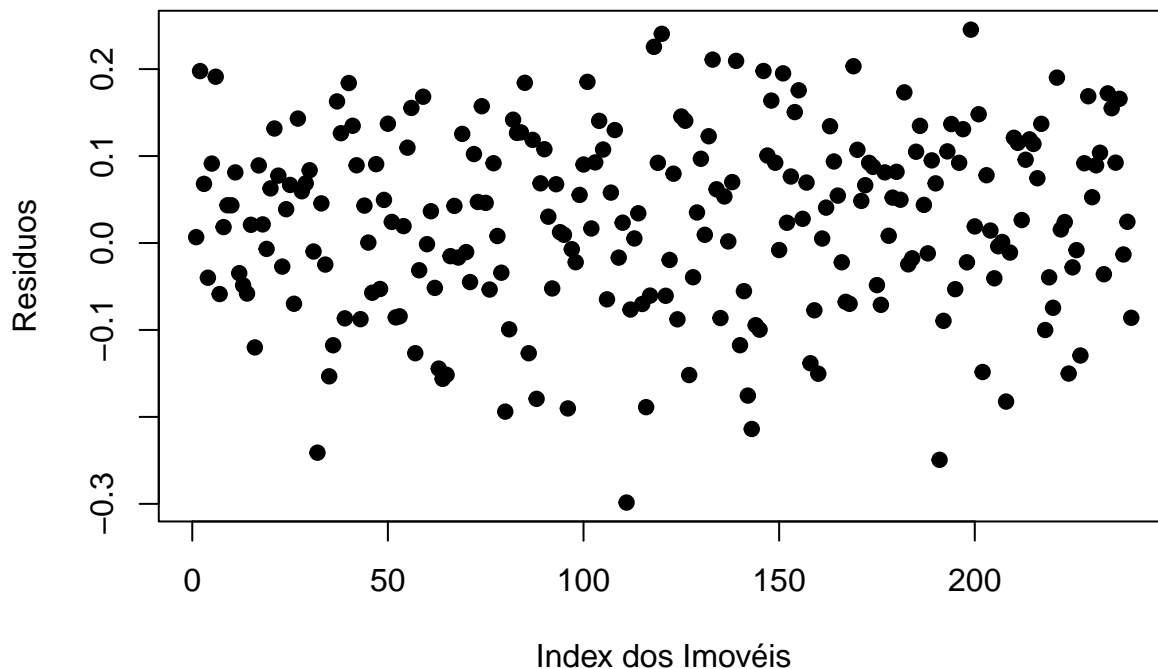
```
library(lmtest)  
dwtest(modelo_betat_cloglog_ftp) #p-value = 0.05838
```

```
##  
## Durbin-Watson test  
##  
## data:  modelo_betat_cloglog_ftp  
## DW = 1.8033, p-value = 0.05838  
## alternative hypothesis: true autocorrelation is greater than 0
```

```
#Independência
```

```
plot(modelo_betat_cloglog_ftp$residuals,  
      ylab = "Resíduos",  
      xlab = "Index dos Imóveis",  
      main = "Suposição de independência",  
      pch = 19)
```

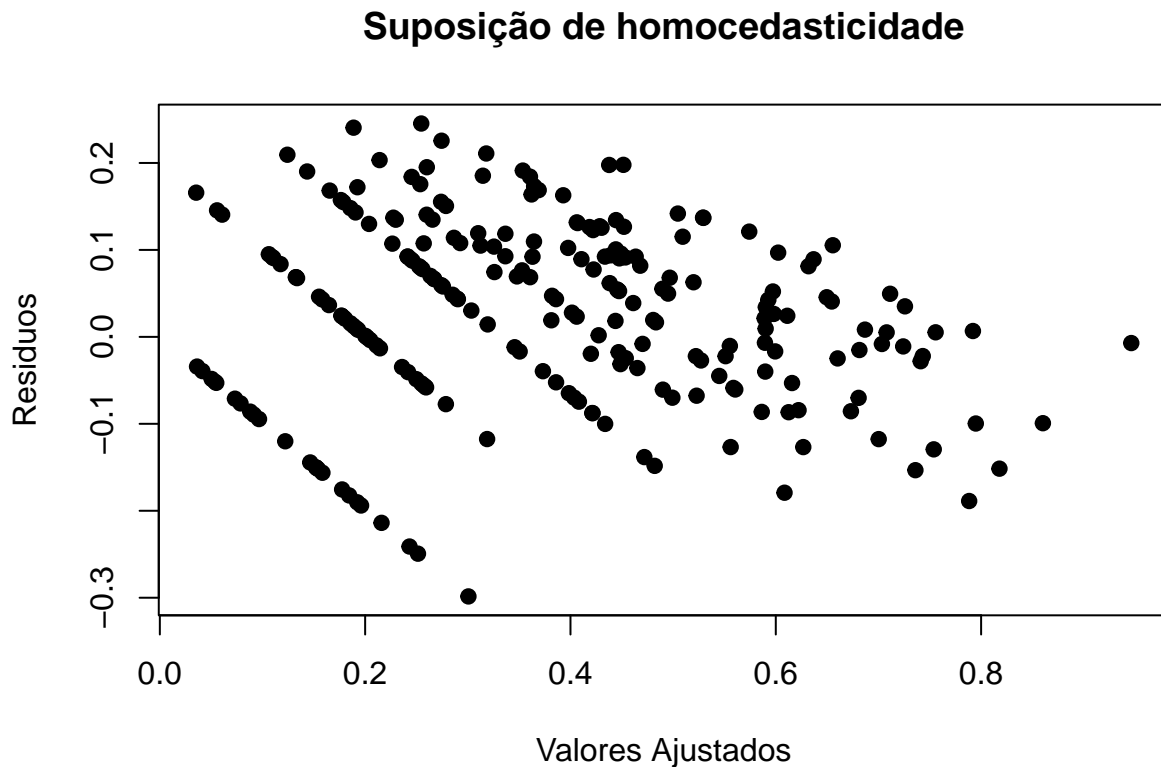
Suposição de independência



```
#Homocedasticidade
```

```
plot(modelo_betat_cloglog_ftp$fitted.values, modelo_betat_cloglog_ftp$residuals,  
      xlab = "Valores Ajustados",  
      ylab = "Resíduos",  
      pch = 19,
```

```
)
  main = "Suposição de homocedasticidade"
```



```
#Breusch_Pagan para homocedasticidade
bptest(modelo_betat_cloglog_ftp) #p-value = 0.0001505 heterocedasticidade
```

```
##
## studentized Breusch-Pagan test
##
## data: modelo_betat_cloglog_ftp
## BP = 20.252, df = 3, p-value = 0.0001505
```

```
### cauchito ###
```

```
modelo_betat_cauchit_ftp <- betareg(formula = WINP_transformado ~ FTP + PlusMinus, data = playoffs_transf
  link = "cauchit")
modelo_betat_cauchit_ftp
```

```
##
## Call:
## betareg(formula = WINP_transformado ~ FTP + PlusMinus, data = playoffs_transformado,
## link = "cauchit")
##
## Coefficients (mean model with cauchit link):
## (Intercept)      FTP      PlusMinus
##   -1.58499     0.01838     0.15092
##
## Phi coefficients (precision model with identity link):
## (phi)
## 7.34
```



```
summary(modelo_betat_cauchit_ftp)

##
## Call:
## betareg(formula = WINP_transformado ~ FTP + PlusMinus, data = playoffs_transformado,
## link = "cauchit")
##
## Standardized weighted residuals 2:
##      Min      1Q  Median      3Q      Max
## -5.7092 -0.3498  0.2333  0.6419  1.3118
##
## Coefficients (mean model with cauchit link):
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) -1.58499    0.79614  -1.991  0.0465 *
## FTP          0.01838    0.01033   1.780  0.0751 .
## PlusMinus    0.15092    0.01172  12.882 <2e-16 ***
##
## Phi coefficients (precision model with identity link):
##              Estimate Std. Error z value Pr(>|z|)
## (phi)       7.3404     0.6427   11.42  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Type of estimator: ML (maximum likelihood)
## Log-likelihood: 154.6 on 4 Df
## Pseudo R-squared: 0.2574
## Number of iterations: 60 (BFGS) + 2 (Fisher scoring)

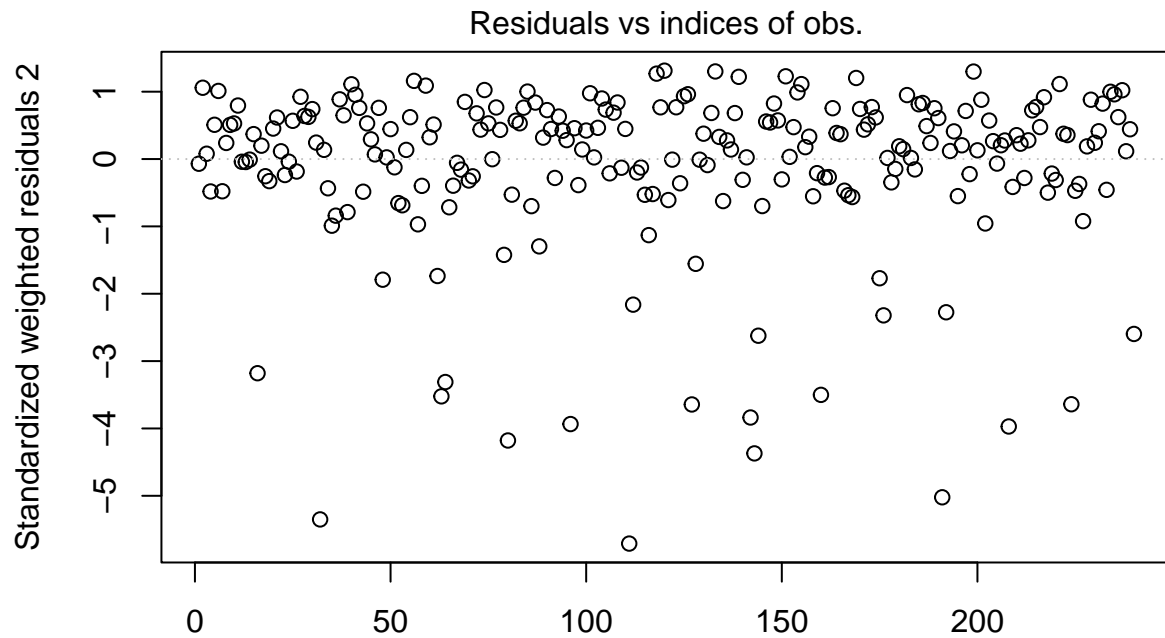
car::Anova(modelo_betat_cauchit_ftp)

## Analysis of Deviance Table (Type II tests)
##
## Response: WINP_transformado
##              Df      Chisq Pr(>Chisq)
## FTP           1    3.1679    0.0751 .
## PlusMinus     1 165.9406    <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

coef(modelo_betat_cauchit_ftp)

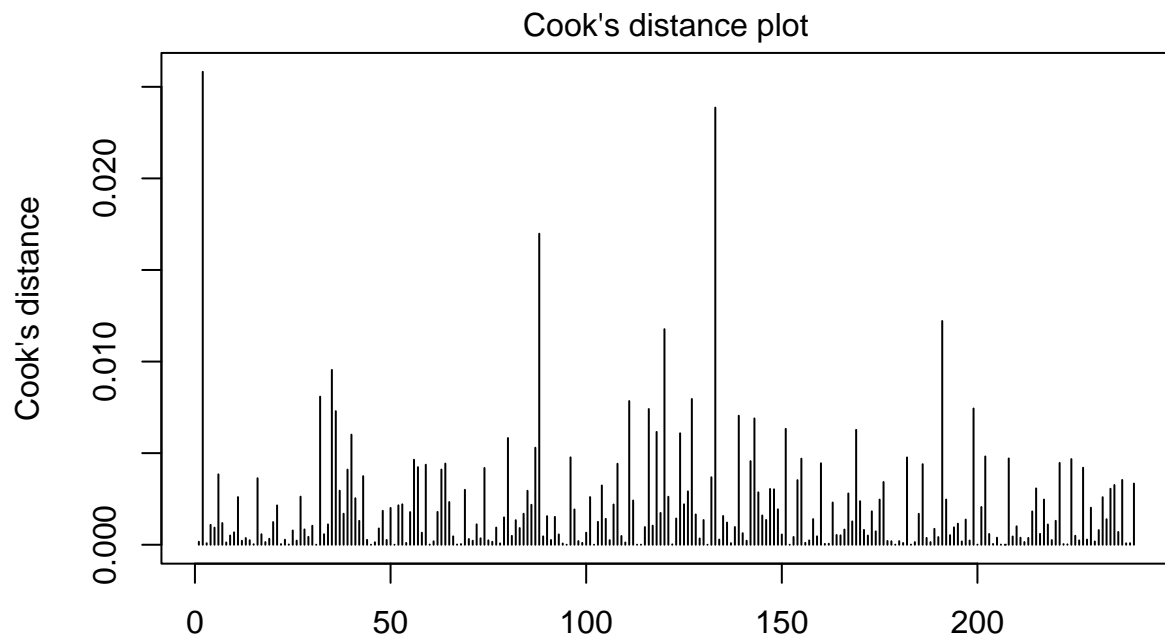
## (Intercept)      FTP  PlusMinus      (phi)
## -1.58499016  0.01838294  0.15091652  7.34042352

# Resíduos logito #
plot(modelo_betat_cauchit_ftp, which = 1)
```



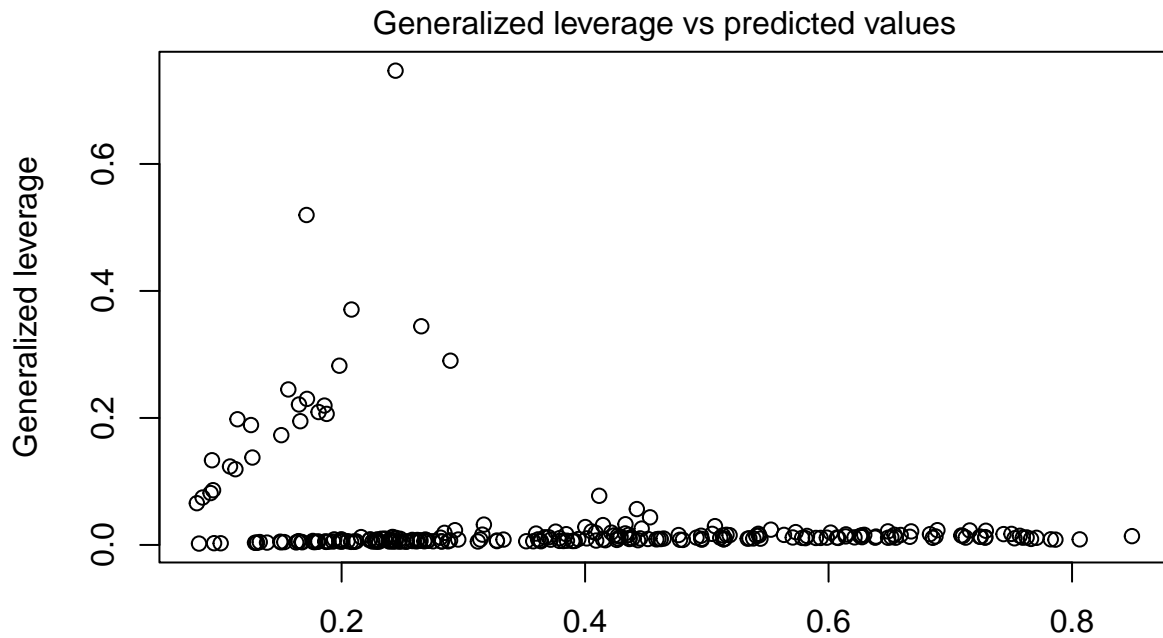
```
betareg(formula = WINP_transformadoObs.FTP.BusMinus, data = playoffs_transformadoObs.FTP.BusMinus, link = "cauchit")
```

```
plot(modelo_betat_cauchit_ftp, which = 2)
```



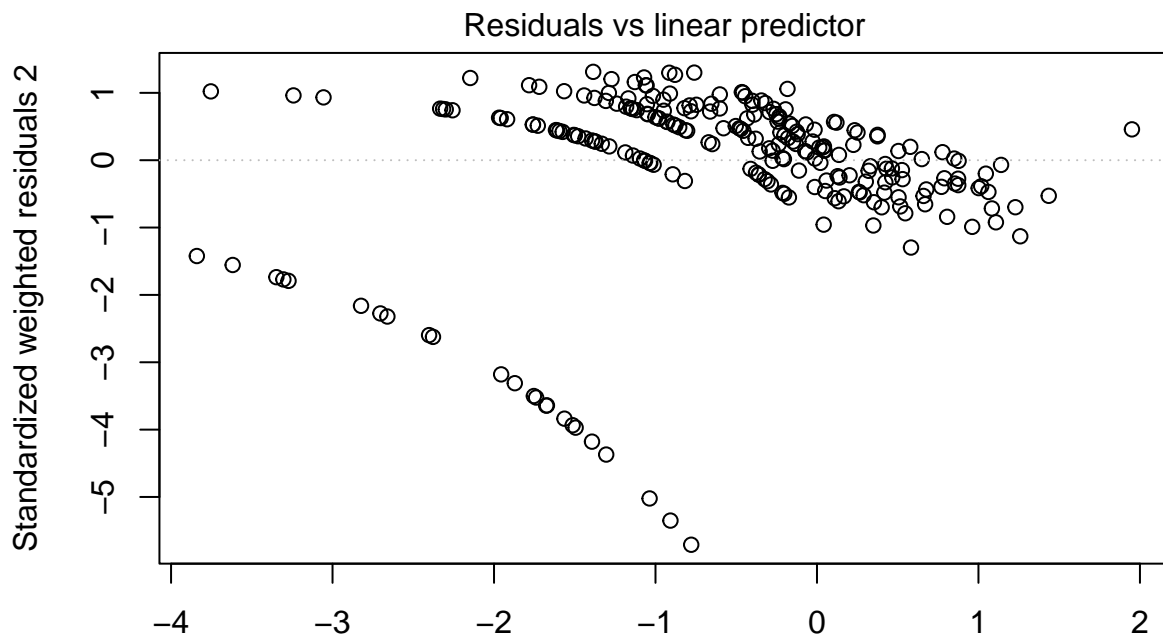
```
betareg(formula = WINP_transformadoObs.FTP.BusMinus, data = playoffs_transformadoObs.FTP.BusMinus, link = "cauchit")
```

```
plot(modelo_betat_cauchit_ftp, which = 3)
```



```
betareg(formula = WINP_transformado FTP + Plus Minus, data = playoffs_transformado,
link = "cauchit")
```

```
plot(modelo_betat_cauchit_ftp, which = 4)
```

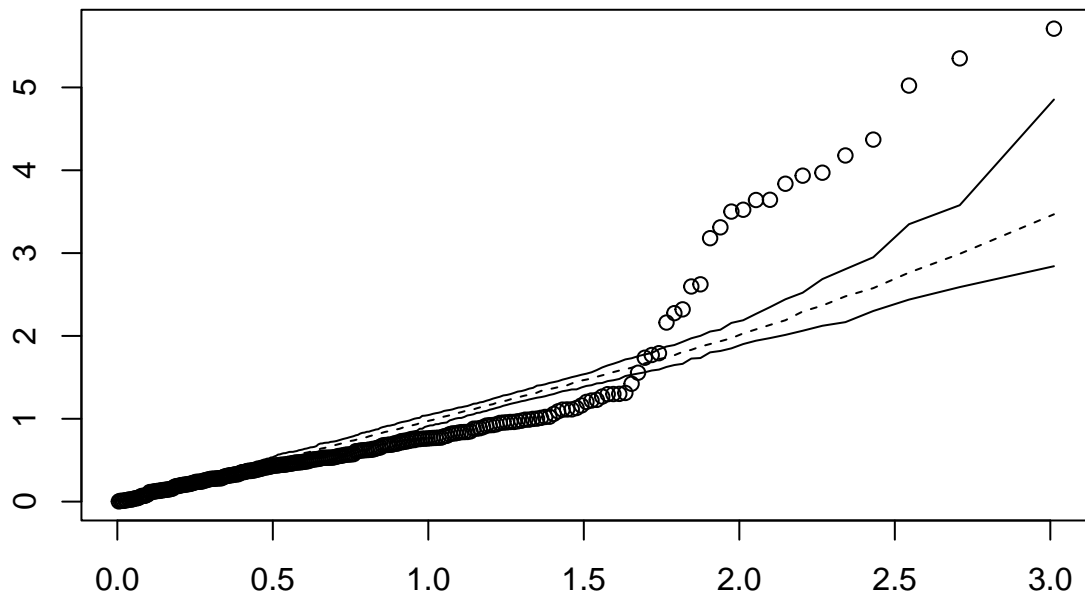


```
betareg(formula = WINP_transformado Linear FTP + Plus Minus, data = playoffs_transformado,
link = "cauchit")
```

```
plot(modelo_betat_cauchit_ftp, which = 5) #QQplot não foi muito bom
```

Standardized weighted residuals 2 (absolute values)

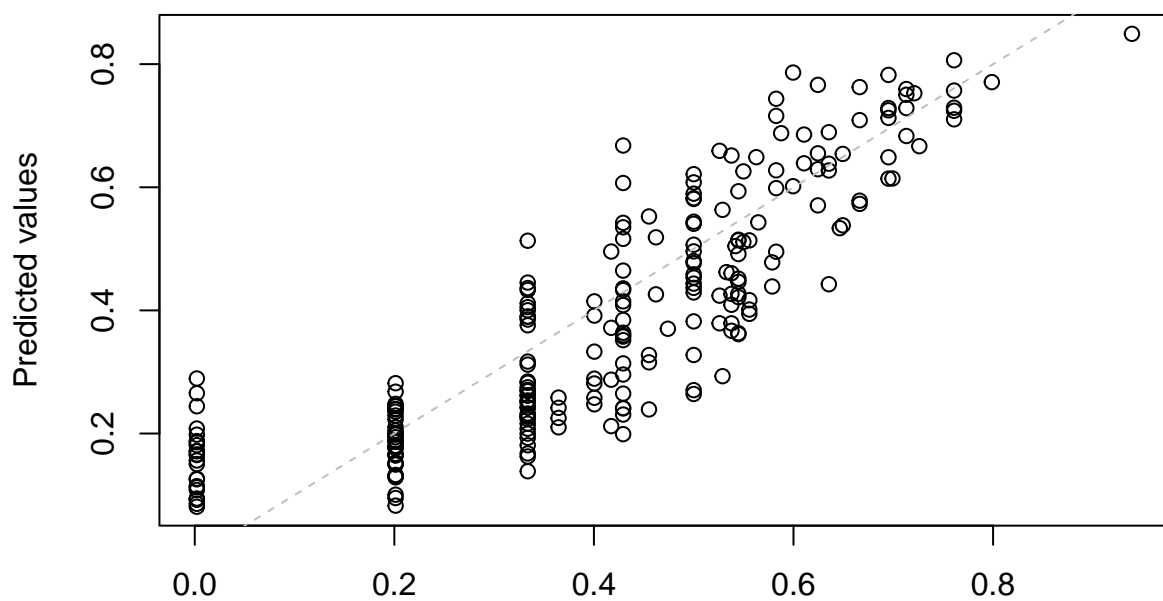
Half-normal plot of residuals



```
betareg(formula = WINP_transformado - FTP + PlusMinus, data = playoffs_transformado,
link = "cauchit")
```

```
plot(modelo_betat_cauchit_ftp, which = 6)
```

Predicted vs observed values



```
betareg(formula = WINP_transformado - FTP + PlusMinus, data = playoffs_transformado,
link = "cauchit")
```

```
shapiro.test(modelo_betat_cauchit_ftp$residuals) #p-value = 0.05594, normal
```

```
##  
## Shapiro-Wilk normality test  
##  
## data:  modelo_betat_cauchit_ftp$residuals  
## W = 0.98867, p-value = 0.05594
```

```
#Teste de durbin watson para independencia
```

```
library(lmtest)
```

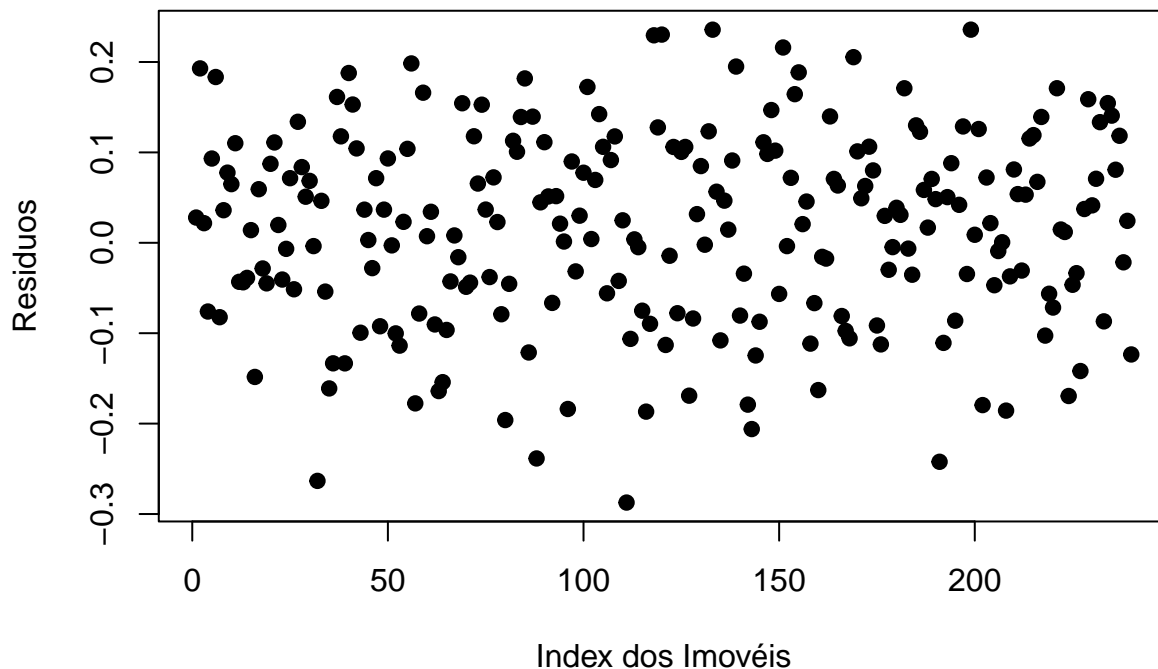
```
dwtest(modelo_betat_cauchit_ftp) #p-value = 0.06737
```

```
##  
## Durbin-Watson test  
##  
## data:  modelo_betat_cauchit_ftp  
## DW = 1.8122, p-value = 0.06737  
## alternative hypothesis: true autocorrelation is greater than 0
```

```
#Independência
```

```
plot(modelo_betat_cauchit_ftp$residuals,  
      ylab = "Resíduos",  
      xlab = "Index dos Imóveis",  
      main = "Suposição de independência",  
      pch = 19)
```

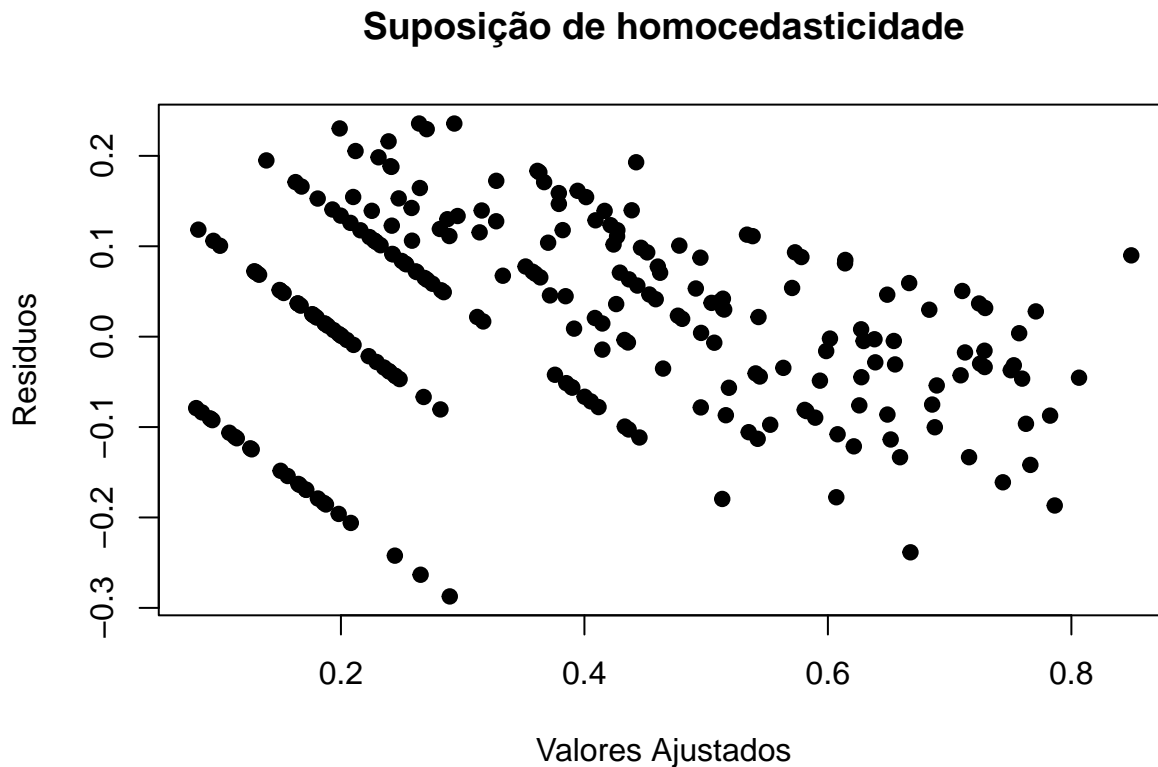
Suposição de independência



```
#Homocedasticidade
```

```
plot(modelo_betat_cauchit_ftp$fitted.values, modelo_betat_cauchit_ftp$residuals,  
      xlab = "Valores Ajustados",  
      ylab = "Resíduos",  
      pch = 19,
```

```
main = "Suposição de homocedasticidade"
)
```



```
#Breusch_Pagan para homocedasticidade
bptest(modelo_betat_cauchit_ftp) #p-value = 0.0001374 heterocedasticidade
```

```
##
## studentized Breusch-Pagan test
##
## data: modelo_betat_cauchit_ftp
## BP = 17.785, df = 2, p-value = 0.0001374
```

```
##### Gamlss #####
```

```
### Beta ###
```

```
gamlss_betap_pf <- gamlss(formula = WINP ~ PF + PlusMinus, family = BEZI, data = dados_regressaop)
```

```
## GAMLSS-RS iteration 1: Global Deviance = -161.4236
## GAMLSS-RS iteration 2: Global Deviance = -329.2529
## GAMLSS-RS iteration 3: Global Deviance = -330.669
## GAMLSS-RS iteration 4: Global Deviance = -330.6692
```

```
gamlss_betap_pf
```

```
##
## Family: c("BEZI", "Zero Inflated Beta")
## Fitting method: RS()
##
## Call: gamlss(formula = WINP ~ PF + PlusMinus, family = BEZI,
## data = dados_regressaop)
##
## Mu Coefficients:
```

```

## (Intercept)          PF      PlusMinus
##      0.5145      -0.0265      0.1063
## Sigma Coefficients:
## (Intercept)
##      3.571
## Nu Coefficients:
## (Intercept)
##      -2.197
##
## Degrees of Freedom for the fit: 5 Residual Deg. of Freedom    235
## Global Deviance:      -330.669
##           AIC:      -320.669
##           SBC:      -303.266
summary(gamlss_betap_pf)

## *****
## Family:  c("BEZI", "Zero Inflated Beta")
##
## Call:  gamlss(formula = WINP ~ PF + PlusMinus, family = BEZI,
##      data = dados_regressaop)
##
## Fitting method: RS()
##
## -----
## Mu link function:  logit
## Mu Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.514484   0.244311   2.106  0.0363 *
## PF          -0.026499   0.011248  -2.356  0.0193 *
## PlusMinus    0.106287   0.004552  23.349  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## -----
## Sigma link function:  log
## Sigma Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept)  3.57084    0.09504   37.57  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## -----
## Nu link function:  logit
## Nu Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -2.1972    0.2152  -10.21  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## -----
## No. of observations in the fit:  240
## Degrees of Freedom for the fit:  5
##      Residual Deg. of Freedom:  235
##      at cycle:  4

```

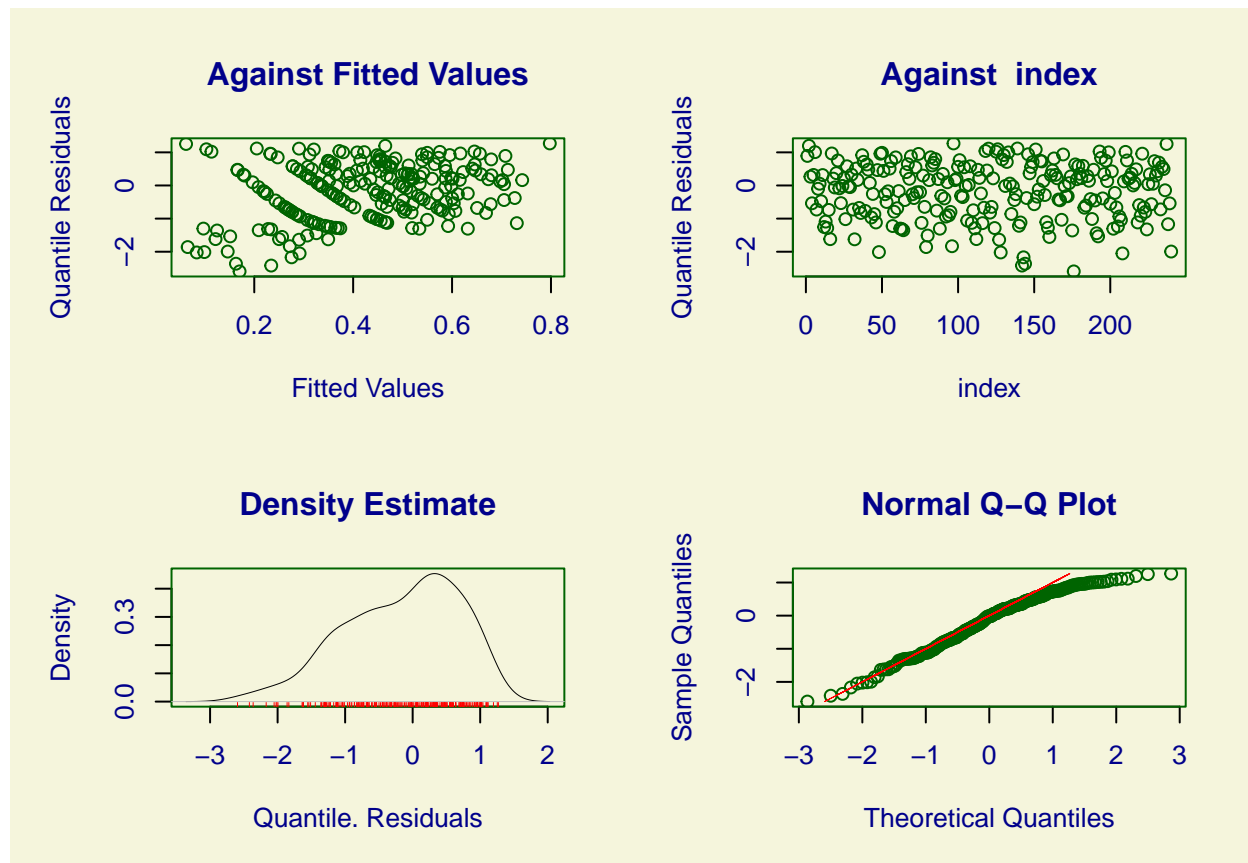
```
##
## Global Deviance:      -330.6692
##           AIC:        -320.6692
##           SBC:        -303.266
## *****
```

```
coef(gamlss_betap_pf)
```

```
## (Intercept)          PF    PlusMinus
##  0.51448416 -0.02649885  0.10628690
```

```
# Resíduos logito #
```

```
plot(gamlss_betap_pf, which = 1)
```



```
## *****
## Summary of the Randomised Quantile Residuals
##           mean    = -0.1690874
##           variance = 0.7131026
##           coef. of skewness = -0.4828724
##           coef. of kurtosis = 2.512757
## Filliben correlation coefficient = 0.9840237
## *****
```

```
shapiro.test(gamlss_betap_pf$residuals) #p-value = 0.05594, normal
```

```
##
## Shapiro-Wilk normality test
##
## data:  gamlss_betap_pf$residuals
```

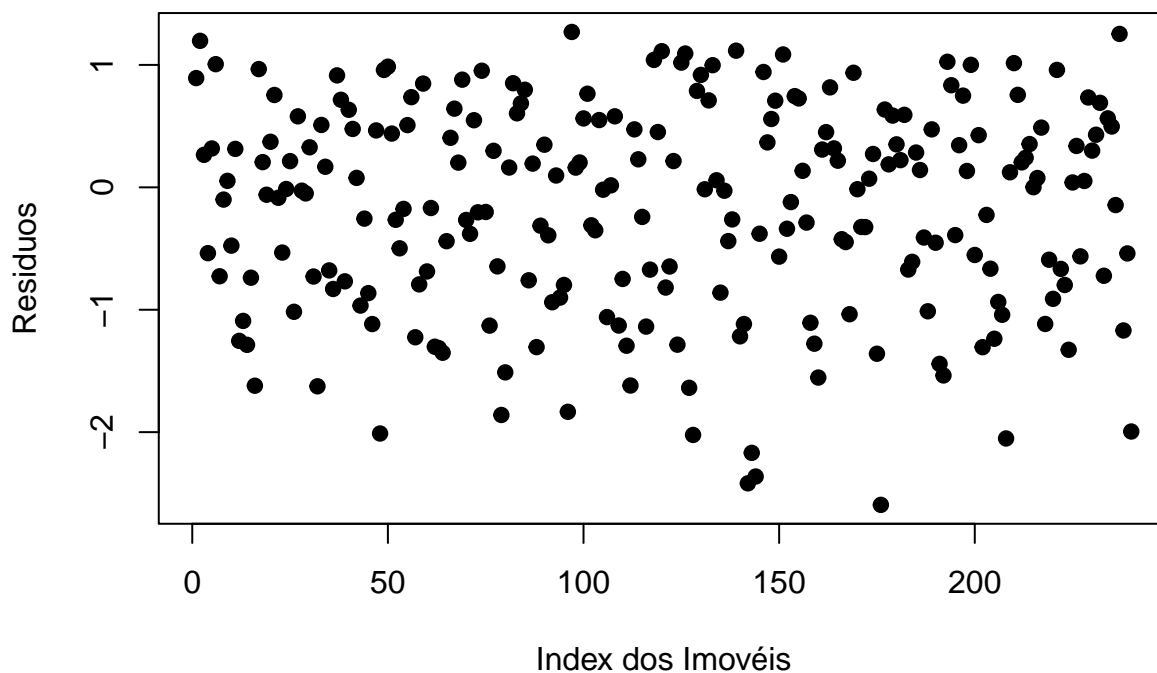


```
## W = 0.96686, p-value = 2.244e-05
#Teste de durbin watson para independencia
library(lmtest)
dwtest(gamlss_betap_pf) #p-value = 0.06737

##
## Durbin-Watson test
##
## data: gamlss_betap_pf
## DW = 1.8508, p-value = 0.1176
## alternative hypothesis: true autocorrelation is greater than 0

#Independência
plot(gamlss_betap_pf$residuals,
     ylab = "Resíduos",
     xlab = "Index dos Imóveis",
     main = "Suposição de independência",
     pch = 19)
```

Suposição de independência



```
#Breusch_Pagan para homocedasticidade
bptest(gamlss_betap_pf) #p-value = 0.0001374 heterocedasticidade

##
## studentized Breusch-Pagan test
##
## data: gamlss_betap_pf
## BP = 18.652, df = 2, p-value = 8.91e-05

##### Modelos Mistos #####
##### Normal Team #####
misto_normalp_dreb <- gamlss(formula = WINP ~ (re(random = ~1 | TEAM)) +
```

```

PlusMinus + DREB, family = NO, data = dados_regressaop)

## GAMLSS-RS iteration 1: Global Deviance = -436.3104
## GAMLSS-RS iteration 2: Global Deviance = -436.3104
misto_normalp_dreb

##
## Family: c("NO", "Normal")
## Fitting method: RS()
##
## Call: gamlss(formula = WINP ~ (re(random = ~1 | TEAM)) +
## PlusMinus + DREB, family = NO, data = dados_regressaop)
##
## Mu Coefficients:
## (Intercept) re(random = ~1 | TEAM) PlusMinus
## 0.343406 NA 0.025386
## DREB
## 0.004065
## Sigma Coefficients:
## (Intercept)
## -2.328
##
## Degrees of Freedom for the fit: 14.43 Residual Deg. of Freedom 225.6
## Global Deviance: -436.31
## AIC: -407.444
## SBC: -357.207
coef(misto_normalp_dreb)

## (Intercept) re(random = ~1 | TEAM) PlusMinus
## 0.343405846 NA 0.025385907
## DREB
## 0.004064528
summary(misto_normalp_dreb) #AIC:

## *****
## Family: c("NO", "Normal")
##
## Call: gamlss(formula = WINP ~ (re(random = ~1 | TEAM)) +
## PlusMinus + DREB, family = NO, data = dados_regressaop)
##
## Fitting method: RS()
##
## -----
## Mu link function: identity
## Mu Coefficients:
## Estimate Std. Error t value Pr(>|t|)
## (Intercept) 0.3434058 0.0734368 4.676 5.03e-06 ***
## PlusMinus 0.0253859 0.0009815 25.864 < 2e-16 ***
## DREB 0.0040645 0.0022729 1.788 0.0751 .
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## -----

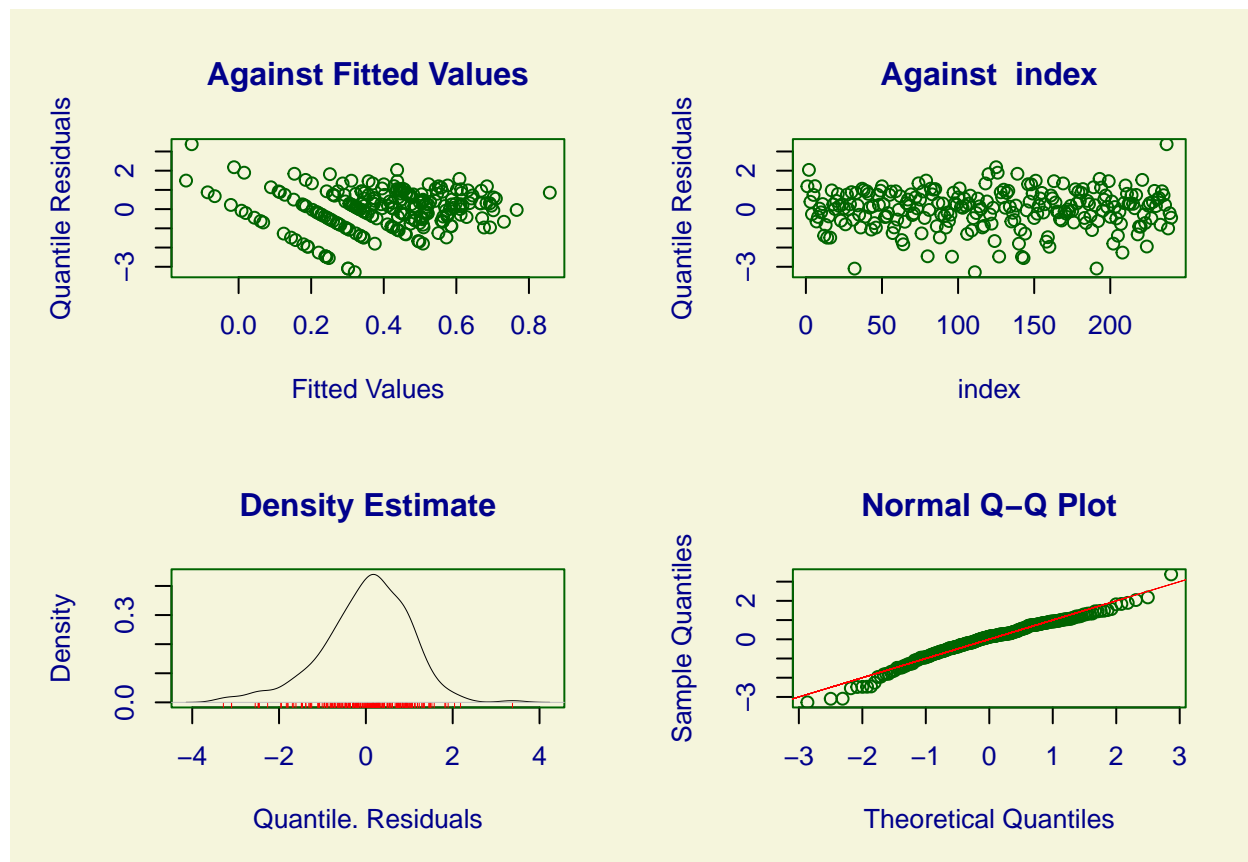
```

```
## Sigma link function: log
## Sigma Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept) -2.32792    0.04564   -51    <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## -----
## NOTE: Additive smoothing terms exist in the formulas:
## i) Std. Error for smoothers are for the linear effect only.
## ii) Std. Error for the linear terms maybe are not accurate.
## -----
## No. of observations in the fit: 240
## Degrees of Freedom for the fit: 14.43325
##      Residual Deg. of Freedom: 225.5668
##              at cycle: 2
##
## Global Deviance:    -436.3104
##           AIC:      -407.4439
##           SBC:      -357.207
## *****
```

```
getSmo(misto_normalp_dreb)
```

```
## Linear mixed-effects model fit by maximum likelihood
##   Data: Data
##   Log-likelihood: 204.9898
##   Fixed: fix.formula
##   (Intercept)
## -0.0008263643
##
## Random effects:
##   Formula: ~1 | TEAM
##           (Intercept) Residual
## StdDev:    0.0282907 1.024705
##
## Variance function:
##   Structure: fixed weights
##   Formula: ~W.var
## Number of Observations: 240
## Number of Groups: 33
```

```
#Resíduos
plot(misto_normalp_dreb)
```



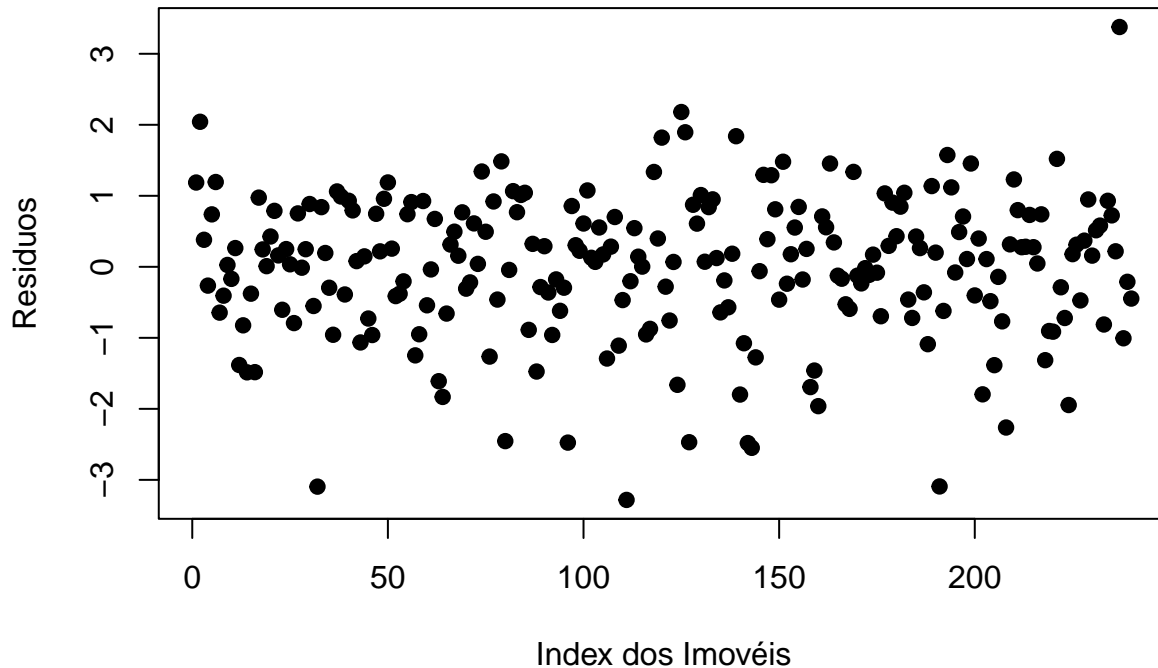
```
## *****
##      Summary of the Quantile Residuals
##              mean   = -4.491375e-17
##              variance = 1.004184
##              coef. of skewness = -0.5315828
##              coef. of kurtosis = 3.924077
## Filliben correlation coefficient = 0.9864969
## *****
```

```
shapiro.test(misto_normalp_dreb$residuals) #p-value =
```

```
##
## Shapiro-Wilk normality test
##
## data: misto_normalp_dreb$residuals
## W = 0.97414, p-value = 0.000228
```

```
#Independência
plot(misto_normalp_dreb$residuals,
     ylab = "Resíduos",
     xlab = "Index dos Imóveis",
     main = "Suposição de independência",
     pch = 19)
```

Suposição de independência



```
#Breusch_Pagan para homocedasticidade
bptest(misto_normalp_dreb) #p-value =

##
## studentized Breusch-Pagan test
##
## data: misto_normalp_dreb
## BP = 21.659, df = 2, p-value = 1.981e-05

#### Normal Temporada ####
misto_normalp_temp_team <- gamlss(formula = WINP ~ (re(random = ~1 | Numero_temporada)) +
                                  PlusMinus + DREB + TEAM, family = NO, data = dados_regressaop)

## GAMLSS-RS iteration 1: Global Deviance = -473.5697
## GAMLSS-RS iteration 2: Global Deviance = -473.5697
misto_normalp_temp_team

##
## Family: c("NO", "Normal")
## Fitting method: RS()
##
## Call: gamlss(formula = WINP ~ (re(random = ~1 | Numero_temporada)) +
##             PlusMinus + DREB + TEAM, family = NO, data = dados_regressaop)
##
## Mu Coefficients:
##
##             (Intercept) re(random = ~1 | Numero_temporada)
##                   0.346627                                NA
##                   PlusMinus                                DREB
##                   0.024781                                0.004688
##                   TEAMBoston Celtics                    TEAMBrooklyn Nets
```

```
## -0.005755 -0.103945
## TEAMCharlotte Bobcats TEAMCharlotte Hornets
## -0.249427 0.163699
## TEAMChicago Bulls TEAMCleveland Cavaliers
## -0.035875 0.021331
## TEAMDallas Mavericks TEAMDenver Nuggets
## -0.021046 -0.046537
## TEAMDetroit Pistons TEAMGolden State Warriors
## -0.089758 0.034484
## TEAMHouston Rockets TEAMIndiana Pacers
## 0.011700 -0.130056
## TEAMLA Clippers TEAMLos Angeles Clippers
## -0.068940 -0.030764
## TEAMLos Angeles Lakers TEAMMemphis Grizzlies
## 0.012975 0.018290
## TEAMMiami Heat TEAMMilwaukee Bucks
## 0.019437 -0.036961
## TEAMMinnesota Timberwolves TEAMNew Orleans Hornets
## -0.068361 0.183304
## TEAMNew Orleans Pelicans TEAMNew York Knicks
## -0.120687 -0.067320
## TEAMOklahoma City Thunder TEAMOrlando Magic
## -0.039946 -0.038859
## TEAMPhiladelphia 76ers TEAMPhoenix Suns
## -0.029856 0.056248
## TEAMPortland Trail Blazers TEAMSacramento Kings
## -0.036629 -0.023561
## TEAMSan Antonio Spurs TEAMToronto Raptors
## -0.043036 0.015121
## TEAMUtah Jazz TEAMWashington Wizards
## -0.046544 -0.002517
## Sigma Coefficients:
## (Intercept)
## -2.406
##
## Degrees of Freedom for the fit: 35 Residual Deg. of Freedom 205
## Global Deviance: -473.57
## AIC: -403.57
## SBC: -281.747
```

```
coef(misto_normalp_temp_team)
```

```
## (Intercept) re(random = ~1 | Numero_temporada)
## 0.346626952 NA
## PlusMinus DREB
## 0.024780875 0.004687656
## TEAMBoston Celtics TEAMBrooklyn Nets
## -0.005755339 -0.103944840
## TEAMCharlotte Bobcats TEAMCharlotte Hornets
## -0.249427359 0.163699455
## TEAMChicago Bulls TEAMCleveland Cavaliers
## -0.035874677 0.021330971
## TEAMDallas Mavericks TEAMDenver Nuggets
## -0.021046376 -0.046537067
## TEAMDetroit Pistons TEAMGolden State Warriors
```

```
##          -0.089758350          0.034483655
##          TEAMHouston Rockets          TEAMIndiana Pacers
##          0.011700011          -0.130055911
##          TEAMLA Clippers          TEAMLos Angeles Clippers
##          -0.068939682          -0.030764280
##          TEAMLos Angeles Lakers          TEAMMemphis Grizzlies
##          0.012975042          0.018290493
##          TEAMMiami Heat          TEAMMilwaukee Bucks
##          0.019437176          -0.036960816
##          TEAMMinnesota Timberwolves          TEAMNew Orleans Hornets
##          -0.068361098          0.183303607
##          TEAMNew Orleans Pelicans          TEAMNew York Knicks
##          -0.120686534          -0.067319855
##          TEAMOklahoma City Thunder          TEAMOrlando Magic
##          -0.039945586          -0.038859328
##          TEAMPhiladelphia 76ers          TEAMPhoenix Suns
##          -0.029855977          0.056248385
##          TEAMPortland Trail Blazers          TEAMSacramento Kings
##          -0.036628537          -0.023561117
##          TEAMSan Antonio Spurs          TEAMToronto Raptors
##          -0.043035574          0.015121085
##          TEAMUtah Jazz          TEAMWashington Wizards
##          -0.046544409          -0.002516683
```

```
summary(misto_normalp_temp_team) #AIC:
```

```
## *****
## Family:  c("NO", "Normal")
##
## Call:  gamlss(formula = WINP ~ (re(random = ~1 | Numero_temporada)) +
##      PlusMinus + DREB + TEAM, family = NO, data = dados_regressaop)
##
## Fitting method: RS()
##
## -----
## Mu link function:  identity
## Mu Coefficients:
##
##          Estimate Std. Error t value Pr(>|t|)
## (Intercept)      0.346627   0.076655   4.522 1.04e-05 ***
## PlusMinus        0.024781   0.001032  24.023 < 2e-16 ***
## DREB             0.004688   0.002300   2.038 0.042839 *
## TEAMBoston Celtics -0.005755   0.035805  -0.161 0.872455
## TEAMBrooklyn Nets  -0.103945   0.041208  -2.522 0.012413 *
## TEAMCharlotte Bobcats -0.249427   0.069121  -3.609 0.000387 ***
## TEAMCharlotte Hornets  0.163699   0.094029   1.741 0.083193 .
## TEAMChicago Bulls   -0.035875   0.039991  -0.897 0.370738
## TEAMCleveland Cavaliers  0.021331   0.043561   0.490 0.624881
## TEAMDallas Mavericks -0.021046   0.038632  -0.545 0.586486
## TEAMDenver Nuggets  -0.046537   0.038789  -1.200 0.231619
## TEAMDetroit Pistons  -0.089758   0.059407  -1.511 0.132354
## TEAMGolden State Warriors  0.034484   0.040998   0.841 0.401271
## TEAMHouston Rockets   0.011700   0.040066   0.292 0.770568
## TEAMIndiana Pacers   -0.130056   0.039828  -3.265 0.001281 **
## TEAMLA Clippers      -0.068940   0.045216  -1.525 0.128885
## TEAMLos Angeles Clippers -0.030764   0.052216  -0.589 0.556392
```

```

## TEAMLos Angeles Lakers      0.012975    0.041296    0.314 0.753693
## TEAMMemphis Grizzlies       0.018290    0.038643    0.473 0.636485
## TEAMMiami Heat              0.019437    0.036987    0.526 0.599798
## TEAMMilwaukee Bucks        -0.036961    0.039210   -0.943 0.346979
## TEAMMinnesota Timberwolves -0.068361    0.058750   -1.164 0.245944
## TEAMNew Orleans Hornets     0.183304    0.070151    2.613 0.009641 **
## TEAMNew Orleans Pelicans   -0.120687    0.058469   -2.064 0.040267 *
## TEAMNew York Knicks        -0.067320    0.048063   -1.401 0.162832
## TEAMOklahoma City Thunder  -0.039946    0.039161   -1.020 0.308916
## TEAMOrlando Magic          -0.038859    0.045153   -0.861 0.390456
## TEAMPhiladelphia 76ers     -0.029856    0.040094   -0.745 0.457336
## TEAMPhoenix Suns           0.056248    0.052393    1.074 0.284267
## TEAMPortland Trail Blazers -0.036629    0.037850   -0.968 0.334323
## TEAMSacramento Kings       -0.023561    0.094120   -0.250 0.802582
## TEAMSan Antonio Spurs      -0.043036    0.038012   -1.132 0.258893
## TEAMToronto Raptors        0.015121    0.041208    0.367 0.714036
## TEAMUtah Jazz              -0.046544    0.040055   -1.162 0.246577
## TEAMWashington Wizards     -0.002517    0.048267   -0.052 0.958467
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## -----
## Sigma link function:  log
## Sigma Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept) -2.40554    0.04564   -52.7  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## -----
## NOTE: Additive smoothing terms exist in the formulas:
## i) Std. Error for smoothers are for the linear effect only.
## ii) Std. Error for the linear terms maybe are not accurate.
## -----
## No. of observations in the fit:  240
## Degrees of Freedom for the fit:  35
##      Residual Deg. of Freedom:  205
##              at cycle:  2
##
## Global Deviance:    -473.5697
##           AIC:      -403.5697
##           SBC:      -281.7473
## *****
getSmo(misto_normalp_temp_team)

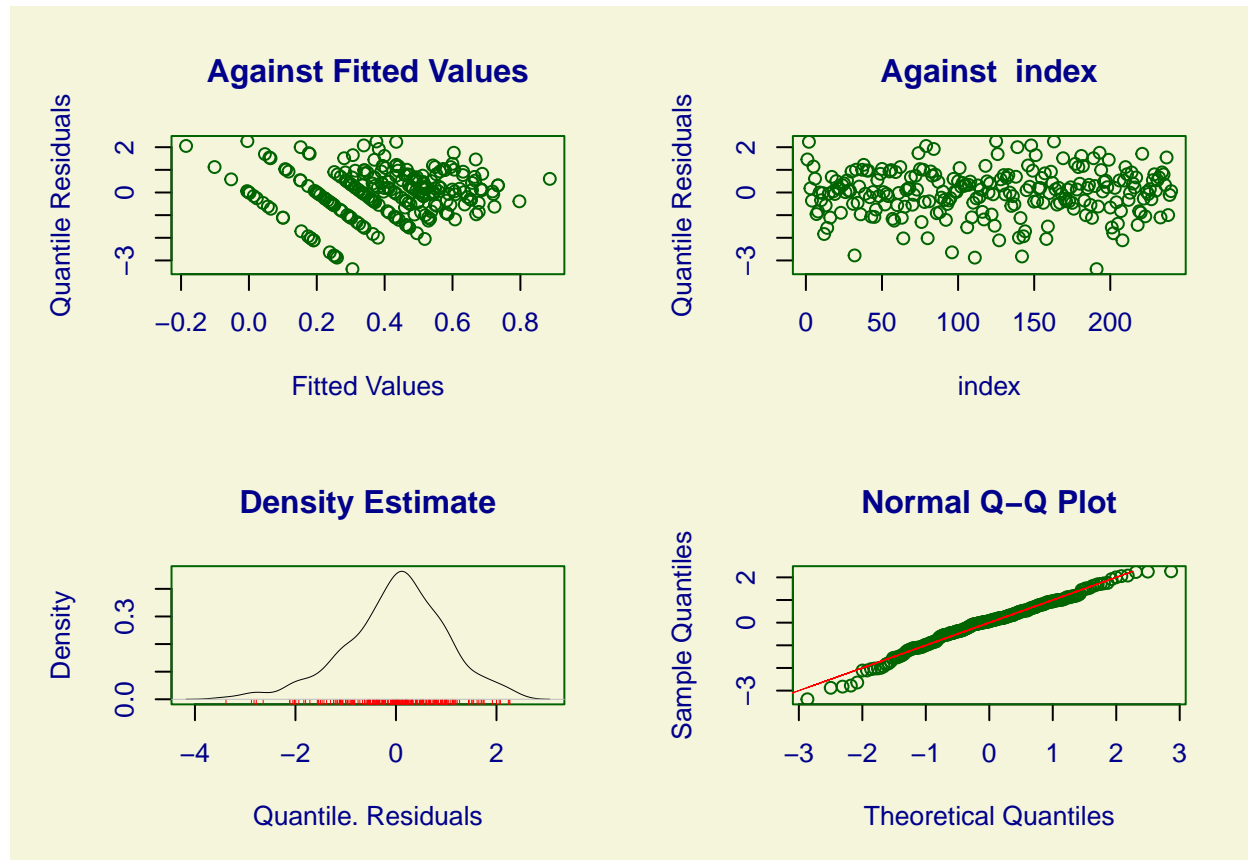
## Linear mixed-effects model fit by maximum likelihood
##   Data: Data
##   Log-likelihood: 236.7848
##   Fixed: fix.formula
##   (Intercept)
## -7.596768e-18
##
## Random effects:
##   Formula: ~1 | Numero_temporada

```



```
##          (Intercept)  Residual
## StdDev: 9.839206e-07 0.9999999
##
## Variance function:
## Structure: fixed weights
## Formula: ~W.var
## Number of Observations: 240
## Number of Groups: 15
```

```
#Resíduos
plot(misto_normalp_temp_team)
```

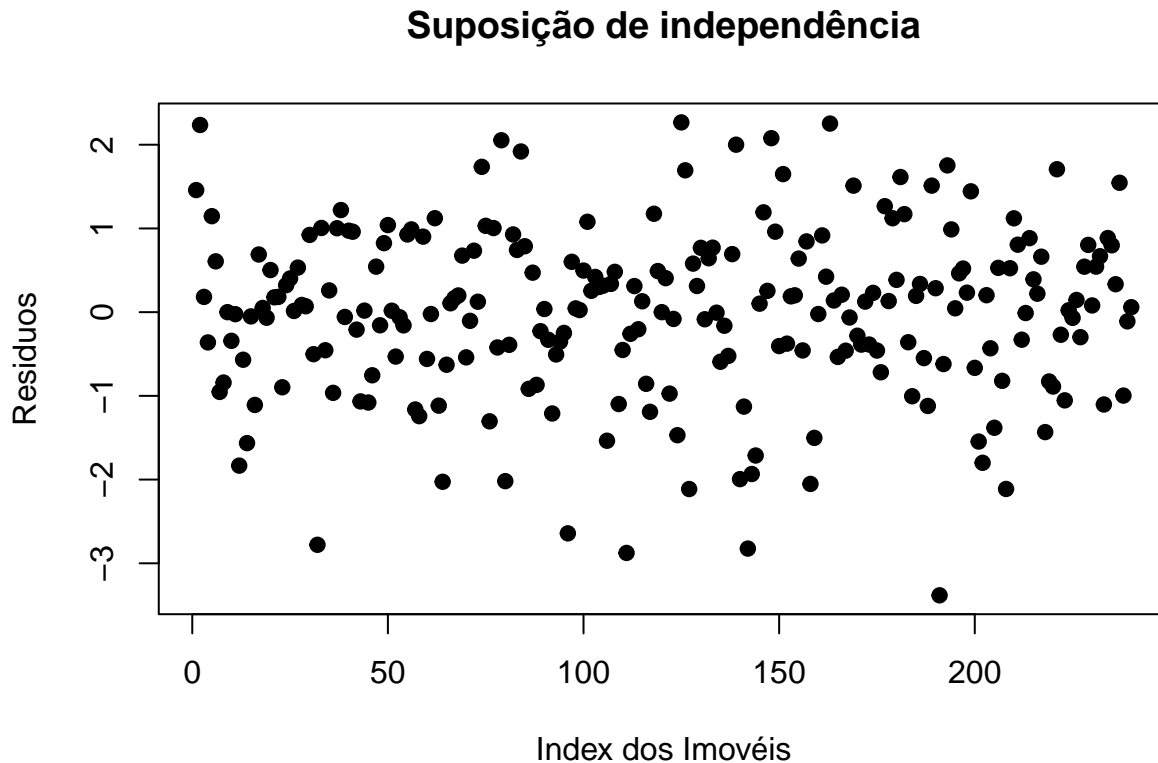


```
## *****
##      Summary of the Quantile Residuals
##              mean   = -2.035307e-18
##              variance = 1.004184
##              coef. of skewness = -0.4382711
##              coef. of kurtosis = 3.51579
## Filliben correlation coefficient = 0.9918678
## *****
```

```
shapiro.test(misto_normalp_temp_team$residuals) #p-value =
```

```
##
## Shapiro-Wilk normality test
##
## data: misto_normalp_temp_team$residuals
## W = 0.98337, p-value = 0.006562
```

```
#Independência
plot(misto_normalp_temp_team$residuals,
     ylab = "Resíduos",
     xlab = "Index dos Imóveis",
     main = "Suposição de independência",
     pch = 19)
```



```
#Breusch_Pagan para homocedasticidade
bptest(misto_normalp_temp_team) #p-value =

##
## studentized Breusch-Pagan test
##
## data: misto_normalp_temp_team
## BP = 60.063, df = 34, p-value = 0.003813

##### Beta Team #####
misto_betap_ftp <- gamlss(formula = WINP ~ (re(random = ~1 | TEAM)) +
                          PlusMinus + PF + BLKA + FTP, family = BEZI, data = dados_regressaop)

## GAMLSS-RS iteration 1: Global Deviance = -170.0295
## GAMLSS-RS iteration 2: Global Deviance = -349.6334
## GAMLSS-RS iteration 3: Global Deviance = -350.6895
## GAMLSS-RS iteration 4: Global Deviance = -350.6399
## GAMLSS-RS iteration 5: Global Deviance = -350.6347
## GAMLSS-RS iteration 6: Global Deviance = -350.6342
misto_betap_ftp

##
## Family: c("BEZI", "Zero Inflated Beta")
```

```
## Fitting method: RS()
##
## Call:  gamlss(formula = WINP ~ (re(random = ~1 | TEAM)) +
##       PlusMinus + PF + BLKA + FTP, family = BEZI, data = dados_regressaop)
##
## Mu Coefficients:
##           (Intercept)  re(random = ~1 | TEAM)           PlusMinus
##           0.215798              NA              0.103393
##           PF              BLKA              FTP
##           -0.025465          -0.028687          0.005414
## Sigma Coefficients:
## (Intercept)
##      3.661
## Nu Coefficients:
## (Intercept)
##      -2.197
##
## Degrees of Freedom for the fit: 13.58 Residual Deg. of Freedom   226.4
## Global Deviance:      -350.634
##           AIC:      -323.47
##           SBC:      -276.196
```

```
coef(misto_betap_ftp)
```

```
##           (Intercept) re(random = ~1 | TEAM)           PlusMinus
##           0.215797839              NA              0.103392931
##           PF              BLKA              FTP
##           -0.025464733          -0.028687176          0.005413543
```

```
summary(misto_betap_ftp) #AIC:
```

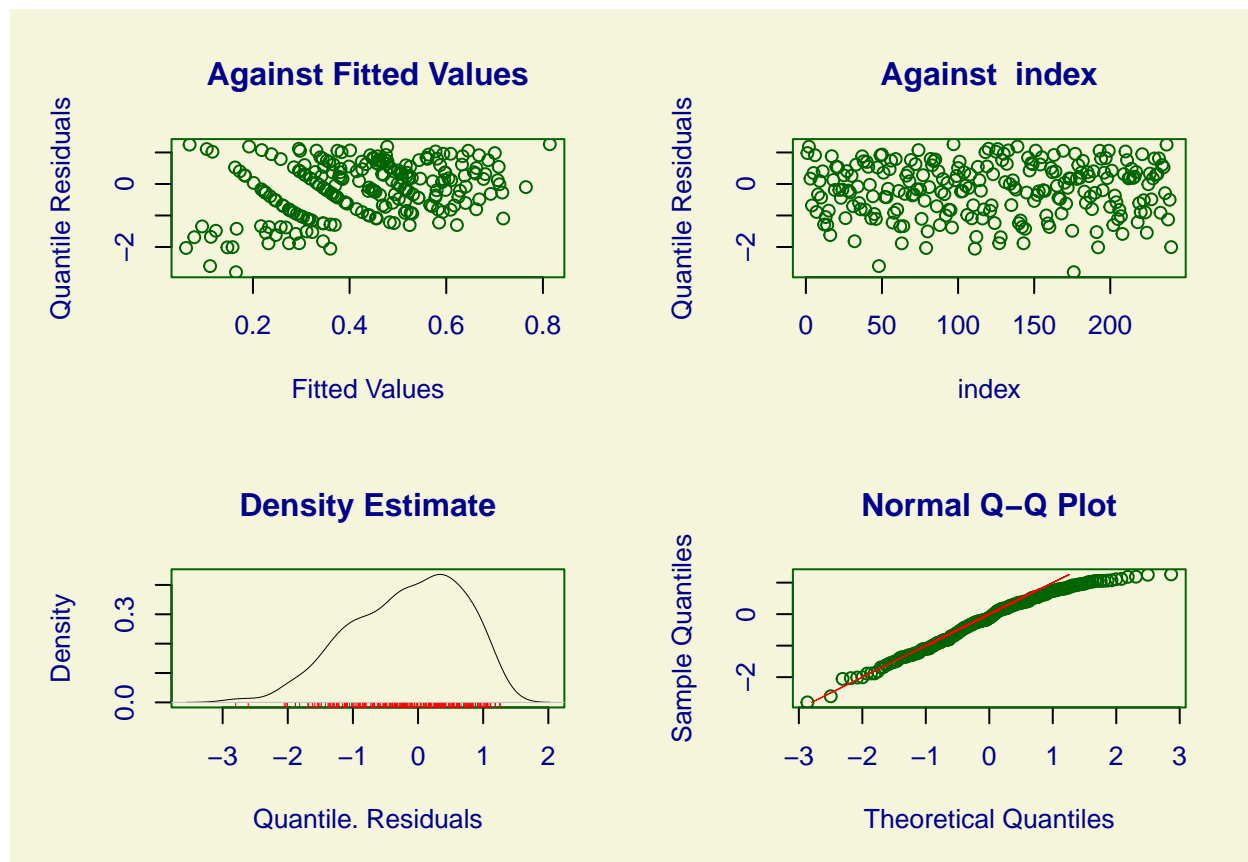
```
## *****
## Family:  c("BEZI", "Zero Inflated Beta")
##
## Call:  gamlss(formula = WINP ~ (re(random = ~1 | TEAM)) +
##       PlusMinus + PF + BLKA + FTP, family = BEZI, data = dados_regressaop)
##
## Fitting method: RS()
##
## -----
## Mu link function:  logit
## Mu Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.215798   0.482300   0.447   0.6550
## PlusMinus    0.103393   0.004502  22.968 <2e-16 ***
## PF          -0.025465   0.010889  -2.339   0.0202 *
## BLKA        -0.028687   0.017780  -1.613   0.1080
## FTP          0.005414   0.004933   1.097   0.2737
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## -----
## Sigma link function:  log
## Sigma Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
```

```
## (Intercept) 3.66081 0.09514 38.48 <2e-16 ***
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## -----
## Nu link function: logit
## Nu Coefficients:
## Estimate Std. Error t value Pr(>|t|)
## (Intercept) -2.1972 0.2152 -10.21 <2e-16 ***
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## -----
## NOTE: Additive smoothing terms exist in the formulas:
## i) Std. Error for smoothers are for the linear effect only.
## ii) Std. Error for the linear terms maybe are not accurate.
## -----
## No. of observations in the fit: 240
## Degrees of Freedom for the fit: 13.58204
## Residual Deg. of Freedom: 226.418
## at cycle: 6
##
## Global Deviance: -350.6342
## AIC: -323.4701
## SBC: -276.1959
## *****
```

```
getSmo(misto_betap_ftp)
```

```
## Linear mixed-effects model fit by maximum likelihood
## Data: Data
## Log-likelihood: -374.7157
## Fixed: fix.formula
## (Intercept)
## -0.0007885399
##
## Random effects:
## Formula: ~1 | TEAM
## (Intercept) Residual
## StdDev: 0.07091602 0.9627084
##
## Variance function:
## Structure: fixed weights
## Formula: ~W.var
## Number of Observations: 240
## Number of Groups: 33
```

```
#Resíduos
plot(misto_betap_ftp)
```



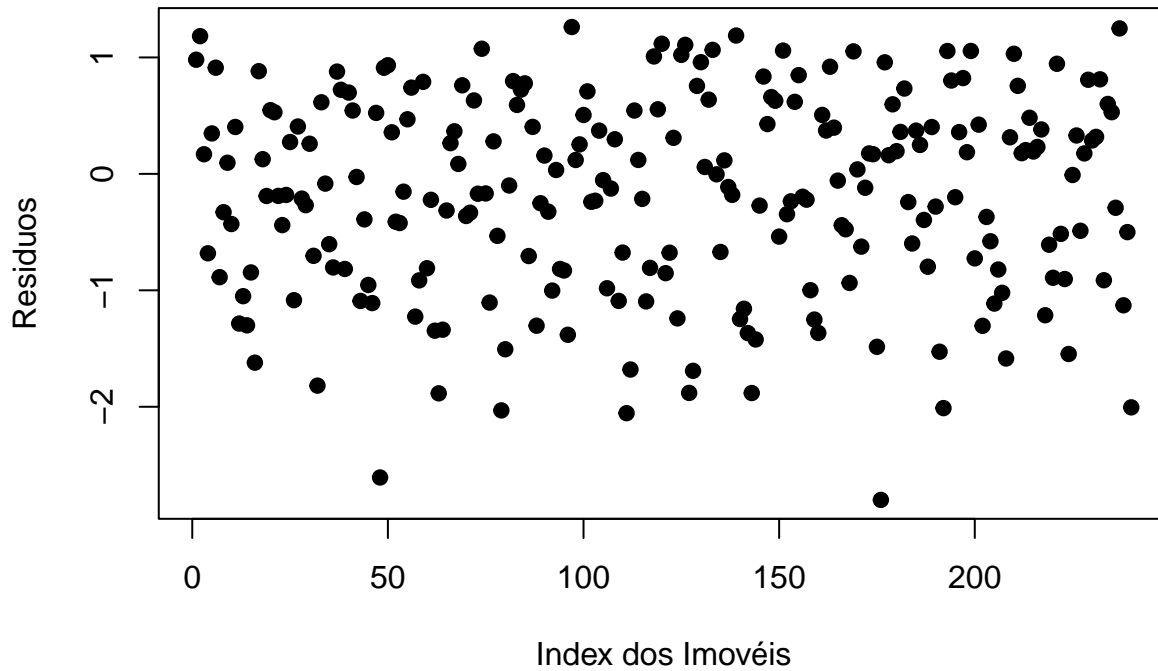
```
## *****
## Summary of the Randomised Quantile Residuals
##           mean      = -0.1708252
##           variance   = 0.7127382
##           coef. of skewness = -0.4692502
##           coef. of kurtosis = 2.567015
## Filliben correlation coefficient = 0.985366
## *****
```

```
shapiro.test(misto_betap_ftp$residuals) #p-value =
```

```
##
## Shapiro-Wilk normality test
##
## data: misto_betap_ftp$residuals
## W = 0.96987, p-value = 5.663e-05
```

```
#Independência
plot(misto_betap_ftp$residuals,
     ylab = "Resíduos",
     xlab = "Index dos Imóveis",
     main = "Suposição de independência",
     pch = 19)
```

Suposição de independência



```
#Breusch_Pagan para homocedasticidade
```

```
bptest(misto_betap_ftp) #p-value =
```

```
##
```

```
## studentized Breusch-Pagan test
```

```
##
```

```
## data: misto_betap_ftp
```

```
## BP = 19.939, df = 4, p-value = 0.0005133
```

```
##### Beta Temp #####
```

```
misto_betap_temp <- gamlss(formula = WINP ~ (re(random = ~1 | Numero_temporada)) +  
                           PlusMinus + PF, family = BEZI, data = dados_regressaop)
```

```
## GAMLSS-RS iteration 1: Global Deviance = -161.4236
```

```
## GAMLSS-RS iteration 2: Global Deviance = -329.2529
```

```
## GAMLSS-RS iteration 3: Global Deviance = -330.669
```

```
## GAMLSS-RS iteration 4: Global Deviance = -330.6692
```

```
misto_betap_temp
```

```
##
```

```
## Family: c("BEZI", "Zero Inflated Beta")
```

```
## Fitting method: RS()
```

```
##
```

```
## Call: gamlss(formula = WINP ~ (re(random = ~1 | Numero_temporada)) +
```

```
## PlusMinus + PF, family = BEZI, data = dados_regressaop)
```

```
##
```

```
## Mu Coefficients:
```

```
## (Intercept) re(random = ~1 | Numero_temporada)
```

```
## 0.5145 NA
```

```
## PlusMinus PF
```

```
##                               0.1063                               -0.0265
## Sigma Coefficients:
## (Intercept)
##      3.571
## Nu Coefficients:
## (Intercept)
##      -2.197
##
## Degrees of Freedom for the fit: 4 Residual Deg. of Freedom    236
## Global Deviance:      -330.669
##           AIC:        -322.669
##           SBC:        -308.747
```

```
coef(misto_betap_temp)
```

```
##                               (Intercept) re(random = ~1 | Numero_temporada)
##                               0.51448416                               NA
##                               PlusMinus                               PF
##                               0.10628690                               -0.02649885
```

```
summary(misto_betap_temp) #AIC:
```

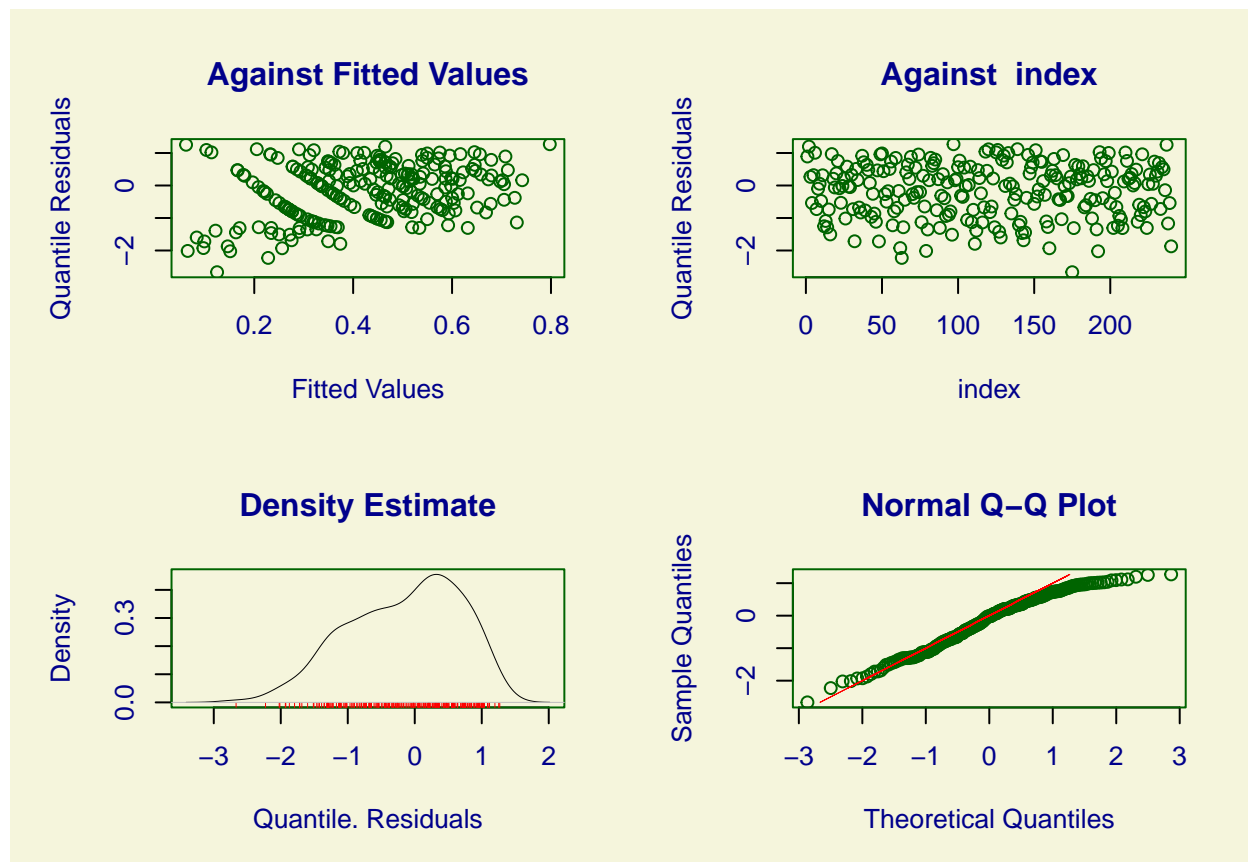
```
## *****
## Family:  c("BEZI", "Zero Inflated Beta")
##
## Call:  gamlss(formula = WINP ~ (re(random = ~1 | Numero_temporada)) +
##      PlusMinus + PF, family = BEZI, data = dados_regressaop)
##
## Fitting method: RS()
##
## -----
## Mu link function:  logit
## Mu Coefficients:
##      Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.514484   0.244311   2.106   0.0363 *
## PlusMinus    0.106287   0.004552  23.349  <2e-16 ***
## PF          -0.026499   0.011248  -2.356   0.0193 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## -----
## Sigma link function:  log
## Sigma Coefficients:
##      Estimate Std. Error t value Pr(>|t|)
## (Intercept)  3.57084    0.09504   37.57  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## -----
## Nu link function:  logit
## Nu Coefficients:
##      Estimate Std. Error t value Pr(>|t|)
## (Intercept) -2.1972     0.2152  -10.21  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
## -----
## NOTE: Additive smoothing terms exist in the formulas:
## i) Std. Error for smoothers are for the linear effect only.
## ii) Std. Error for the linear terms maybe are not accurate.
## -----
## No. of observations in the fit: 240
## Degrees of Freedom for the fit: 4
## Residual Deg. of Freedom: 236
## at cycle: 4
##
## Global Deviance: -330.6692
## AIC: -322.6692
## SBC: -308.7466
## *****
```

```
getSmo(misto_betap_temp)
```

```
## Linear mixed-effects model fit by maximum likelihood
## Data: Data
## Log-likelihood: -376.032
## Fixed: fix.formula
## (Intercept)
## 4.471334e-12
##
## Random effects:
## Formula: ~1 | Numero_temporada
## (Intercept) Residual
## StdDev: 8.256872e-06 0.9485917
##
## Variance function:
## Structure: fixed weights
## Formula: ~W.var
## Number of Observations: 240
## Number of Groups: 15
```

```
#Resíduos
plot(misto_betap_temp)
```

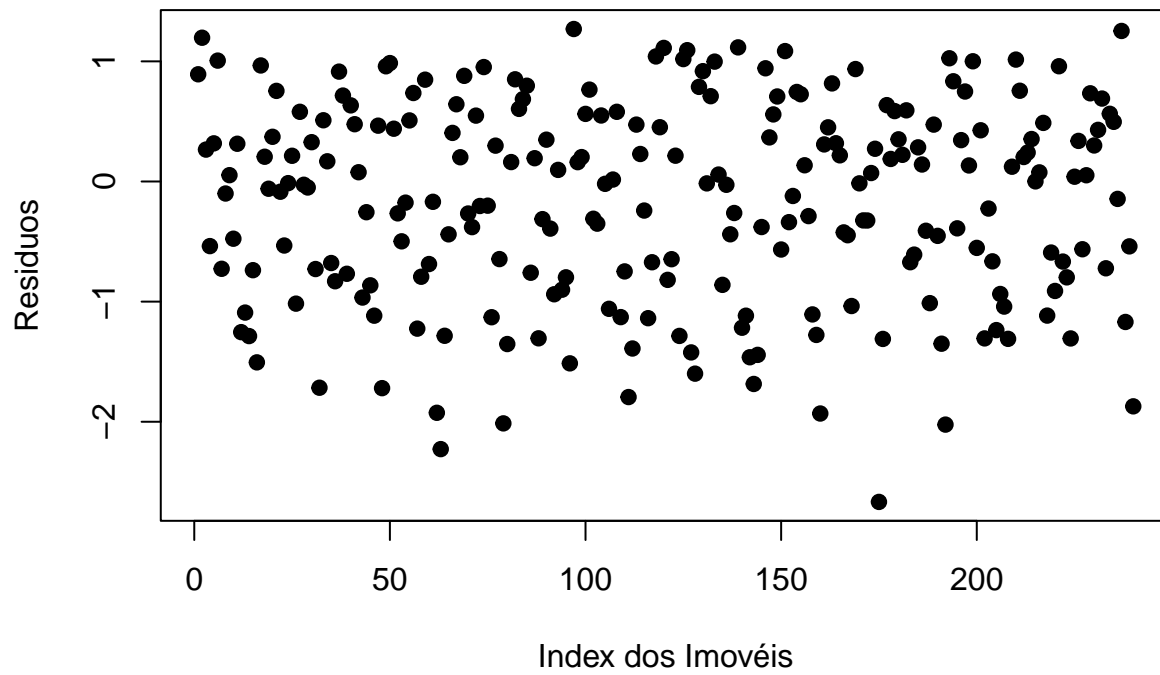
```
## *****
## Summary of the Randomised Quantile Residuals
##           mean      = -0.1608209
##           variance   = 0.6849506
##           coef. of skewness = -0.4146971
##           coef. of kurtosis = 2.375496
## Filliben correlation coefficient = 0.9848947
## *****
```

```
shapiro.test(misto_betap_temp$residuals) #p-value =
```

```
##
## Shapiro-Wilk normality test
##
## data: misto_betap_temp$residuals
## W = 0.96886, p-value = 4.135e-05
```

```
#Independência
plot(misto_betap_temp$residuals,
     ylab = "Resíduos",
     xlab = "Index dos Imóveis",
     main = "Suposição de independência",
     pch = 19)
```

Suposição de independência



```
#Breusch_Pagan para homocedasticidade  
bptest(misto_betap_temp) #p-value =
```

```
##  
## studentized Breusch-Pagan test  
##  
## data: misto_betap_temp  
## BP = 18.652, df = 2, p-value = 8.91e-05
```