

Universidade Estadual de Campinas
Métodos em Análise Multivariada

Trabalho ME731

Parte 1

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Dezembro/2017

Sumário

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1 INTRODUÇÃO

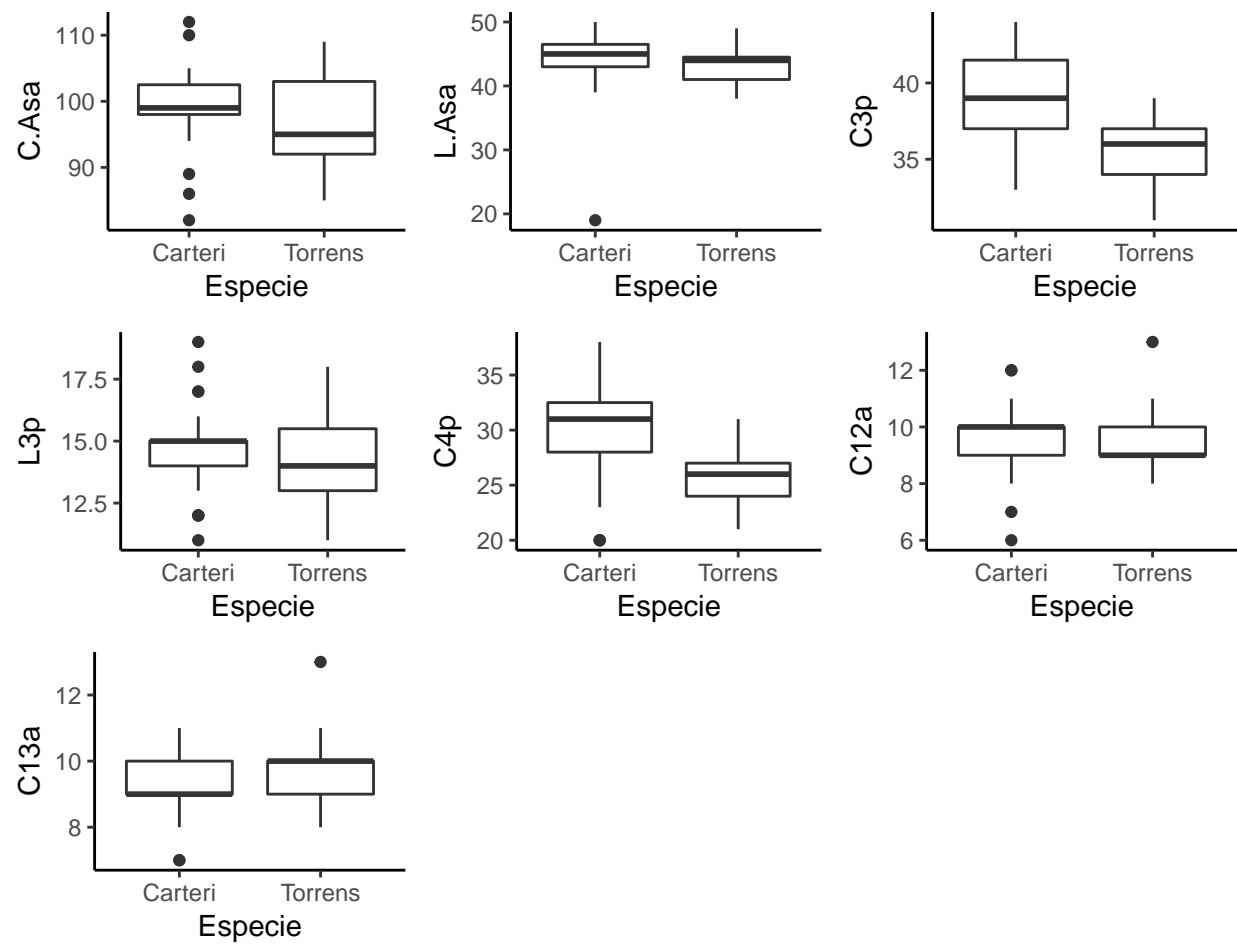
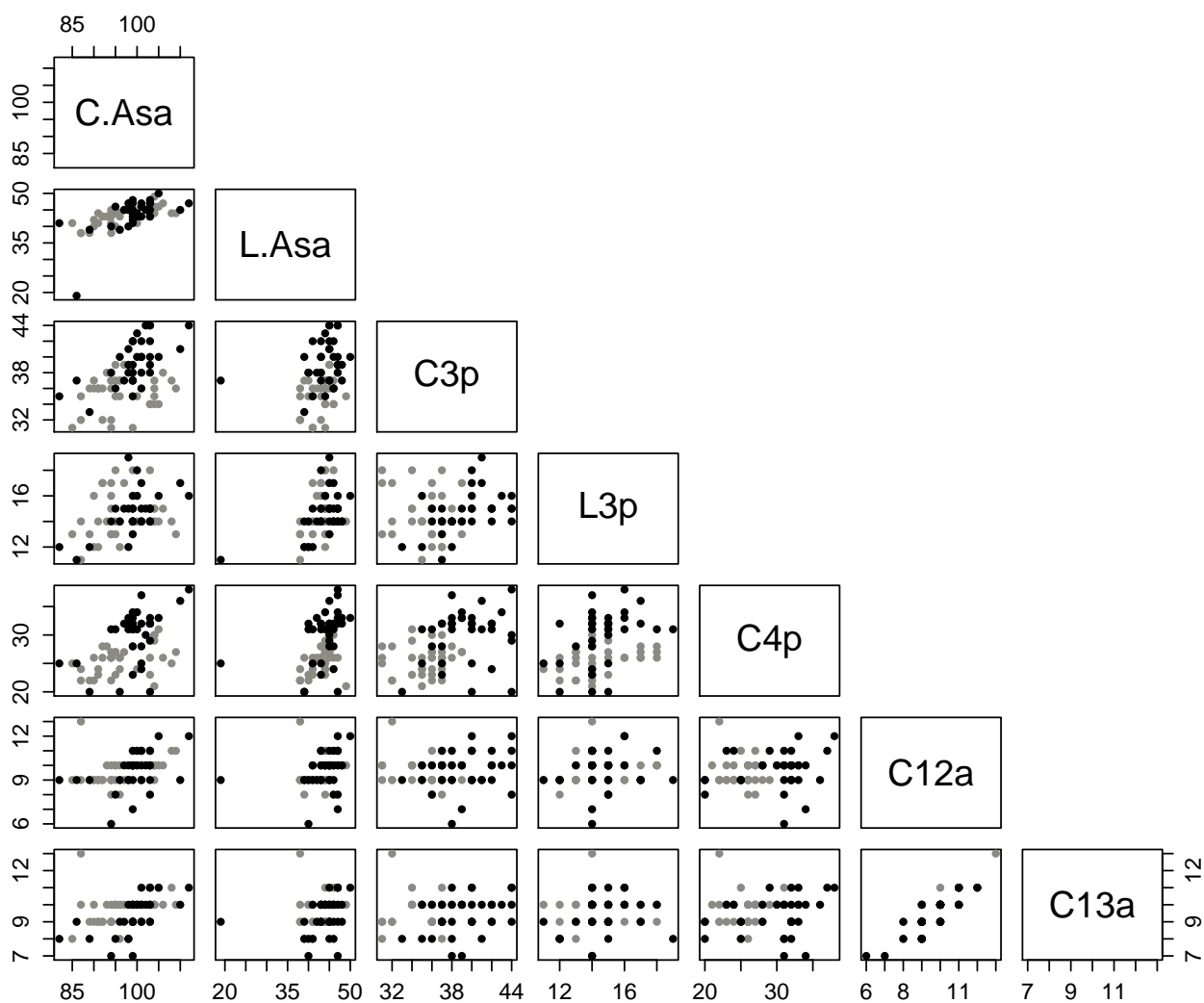


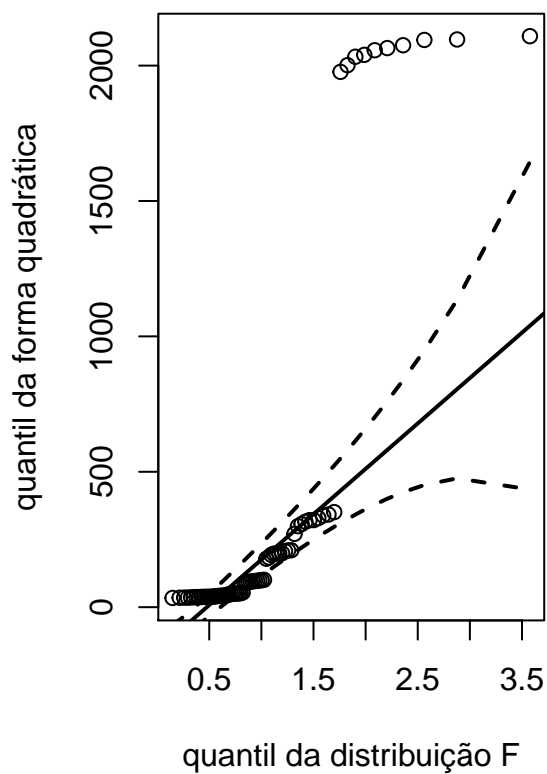
Figure 1: BoxPlots

Gráfico de Dispersão

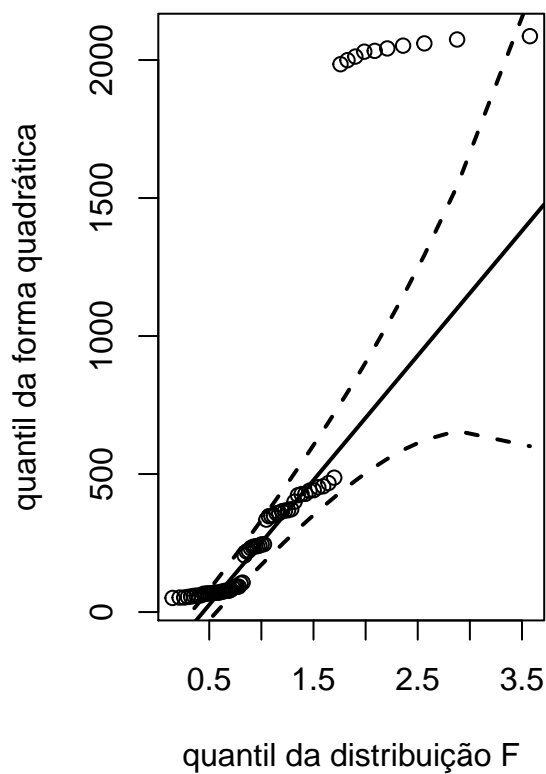


| | C.Asa | L.Asa | C3p | L3p | C4p | C12a | C13a |
|---------|-------|-------|-------|-------|-------|-------|-------|
| TORRENS | | | | | | | |
| C.Asa | 40,73 | 0,67 | 0,17 | 0,19 | 0,39 | 0,32 | 0,29 |
| L.Asa | 11,72 | 7,49 | 0,30 | 0,37 | 0,48 | 0,13 | 0,12 |
| C3p | 2,33 | 1,83 | 4,83 | -0,19 | 0,11 | -0,18 | 0,09 |
| L3p | 2,20 | 1,84 | -0,78 | 3,38 | 0,37 | 0,10 | 0,00 |
| C4p | 6,26 | 3,26 | 0,61 | 1,70 | 6,24 | -0,01 | -0,02 |
| C12a | 1,88 | 0,32 | -0,37 | 0,17 | -0,02 | 0,84 | 0,78 |
| C13a | 1,66 | 0,30 | 0,17 | 0,00 | -0,05 | 0,64 | 0,80 |
| CARTERI | | | | | | | |
| | C.Asa | L.Asa | C3p | L3p | C4p | C12a | C13a |
| C.Asa | 31,29 | 0,61 | 0,62 | 0,56 | 0,50 | 0,42 | 0,60 |
| L.Asa | 17,47 | 25,79 | 0,26 | 0,50 | 0,38 | 0,28 | 0,28 |
| C3p | 9,83 | 3,70 | 8,04 | 0,46 | 0,20 | 0,22 | 0,38 |
| L3p | 5,15 | 4,14 | 2,17 | 2,70 | 0,41 | 0,18 | 0,25 |
| C4p | 12,88 | 8,94 | 2,62 | 3,12 | 21,29 | 0,20 | 0,26 |
| C12a | 2,97 | 1,79 | 0,79 | 0,38 | 1,15 | 1,58 | 0,87 |
| C13a | 3,63 | 1,57 | 1,17 | 0,46 | 1,32 | 1,19 | 1,18 |

Especie Torrens

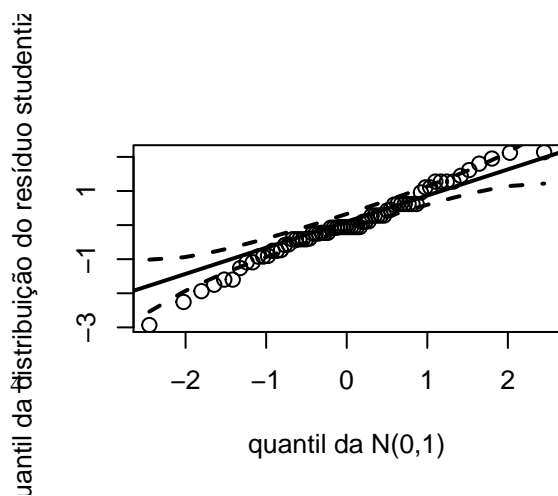
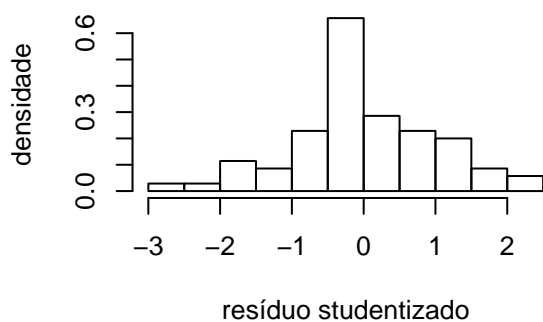
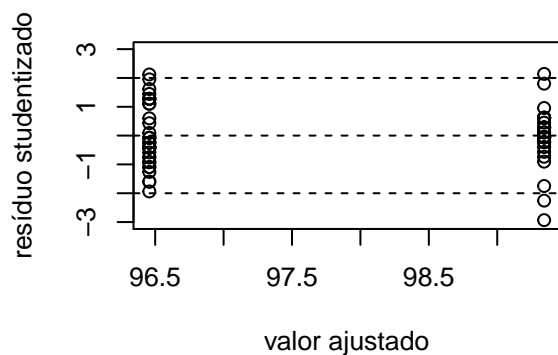
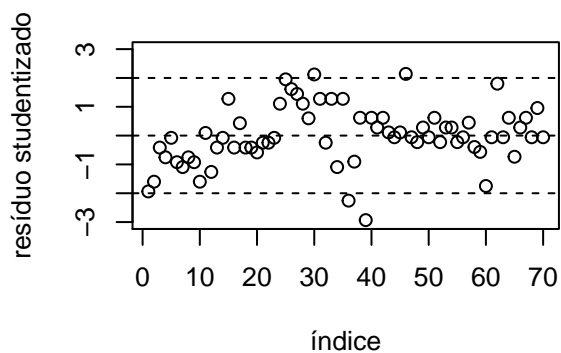


Especie Carteri



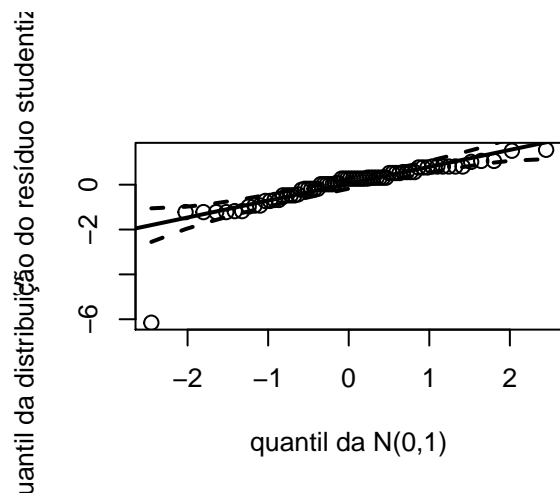
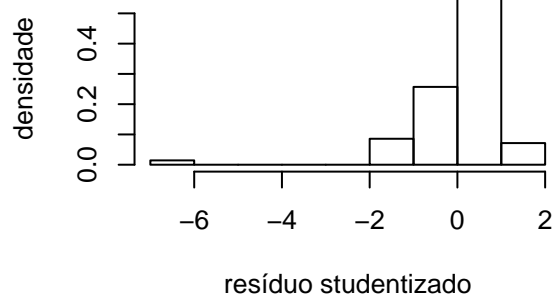
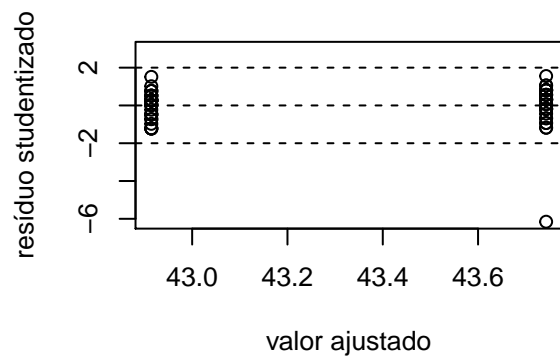
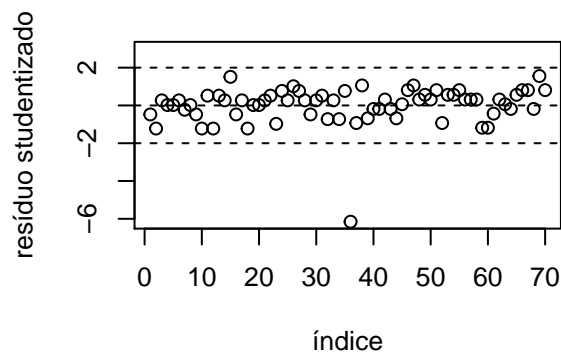
| Variável | Especie | Média | DP | Var | CV | Mínimo | Mediana | Máximo | n |
|----------|---------|-------|------|-------|-------|--------|---------|--------|----|
| C.Asa | Carteri | 99,34 | 5,59 | 31,29 | 5,63 | 82 | 99,00 | 112 | 35 |
| | Torrens | 96,46 | 6,38 | 40,73 | 6,62 | 85 | 95,00 | 109 | 35 |
| L.Asa | Carteri | 43,74 | 5,08 | 25,78 | 11,61 | 19 | 45,00 | 50 | 35 |
| | Torrens | 42,91 | 2,74 | 7,49 | 6,38 | 38 | 44,00 | 49 | 35 |
| C3p | Carteri | 39,31 | 2,84 | 8,05 | 7,21 | 33 | 39,00 | 44 | 35 |
| | Torrens | 35,37 | 2,20 | 4,83 | 6,21 | 31 | 36,00 | 39 | 35 |
| L3p | Carteri | 14,66 | 1,64 | 2,70 | 11,22 | 11 | 15,00 | 19 | 35 |
| | Torrens | 14,51 | 1,84 | 3,37 | 12,66 | 11 | 14,00 | 18 | 35 |
| C4p | Carteri | 30,00 | 4,61 | 21,29 | 15,38 | 20 | 31,00 | 38 | 35 |
| | Torrens | 25,63 | 2,50 | 6,24 | 9,75 | 21 | 26,00 | 31 | 35 |
| C12a | Carteri | 9,66 | 1,26 | 1,58 | 13,04 | 6 | 10,00 | 12 | 35 |
| | Torrens | 9,57 | 0,92 | 0,84 | 9,58 | 8 | 9,00 | 13 | 35 |
| C13a | Carteri | 9,37 | 1,09 | 1,18 | 11,60 | 7 | 9,00 | 11 | 35 |
| | Torrens | 9,71 | 0,89 | 0,80 | 9,20 | 8 | 10,00 | 13 | 35 |

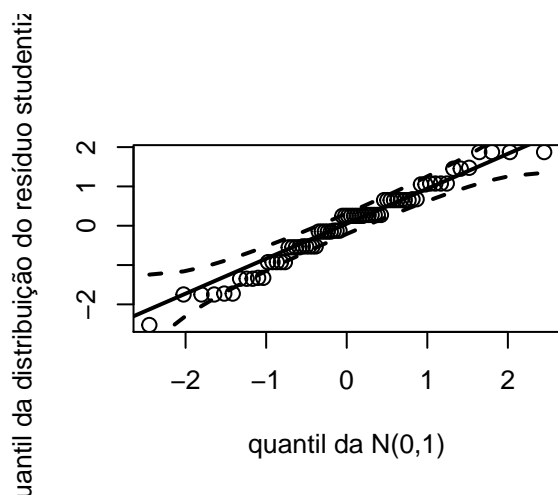
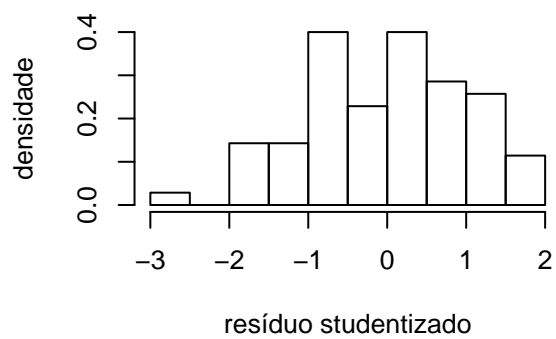
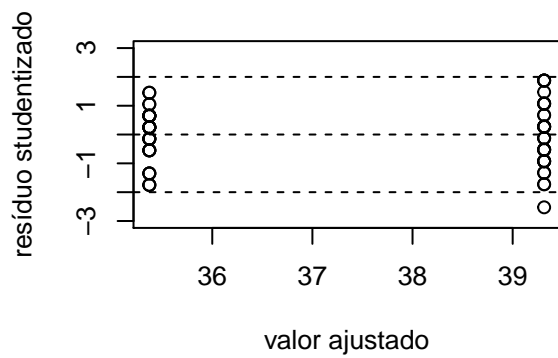
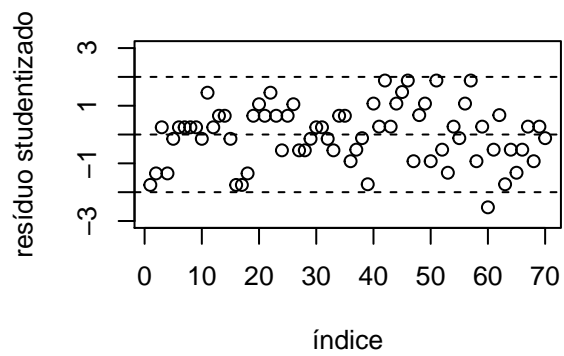
| Estatística | Valor | Aprox. Dist. F | P-Valor |
|------------------|-------|----------------|---------|
| Wilks | 0,39 | 13,82 | <0,01 |
| Pillai | 0,61 | 13,82 | <0,01 |
| Hotteling-Lawley | 1,56 | 13,82 | <0,01 |
| Roy | 1,56 | 13,82 | <0,01 |

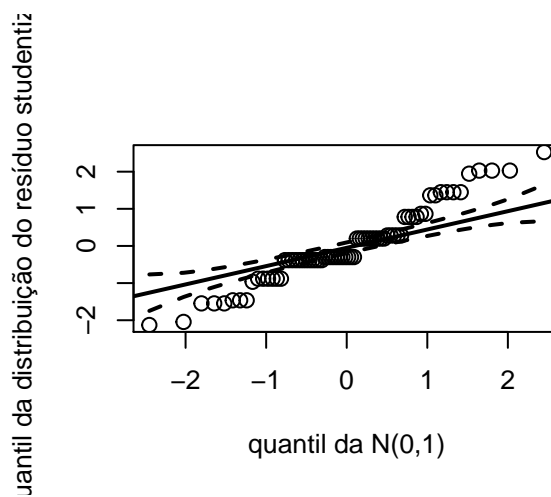
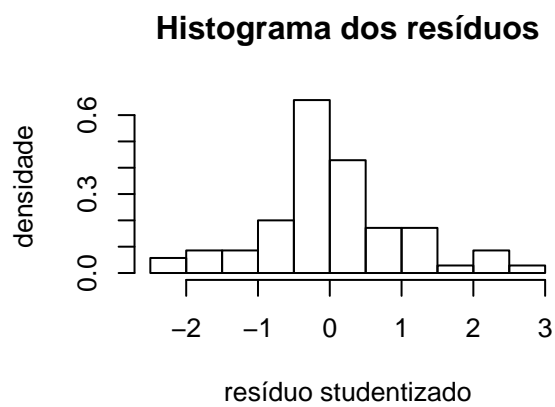
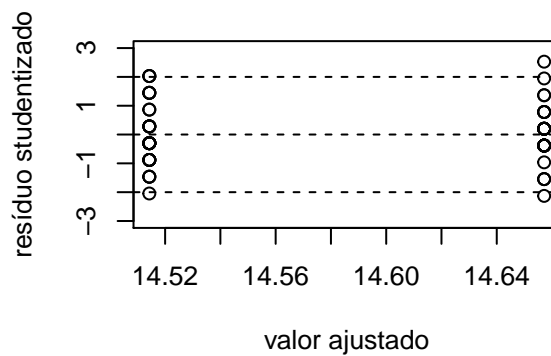
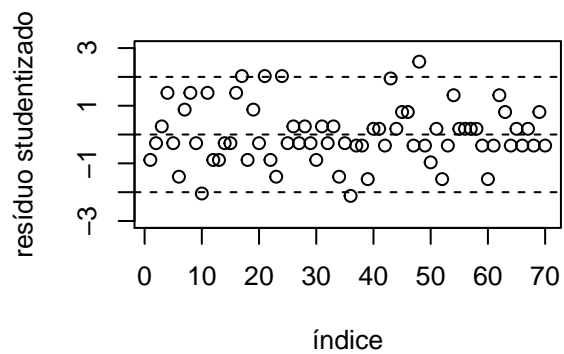


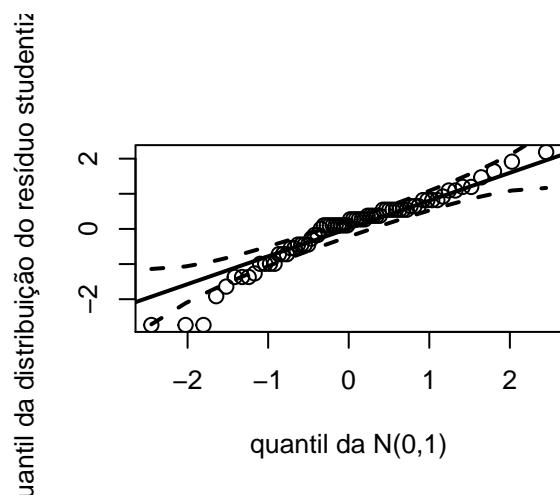
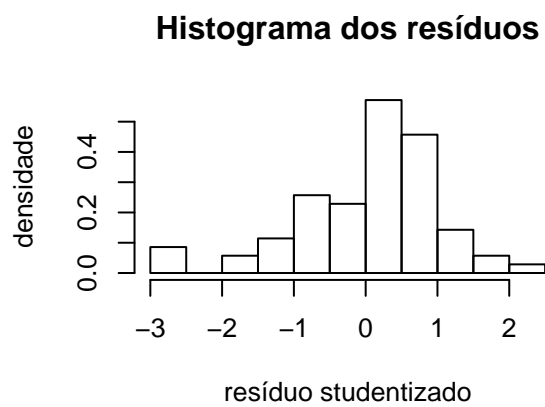
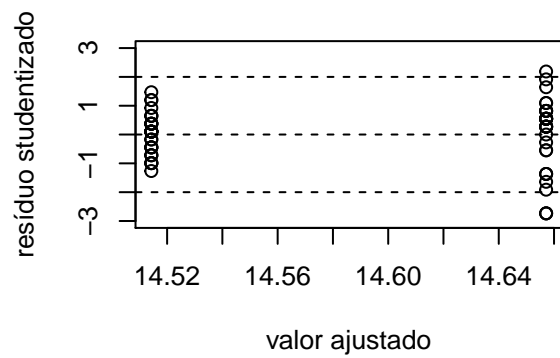
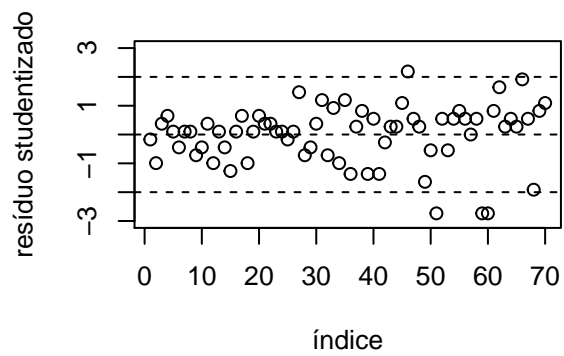
| Variável | Parâmetro | Estimativa | Erro Padrão | Valor t | p-valor |
|----------|------------|------------|-------------|---------|---------|
| C.Asa | μ_1 | 96,46 | 1,01 | 95,10 | <0,01 |
| | α_1 | 2,89 | 1,43 | 2,01 | 0,05 |
| L.Asa | μ_1 | 42,91 | 0,69 | 62,24 | <0,01 |
| | α_1 | 0,83 | 0,98 | 0,85 | 0,40 |
| C3p | μ_1 | 35,37 | 0,43 | 82,48 | <0,01 |
| | α_1 | 3,94 | 0,61 | 6,50 | <0,01 |
| L3p | μ_1 | 14,51 | 0,29 | 49,26 | <0,01 |
| | α_1 | 0,14 | 0,42 | 0,34 | 0,73 |
| C4p | μ_1 | 25,63 | 0,63 | 40,86 | <0,01 |
| | α_1 | 4,37 | 0,89 | 4,93 | <0,01 |
| C12a | μ_1 | 9,57 | 0,19 | 51,42 | <0,01 |
| | α_1 | 0,09 | 0,26 | 0,33 | 0,75 |
| C13a | μ_1 | 9,71 | 0,17 | 57,76 | <0,01 |
| | α_1 | -0,34 | 0,24 | -1,44 | 0,15 |

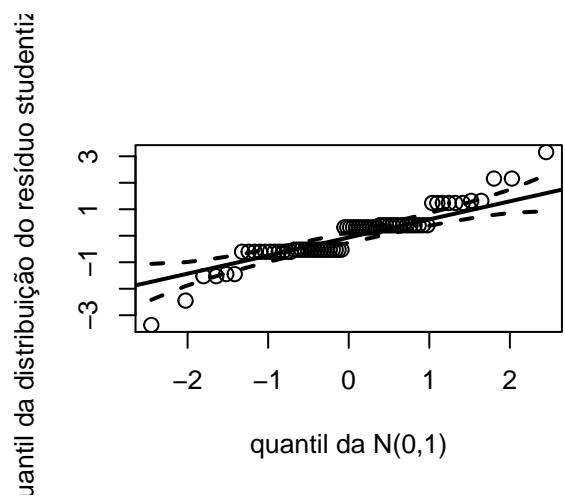
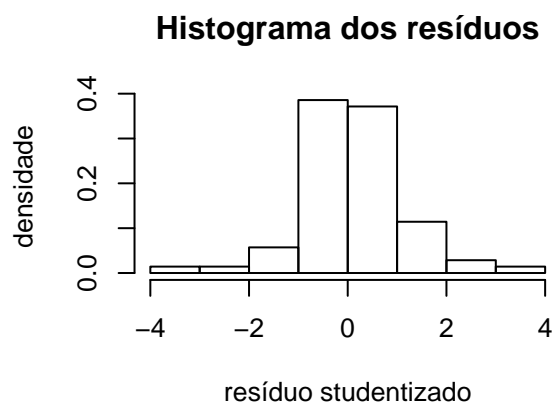
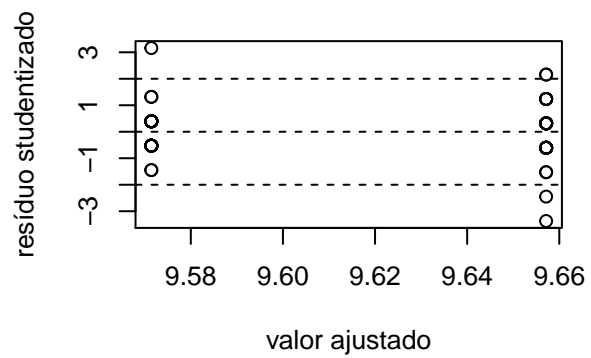
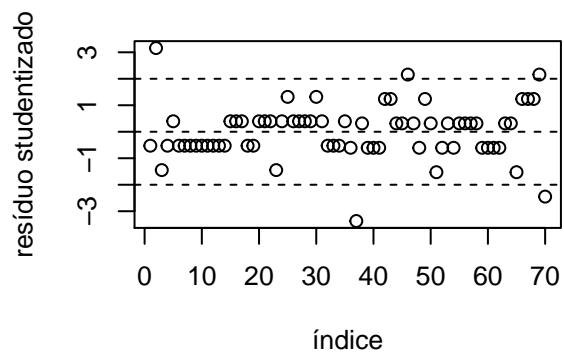
| Variável | Estatística | p-valor |
|----------|-------------|---------|
| C.Asa | 4,05 | 0,00 |
| L.Asa | 0,72 | 0,40 |
| C3p | 42,26 | 0,00 |
| L3P | 0,12 | 0,73 |
| C4p | 24,29 | 0,00 |
| C12a | 0,11 | 0,75 |
| C13a | 2,08 | 0,15 |

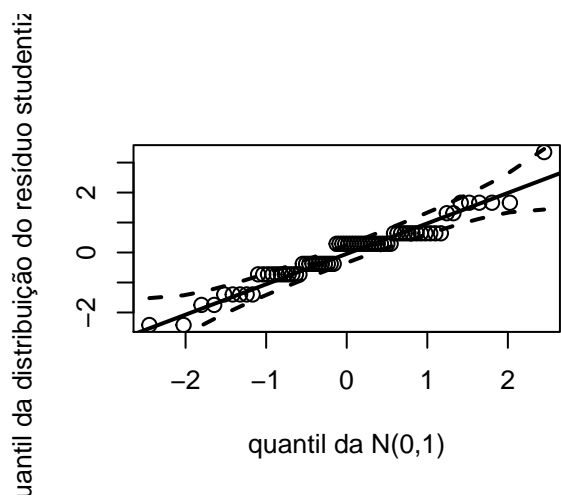
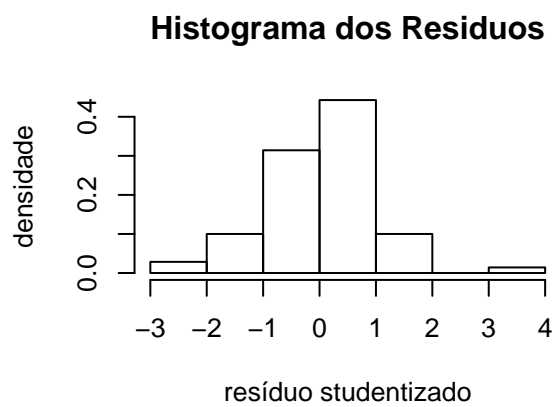
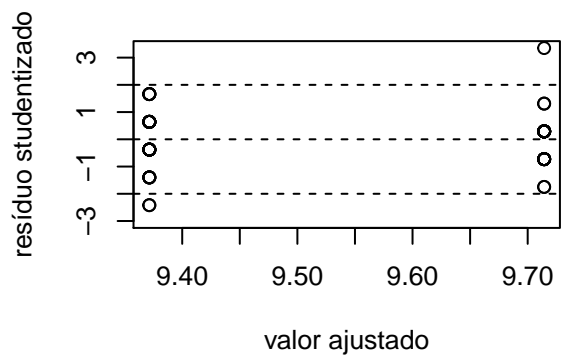
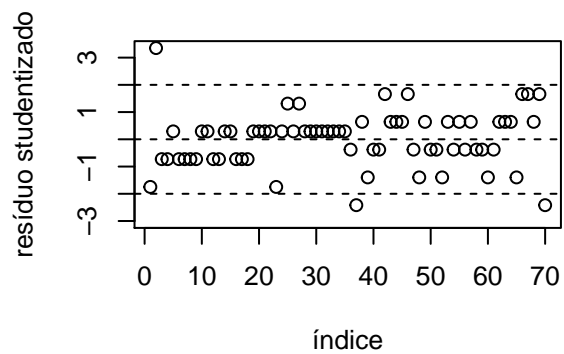










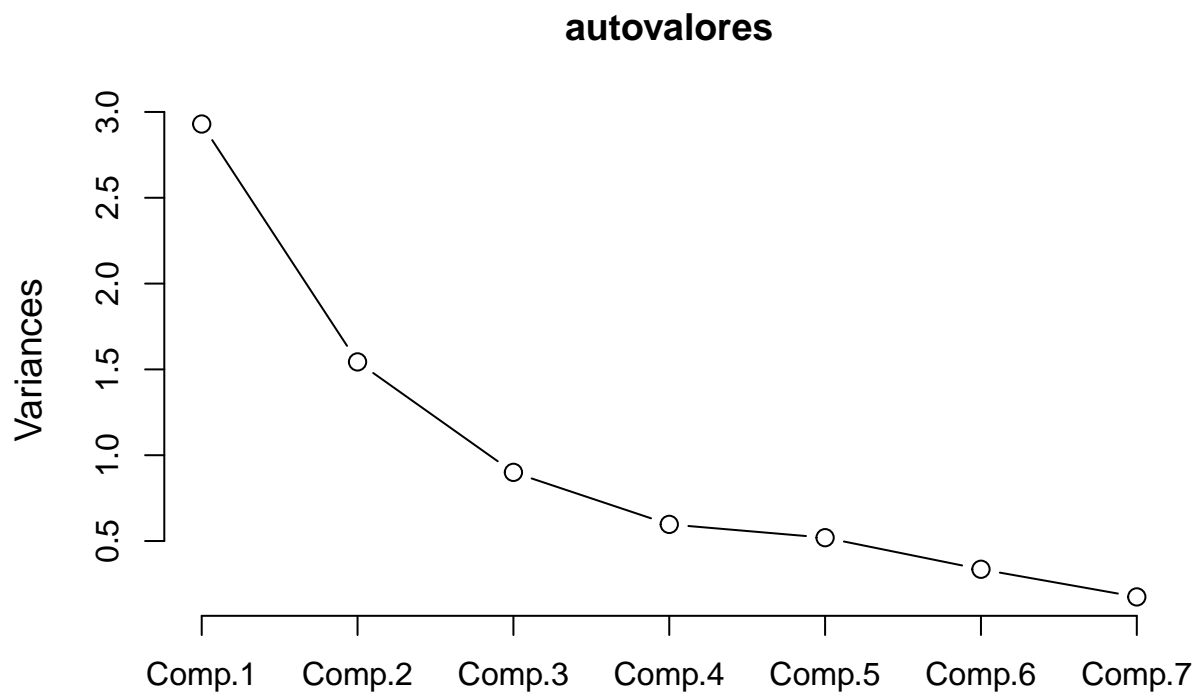


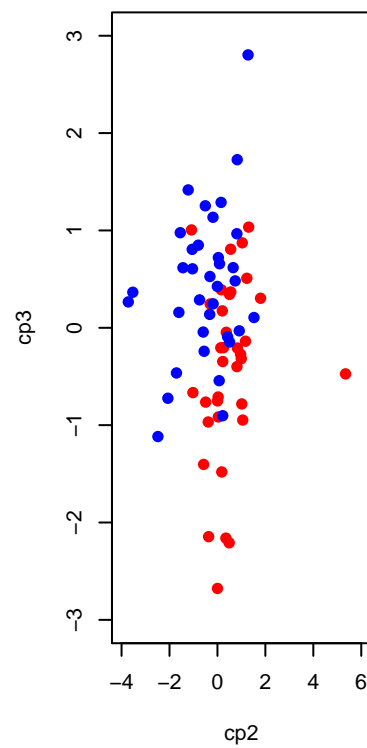
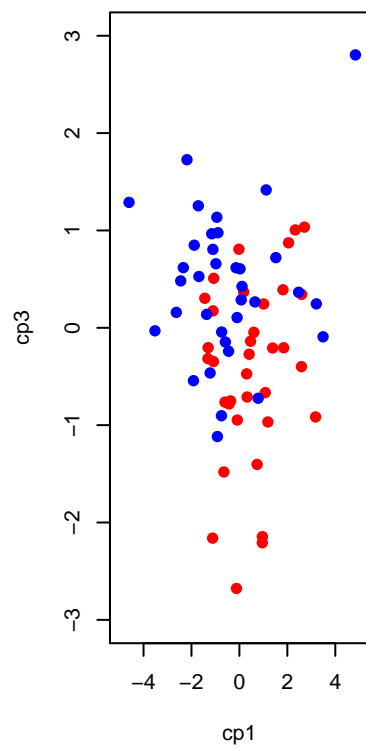
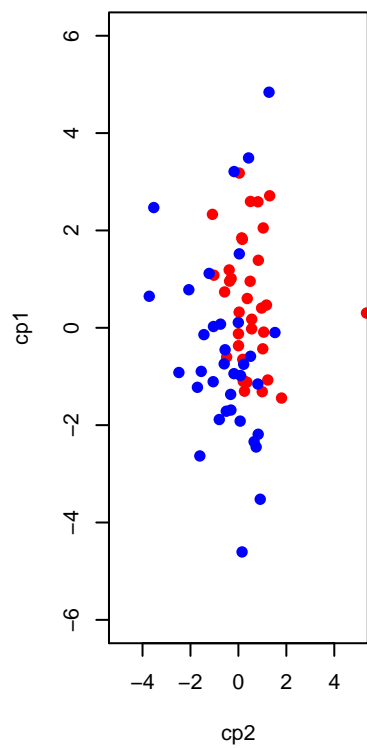
1.1 QUESTÃO 2

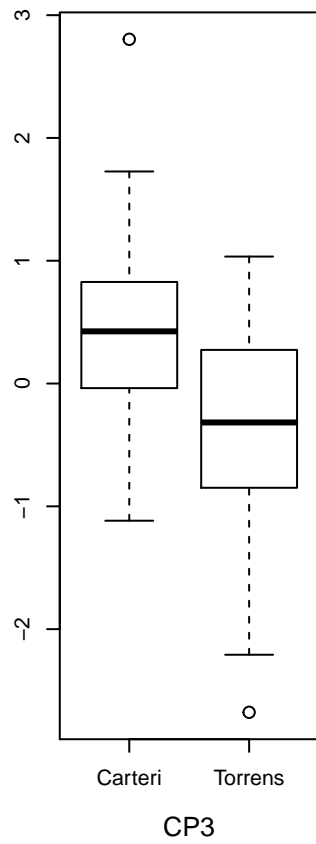
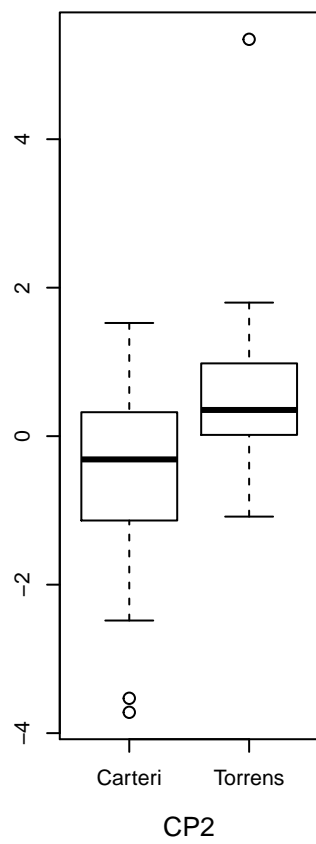
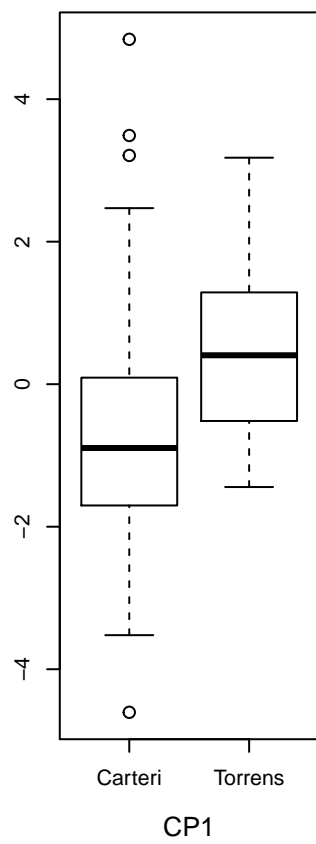
Importance of components:

| ## | Comp.1 | Comp.2 | Comp.3 | Comp.4 | Comp.5 |
|---------------------------|-----------|-----------|-----------|------------|------------|
| ## Standard deviation | 1.7116366 | 1.2424549 | 0.9487536 | 0.77266752 | 0.72078630 |
| ## Proportion of Variance | 0.4185286 | 0.2205277 | 0.1285905 | 0.08528787 | 0.07421898 |
| ## Cumulative Proportion | 0.4185286 | 0.6390563 | 0.7676468 | 0.85293466 | 0.92715364 |

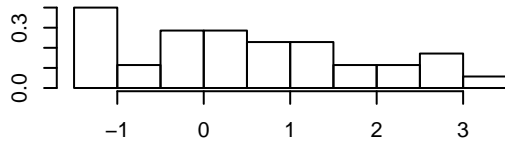
| ## | Comp.6 | Comp.7 |
|---------------------------|-----------|------------|
| ## Standard deviation | 0.5792105 | 0.41765975 |
| ## Proportion of Variance | 0.0479264 | 0.02491995 |
| ## Cumulative Proportion | 0.9750800 | 1.00000000 |



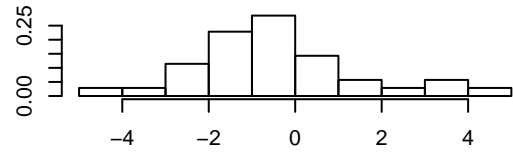




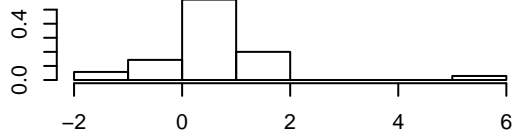
CP1



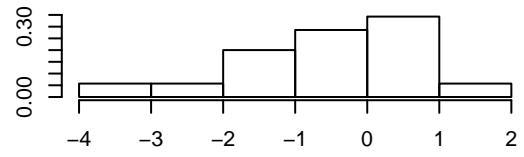
CP1



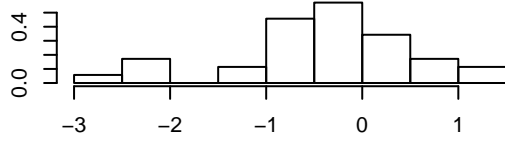
CP2



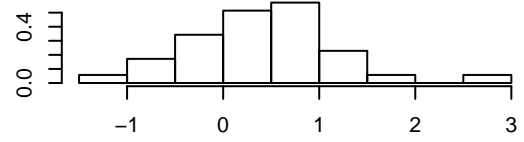
CP2

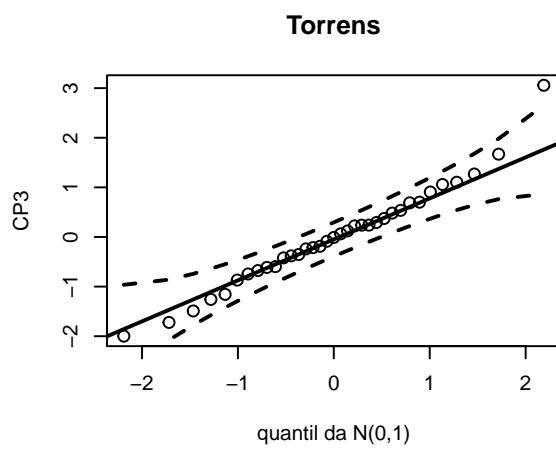
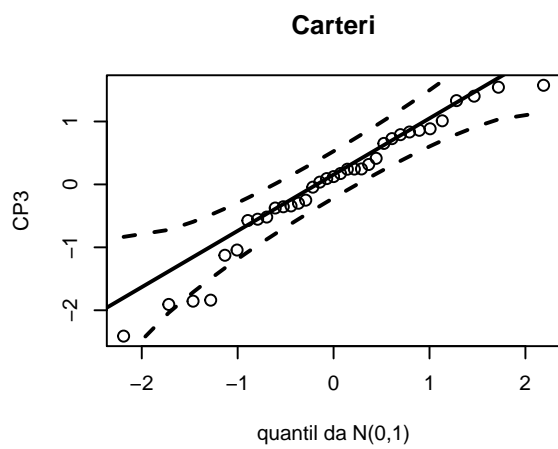
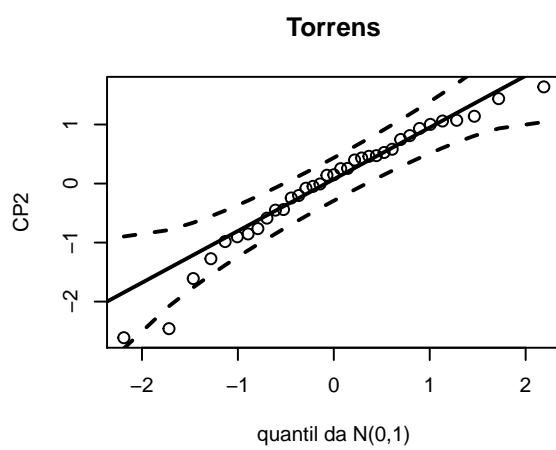
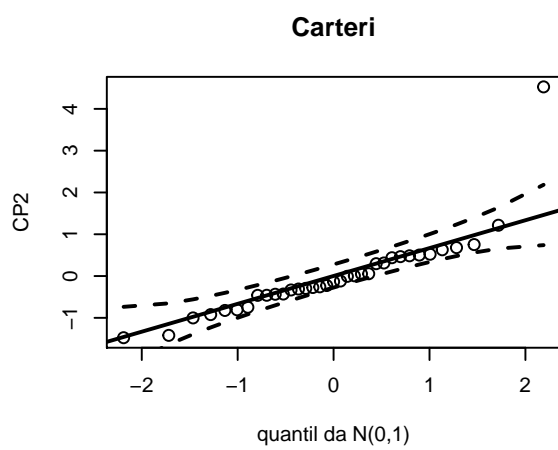
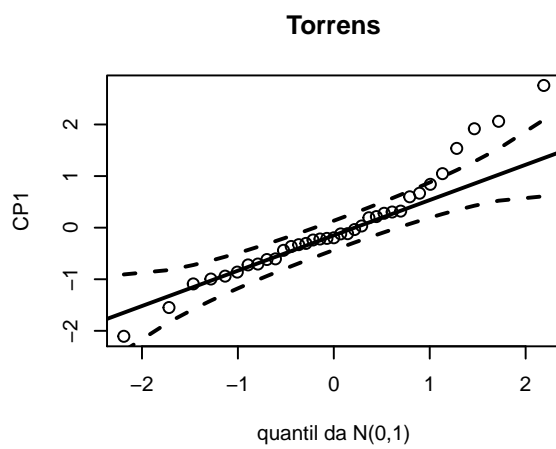
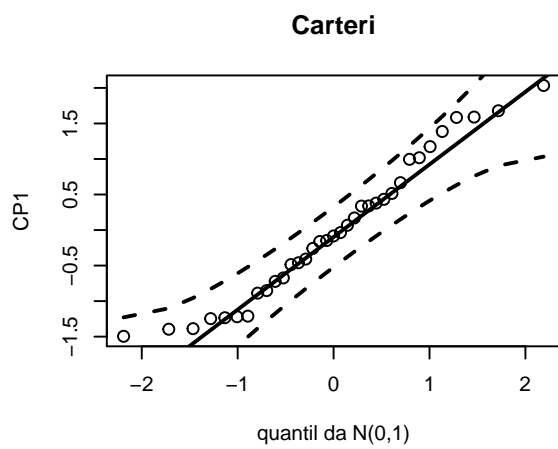


CP3



CP3





```
##
## Call:
## lm(formula = cpl ~ especief)
##
## Residuals:
```

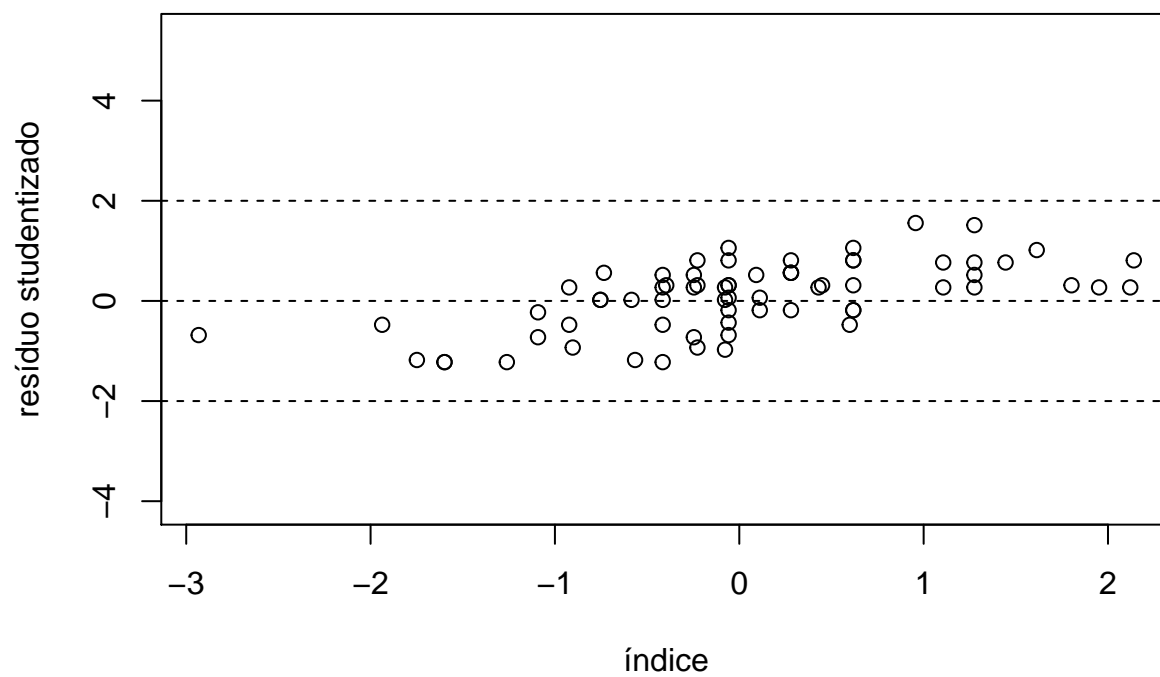
| | Min | 1Q | Median | 3Q | Max |
|--|---------|---------|---------|--------|--------|
| | -4.0902 | -1.1506 | -0.2188 | 0.6618 | 5.3544 |

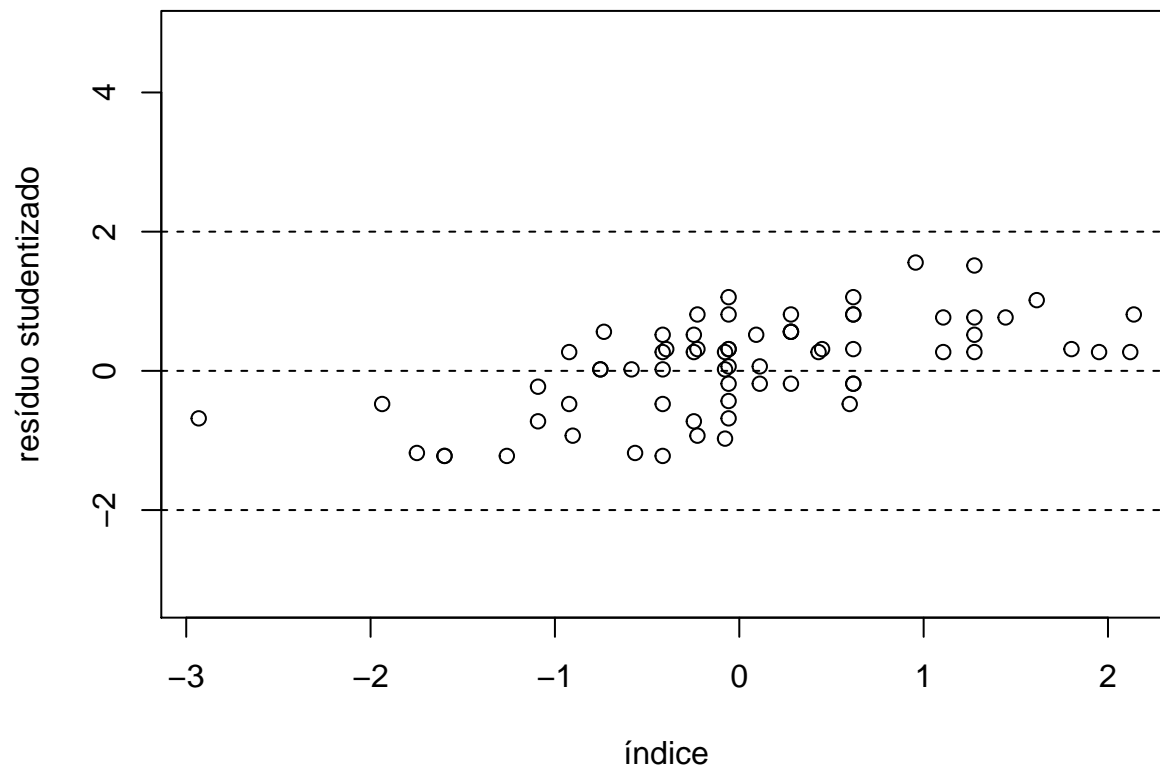
```
##
## Coefficients:
```

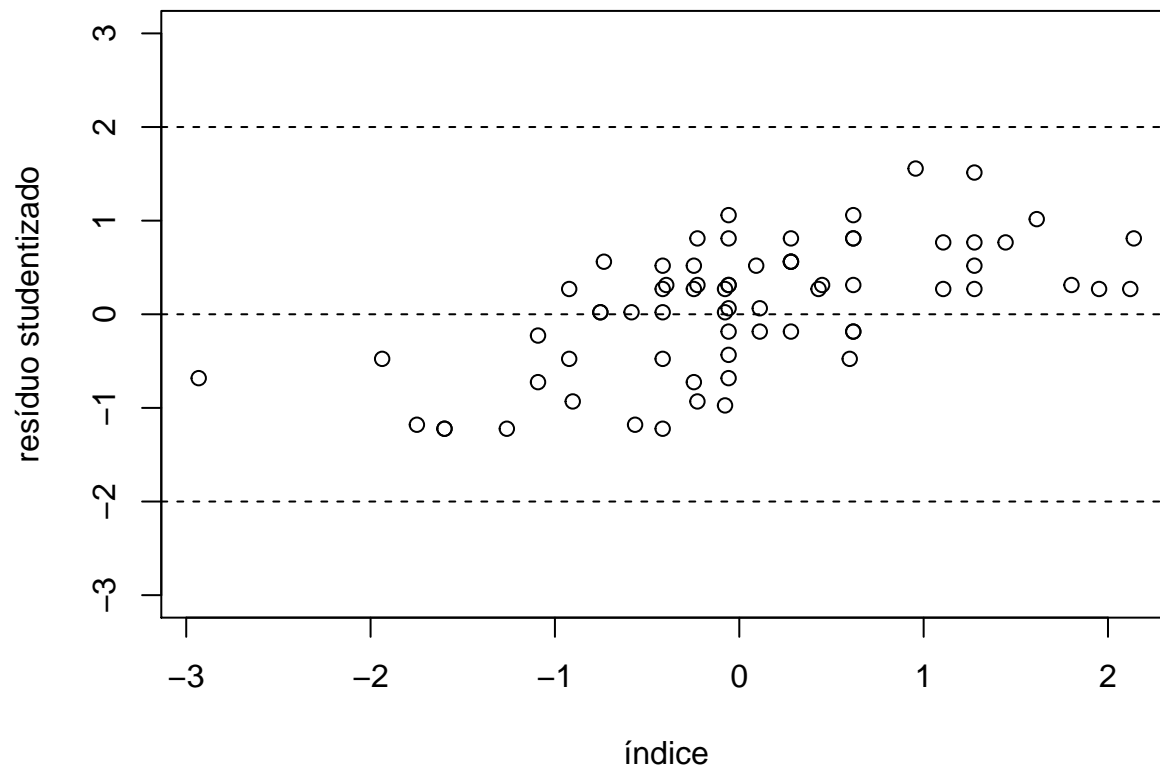
| | Estimate | Std. Error | t value | Pr(> t) |
|-----------------|----------|------------|---------|----------|
| (Intercept) | -0.5144 | 0.2800 | -1.837 | 0.0705 . |
| especiefTorrens | 1.0288 | 0.3959 | 2.598 | 0.0115 * |

```
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.656 on 68 degrees of freedom
## Multiple R-squared:  0.09033,    Adjusted R-squared:  0.07695
## F-statistic: 6.752 on 1 and 68 DF,  p-value: 0.01147
```

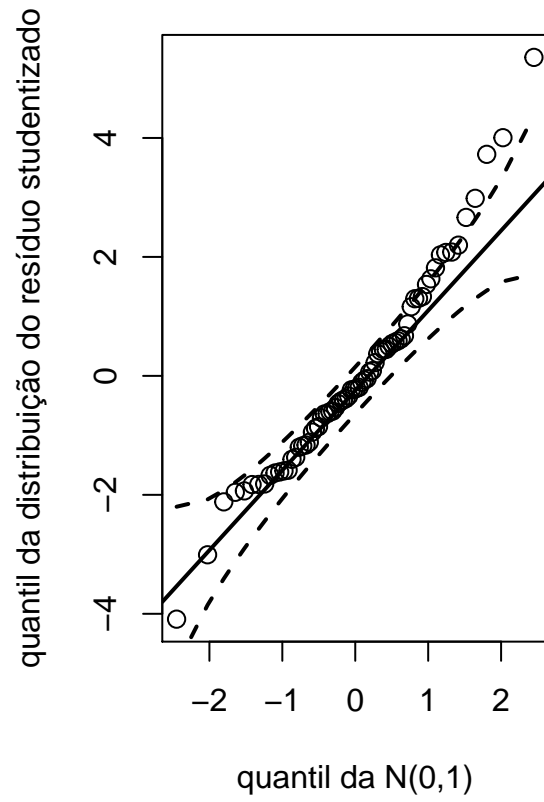
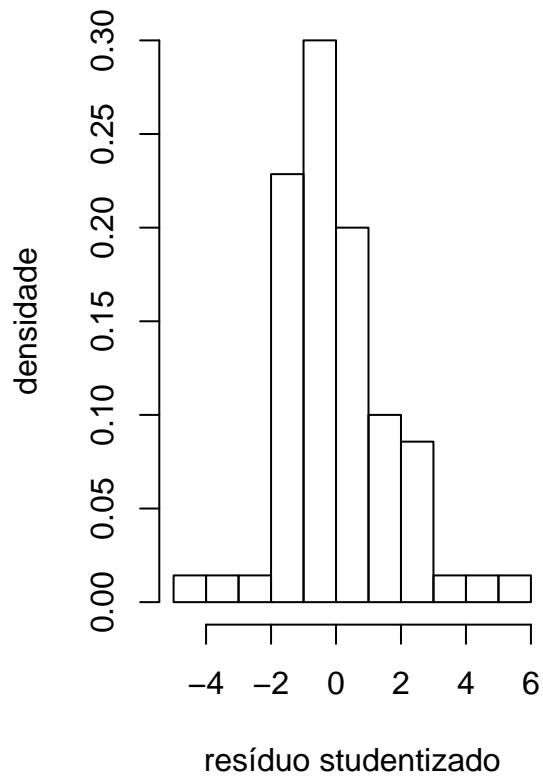
Resíduos do modelo com a Componente 1



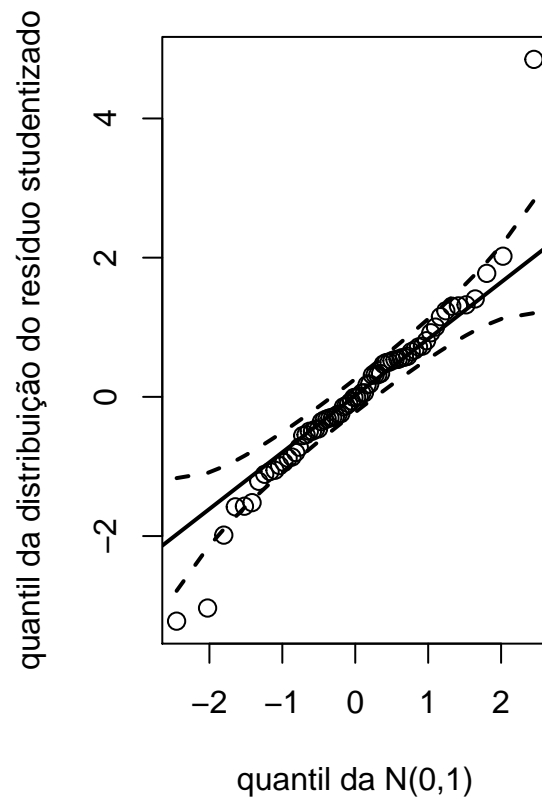
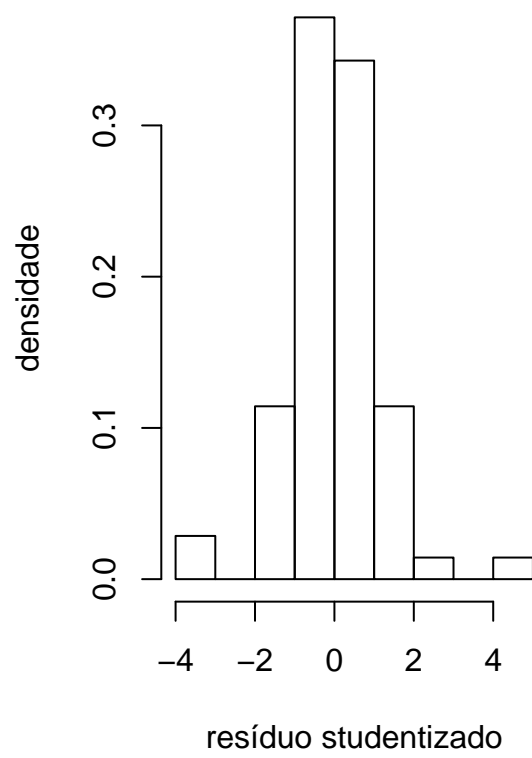




Histograma dos resíduos



Histograma dos resíduos



Histograma dos resíduos

