20210327-tarde-exercicio-final.R

rstudio-user

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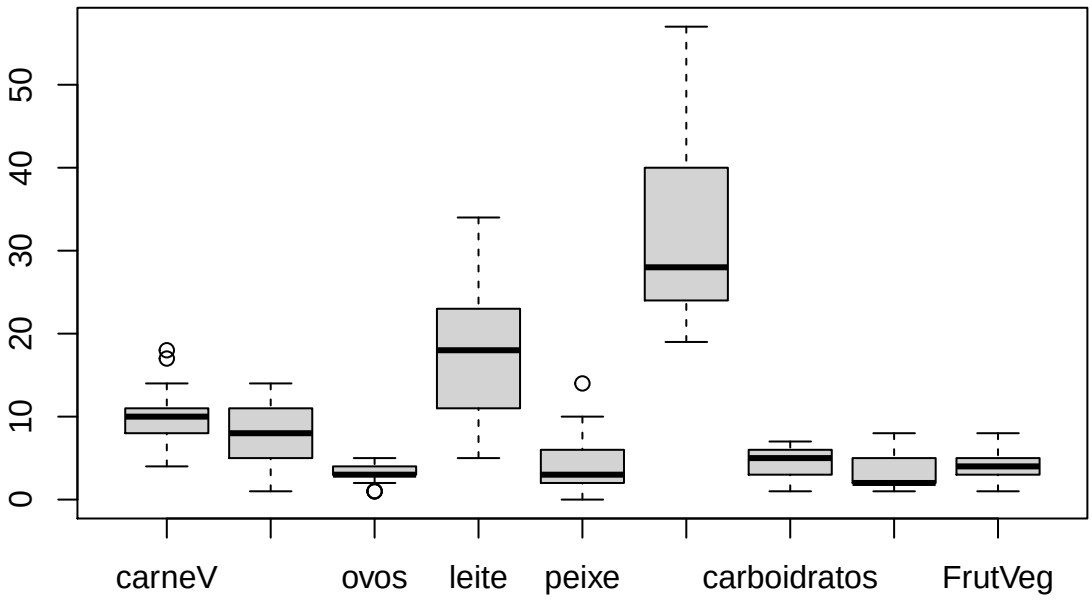
```
# Importando dados
Proteinas_alimentacao <- read.csv("/cloud/project/Proteinas_alimentacao.txt", row.names=1, sep="")
Proteinas_alimentacao
```

```
##       carneV carneB ovos leite peixe cereais carboidratos GraosNozes FrutVeg
## Alban     10      1    1     9     0      42            1          6       2
## Austr      9     14    4    20     2      28            4          1       4
## Belgi     14      9    4    18     5      27            6          2       4
## Bula       8      6    2     8     1      57            1          4       4
## Tchec     10     11    3    13     2      34            5          1       4
## Dinam     11     11    4    25    10      22            5          1       2
## AleOc      8     12    4    11     5      25            7          1       4
## Finla     10      5    3    34     6      26            5          1       1
## Franc     18     10    3    20     6      28            5          2       7
## Greci     10      3    3    18     6      42            2          8       7
## Hungr      5     12    3    10     0      40            4          5       4
## Irlan     14     10    5    26     2      24            6          2       3
## Itali      9      5    3    14     3      37            2          4       7
## PaisB     10     14    4    23     3      22            4          2       4
## Norue      9      5    3    23    10      23            5          2       3
## Polon      7     10    3    19     3      36            6          2       7
## Portu      6      4    1     5    14      27            6          5       8
## Romen      6      6    2    11     1      50            3          5       3
## Espan      7      3    3     9     7      29            6          6       7
## Sueci     10      8    4    25     8      20            4          1       2
## Suica     13     10    3    24     2      26            3          2       5
## ReinU     17      6    5    21     4      24            5          3       3
## USSR       9      5    2    17     3      44            6          3       3
## AleOr     11     13    4    19     3      19            5          2       4
## Iugos      4      5    1    10     1      56            3          6       3
```

```
boxplot(Proteinas_alimentacao)
```




```
# Padronizando os dados
data_scaled <- scale(Proteinas_alimentacao)

# Visualizar a matriz de distancias
dist(data_scaled)
```

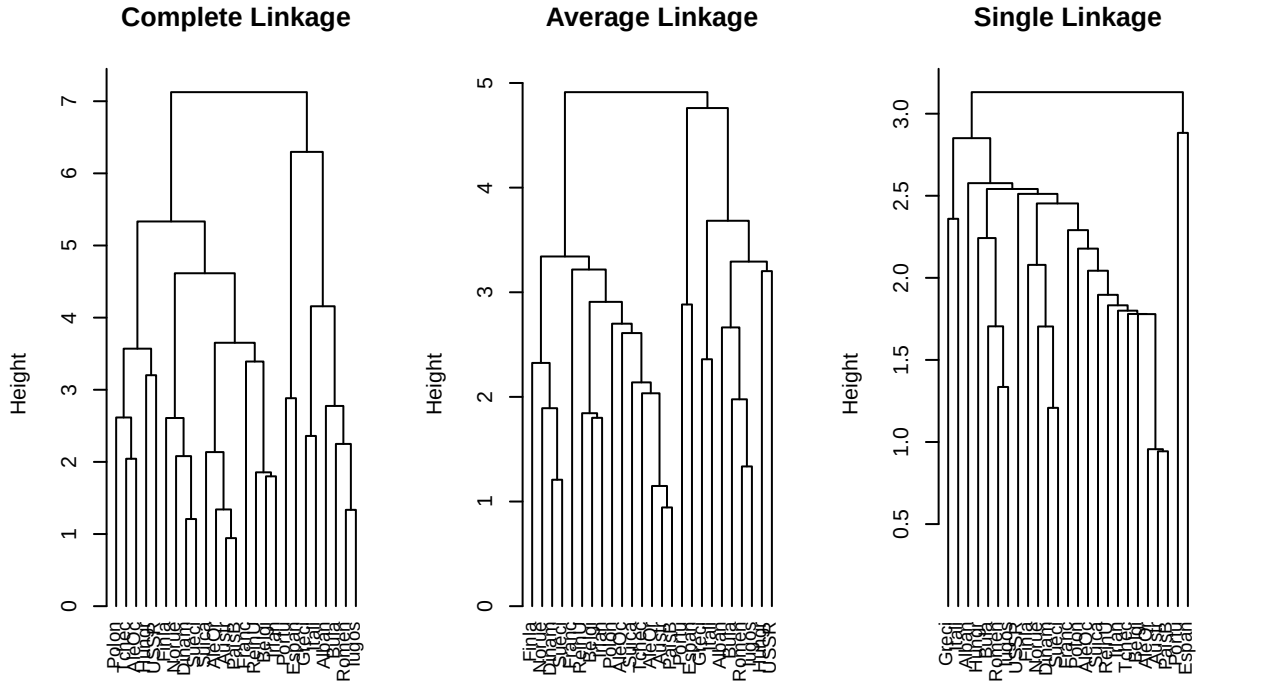
```
##           Alban     Austr     Belgi      Bula     Tchec     Dinam     AleOc
## Austr 5.8532900
## Belgi 5.7335008 2.5465552
## Bula  2.6395440 4.8216564 5.2736332
## Tchec 4.9602301 1.7799956 2.1747325 3.9907771
## Dinam 6.5671718 2.9243339 2.4533110 6.1226012 3.3677881
## AleOc 6.4134362 2.4670392 2.3166803 5.5758731 2.0434782 3.0724538
## Finla 5.8406039 3.8406799 3.4009989 5.9283025 3.9544563 2.6085261 4.3769688
## Franc 6.1742286 3.6515531 2.2906856 5.6327312 3.3007058 3.7803717 3.9557671
## Greci 4.0329196 5.3381984 4.8807791 3.8018379 4.9684184 5.7608608 5.8288945
## Hungr 4.3239024 3.1466248 4.1046496 3.1984826 2.7068851 4.9806320 3.5696540
## Irlan 6.4885734 2.6325738 1.8001254 6.1127477 3.1197009 2.8111758 3.2098204
## Itali 3.7498024 3.7657225 3.8543173 2.8509554 3.2837498 4.9355223 4.4583913
## PaisB 5.9626954 0.9435472 2.3795661 5.2254644 2.3051360 2.5648993 2.7250661
## Norue 5.4457085 3.6297069 2.7290545 5.3650109 3.3873780 2.0803710 3.3671156
## Polon 5.7165517 2.6614908 2.9292777 4.5788319 2.1780483 4.0106800 2.6157163
## Portu 6.2976365 6.4297383 5.5858852 6.0666226 5.5122545 6.0399845 5.3182926
## Romen 2.5768976 4.3374705 4.6707088 1.7047167 3.4501722 5.4683617 4.7598552
## Espan 5.0680351 4.9324883 3.9949339 4.8548832 4.1112316 5.1291342 4.0217635
## Sueci 5.8775665 2.7862695 2.5244791 5.6151507 3.2199074 1.2081340 3.2723879
## Suica 4.9529805 2.1360194 2.4473759 4.4622628 2.3992005 3.2934407 3.7035298
## ReinU 5.8365164 3.6063734 1.8556264 5.8029350 3.5937897 3.2081924 3.8935655
## USSR  3.9609658 3.7540429 3.1261489 3.6240876 2.5115136 4.1334745 3.5282693
## AleOr 5.9637845 1.3409333 1.7791191 5.3816377 2.0187736 2.5454973 2.1102420
## Iugos 2.7755336 5.5218480 5.8338373 2.2491049 4.5844276 6.5295053 5.8001602
##           Finla     Franc     Greci     Hungr     Irlan     Itali     PaisB
## Austr
## Belgi
## Bula
```

```
## Tchec
## Dinam
## AleOc
## Finla
## Franc 4.6150744
## Greci 5.7097979 4.7789613
## Hungr 5.3333012 5.1053974 4.2850275
## Irlan 3.2738587 3.3914878 5.6925883 4.6863290
## Itali 5.0082418 3.8955518 2.3596802 3.1908949 4.7625440
## PaisB 3.5970486 3.3934201 5.1710323 3.4972572 2.3143576 3.8779632
## Norue 2.2863117 3.8544030 4.6533776 4.6658740 3.6094330 3.9903428 3.3754514
## Polon 4.3624011 3.4793814 4.4735805 3.0398080 3.7489430 3.0752251 2.9280510
## Portu 6.6588227 5.5547807 4.8491900 5.6449530 7.1258298 4.7856955 6.3625595
## Romen 5.1049726 5.4851406 3.6525991 2.2424874 5.4337154 2.9208731 4.6556697
## Espan 5.4719510 4.5530910 3.2684234 3.9217489 5.2207565 3.1312167 4.8673242
## Sueci 2.0789731 3.9242956 5.3090340 4.7118733 2.7550599 4.3452517 2.4692299
## Suica 3.4562862 2.5274841 4.3266802 3.8073662 2.7913200 2.9446793 1.8966361
## ReinU 3.6483965 3.0886557 5.0054744 5.0677943 1.8327677 4.3768934 3.2690262
## USSR  3.5333342 4.1946705 4.2792677 3.2020283 4.0520695 3.4402756 3.9720243
## AleOr 3.7124018 3.0931434 5.2666612 3.5425016 2.0307766 3.9512746 0.9563501
## Iugos 5.9951737 6.4962265 4.1573776 3.1437121 6.6414965 3.8357345 5.8241028
##           Norue     Polon     Portu     Romen     Espan     Sueci     Suica
## Austr
## Belgi
## Bula
## Tchec
## Dinam
## AleOc
## Finla
## Franc
## Greci
## Hungr
## Irlan
## Itali
## PaisB
## Norue
## Polon 3.5553930
## Portu 4.6204437 4.7919170
## Romen 4.5736176 3.8870793 5.5049065
## Espan 3.7708759 3.3382969 2.8830924 4.0166916
## Sueci 1.7036872 3.9105822 6.0249236 4.9829920 4.8591410
## Suica 3.3356945 2.9812230 6.0908143 4.2030576 4.6396518 2.8701823
## ReinU 3.4836698 4.3952070 6.7248921 5.3323892 4.8209640 2.9525189 3.0135860
## USSR  3.1361796 2.8552498 4.9740917 2.5412637 3.5301244 3.8416304 3.5101872
## AleOr 3.2425576 2.8341173 6.0487449 4.7272855 4.4960662 2.5244346 2.1234063
## Iugos 5.4611055 4.7532526 5.6772596 1.3353611 4.5772131 6.0815743 5.3301075
##           ReinU      USSR     AleOr
## Austr
## Belgi
## Bula
## Tchec
## Dinam
## AleOc
## Finla
```

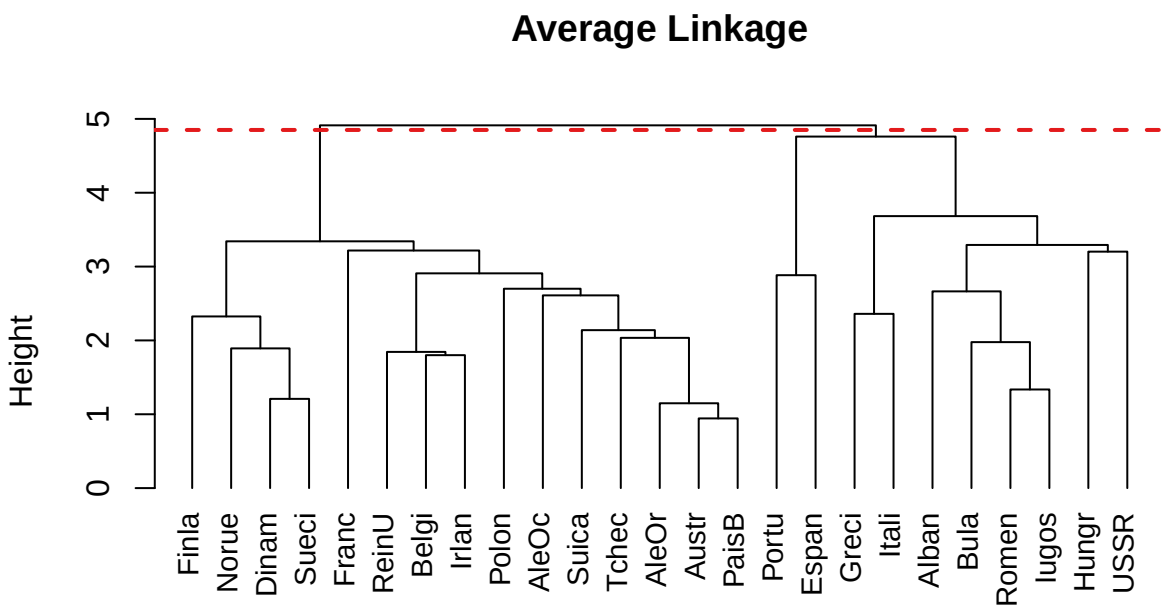
```
## Franc
## Greci
## Hungr
## Irlan
## Itali
## PaisB
## Norue
## Polon
## Portu
## Romen
## Espan
## Sueci
## Suica
## ReinU
## USSR  4.1110165
## AleOr 2.8810687 3.7754617
## Iugos 6.5416937 3.3087134 5.9103892
```

```r
# Algoritmo HC com distância Euclidiana
mun.hc.complete <- hclust(dist(data_scaled), method = "complete")
mun.hc.average <- hclust(dist(data_scaled), method = "average")
mun.hc.single <- hclust(dist(data_scaled), method = "single")

# Apresentando dendogramas
par(mfrow=c(1,3))
plot(mun.hc.complete, main = "Complete Linkage", xlab = "", sub = "", cex = .9, hang = -1)
plot(mun.hc.average, main = "Average Linkage", xlab = "", sub = "", cex = .9, hang = -1)
plot(mun.hc.single, main = "Single Linkage", xlab = "", sub = "", cex = .9, hang = -1)
```

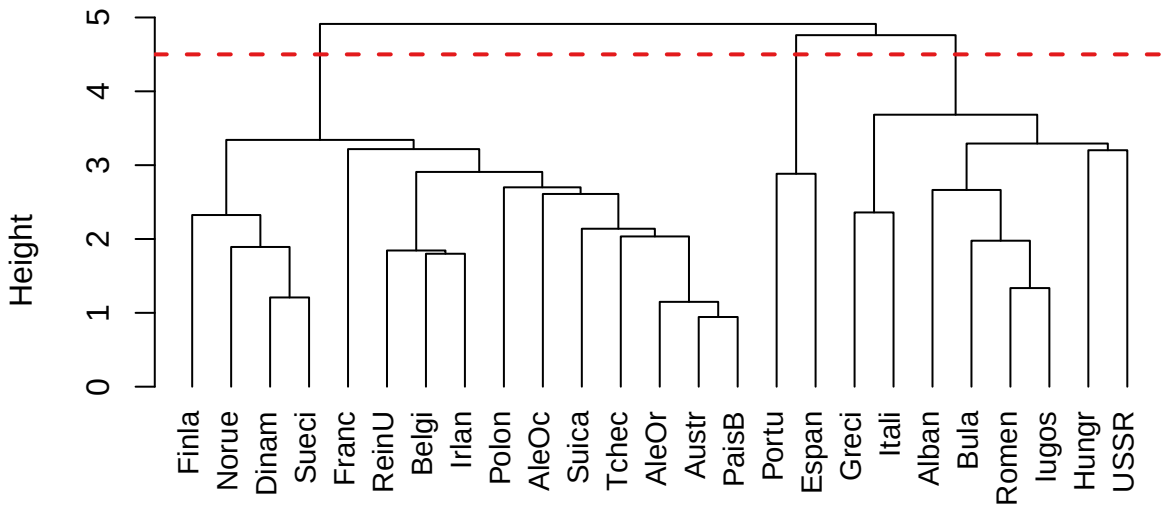



```r
# Utilizando apenas o Average Linkage, vamos fazer 3 cortes com 2, 3 e 5 clusters
par(mfrow=c(1,1))
plot(mun.hc.average, main = "Average Linkage", xlab = "", sub = "", cex = .9, hang = -1)
abline(h=4.85, lty=2, lwd=2, col="#E31A1C")
```



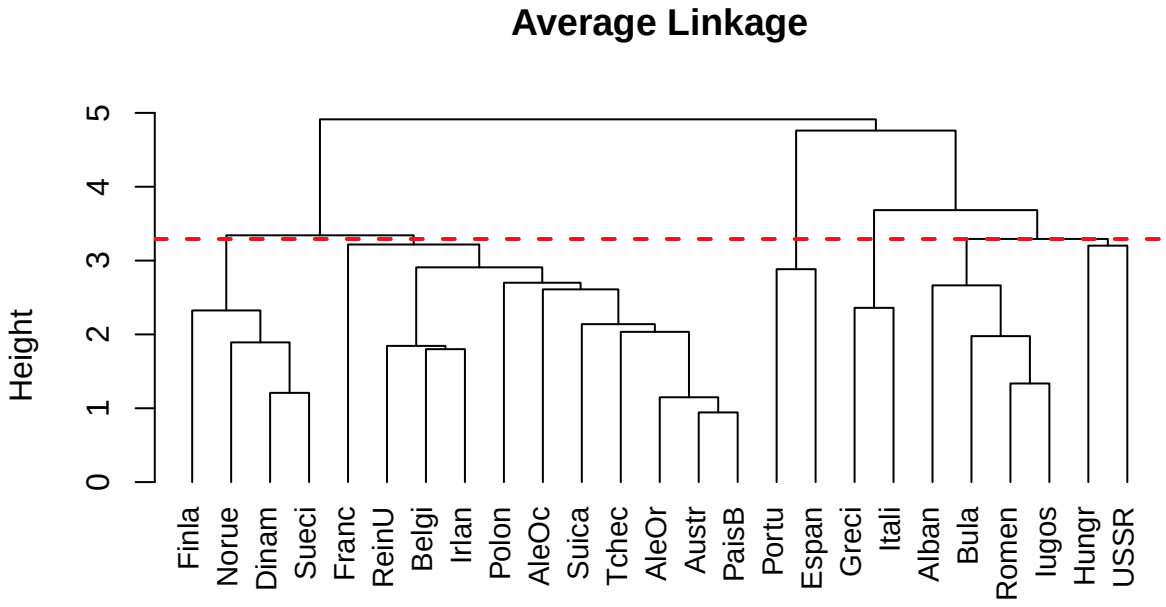

```
# Com 2 clusters:
# 1 - Finla, Norue, Dinam, Sueci, Franc, ReinU, Belgi, Irlan, Polon, AleOc, Suica, Tchec, AleOr, Austr,
# 2 - Portu, Espan, Greci, Itali, Alban, Bula, Romen, Iugos, Hungr, USSR

par(mfrow=c(1,1))
plot(mun.hc.average, main = "Average Linkage", xlab = "", sub = "", cex = .9, hang = -1)
abline(h=4.5, lty=2, lwd=2, col="#E31A1C")
```




```
# Com 3 clusters:
# 1 - Finla, Norue, Dinam, Sueci, Franc, ReinU, Belgi, Irlan, Polon, AleOc, Suica, Tchec, AleOr, Austr,
# 2 - Portu, Espan
# 3 - Greci, Itali, Alban, Bula, Romen, Iugos, Hungr, USSR

par(mfrow=c(1,1))
plot(mun.hc.average, main = "Average Linkage", xlab = "", sub = "", cex = .9, hang = -1)
abline(h=3.292, lty=2, lwd=2, col="#E31A1C")
```




```
# Com 5 clusters:
# 1 - Finla, Norue, Dinam, Sueci
# 2 - Franc, ReinU, Belgi, Irlan, Polon, AleOc, Suica, Tchec, AleOr, Austr, PaisB
# 3 - Portu, Espan
# 4 - Greci, Itali
# 5 - Alban, Bula, Romen, Iugos, Hungr, USSR
```