

Analyse des Correspondances (AFC) avec FactoMineR sur les données du cours

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Script et sorties R de la vidéo du cours.

Chargement de FactoMineR

```
library(FactoMineR)
```

Importation du jeu de données depuis le site

```
Nobel = read.table("AnaDo_JeuDonnees_Nobel_avecMaths.csv", header=TRUE, sep=";",  
  row.names=1, ,check.names=FALSE)  
summary(Nobel)
```

```
##      Chimie      Economie      Littérature      Médecine  
## Min.   : 1.00   Min.   : 0.00   Min.   : 0.00   Min.   : 2.00  
## 1st Qu.: 4.00   1st Qu.: 1.00   1st Qu.: 5.00   1st Qu.: 4.00  
## Median : 8.00   Median : 3.00   Median : 7.00   Median : 9.00  
## Mean   :22.46   Mean   :10.38   Mean   :12.38   Mean   :26.69  
## 3rd Qu.:24.00   3rd Qu.: 6.00   3rd Qu.:10.00   3rd Qu.:26.00  
## Max.   :94.00   Max.   :47.00   Max.   :79.00   Max.   :110.00  
##      Paix      Physique      Mathématiques  
## Min.   : 0.00   Min.   : 2.00   Min.   : 1.000  
## 1st Qu.: 1.00   1st Qu.: 5.00   1st Qu.: 1.000  
## Median : 8.00   Median :11.00   Median : 4.000  
## Mean   :11.62   Mean   :26.54   Mean   : 7.846  
## 3rd Qu.:16.00   3rd Qu.:24.00   3rd Qu.:11.000  
## Max.   :51.00   Max.   :103.00   Max.   :34.000
```

Test du Chi²

```
res.test.chi2 <- chisq.test(Nobel)
```

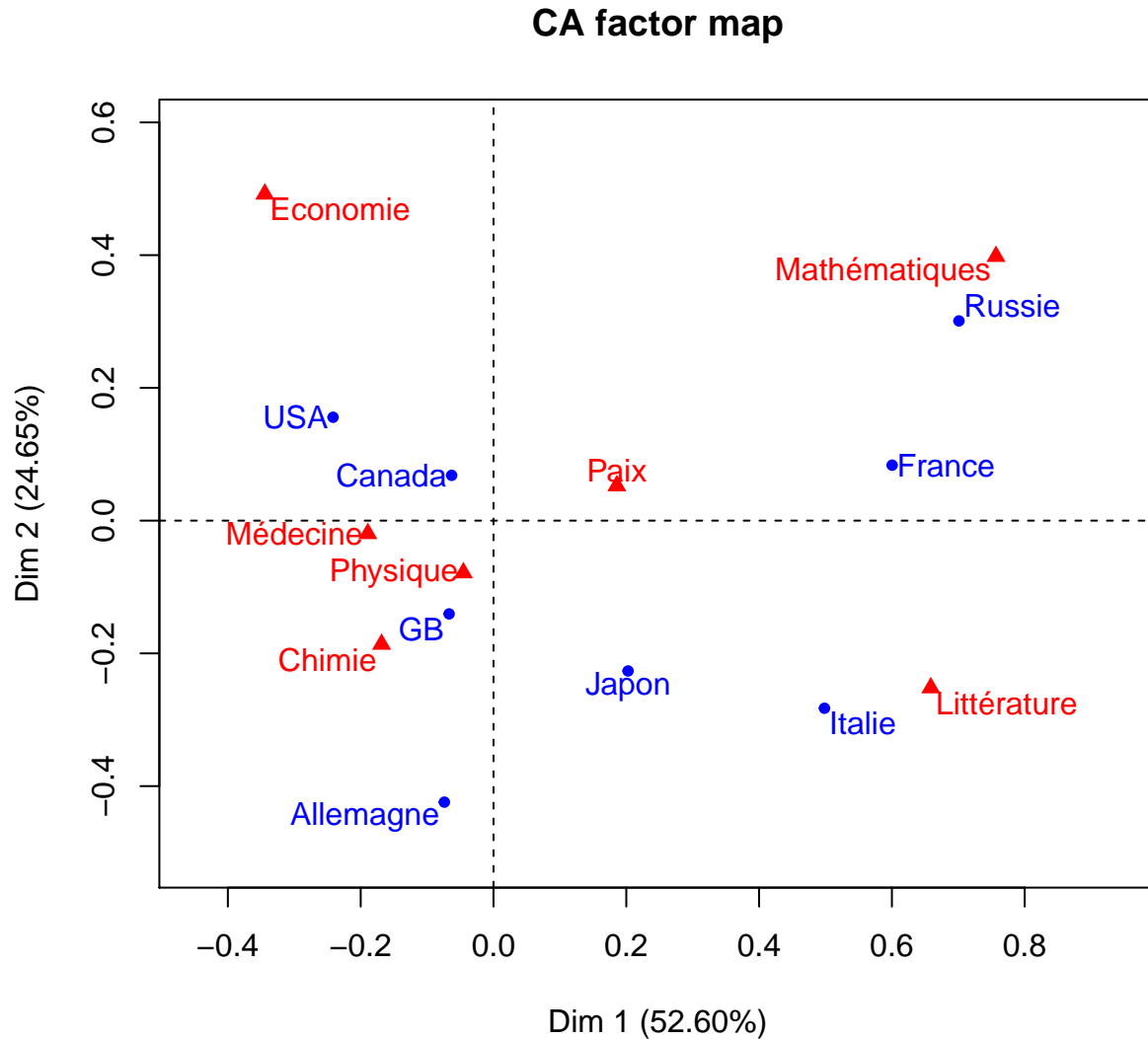
```
## Warning in chisq.test(Nobel): Chi-squared approximation may be incorrect
```

```
res.test.chi2
```

```
##  
## Pearson's Chi-squared test  
##  
## data:  Nobel  
## X-squared = 234.07, df = 72, p-value < 2.2e-16
```

L'AFC : les sorties et le graphe par défaut

```
res.ca=CA(Nobel[1:8,])
```



```
summary(res.ca)
```

```
##  
## Call:  
## CA(X = Nobel[1:8, ])  
##  
## The chi square of independence between the two variables is equal to 120.7416 (p-value = 1.518833e-06)  
##  
## Eigenvalues  
##           Dim.1  Dim.2  Dim.3  Dim.4  Dim.5  Dim.6  
## Variance      0.104  0.049  0.027  0.016  0.002  0.000  
## % of var.     52.600  24.648  13.534  8.320  0.894  0.003  
## Cumulative % of var. 52.600  77.248  90.782  99.103  99.997  100.000
```

```

##
## Rows
##      Iner*1000  Dim.1  ctr  cos2  Dim.2  ctr  cos2
## Allemagne | 25.599 | -0.074 0.697 0.028 | -0.424 48.958 0.928 |
## Canada | 2.078 | -0.063 0.119 0.059 | 0.068 0.297 0.069 |
## France | 43.959 | 0.600 36.324 0.856 | 0.084 1.501 0.017 |
## GB | 9.078 | -0.067 0.682 0.078 | -0.141 6.435 0.344 |
## Italie | 24.816 | 0.498 7.824 0.327 | -0.283 5.368 0.105 |
## Japon | 14.679 | 0.203 1.682 0.119 | -0.227 4.483 0.148 |
## Russie | 39.949 | 0.701 27.854 0.722 | 0.301 10.952 0.133 |
## USA | 36.811 | -0.242 24.818 0.699 | 0.156 22.006 0.290 |
##      Dim.3  ctr  cos2
## Allemagne -0.083 3.413 0.036 |
## Canada 0.068 0.536 0.069 |
## France 0.181 12.873 0.078 |
## GB 0.102 6.199 0.182 |
## Italie 0.376 17.307 0.186 |
## Japon -0.493 38.673 0.702 |
## Russie -0.309 20.997 0.140 |
## USA 0.001 0.002 0.000 |
##
## Columns
##      Iner*1000  Dim.1  ctr  cos2  Dim.2  ctr  cos2
## Chimie | 16.819 | -0.169 5.410 0.333 | -0.186 14.099 0.407 |
## Economie | 37.886 | -0.344 11.203 0.306 | 0.492 48.813 0.626 |
## Littérature | 48.264 | 0.659 33.466 0.718 | -0.252 10.446 0.105 |
## Médecine | 13.876 | -0.189 7.890 0.589 | -0.019 0.179 0.006 |
## Paix | 11.836 | 0.186 2.772 0.243 | 0.053 0.472 0.019 |
## Physique | 13.024 | -0.045 0.482 0.038 | -0.079 3.095 0.115 |
## Mathématiques | 55.263 | 0.757 38.778 0.727 | 0.398 22.896 0.201 |
##      Dim.3  ctr  cos2
## Chimie -0.085 5.318 0.084 |
## Economie 0.080 2.326 0.016 |
## Littérature 0.240 17.232 0.095 |
## Médecine 0.152 19.847 0.381 |
## Paix 0.189 11.094 0.250 |
## Physique -0.189 32.524 0.666 |
## Mathématiques -0.210 11.659 0.056 |

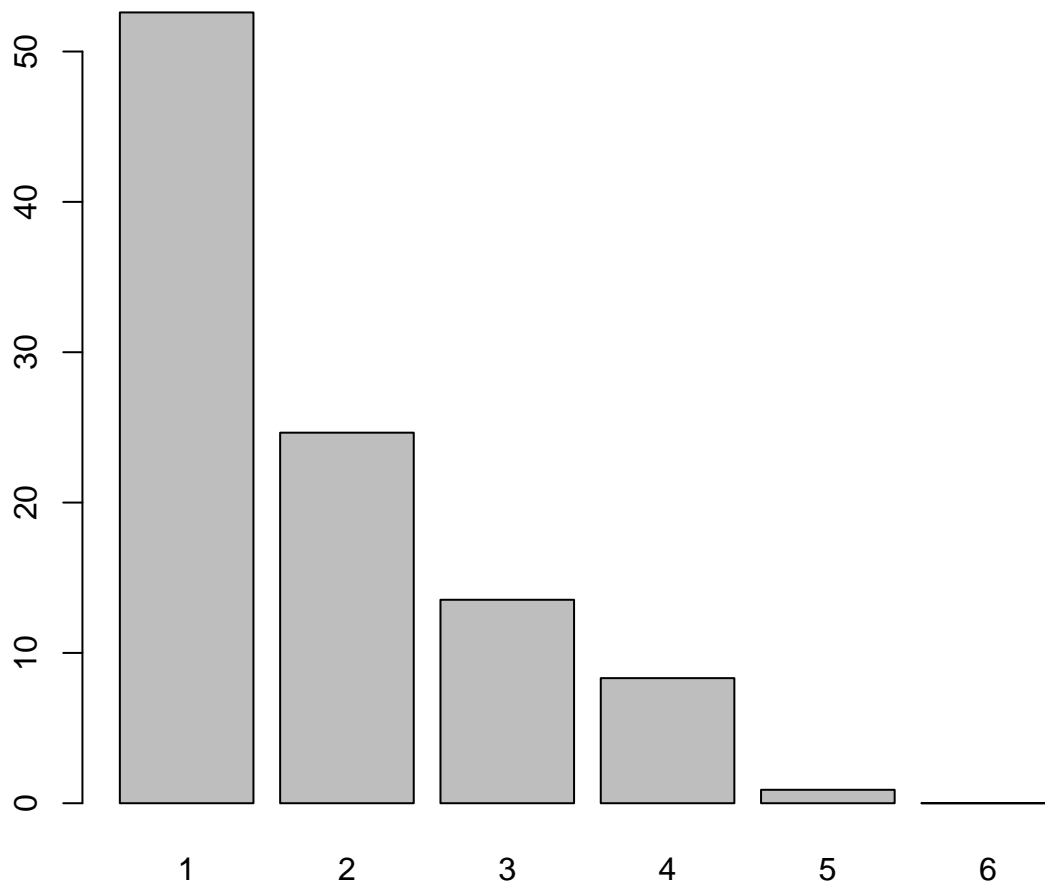
```

```

barplot(res.ca$eig[,2],main="Valeurs propres", names.arg=1:nrow(res.ca$eig))

```

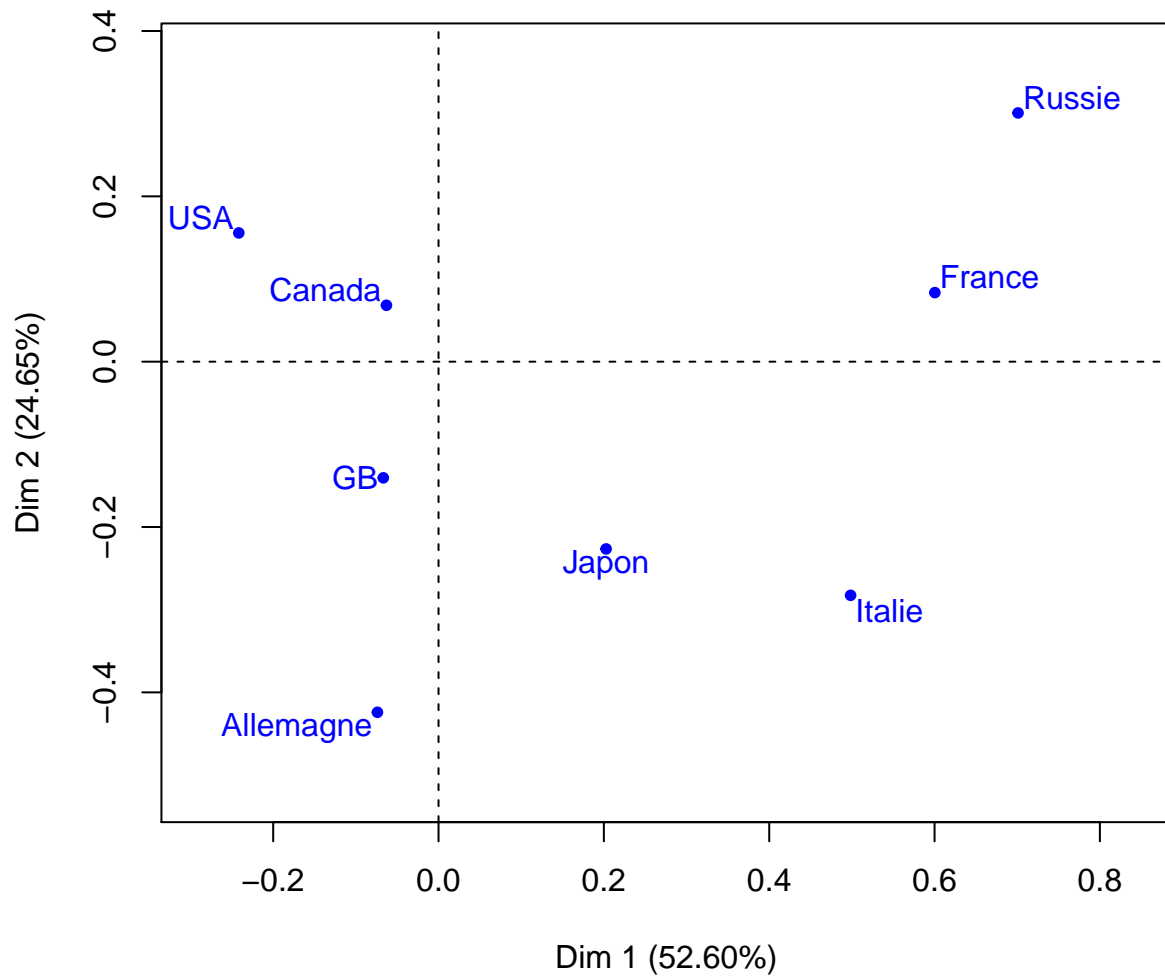
Valeurs propres



Les graphiques des lignes et des colonnes séparés

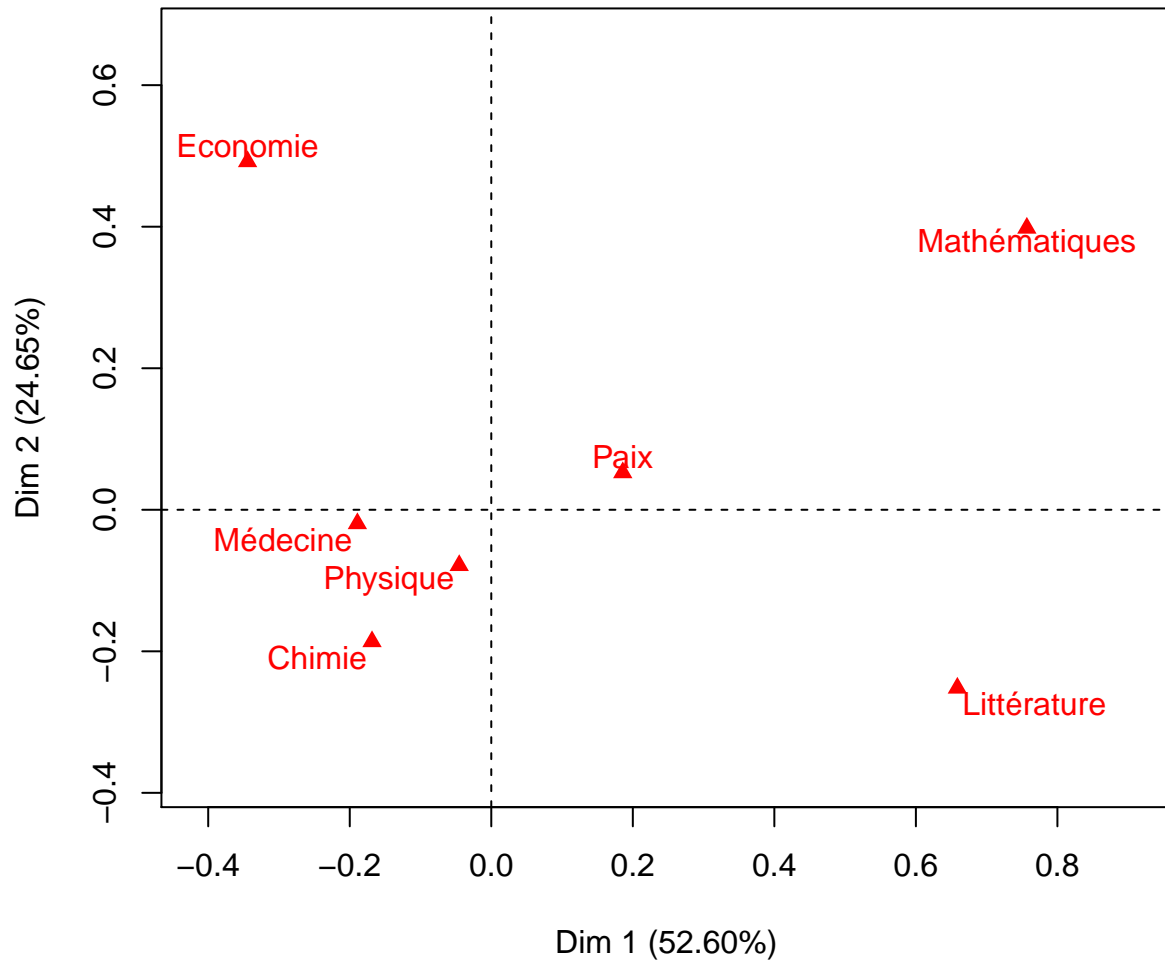
```
plot(res.ca, invisible="col",title="Représentation des lignes")
```

Représentation des lignes



```
plot(res.ca, invisible="row", title="Représentation des colonnes")
```

Représentation des colonnes



AFC avec colonne supplémentaire

```
res.ca=CA(Nobel, col.sup=7)
```

CA factor map

