정준상관분석

```
fitness <- read.csv('C:/Users/hyose/Desktop/fitness.csv')
#두 개의 변수집합
x <- fitness[,c("chins","situps","jumps")]
y <- fitness[,c("weight","waist","pulse")]

#정준상관계수
cancor(x,y)
```

```
## $cor
## [1] 0.79560815 0.20055604 0.07257029
##
## $xcoef
##                [,1]          [,2]         [,3]
## chins  -0.015167589 -0.0162979716 -0.056270024
## situps -0.003864790  0.0004528082  0.004535007
## jumps   0.003205298  0.0047521419 -0.001873747
##
## $ycoef
##                [,1]         [,2]         [,3]
## weight -0.007204730 -0.017508896 -0.001774541
## waist   0.113157401  0.084590855  0.036255405
## pulse  -0.001881052 -0.007353232  0.033433269
##
## $xcenter
##  chins situps  jumps
##   9.45 145.55  70.30
##
## $ycenter
## weight  waist  pulse
##  178.6   35.4   56.1
```

```
library(CCA)
```

```
## 필요한 패키지를 로딩중입니다: fda
```

```
## 필요한 패키지를 로딩중입니다: splines
```

```
## 필요한 패키지를 로딩중입니다: Matrix
```

```
## 필요한 패키지를 로딩중입니다: fds
```

```
## 필요한 패키지를 로딩중입니다: rainbow
```

```
## 필요한 패키지를 로딩중입니다: MASS
```

```
## 필요한 패키지를 로딩중입니다: pcaPP
```

```
## 필요한 패키지를 로딩중입니다: RCurl
```

```
## 필요한 패키지를 로딩중입니다: deSolve
```

```
##
## 다음의 패키지를 부착합니다: 'fda'
```

```
## The following object is masked from 'package:graphics':
##
##     matplot
```

```
## 필요한 패키지를 로딩중입니다: fields
```

```
## 필요한 패키지를 로딩중입니다: spam
```

```
## 필요한 패키지를 로딩중입니다: dotCall64
```

```
## 필요한 패키지를 로딩중입니다: grid
```

```
## Spam version 2.7-0 (2021-06-25) is loaded.
## Type 'help( Spam)' or 'demo( spam)' for a short introduction
## and overview of this package.
## Help for individual functions is also obtained by adding the
## suffix '.spam' to the function name, e.g. 'help( chol.spam)'.
```

```
##
## 다음의 패키지를 부착합니다: 'spam'
```

```
## The following object is masked from 'package:Matrix':
##
##     det
```

```
## The following objects are masked from 'package:base':
##
##     backsolve, forwardsolve
```

```
## 필요한 패키지를 로딩중입니다: viridis
```

```
## 필요한 패키지를 로딩중입니다: viridisLite
```

```
##
## Try help(fields) to get started.
```

```
fitness.cc <- cc(x,y)
#정준상관계수: 3개의 정준변수짝이 존재
fitness.cc$cor
```

```
## [1] 0.79560815 0.20055604 0.07257029
```

```
 #x집단, 표준정준계수
fitness.cc$xcoef*sapply(x,sd)
```

```
##              [,1]       [,2]       [,3]
## chins  -0.3494969  0.3755436  1.2965937
## situps -1.0540110 -0.1234905 -1.2367934
## jumps   0.7164267 -1.0621670  0.4188073
```

```
#y집단, 표준정준계수
fitness.cc$ycoef*sapply(y,sd)
```

```
##               [,1]       [,2]       [,3]
## weight -0.77539761  1.8843672  0.1909822
## waist   1.57934657 -1.1806411 -0.5060195
## pulse  -0.05912012  0.2311068 -1.0507838
```

```
#원변수, x의 정준변수, y의 정준변수간 상관행렬 시각화 및 산점도
CCA::matcor(x,y)
```

```
## $Xcor
##            chins    situps     jumps
## chins  1.0000000 0.6957274 0.4957602
## situps 0.6957274 1.0000000 0.6692061
## jumps  0.4957602 0.6692061 1.0000000
##
## $Ycor
##            weight      waist      pulse
## weight  1.0000000  0.8702435 -0.3657620
## waist   0.8702435  1.0000000 -0.3528921
## pulse  -0.3657620 -0.3528921  1.0000000
##
## $XYcor
##             chins     situps       jumps     weight      waist       pulse
## chins   1.0000000  0.6957274  0.49576018 -0.3896937 -0.5522321  0.15064802
## situps  0.6957274  1.0000000  0.66920608 -0.4930836 -0.6455980  0.22503808
## jumps   0.4957602  0.6692061  1.00000000 -0.2262956 -0.1914994  0.03493306
## weight -0.3896937 -0.4930836 -0.22629556  1.0000000  0.8702435 -0.36576203
## waist  -0.5522321 -0.6455980 -0.19149937  0.8702435  1.0000000 -0.35289213
## pulse   0.1506480  0.2250381  0.03493306 -0.3657620 -0.3528921  1.00000000
```

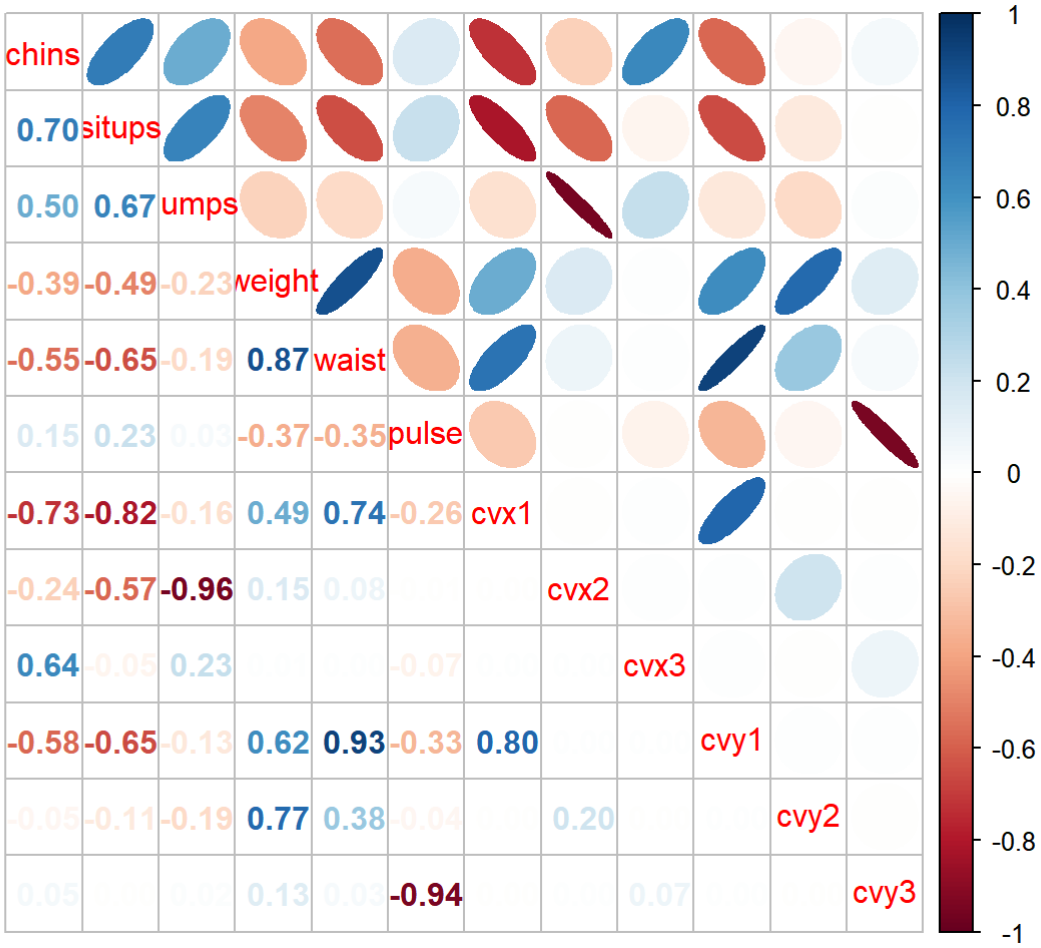
```
cvx <- fitness.cc$scores$xscores ; colnames(cvx) <- c('cvx1','cvx2','cvx3')
cvy <- fitness.cc$scores$yscores ; colnames(cvy) <- c('cvy1','cvy2','cvy3')
cor(cbind(x,y,cvx,cvy))
```

```
##             chins      situps       jumps       weight        waist
## chins   1.00000000  0.69572743  0.49576018 -0.389693651 -0.552232132
## situps  0.69572743  1.00000000  0.66920608 -0.493083645 -0.645598028
## jumps   0.49576018  0.66920608  1.00000000 -0.226295561 -0.191499371
## weight -0.38969365 -0.49308365 -0.22629556  1.000000000  0.870243492
## waist  -0.55223213 -0.64559803 -0.19149937  0.870243492  1.000000000
## pulse   0.15064802  0.22503808  0.03493306 -0.365762032 -0.352892127
## cvx1   -0.72762543 -0.81772845 -0.16219050  0.493788117  0.736275568
## cvx2   -0.23695220 -0.57302310 -0.95862799  0.154907853  0.075742277
## cvx3    0.64375064 -0.05444915  0.23393722  0.009794003  0.002249306
## cvy1   -0.57890472 -0.65059143 -0.12904008  0.620642353  0.925424864
## cvy2   -0.04752220 -0.11492324 -0.19225863  0.772391855  0.377661409
## cvy3    0.04671717 -0.00395139  0.01697689  0.134958857  0.030994863
##              pulse          cvx1          cvx2          cvx3          cvy1
## chins   0.150648020 -7.276254e-01 -2.369522e-01  6.437506e-01 -5.789047e-01
## situps  0.225038083 -8.177285e-01 -5.730231e-01 -5.444915e-02 -6.505914e-01
## jumps   0.034933062 -1.621905e-01 -9.586280e-01  2.339372e-01 -1.290401e-01
## weight -0.365762032  4.937881e-01  1.549079e-01  9.794003e-03  6.206424e-01
## waist  -0.352892127  7.362756e-01  7.574228e-02  2.249306e-03  9.254249e-01
## pulse   1.000000000 -2.648166e-01 -8.319907e-03 -6.836611e-02 -3.328481e-01
## cvx1   -0.264816648  1.000000e+00 -1.500532e-16  1.963947e-16  7.956082e-01
## cvx2   -0.008319907 -1.500532e-16  1.000000e+00  3.965355e-16  3.391922e-17
## cvx3   -0.068366110  1.963947e-16  3.965355e-16  1.000000e+00  2.182368e-16
## cvy1   -0.332848081  7.956082e-01  3.391922e-17  2.182368e-16  1.000000e+00
## cvy2   -0.041484202 -3.243476e-16  2.005560e-01 -1.616831e-16  1.371828e-17
## cvy3   -0.942067522 -5.640134e-17  2.622485e-17  7.257029e-02  1.618047e-16
##                cvy2          cvy3
## chins  -4.752220e-02  4.671717e-02
## situps -1.149232e-01 -3.951390e-03
## jumps  -1.922586e-01  1.697689e-02
## weight  7.723919e-01  1.349589e-01
## waist   3.776614e-01  3.099486e-02
## pulse  -4.148420e-02 -9.420675e-01
## cvx1   -3.243476e-16 -5.640134e-17
## cvx2    2.005560e-01  2.622485e-17
## cvx3   -1.616831e-16  7.257029e-02
## cvy1    1.371828e-17  1.618047e-16
## cvy2    1.000000e+00 -3.499462e-16
## cvy3   -3.499462e-16  1.000000e+00
```

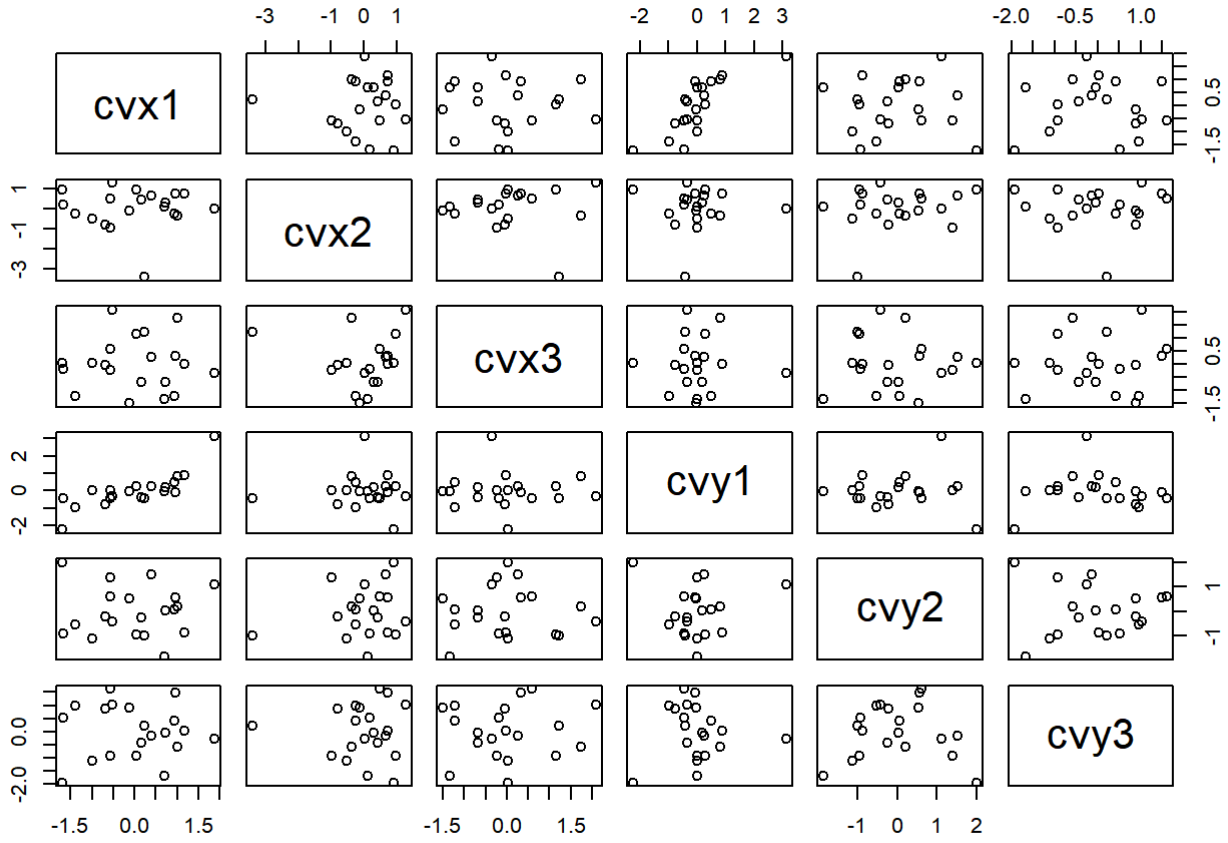
```
rr <- cor(cbind(x,y,cvx,cvy))
library(corrplot)
```

```
## corrplot 0.92 loaded
```

```
corrplot.mixed(rr,upper='ellipse')
```




```
pairs(cbind(cvx,cvy))
```



```
#해석: 정준상관계수는 0.79, 0.2, 0.072 이며 첫 번째 정준변수간 상관관계가 가장 높다.
#또한 y정준변수 중 weigt와 waist 상관관계가 높다고 판단할 수 있다.
```