

Exercise section15

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```
knitr::opts_chunk$set(echo = TRUE)
library(MASS)
library(haven)
library(ggplot2)
data<-as.data.frame(read_spss("F:/lessons/Multi countios Variate2/data/Table
8.3 football.sav"))
head(data)

##   group WDIM CIRCUM FBEYE EYEHD EARHD JAW
## 1     1 13.5  57.15  19.5  12.5  14.0  11
## 2     1 15.5  58.42  21.0  12.0  16.0  12
## 3     1 14.5  55.88  19.0  10.0  13.0  12
## 4     1 15.5  58.42  20.0  13.5  15.0  12
## 5     1 14.5  58.42  20.0  13.0  15.5  12
## 6     1 14.0  60.96  21.0  12.0  14.0  13

m1 = lda(data$group ~ . , data = data)
m1

## Call:
## lda(data$group ~ ., data = data)
##
## Prior probabilities of groups:
##      1      2      3
## 0.3333333 0.3333333 0.3333333
##
## Group means:
##      WDIM  CIRCUM  FBEYE  EYEHD  EARHD  JAW
## 1 15.20 58.93700 20.10833 13.08333 14.73333 12.26667
## 2 15.42 57.37967 19.80333 10.08000 13.45333 11.94333
## 3 15.58 57.77000 19.81000 10.94667 13.69667 11.80333
##
## Coefficients of linear discriminants:
##      LD1      LD2
## WDIM  0.948423100 1.4067750094
## CIRCUM -0.003639865 -0.0005126312
## FBEYE  -0.006439599 -0.0286176430
## EYEHD  -0.647483088 0.5402700415
## EARHD  -0.504360916 -0.3839132257
## JAW    -0.828535064 -1.5288556226
##
## Proportion of trace:
##  LD1  LD2
## 0.943 0.057
```



مثال بازیکنان فوتبال

$$\mathbf{E}^{-1}\mathbf{H}$$

Rank = 2

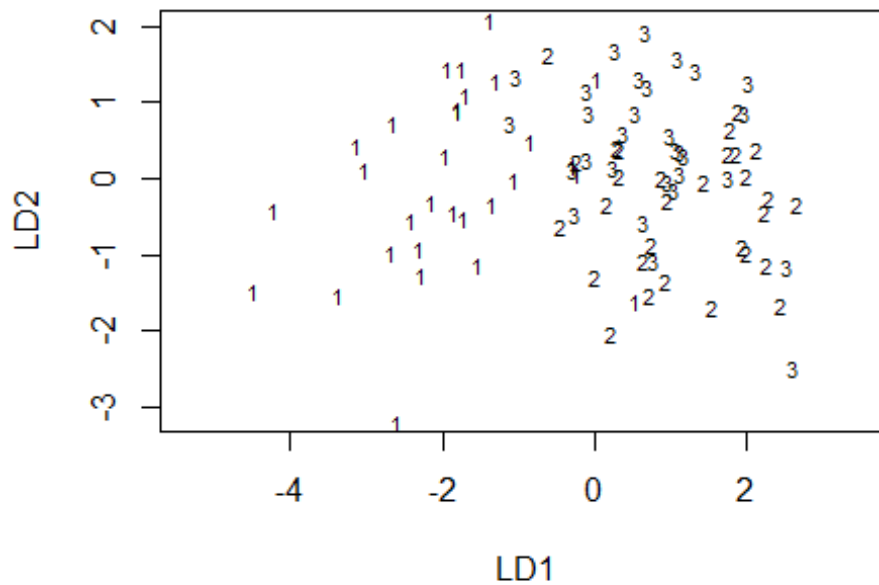
$$\lambda_1 = 1.9178$$

$$\lambda_2 = .1159$$

$$\mathbf{a}_1 = \begin{pmatrix} -.948 \\ .004 \\ .006 \\ .647 \\ .504 \\ .829 \end{pmatrix}$$

$$\mathbf{a}_2 = \begin{pmatrix} -1.407 \\ .001 \\ .029 \\ -.540 \\ .384 \\ 1.529 \end{pmatrix}$$

plot(m1)



```
pp = predict(m1)
dd= data.frame(LD1 = pp $ x [,1] , LD2 = pp $ x [,2])
ggplot(data = dd , aes(x = LD1 , y = LD2 ))+
  geom_point(aes (col = factor(data$group)))
```

