

Ejercicio 7

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1. Visualice la relacion de cada una de las medidas corporales con respecto a la variable porc_grasa y estime las correlaciones

```
mod <- lm(porc_grasa ~ cuello + pecho + abdomen + cadera + muslo
          + rodilla + tobillo + biceps + brazo + muneca, data = datos )

summary(mod)

##
## Call:
## lm(formula = porc_grasa ~ cuello + pecho + abdomen + cadera +
##     muslo + rodilla + tobillo + biceps + brazo + muneca, data = datos)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -9.3159 -2.7435 -0.1584  2.8388 10.5150
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  7.228749   6.214309   1.163  0.24588
## cuello      -0.581947   0.208580  -2.790  0.00569 **
## pecho       -0.090847   0.085430  -1.063  0.28866
## abdomen      0.960229   0.071582  13.414 < 2e-16 ***
## cadera      -0.391355   0.112686  -3.473  0.00061 ***
## muslo        0.133708   0.124922   1.070  0.28554
## rodilla     -0.094055   0.212394  -0.443  0.65828
## tobillo      0.004222   0.203175   0.021  0.98344
## biceps       0.111196   0.159118   0.699  0.48533
## brazo        0.344536   0.185511   1.857  0.06450 .
## muneca      -1.353472   0.471410  -2.871  0.00445 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4.071 on 241 degrees of freedom
## Multiple R-squared:  0.7351, Adjusted R-squared:  0.7241
## F-statistic: 66.87 on 10 and 241 DF,  p-value: < 2.2e-16
```

2. Estime la matriz de correlacion de las mediciones corporales.

```

#Matriz de correlaciones

#install.packages("corrplot")

library(corrplot)

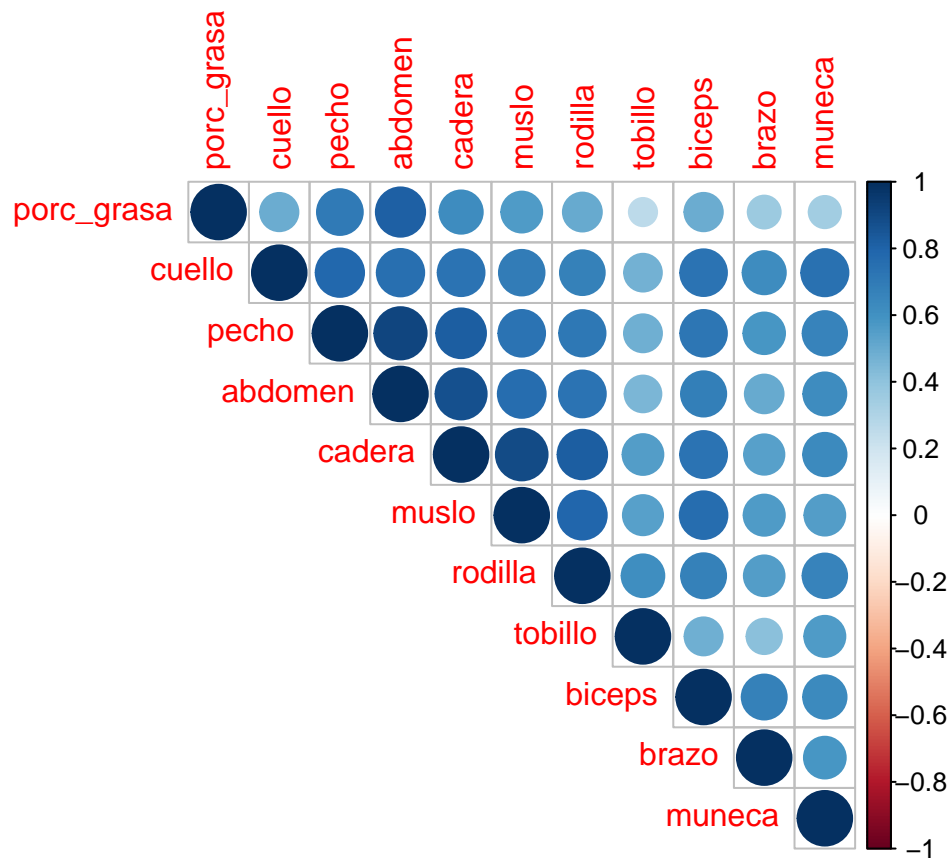
## corrplot 0.92 loaded

 analisis <- datos[,-(c(2,3,4))]

 correlacion <- round(cor(analisis),3)

 corrplot(correlacion, method="circle", type="upper",pch.col = 10)

```



4. Realice un conjunto de modelos de RLS que expliquen la relacion de cada medida corporal con respecto al porcentaje de grasa corporal. ¿Que observa?

```

mod1 <- lm(porc_grasa ~ cuello , data = datos )

mod2 <- lm(porc_grasa ~ pecho , data = datos )

mod3 <- lm(porc_grasa ~ abdomen , data = datos )

```

```

mod4 <- lm(porc_grasa ~ cadera , data = datos )
mod5<- lm(porc_grasa ~ muslo , data = datos )
mod6<- lm(porc_grasa ~ rodilla , data = datos )
mod7<- lm(porc_grasa ~ tobillo , data = datos )
mod8<- lm(porc_grasa ~ biceps , data = datos )
mod9<- lm(porc_grasa ~ brazo , data = datos )
mod10<- lm(porc_grasa ~ muneca , data = datos )

algo <- rbind(coef(mod1),coef(mod2),coef(mod3),coef(mod4),coef(mod5),coef(mod6)
             ,coef(mod7),coef(mod8),coef(mod9),coef(mod10))

algo <- algo[,2]

RLS_porcGrasa <- as.data.frame(cbind(c("Cuello","Pecho","Abdomen","Cadera","Muslo","Rodilla","Tobillo",
colnames(RLS_porcGrasa)<-c("Variable","Beta")

class(RLS_porcGrasa)

```

```
## [1] "data.frame"
```

```
RLS_porcGrasa
```

```

##      Variable      Beta
## 1   Cuello  1.5670899630347
## 2    Pecho 0.646222311718054
## 3  Abdomen 0.584890527012418
## 4   Cadera 0.676950137461153
## 5    Muslo 0.828661701987687
## 6  Rodilla 1.63187973004883
## 7  Tobillo 1.22001365754821
## 8   Biceps 1.26483448827388
## 9    Brazo 1.39343956604193
## 10 Muñeca 2.88563598657192

```

5. Ajuste la siguiente serie de modelo:

$\text{porc_grasai} = B_0 + B_1 \text{abdomi} + B_i$.

$\text{porc_grasai} = B_0 + B_1 \text{abdomi} + B_2 \text{cinturai} + B_i$.

$\text{porc_grasai} = B_0 + B_1 \text{abdomi} + B_2 \text{cinturai} + B_3 \text{cuelloi} + B_i$.

$\text{porc_grasai} = B_0 + B_1 \text{abdomi} + B_2 \text{cinturai} + B_3 \text{cuelloi} + B_4 \text{muneca} + B_i$.

A partir de las estimaciones de estos modelo:

Compare la evolucion del R2.

Compare la evolucion de la estimacion de B2.

Compare la evolucion del coefiente asociado a la circunferencia abdominal.

```
mod11<- lm(porc_grasa ~ abdomen , data = datos )
```

```
summary(mod11)
```

```
##
## Call:
## lm(formula = porc_grasa ~ abdomen, data = datos)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -17.6257  -3.4672   0.0111   3.1415  11.9754
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -35.19661     2.46229  -14.29  <2e-16 ***
## abdomen      0.58489     0.02643   22.13  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4.514 on 250 degrees of freedom
## Multiple R-squared:  0.6621, Adjusted R-squared:  0.6608
## F-statistic: 489.9 on 1 and 250 DF,  p-value: < 2.2e-16
```

```
mod12<- lm(porc_grasa ~ abdomen + cadera , data = datos )
```

```
summary(mod12)
```

```
##
## Call:
## lm(formula = porc_grasa ~ abdomen + cadera, data = datos)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -11.532  -3.153  -0.256   2.953  11.746
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -17.09863     4.30711  -3.970 9.41e-05 ***
## abdomen      0.81259     0.05194  15.644 < 2e-16 ***
## cadera      -0.39210     0.07818  -5.015 1.01e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4.311 on 249 degrees of freedom
## Multiple R-squared:  0.6931, Adjusted R-squared:  0.6907
## F-statistic: 281.2 on 2 and 249 DF,  p-value: < 2.2e-16
```

```
mod13<- lm(porc_grasa ~ abdomen + cadera + cuello , data = datos )
summary(mod13)
```

```
##
## Call:
## lm(formula = porc_grasa ~ abdomen + cadera + cuello, data = datos)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -9.9972 -2.9498 -0.1737  2.8267 12.4451
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -4.33037    5.07977  -0.852   0.395
## abdomen      0.89166    0.05330  16.728 < 2e-16 ***
## cadera      -0.31127    0.07771  -4.006 8.18e-05 ***
## cuello      -0.74128    0.16939  -4.376 1.78e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4.162 on 248 degrees of freedom
## Multiple R-squared:  0.7151, Adjusted R-squared:  0.7117
## F-statistic: 207.5 on 3 and 248 DF,  p-value: < 2.2e-16
```

```
mod14<- lm(porc_grasa ~ abdomen + cadera + cuello + muneca , data = datos )
summary(mod14)
```

```
##
## Call:
## lm(formula = porc_grasa ~ abdomen + cadera + cuello + muneca,
##      data = datos)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -11.3584  -2.7101  -0.2303   2.9092  10.9033
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  4.65504    5.79616   0.803 0.422675
## abdomen      0.89202    0.05243  17.014 < 2e-16 ***
## cadera      -0.28141    0.07705  -3.652 0.000317 ***
## cuello      -0.43807    0.19388  -2.260 0.024722 *
## muneca      -1.29023    0.42188  -3.058 0.002471 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4.094 on 247 degrees of freedom
## Multiple R-squared:  0.7255, Adjusted R-squared:  0.7211
## F-statistic: 163.2 on 4 and 247 DF,  p-value: < 2.2e-16
```