Clase6.R

Usuario

2019-08-12

```
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#Clase 6
#09/08/2019

#Analisis co-varianza

rascon <-read.csv("C:/MCF202-2019/rascon.csv", header= T)
head(rascon)
```

```
##   arbol  DAP EDAD        SP
## 1     1 27.4   59 arizonica
## 2     2 19.5   29 arizonica
## 3     3 20.0   24 arizonica
## 4     4 22.0   40 arizonica
## 5     5 34.0   50 arizonica
## 6     6 33.1   44 arizonica
```

```
summary(rascon)
```

```
##      arbol             DAP             EDAD                   SP
##  Min.   : 1.00   Min.   : 7.70   Min.   : 14.00   arizonica  :30
##  1st Qu.:15.75   1st Qu.:16.62   1st Qu.: 28.75   durangensis:30
##  Median :30.50   Median :22.05   Median : 41.50
##  Mean   :30.50   Mean   :23.24   Mean   : 48.03
##  3rd Qu.:45.25   3rd Qu.:28.98   3rd Qu.: 58.25
##  Max.   :60.00   Max.   :45.60   Max.   :128.00
```

```
# Actividad a realizar ----------------------------------------------------
#Estadistica descriptiva
mean(rascon$DAP)
```

```
## [1] 23.24167
```

```
mean(rascon$EDAD)
```

```
## [1] 48.03333
```

```
sd(rascon$DAP)
```

```
## [1] 9.244921
```

```
sd(rascon$EDAD)
```

```
## [1] 28.26507
```

```
var(rascon$DAP)
```

```
## [1] 85.46857
```

```
var(rascon$EDAD)
```

```
## [1] 798.9141
```

```r
# Correlacion ------------------------------------------------------------
shapiro.test(rascon$EDAD)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  rascon$EDAD
## W = 0.87401, p-value = 1.684e-05
```

```r
shapiro.test(rascon$DAP)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  rascon$DAP
## W = 0.97282, p-value = 0.2
```

```r
cor.test(rascon$EDAD, rascon$DAP)
```

```
##
##  Pearson's product-moment correlation
##
## data:  rascon$EDAD and rascon$DAP
## t = 9.9917, df = 58, p-value = 3.201e-14
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  0.6783908 0.8729475
## sample estimates:
##       cor
## 0.7953145
```

```r
# Conclusion de correlacion ----------------------------------------------
#la correlacion r=0.7953145

#correlacion:
#la correlacion entre las variables es siginificativa porque se
#observa que el valor de p-value < 3.201e-14.
#cuales el coeficiente de correlacion (r)?


# Analisis de covarianza -------------------------------------------------
lm.rasco <- lm(rascon$EDAD ~ rascon$DAP)
lm.rasco
```

```
##
## Call:
## lm(formula = rascon$EDAD ~ rascon$DAP)
##
## Coefficients:
## (Intercept)   rascon$DAP
##      -8.480        2.432
```

```r
summary(lm.rasco)
```

```
##
## Call:
## lm(formula = rascon$EDAD ~ rascon$DAP)
```

```
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -28.005 -12.539   0.270   7.457  49.630
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -8.4803     6.0802  -1.395    0.168
## rascon$DAP    2.4316     0.2434   9.992  3.2e-14 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 17.28 on 58 degrees of freedom
## Multiple R-squared:  0.6325, Adjusted R-squared:  0.6262
## F-statistic: 99.83 on 1 and 58 DF,  p-value: 3.201e-14
```

```
length(rascon$EDAD)
```

```
## [1] 60
```

```
# dentificar columna SP como factor
arizedad <- factor(rascon$SP)
arizedad
```

```
##  [1] arizonica   arizonica   arizonica   arizonica   arizonica
##  [6] arizonica   arizonica   arizonica   arizonica   arizonica
## [11] arizonica   arizonica   arizonica   arizonica   arizonica
## [16] arizonica   arizonica   arizonica   arizonica   arizonica
## [21] arizonica   arizonica   arizonica   arizonica   arizonica
## [26] arizonica   arizonica   arizonica   arizonica   arizonica
## [31] durangensis durangensis durangensis durangensis durangensis
## [36] durangensis durangensis durangensis durangensis durangensis
## [41] durangensis durangensis durangensis durangensis durangensis
## [46] durangensis durangensis durangensis durangensis durangensis
## [51] durangensis durangensis durangensis durangensis durangensis
## [56] durangensis durangensis durangensis durangensis durangensis
## Levels: arizonica durangensis
```

```
# separar factor
ariz <-subset(rascon, SP =="arizonica")
ariz
```

```
##    arbol  DAP EDAD        SP
## 1      1 27.4   59 arizonica
## 2      2 19.5   29 arizonica
## 3      3 20.0   24 arizonica
## 4      4 22.0   40 arizonica
## 5      5 34.0   50 arizonica
## 6      6 33.1   44 arizonica
## 7      7 32.0   44 arizonica
## 8      8 10.0   17 arizonica
## 9      9 14.0   15 arizonica
## 10    10 11.0   16 arizonica
## 11    11 21.6   23 arizonica
## 12    12 11.2   14 arizonica
## 13    13  8.0   18 arizonica
## 14    14 22.1   22 arizonica
```

```
## 15    15 10.0   20 arizonica
## 16    16 16.8   20 arizonica
## 17    17 17.9   22 arizonica
## 18    18 26.1   40 arizonica
## 19    19  7.7   15 arizonica
## 20    20 11.3   25 arizonica
## 21    21 13.5   26 arizonica
## 22    22 10.7   28 arizonica
## 23    23 17.0   34 arizonica
## 24    24 20.0   33 arizonica
## 25    25 24.7   46 arizonica
## 26    26 21.9   42 arizonica
## 27    27 25.2   39 arizonica
## 28    28 28.9   43 arizonica
## 29    29 29.2   44 arizonica
## 30    30 12.6   29 arizonica
```

```
ariz.lm <-lm(ariz$EDAD ~ ariz$DAP)
ariz.lm
```

```
##
## Call:
## lm(formula = ariz$EDAD ~ ariz$DAP)
##
## Coefficients:
## (Intercept)     ariz$DAP
##       5.333        1.313
```

```
dura <-subset(rascon, SP =="durangensis")
dura
```

```
##    arbol  DAP EDAD          SP
## 31    31 16.8   82 durangensis
## 32    32 25.9   32 durangensis
## 33    33 43.7  125 durangensis
## 34    34 41.2  103 durangensis
## 35    35 24.2   45 durangensis
## 36    36 37.1  108 durangensis
## 37    37 35.5   58 durangensis
## 38    38 45.6   75 durangensis
## 39    39 38.0   89 durangensis
## 40    40 21.9   40 durangensis
## 41    41 18.5   36 durangensis
## 42    42 22.3   59 durangensis
## 43    43 16.1   56 durangensis
## 44    44 17.6   34 durangensis
## 45    45 24.8   57 durangensis
## 46    46 16.1   41 durangensis
## 47    47 15.2   38 durangensis
## 48    48 25.8   63 durangensis
## 49    49 23.2   42 durangensis
## 50    50 32.0  106 durangensis
## 51    51 33.2   82 durangensis
## 52    52 27.1   60 durangensis
## 53    53 16.0   37 durangensis
## 54    54 29.7   69 durangensis
```

```
## 55    55 39.2  128 durangensis
## 56    56 35.5  113 durangensis
## 57    57 24.8   54 durangensis
## 58    58 21.1   55 durangensis
## 59    59 25.7   32 durangensis
## 60    60 21.3   42 durangensis
```

```
# Regresion dos factores
cov.edad <-lm(rascon$EDAD ~ rascon$DAP + rascon$SP)
cov.edad
```

```
##
## Call:
## lm(formula = rascon$EDAD ~ rascon$DAP + rascon$SP)
##
## Coefficients:
##          (Intercept)            rascon$DAP  rascon$SPdurangensis
##               -7.657                 1.986                19.063
```

```
summary(cov.edad)
```

```
##
## Call:
## lm(formula = rascon$EDAD ~ rascon$DAP + rascon$SP)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -30.844  -8.515  -1.731   7.473  38.741
##
## Coefficients:
##                      Estimate Std. Error t value Pr(>|t|)
## (Intercept)           -7.6573     5.2903  -1.447    0.153
## rascon$DAP             1.9861     0.2342   8.480 1.10e-11 ***
## rascon$SPdurangensis  19.0629     4.2942   4.439 4.19e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 15.03 on 57 degrees of freedom
## Multiple R-squared:  0.7269, Adjusted R-squared:  0.7174
## F-statistic: 75.87 on 2 and 57 DF,  p-value: < 2.2e-16
```

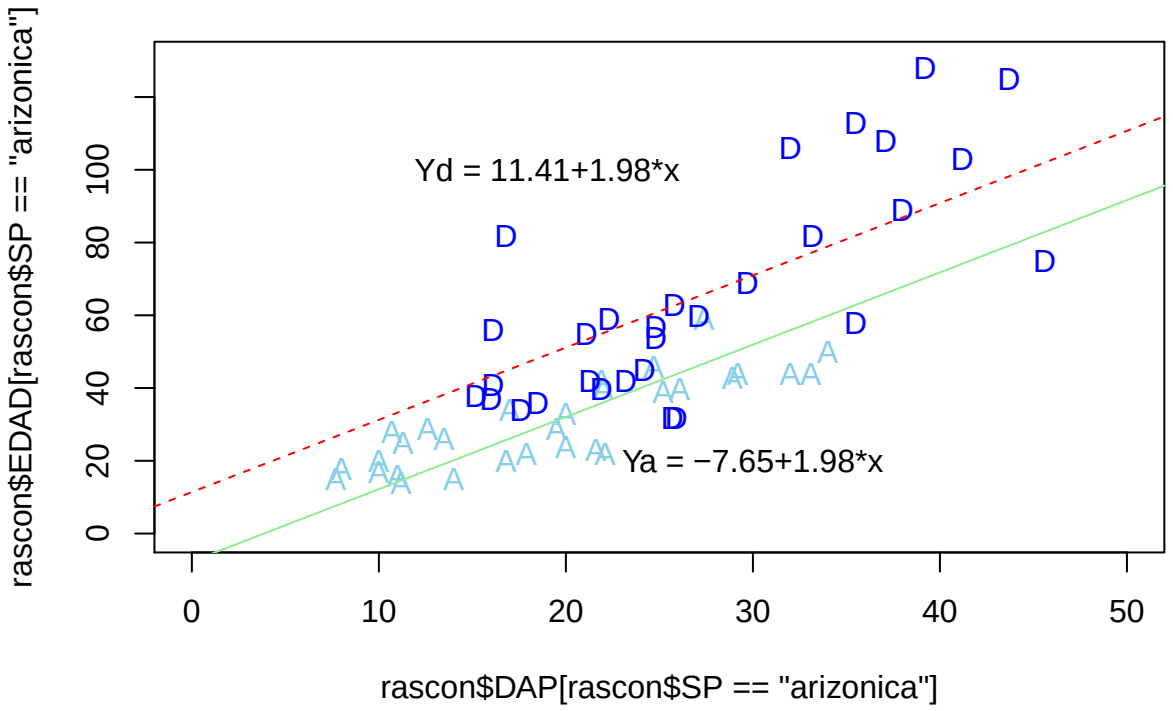
```
#existe diferencia significativas
#p-value que ambas lineas son difenrentes significativas

#aqui se compara en diferentes especies
plot(rascon$DAP[rascon$SP =="arizonica"], rascon$EDAD[rascon$SP =="arizonica"],
     col="sky blue", pch="A", xlim=c(0,50),ylim=c(0,130))
abline(cov.edad$coefficients[1], cov.edad$coefficients[2], col="light green")
text(30,20, "Ya = -7.65+1.98*x")


points(rascon$DAP[rascon$SP =="durangensis"], rascon$EDAD[rascon$SP =="durangensis"],
       col="blue", pch="D")

abline(cov.edad$coefficients[1] + cov.edad$coefficients[3],
       cov.edad$coefficients[2], col="red", lty="dashed")
```

```
text(19,100, "Yd = 11.41+1.98*x")
```




```
#hO.nO EXISTE COVARIACION ENTRE LA LINEA DE REGRESION
#h1= EXISTE covaraicion entre la linea de regresion
```