Laboratorio : Regresion Multiple y Analisis multivarial

REGRESION MULTIPLE.

```
> datos<-read.table("oca.txt",skip=14,header=TRUE)
> datos
       v1     v2     v3    v4    v5   v6    v7      v8     v9   v10   v11
1  14.774  4.885  7.093 5.059 2.137 8.13 0.162 162.616 11.707 1.102 0.601
2  20.287 11.513 13.769 3.125 0.847 7.80 0.114 108.113 27.464 1.347 0.584
3  16.470  6.093  8.680 5.233 2.082 9.20 0.159 199.557 26.109 1.152 0.459
4  20.391  9.187 12.542 5.036 1.305 9.73 0.204 223.361 22.259 1.485 0.646
5  19.223  9.515 13.094 3.393 0.822 7.43 0.117 112.707 28.248 1.220 0.553
6  17.602  7.970 11.437 3.495 1.214 6.73 0.156 179.466 23.257 1.152 0.680
7  18.719  9.111 11.811 3.557 1.042 7.07 0.123 142.484 23.213 1.351 0.578
8  18.276  7.318 10.083 4.982 1.502 8.33 0.177 219.337 20.472 1.202 0.662
9  20.704 10.041 13.712 4.095 0.933 8.33 0.161 194.799 30.032 1.412 0.714
10 17.002  6.329  9.260 5.107 1.550 8.07 0.181 212.463 16.138 1.095 0.606
11 14.028  5.201  7.471 4.123 1.402 7.33 0.116 100.149 14.824 1.145 0.545
12 16.302  7.191  8.711 4.268 1.323 8.20 0.159 155.579 22.818 1.181 0.669
13 13.059  4.521  6.258 4.245 1.798 7.27 0.219 211.973 22.575 1.038 0.471
14 17.400  8.263 10.815 3.758 1.153 7.93 0.151 143.835 26.908 1.120 0.649
15 21.851 11.014 14.999 3.191 1.045 7.53 0.162 178.815 19.676 1.471 0.781
16 16.277  6.361  8.638 4.334 1.237 8.07 0.185 194.120 17.494 1.285 0.602
17 15.424  6.830  8.793 3.713 1.303 7.07 0.221 219.811 11.030 1.201 0.611
18 14.831  6.958  9.281 2.737 1.324 6.07 0.234 216.110  8.252 1.187 0.560
     v12   v13
1  0.554 0.166
2  0.491 0.125
3  0.509 0.120
4  0.492 0.133
5  0.534 0.091
6  0.472 0.104
7  0.534 0.210
8  0.500 0.105
9  0.449 0.150
10 0.514 0.205
11 0.492 0.094
12 0.490 0.144
13 0.612 0.131
14 0.520 0.205
15 0.512 0.169
16 0.589 0.260
17 0.445 0.178
18 0.556 0.154

> modelo<-lm(v6~.,data=datos)
> modelo
Call:
lm(formula = v6 ~ ., data = datos)

Coefficients:
(Intercept)           v1           v2           v3           v4           v5
   -1.84642      0.84739     -0.32236     -0.40491      0.49753      0.67850
         v7           v8           v9          v10          v11          v12
   32.68899     -0.02846      0.05693      1.17111     -2.67936     -5.94581
        v13
```

```
    1.99267
> estudio<-step(modelo,direction=c("both"),k=6)
Start:  AIC= 10.39
 v6 ~ v1 + v2 + v3 + v4 + v5 + v7 + v8 + v9 + v10 + v11 + v12 +
    v13

       Df Sum of Sq     RSS     AIC
- v2    1    0.0329  0.4537  5.7478
- v4    1    0.0411  0.4619  6.0715
- v10   1    0.0695  0.4904  7.1473
- v13   1    0.0716  0.4924  7.2221
- v3    1    0.0747  0.4956  7.3363
- v1    1    0.1002  0.5210  8.2376
- v11   1    0.1078  0.5286  8.4990
<none>               0.4208 10.3943
- v12   1    0.1678  0.5886 10.4336
- v5    1    0.1775  0.5983 10.7277
- v7    1    0.4613  0.8822 17.7163
- v8    1    0.4681  0.8890 17.8549
- v9    1    0.4941  0.9150 18.3736

Step:  AIC= 5.75
 v6 ~ v1 + v3 + v4 + v5 + v7 + v8 + v9 + v10 + v11 + v12 + v13

       Df Sum of Sq     RSS     AIC
- v3    1    0.0419  0.4956  1.3365
- v13   1    0.0470  0.5007  1.5230
- v11   1    0.0876  0.5413  2.9268
- v10   1    0.1190  0.5727  3.9394
- v1    1    0.1254  0.5791  4.1396
- v5    1    0.1518  0.6055  4.9420
<none>               0.4537  5.7478
- v12   1    0.2169  0.6706  6.7803
+ v2    1    0.0329  0.4208 10.3943
- v9    1    0.5626  1.0163 14.2637
- v4    1    0.6456  1.0993 15.6775
- v7    1    0.9199  1.3736 19.6874
- v8    1    0.9517  1.4054 20.0986

Step:  AIC= 1.34
 v6 ~ v1 + v4 + v5 + v7 + v8 + v9 + v10 + v11 + v12 + v13

       Df Sum of Sq    RSS    AIC
- v11   1     0.058  0.554 -2.662
- v13   1     0.081  0.577 -1.924
- v5    1     0.159  0.655  0.350
- v12   1     0.184  0.680  1.028
- v10   1     0.186  0.681  1.065
<none>              0.496  1.336
- v1    1     0.314  0.810  4.181
+ v3    1     0.042  0.454  5.748
+ v2    1 5.857e-06  0.496  7.336
- v9    1     0.567  1.063  9.066
- v7    1     0.880  1.375 13.710
- v8    1     0.918  1.413 14.200
- v4    1     3.400  3.895 32.449
```

```
Step:  AIC= -2.66
 v6 ~ v1 + v4 + v5 + v7 + v8 + v9 + v10 + v12 + v13

       Df Sum of Sq     RSS     AIC
- v13   1    0.0531  0.6070 -7.0125
- v12   1    0.1349  0.6888 -4.7376
- v5    1    0.1756  0.7295 -3.7049
<none>               0.5539 -2.6617
- v10   1    0.2508  0.8047 -1.9379
- v1    1    0.2570  0.8109 -1.8006
+ v11   1    0.0583  0.4956  1.3365
+ v2    1    0.0203  0.5336  2.6660
+ v3    1    0.0125  0.5413  2.9268
- v9    1    0.7619  1.3158  6.9127
- v7    1    0.8319  1.3858  7.8461
- v8    1    0.8807  1.4346  8.4687
- v4    1    3.3592  3.9131 26.5312

Step:  AIC= -7.01
 v6 ~ v1 + v4 + v5 + v7 + v8 + v9 + v10 + v12

       Df Sum of Sq      RSS      AIC
- v12   1    0.0871   0.6941 -10.5985
- v5    1    0.1294   0.7364  -9.5333
<none>               0.6070  -7.0125
- v1    1    0.2421   0.8491  -6.9701
- v10   1    0.2651   0.8722  -6.4889
+ v13   1    0.0531   0.5539  -2.6617
+ v2    1    0.0383   0.5687  -2.1852
+ v3    1    0.0344   0.5726  -2.0641
+ v11   1    0.0300   0.5770  -1.9243
- v9    1    0.7118   1.3188   0.9547
- v7    1    0.7884   1.3954   1.9710
- v8    1    0.8299   1.4369   2.4984
- v4    1    3.7133   4.3203  22.3131

Step:  AIC= -10.6
 v6 ~ v1 + v4 + v5 + v7 + v8 + v9 + v10

       Df Sum of Sq      RSS      AIC
- v5    1    0.0874   0.7815 -14.4647
- v10   1    0.2436   0.9378 -11.1835
- v1    1    0.2719   0.9660 -10.6492
<none>               0.6941 -10.5985
+ v2    1    0.0989   0.5952  -7.3654
+ v12   1    0.0871   0.6070  -7.0125
- v9    1    0.6401   1.3342  -4.8369
+ v3    1    0.0085   0.6856  -4.8210
+ v11   1    0.0075   0.6866  -4.7938
+ v13   1    0.0053   0.6888  -4.7376
- v7    1    0.7113   1.4054  -3.9010
- v8    1    0.7545   1.4486  -3.3560
- v4    1    3.8767   4.5708  17.3277

Step:  AIC= -14.46
 v6 ~ v1 + v4 + v7 + v8 + v9 + v10
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```
       Df Sum of Sq      RSS      AIC
- v1    1    0.2051   0.9866 -16.2704
- v10   1    0.2080   0.9895 -16.2170
<none>                0.7815 -14.4647
+ v2    1    0.0969   0.6846 -10.8480
+ v5    1    0.0874   0.6941 -10.5985
- v9    1    0.5715   1.3530 -10.5852
+ v12   1    0.0450   0.7364  -9.5333
- v7    1    0.6563   1.4378  -9.4909
- v8    1    0.6841   1.4655  -9.1467
+ v11   1    0.0243   0.7571  -9.0344
+ v3    1    0.0062   0.7753  -8.6079
+ v13   1 3.946e-07   0.7815  -8.4647
- v4    1    7.1649   7.9464  21.2822

Step:  AIC= -16.27
 v6 ~ v4 + v7 + v8 + v9 + v10

       Df Sum of Sq      RSS      AIC
+ v2    1    0.2888   0.6977 -16.5056
<none>                0.9866 -16.2704
- v7    1    0.4513   1.4378 -15.4905
- v8    1    0.4790   1.4656 -15.1464
+ v1    1    0.2051   0.7815 -14.4647
+ v3    1    0.1689   0.8176 -13.6511
+ v12   1    0.0821   0.9044 -11.8351
+ v5    1    0.0205   0.9660 -10.6492
+ v11   1    0.0099   0.9767 -10.4519
+ v13   1    0.0002   0.9864 -10.2735
- v9    1    1.0939   2.0805  -8.8402
- v10   1    2.1613   3.1479  -1.3856
- v4    1    7.3672   8.3538  16.1821

Step:  AIC= -16.51
 v6 ~ v4 + v7 + v8 + v9 + v10 + v2

       Df Sum of Sq      RSS      AIC
- v10   1    0.1793   0.8770 -18.3895
<none>                0.6977 -16.5056
- v2    1    0.2888   0.9866 -16.2704
- v9    1    0.3585   1.0562 -15.0420
+ v5    1    0.0960   0.6017 -13.1705
+ v11   1    0.0144   0.6833 -10.8815
+ v1    1    0.0131   0.6846 -10.8480
+ v12   1    0.0126   0.6851 -10.8342
+ v3    1    0.0118   0.6859 -10.8119
+ v13   1  3.71e-05   0.6977 -10.5066
- v7    1    0.6737   1.3715 -10.3408
- v8    1    0.6828   1.3805 -10.2228
- v4    1    5.3764   6.0741  16.4459

Step:  AIC= -18.39
 v6 ~ v4 + v7 + v8 + v9 + v2

       Df Sum of Sq      RSS      AIC
- v9    1    0.2250   1.1020 -20.2779
<none>                0.8770 -18.3895
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```
+ v10   1    0.1793   0.6977 -16.5056
- v8    1    0.7100   1.5870 -13.7134
+ v5    1    0.0532   0.8238 -13.5153
- v7    1    0.7597   1.6367 -13.1584
+ v11   1    0.0198   0.8572 -12.8010
+ v3    1    0.0060   0.8710 -12.5128
+ v13   1    0.0035   0.8735 -12.4615
+ v12   1    0.0013   0.8757 -12.4169
+ v1    1 3.006e-06   0.8770 -12.3895
- v2    1    2.2709   3.1479  -1.3856
- v4    1    7.2843   8.1613  15.7626

Step:  AIC= -20.28
 v6 ~ v4 + v7 + v8 + v2

       Df Sum of Sq      RSS      AIC
<none>                1.1020 -20.2779
- v7    1    0.6036   1.7056 -18.4162
+ v9    1    0.2250   0.8770 -18.3895
- v8    1    0.6326   1.7346 -18.1129
+ v11   1    0.0902   1.0118 -15.8155
+ v10   1    0.0458   1.0562 -15.0420
+ v5    1    0.0338   1.0682 -14.8392
+ v1    1    0.0268   1.0752 -14.7213
+ v3    1    0.0183   1.0837 -14.5796
+ v12   1    0.0043   1.0978 -14.3478
+ v13   1    0.0016   1.1004 -14.3039
- v2    1    3.5374   4.6394  -0.4042
- v4    1    8.0757   9.1777  11.8754
> summary(estudio)
```

Análisis y comentario.

Para visualizar los datos de “oca.txt”

```
> file.show("oca.txt")
```

```
Materia seca     V1 g
Rend. almidón    V2 g
Almidón total    V3 g
Azúcar total     V4 g
Az. reductor     V5 g
Brix         V6 °B
Acidez       V7 %
Oxalato total    v8 mg
Acido ascorbico v9 mg
Proteína     v10 g
Ceniza       v11 g
Fibra        v12 g
Grasa        v13 g
#-----------------------------------------
v1 v2 v3 v4 v5 v6 v7 v8 v9 v10 v11 v12 v13
14.774  4.885   7.093   5.059   2.137   8.13    0.162   162.616 11.707  1.102   0.601   0.554
0.166
20.287  11.513  13.769  3.125   0.847   7.80    0.114   108.113 27.464  1.347   0.584   0.491
0.125
16.470  6.093   8.680   5.233   2.082   9.20    0.159   199.557 26.109  1.152   0.459   0.509
0.120
20.391  9.187   12.542  5.036   1.305   9.73    0.204   223.361 22.259  1.485   0.646   0.492
0.133
19.223  9.515   13.094  3.393   0.822   7.43    0.117   112.707 28.248  1.220   0.553   0.534
0.091
17.602  7.970   11.437  3.495   1.214   6.73    0.156   179.466 23.257  1.152   0.680   0.472
0.104
18.719  9.111   11.811  3.557   1.042   7.07    0.123   142.484 23.213  1.351   0.578   0.534
0.210
18.276  7.318   10.083  4.982   1.502   8.33    0.177   219.337 20.472  1.202   0.662   0.500
0.105
20.704  10.041  13.712  4.095   0.933   8.33    0.161   194.799 30.032  1.412   0.714   0.449
0.150
17.002  6.329   9.260   5.107   1.550   8.07    0.181   212.463 16.138  1.095   0.606   0.514
0.205
14.028  5.201   7.471   4.123   1.402   7.33    0.116   100.149 14.824  1.145   0.545   0.492
0.094
16.302  7.191   8.711   4.268   1.323   8.20    0.159   155.579 22.818  1.181   0.669   0.490
0.144
13.059  4.521   6.258   4.245   1.798   7.27    0.219   211.973 22.575  1.038   0.471   0.612
0.131
17.400  8.263   10.815  3.758   1.153   7.93    0.151   143.835 26.908  1.120   0.649   0.520
0.205
21.851  11.014  14.999  3.191   1.045   7.53    0.162   178.815 19.676  1.471   0.781   0.512
0.169
16.277  6.361   8.638   4.334   1.237   8.07    0.185   194.120 17.494  1.285   0.602   0.589
0.260
15.424  6.830   8.793   3.713   1.303   7.07    0.221   219.811 11.030  1.201   0.611   0.445
0.178
14.831  6.958   9.281   2.737   1.324   6.07    0.234   216.110 8.252   1.187   0.560   0.556
0.154
```