assignment10

2023-04-14

```
library(faraway)
data(meatspec,package="faraway")
df <- meatspec
lmod=lm(fat ~ . , data=df)
summary(lmod)
```

```
##
## Call:
## lm(formula = fat ~ ., data = df)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.9833 -0.4982  0.0135  0.4864  3.1727
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)      7.302      1.876   3.892 0.000168 ***
## V1           10898.047   3003.614   3.628 0.000428 ***
## V2          -12174.864   5520.233  -2.205 0.029426 *
## V3           -5953.285   8868.517  -0.671 0.503398
## V4           23229.862  15426.530   1.506 0.134875
## V5          -28386.219  19758.501  -1.437 0.153554
## V6           12748.270  17381.421   0.733 0.464794
## V7          -11422.335  11454.169  -0.997 0.320769
## V8            7102.332   7123.935   0.997 0.320892
## V9             783.655   5228.808   0.150 0.881130
## V10           3512.239   6787.803   0.517 0.605856
## V11         -10547.574  10580.407  -0.997 0.320926
## V12          34638.288  18344.772   1.888 0.061543 .
## V13         -38705.447  23098.395  -1.676 0.096542 .
## V14          28895.947  19952.355   1.448 0.150293
## V15         -13726.347  13312.307  -1.031 0.304676
## V16          -7062.769   8172.878  -0.864 0.389308
## V17           2571.597   6279.661   0.410 0.682932
## V18           5263.427   6183.397   0.851 0.396432
## V19           8860.827   8925.154   0.993 0.322914
## V20         -12149.937  15184.189  -0.800 0.425276
## V21         -19284.872  20536.132  -0.939 0.349680
## V22          36626.953  22847.592   1.603 0.111680
## V23         -11165.390  19302.712  -0.578 0.564111
## V24         -15008.939  13616.072  -1.102 0.272655
## V25          16698.992   8582.462   1.946 0.054151 .
## V26          -4891.852   5901.456  -0.829 0.408880
## V27          -6334.752   6072.685  -1.043 0.299084
```

```
## V28           24043.786    8144.906    2.952 0.003834 **
## V29          -39940.900   12335.575   -3.238 0.001578 **
## V30           33309.092   17674.622    1.885 0.062034 .
## V31          -23174.509   20974.708   -1.105 0.271539
## V32           18764.305   18959.821    0.990 0.324423
## V33           -3747.892   13458.994   -0.278 0.781158
## V34           -6671.747    9353.448   -0.713 0.477122
## V35           -5318.549    7534.861   -0.706 0.481716
## V36           10488.898    5773.159    1.817 0.071869 .
## V37           -8410.539    5892.265   -1.427 0.156202
## V38            -408.228    7970.269   -0.051 0.959241
## V39           19815.971   11338.219    1.748 0.083206 .
## V40          -23690.179   15971.026   -1.483 0.140748
## V41           29398.659   19340.032    1.520 0.131256
## V42          -32055.252   20639.448   -1.553 0.123170
## V43           11826.000   17491.895    0.676 0.500356
## V44           -9994.257   11435.392   -0.874 0.383969
## V45           23017.798    8927.175    2.578 0.011200 *
## V46           -9041.633    6218.630   -1.454 0.148705
## V47           -4846.799    3520.124   -1.377 0.171246
## V48            1536.042    4401.789    0.349 0.727764
## V49            2188.418    7363.225    0.297 0.766848
## V50          -13170.870    9829.843   -1.340 0.182947
## V51           26420.737   13371.372    1.976 0.050580 .
## V52          -23565.834   16339.395   -1.442 0.151968
## V53           -2005.210   16742.496   -0.120 0.904878
## V54           30327.413   14023.378    2.163 0.032658 *
## V55          -31802.344   10650.780   -2.986 0.003461 **
## V56           12428.271    6395.916    1.943 0.054463 .
## V57            -102.107    4676.993   -0.022 0.982620
## V58             210.251    4388.133    0.048 0.961869
## V59           -7679.011    4511.526   -1.702 0.091465 .
## V60           11590.949    3967.244    2.922 0.004199 **
## V61           -6559.639    3756.703   -1.746 0.083485 .
## V62            2533.819    3939.248    0.643 0.521370
## V63           11950.924    5296.267    2.256 0.025947 *
## V64          -18515.851    7070.171   -2.619 0.010021 *
## V65            4051.697    8539.248    0.474 0.636066
## V66             222.861    9691.472    0.023 0.981694
## V67           10439.030   10111.231    1.032 0.304061
## V68          -22570.742    9493.417   -2.378 0.019094 *
## V69           17285.149    8168.742    2.116 0.036520 *
## V70             -45.036    7357.838   -0.006 0.995127
## V71           -8134.714    6796.093   -1.197 0.233802
## V72           -1768.780    6344.295   -0.279 0.780905
## V73           15744.948    5531.706    2.846 0.005246 **
## V74          -11219.545    5666.910   -1.980 0.050132 .
## V75            5289.427    5067.718    1.044 0.298810
## V76           -2454.612    4760.274   -0.516 0.607101
## V77             740.608    4922.688    0.150 0.880677
## V78           -5730.806    5518.607   -1.038 0.301257
## V79           12166.493    6026.835    2.019 0.045863 *
## V80          -22688.979    7023.823   -3.230 0.001616 **
## V81           14991.763    8595.338    1.744 0.083824 .
```

```
## V82             3331.367    9984.910    0.334 0.739264
## V83            -6651.082   11358.746   -0.586 0.559337
## V84            -6752.949   12405.922   -0.544 0.587276
## V85            16271.066   12434.546    1.309 0.193323
## V86             5512.031   13689.180    0.403 0.687955
## V87           -21092.220   15770.171   -1.337 0.183730
## V88             9657.690   15143.593    0.638 0.524921
## V89              273.586   13103.448    0.021 0.983379
## V90            -5489.915   13927.199   -0.394 0.694180
## V91             2891.941   15479.740    0.187 0.852133
## V92            10160.850   14407.777    0.705 0.482103
## V93            -3183.235   11882.686   -0.268 0.789269
## V94            -7330.650   10959.287   -0.669 0.504913
## V95             5551.521    9450.485    0.587 0.558075
## V96            -3320.415    8349.562   -0.398 0.691613
## V97            -2512.787    7974.922   -0.315 0.753272
## V98            -5979.563    7355.289   -0.813 0.417935
## V99             8283.253    7911.765    1.047 0.297336
## V100            -101.926    3591.166   -0.028 0.977407
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.22 on 114 degrees of freedom
## Multiple R-squared:  0.9951, Adjusted R-squared:  0.9908
## F-statistic:   232 on 100 and 114 DF,  p-value: < 2.2e-16
```

```r
# Extract p-values for coefficients
p_values <- summary(lmod)$coefficients[-1, 4]
```

```r
p_values
```

```
##          V1           V2           V3           V4           V5           V6
## 0.0004283297 0.0294256650 0.5033981889 0.1348745281 0.1535538037 0.4647943207
##          V7           V8           V9          V10          V11          V12
## 0.3207693528 0.3208916975 0.8811299832 0.6058559085 0.3209258938 0.0615433570
##         V13          V14          V15          V16          V17          V18
## 0.0965422164 0.1502926730 0.3046755629 0.3893083081 0.6829323019 0.3964319860
##         V19          V20          V21          V22          V23          V24
## 0.3229136323 0.4252764439 0.3496800608 0.1116799533 0.5641105785 0.2726547758
##         V25          V26          V27          V28          V29          V30
## 0.0541511081 0.4088802236 0.2990835887 0.0038340431 0.0015775341 0.0620343696
##         V31          V32          V33          V34          V35          V36
## 0.2715386246 0.3244226674 0.7811579873 0.4771222175 0.4817158475 0.0718690219
##         V37          V38          V39          V40          V41          V42
## 0.1562020058 0.9592407305 0.0832059828 0.1407482329 0.1312561915 0.1231696311
##         V43          V44          V45          V46          V47          V48
## 0.5003562519 0.3839687639 0.0111996624 0.1487052405 0.1712463541 0.7277641070
##         V49          V50          V51          V52          V53          V54
## 0.7668477428 0.1829470928 0.0505798445 0.1519677289 0.9048779908 0.0326584621
##         V55          V56          V57          V58          V59          V60
## 0.0034611034 0.0544625942 0.9826203770 0.9618689776 0.0914645627 0.0041986807
##         V61          V62          V63          V64          V65          V66
## 0.0834846286 0.5213704458 0.0259469095 0.0100214548 0.6360656884 0.9816939643
```

```
##          V67          V68          V69          V70          V71          V72
## 0.3040610504 0.0190942824 0.0365201162 0.9951269670 0.2338017348 0.7809045001
##          V73          V74          V75          V76          V77          V78
## 0.0052463432 0.0501317942 0.2988096151 0.6071008125 0.8806771054 0.3012574109
##          V79          V80          V81          V82          V83          V84
## 0.0458632490 0.0016162837 0.0838241617 0.7392639838 0.5593371748 0.5872756605
##          V85          V86          V87          V88          V89          V90
## 0.1933231459 0.6879553379 0.1837297663 0.5249211429 0.9833787242 0.6941796989
##          V91          V92          V93          V94          V95          V96
## 0.8521330321 0.4821032694 0.7892692561 0.5049125530 0.5580750742 0.6916131495
##          V97          V98          V99         V100
## 0.7532723377 0.4179350446 0.2973355717 0.9774068543
```

```r
# Getting adjusted p values using Benjamini-Hochberg procedure
p_values_adjustBH <- p.adjust (p_values , method = "BH")

# Applying FDR value = 0.2
p_values_adjustBH[p_values_adjustBH <= 0.2]
```

```
##         V1        V28        V29        V45        V55        V60        V64
## 0.04283297 0.06997801 0.05387612 0.12444069 0.06997801 0.06997801 0.12444069
##        V68        V73        V80
## 0.19094282 0.07494776 0.05387612
```

```r
names(p_values_adjustBH[p_values_adjustBH <= 0.2])
```

```
##  [1] "V1"  "V28" "V29" "V45" "V55" "V60" "V64" "V68" "V73" "V80"
```