MATJAZ_URBAN

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```r
# Ht, telesna višina v cm

lungcap$Ht <- lungcap$Ht*2.54

#  Smoke naj bo faktor z vrednostma "Ne" in "Da"

lungcap$Smoke <- factor(lungcap$Smoke, labels=c("Ne", "Da"))
levels(lungcap$Gender)
```
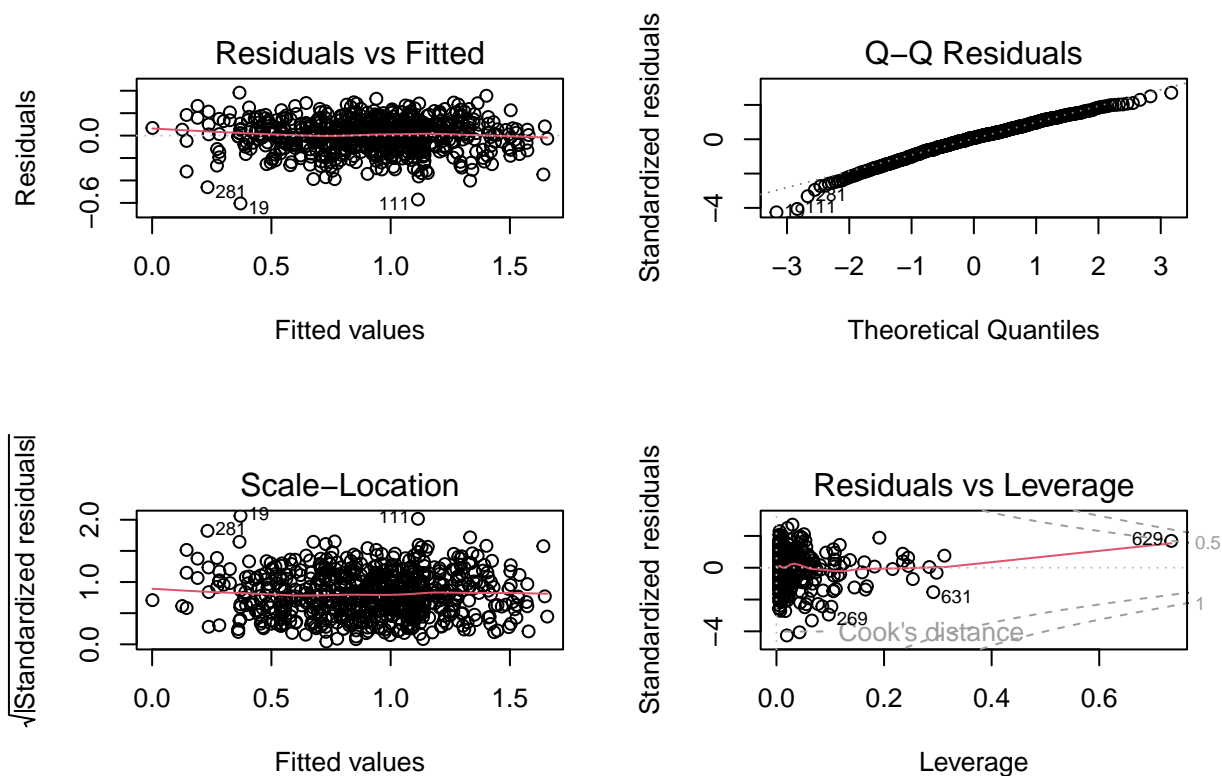
```
## [1] "F" "M"
```

```r
# zamenjamo oznaki za spol za grafične prikaze

levels(lungcap$Gender) <- c("Ženske", "Moški")
```

```r
mod2.int <- lm(log(FEV) ~ Age*Ht*Gender*Smoke, data=lungcap)
par(mfrow=c(2,2))
plot(mod2.int)
```

Residuals vs Fitted

Residuals

Fitted values

281 19 111

Q–Q Residuals

Standardized residuals

Theoretical Quantiles

281 111

Scale–Location

√|Standardized residuals|

Fitted values

19 281 111

Residuals vs Leverage

Standardized residuals

Leverage

629 0.5

631

269 Cook's distance 1

```r
summary(mod2.int)
```

```
## 
## Call:
## lm(formula = log(FEV) ~ Age * Ht * Gender * Smoke, data = lungcap)
## 
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.60494 -0.08675  0.01153  0.09379  0.38277
## 
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)          -2.546e+00  3.166e-01  -8.043 4.29e-15 ***
## Age                   1.215e-01  4.111e-02   2.954  0.00325 **
## Ht                    2.049e-02  2.153e-03   9.515  < 2e-16 ***
## GenderMoški           9.803e-01  4.131e-01   2.373  0.01794 *
## SmokeDa               1.205e+01  4.997e+00   2.412  0.01614 *
## Age:Ht               -6.003e-04  2.595e-04  -2.313  0.02103 *
## Age:GenderMoški      -1.371e-01  5.095e-02  -2.692  0.00730 **
## Ht:GenderMoški       -5.876e-03  2.793e-03  -2.104  0.03579 *
## Age:SmokeDa          -8.366e-01  3.779e-01  -2.214  0.02721 *
## Ht:SmokeDa           -7.147e-02  3.035e-02  -2.355  0.01883 *
## GenderMoški:SmokeDa  -1.388e+01  5.811e+00  -2.388  0.01722 *
## Age:Ht:GenderMoški    8.444e-04  3.158e-04   2.673  0.00770 **
## Age:Ht:SmokeDa        4.931e-03  2.297e-03   2.147  0.03219 *
```

```
## Age:GenderMoški:SmokeDa        8.748e-01  4.570e-01   1.914  0.05603 .
## Ht:GenderMoški:SmokeDa         8.236e-02  3.497e-02   2.355  0.01881 *
## Age:Ht:GenderMoški:SmokeDa    -5.194e-03  2.739e-03  -1.897  0.05834 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1435 on 638 degrees of freedom
## Multiple R-squared:  0.8189, Adjusted R-squared:  0.8147
## F-statistic: 192.4 on 15 and 638 DF,  p-value: < 2.2e-16
```

Splošna enačba modela

$$\hat{y}_i = \beta_0 + \beta_1 \cdot \text{Age}_i + \beta_2 \cdot \text{Ht}_i + \beta_3 \cdot \text{Gender}_i + \beta_4 \cdot \text{Smoke}_i + \beta_5 \cdot (\text{Age}_i \cdot \text{Ht}_i) + \beta_6 \cdot (\text{Age}_i \cdot \text{Gender}_i) + \beta_7 \cdot (\text{Age}_i \cdot \text{Smoke}_i)$$

$$+ \beta_8 \cdot (\text{Ht}_i \cdot \text{Gender}_i) + \beta_9 \cdot (\text{Ht}_i \cdot \text{Smoke}_i) + \beta_{10} \cdot (\text{Gender}_i \cdot \text{Smoke}_i) + \beta_{11} \cdot (\text{Age}_i \cdot \text{Ht}_i \cdot \text{Gender}_i) + \beta_{12} \cdot (\text{Age}_i \cdot \text{Ht}_i \cdot \text{Smoke}_i)$$

$$+ \beta_{13} \cdot (\text{Age}_i \cdot \text{Gender}_i \cdot \text{Smoke}_i) + \beta_{14} \cdot (\text{Ht}_i \cdot \text{Gender}_i \cdot \text{Smoke}_i) + \beta_{15} \cdot (\text{Age}_i \cdot \text{Ht}_i \cdot \text{Gender}_i \cdot \text{Smoke}_i) + \epsilon_i$$

Ženske nekadilke

$$\log(\text{FEV}) = -2.55 + 0.12 \cdot \text{Age} + 0.02 \cdot \text{Ht} - 0.0006 \cdot (\text{Age} \cdot \text{Ht})$$

Ženske kadilke

$$\log(\text{FEV}) = (-2.55 + 12.05) + (0.12 - 0.84) \cdot \text{Age} + (0.02 - 0.07) \cdot \text{Ht} + (0.005 - 0.0006) \cdot (\text{Age} \cdot \text{Ht})$$

Moški nekadilci

$$\log(\text{FEV}) = (-2.55 + 0.98) + (0.12 - 0.14) \cdot \text{Age} + (0.02 - 0.006) \cdot \text{Ht} + (0.0008 - 0.0006) \cdot (\text{Age} \cdot \text{Ht})$$

Moški kadilci

$$\log(\text{FEV}) = (-2.55 + 0.98 + 12.05 - 13.88) + (-0.14 - 0.84 + 0.87) \cdot \text{Age} + (-0.006 - 0.07 + 0.08) \cdot \text{Ht} + (0.0008 + 0.005 - 0.005 - 0.0006) \cdot$$