Lineární regresní modely

model	přímkový	hyperbolický	logaritmický	parabolický
Y	$\beta_0 + \beta_1 X$	$\beta_0 + \frac{\beta_1}{X}$	$\beta_0 + \beta_1 \ln X$	$\beta_0 + \beta_1 X + \beta_2 X^2$
$\hat{y}$	$b_0 + b_1 x$	$b_0 + \frac{b_1}{x}$	$b_0 + b_1 \ln x$	$b_0 + b_1 x + b_2 x^2$
soustava normálních rovnic	$b_0 n + b_1 \sum x_i = \sum y_i$ $b_0 \sum x_i + b_1 \sum x_i^2 = \sum y_i x_i$	$b_0 n + b_1 \sum \frac{1}{x_i} = \sum y_i$ $b_0 \sum \frac{1}{x_i} + b_1 \sum \frac{1}{x_i^2} = \sum \frac{y_i}{x_i}$	$b_0 n + b_1 \sum \ln x_i = \sum y_i$ $b_0 \sum \ln x_i + b_1 \sum \ln^2 x_i = \sum y_i \ln x_i$	$b_0 n + b_1 \sum x_i + b_2 \sum x_i^2 = \sum y_i$ $b_0 \sum x_i + b_1 \sum x_i^2 + b_2 \sum x_i^3 = \sum y_i x_i$ $b_0 \sum x_i^2 + b_1 \sum x_i^3 + b_3 \sum x_i^4 = \sum y_i x_i^2$
b_0	$\frac{\sum y_i \sum x_i^2 - \sum x_i \sum x_i y_i}{n \sum x_i^2 - (\sum x_i)^2}$	$\frac{\sum y_i \sum \frac{1}{x_i^2} - \sum \frac{1}{x_i} \sum \frac{y_i}{x_i}}{n \sum \frac{1}{x_i^2} - (\sum \frac{1}{x_i})^2}$	$\frac{\sum y_i \sum \ln^2 x_i - \sum \ln x_i \sum y_i \ln x_i}{n \sum \ln^2 x_i - (\sum \ln x_i)^2}$	—
b_1	$\frac{n \sum x_i y_i - \sum x_i \sum y_i}{n \sum x_i^2 - (\sum x_i)^2}$	$\frac{n \sum \frac{y_i}{x_i} - \sum \frac{1}{x_i} \sum y_i}{n \sum \frac{1}{x_i^2} - (\sum \frac{1}{x_i})^2}$	$\frac{n \sum y_i \ln x_i - \sum \ln x_i \sum y_i}{n \sum \ln^2 x_i - (\sum \ln x_i)^2}$	—
S_R	$\sum y_i^2 - b_0 \sum y_i - b_1 \sum x_i y_i$	$\sum y_i^2 - b_0 \sum y_i - b_1 \sum \frac{y_i}{x_i}$	$\sum y_i^2 - b_0 \sum y_i - b_1 \sum y_i \cdot \ln x_i$	$\sum y_i^2 - b_0 \sum y_i - b_1 \sum x_i y_i - b_2 \sum x_i^2 y_i$
s_R^2	$\frac{S_R}{n-2}$	$\frac{S_R}{n-2}$	$\frac{S_R}{n-2}$	$\frac{S_R}{n-3}$
$r^2,\ i^2$	$\frac{S_T}{S_Y}$	$\frac{S_T}{S_Y}$	$\frac{S_T}{S_Y}$	$\frac{S_T}{S_Y}$

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S_T	$b_0\sum y_i + b_1\sum x_i y_i - \frac{\left(\sum y_i\right)^2}{n}$	$b_0\sum y_i + b_1\sum \frac{y_i}{x_i} - \frac{\left(\sum y_i\right)^2}{n}$	$b_0\sum y_i + b_1\sum y_i \cdot \ln x_i - \frac{\left(\sum y_i\right)^2}{n}$	$b_0\sum y_i + b_1\sum x_i y_i + b_2\sum x_i^2 y_i - \frac{\left(\sum y_i\right)^2}{n}$
S_Y	$\sum y_i^2 - \frac{\left(\sum y_i\right)^2}{n}$	$\sum y_i^2 - \frac{\left(\sum y_i\right)^2}{n}$	$\sum y_i^2 - \frac{\left(\sum y_i\right)^2}{n}$	$\sum y_i^2 - \frac{\left(\sum y_i\right)^2}{n}$
r_{kor}^2 , i_{kor}^2	$1-\left(1-r^2\right)\frac{n-1}{n-2}$	$1-\left(1-i^2\right)\frac{n-1}{n-2}$	$1-\left(1-i^2\right)\frac{n-1}{n-2}$	$1-\left(1-i^2\right)\frac{n-1}{n-3}$
interval spolehlivosti pro regresní parametry	$b_j \pm t_{1-\alpha/2}(n-2) \cdot s(b_j)$	$b_j \pm t_{1-\alpha/2}(n-2) \cdot s(b_j)$	$b_j \pm t_{1-\alpha/2}(n-2) \cdot s(b_j)$	$b_j \pm t_{1-\alpha/2}(n-3) \cdot s(b_j)$
$s(b_0)$	$s_R \cdot \sqrt{\frac{\sum x_i^2}{n\sum x_i^2 - \left(\sum x_i\right)^2}}$	$s_R \cdot \sqrt{\frac{\sum\left(\frac{1}{x_i}\right)^2}{n\sum\left(\frac{1}{x_i}\right)^2 - \left(\sum \frac{1}{x_i}\right)^2}}$	$s_R \cdot \sqrt{\frac{\sum(\ln x_i)^2}{n\sum(\ln x_i)^2 - \left(\sum \ln x_i\right)^2}}$	—
$s(b_1)$	$s_R \cdot \sqrt{\frac{n}{n\sum x_i^2 - \left(\sum x_i\right)^2}}$	$s_R \cdot \sqrt{\frac{n}{n\sum\left(\frac{1}{x_i}\right)^2 - \left(\sum \frac{1}{x_i}\right)^2}}$	$s_R \cdot \sqrt{\frac{n}{n\sum \ln x_i^2 - \left(\sum \ln x_i\right)^2}}$	—

Lineární regresní modely

model	přímkový	hyperbolický	logaritmický	parabolický
interval spolehlivosti pro regresní funkci	$\hat{y}_i \pm t_{1-\alpha/2}(n-2) \cdot s(\hat{y}_i)$	$\hat{y}_i \pm t_{1-\alpha/2}(n-2) \cdot s(\hat{y}_i)$	$\hat{y}_i \pm t_{1-\alpha/2}(n-2) \cdot s(\hat{y}_i)$	$\hat{y}_i \pm t_{1-\alpha/2}(n-3) \cdot s(\hat{y}_i)$
$s(\hat{y}_i)$	$s_R \cdot \sqrt{\frac{1}{n} + \frac{\left(x_i - \frac{\sum x_i}{n}\right)^2}{\sum x_i^2 - \frac{\left(\sum x_i\right)^2}{n}}}$	$s_R \cdot \sqrt{\frac{1}{n} + \frac{\left(\frac{1}{x_i} - \frac{\sum \frac{1}{x_i}}{n}\right)^2}{\sum \left(\frac{1}{x_i}\right)^2 - \frac{\left(\sum \frac{1}{x_i}\right)^2}{n}}}$	$s_R \cdot \sqrt{\frac{1}{n} + \frac{\left(\ln x_i - \frac{\sum \ln x_i}{n}\right)^2}{\sum (\ln x_i)^2 - \frac{\left(\sum \ln x_i\right)^2}{n}}}$	—
interval spolehlivosti pro individuální předpověď	$y_0 \pm t_{1-\alpha/2}(n-2) \cdot s(y_0)$	$y_0 \pm t_{1-\alpha/2}(n-2) \cdot s(y_0)$	$y_0 \pm t_{1-\alpha/2}(n-2) \cdot s(y_0)$	$y_0 \pm t_{1-\alpha/2}(n-3) \cdot s(y_0)$
$s(y_0)$	$s_R \cdot \sqrt{1 + \frac{1}{n} + \frac{\left(x_0 - \frac{\sum x_i}{n}\right)^2}{\sum x_i^2 - \frac{\left(\sum x_i\right)^2}{n}}}$	$s_R \cdot \sqrt{1 + \frac{1}{n} + \frac{\left(\frac{1}{x_0} - \frac{\sum \frac{1}{x_i}}{n}\right)^2}{\sum \left(\frac{1}{x_i}\right)^2 - \frac{\left(\sum \frac{1}{x_i}\right)^2}{n}}}$	$s_R \cdot \sqrt{1 + \frac{1}{n} + \frac{\left(\ln x_0 - \frac{\sum \ln x_i}{n}\right)^2}{\sum (\ln x_i)^2 - \frac{\left(\sum \ln x_i\right)^2}{n}}}$	—

Lineární regresní modely

model	přímkový	hyperbolický	logaritmický	parabolický
Individuální testy o významnosti parametrů	$H: \beta_j = 0 \rightarrow A: \beta_j \neq 0$ $t = \frac{b_j - \beta_j}{s(b_j)} = \frac{b_j - 0}{s(b_j)}$ $W_\alpha: \lvert t \rvert > t_{1-\alpha/2}(n-2)$	$H: \beta_j = 0 \rightarrow A: \beta_j \neq 0$ $t = \frac{b_j - \beta_j}{s(b_j)} = \frac{b_j - 0}{s(b_j)}$ $W_\alpha: \lvert t \rvert > t_{1-\alpha/2}(n-2)$	$H: \beta_j = 0 \rightarrow A: \beta_j \neq 0$ $t = \frac{b_j - \beta_j}{s(b_j)} = \frac{b_j - 0}{s(b_j)}$ $W_\alpha: \lvert t \rvert > t_{1-\alpha/2}(n-2)$	$H: \beta_j = 0 \rightarrow A: \beta_j \neq 0$ $t = \frac{b_j - \beta_j}{s(b_j)} = \frac{b_j - 0}{s(b_j)}$ $W_\alpha: \lvert t \rvert > t_{1-\alpha/2}(n-3)$
Test o významnosti modelu	$H: \beta_0 = k, \beta_1 = 0 \rightarrow A: \beta_j \neq 0$ $k \neq 0$ $F = \frac{\frac{S_T(y)}{1}}{\frac{S_R(y)}{n-2}}$ $W_\alpha: F > F_{1-\alpha}(1; n-2)$	$H: \beta_0 = k, \beta_1 = 0 \rightarrow A: \beta_j \neq 0$ $k \neq 0$ $F = \frac{\frac{S_T(y)}{1}}{\frac{S_R(y)}{n-2}}$ $W_\alpha: F > F_{1-\alpha}(1; n-2)$	$H: \beta_0 = k, \beta_1 = 0 \rightarrow A: \beta_j \neq 0$ $k \neq 0$ $F = \frac{\frac{S_T(y)}{1}}{\frac{S_R(y)}{n-2}}$ $W_\alpha: F > F_{1-\alpha}(1; n-2)$	$H: \beta_0 = k, \beta_1 = \beta_2 = 0 \rightarrow A: \beta_j \neq 0$ $k \neq 0$ $F = \frac{\frac{S_T(y)}{2}}{\frac{S_R(y)}{n-3}}$ $W_\alpha: F > F_{1-\alpha}(2; n-3)$

Test o významnosti korelačního koeficintu	$H: \rho = 0 \rightarrow A: \rho \neq 0$ $t = \frac{r}{\sqrt{1-r^2}}\sqrt{n-2}$ $W_\alpha: \lvert t \rvert > t_{1-\alpha/2}(n-2)$	$r = \frac{n\sum x_i y_i - \sum x_i \sum y_i}{\sqrt{n\sum x_i^2 - (\sum x_i)^2}\sqrt{n\sum y_i^2 - (\sum y_i)^2}}$