

7. cvičení

$\$ \def\mc{#1}{\mathcal{#1}} \def\scal{#1#2}{\angle #1, #2 \rangle} \def\N{\mathbb{N}} \def\R{\mathbb{R}} \def\Q{\mathbb{Q}} \def\Z{\mathbb{Z}} \def\D{\mathbb{D}} \def\bm{#1}{\boldsymbol{#1}} \def\vv{#1}{\mathbf{#1}} \def\vp{#1}{\mathbf{#1}} \def\floor{#1}{\lfloor #1 \rfloor} \def\ceil{#1}{\lceil #1 \rceil} \def\grad{#1}{\mathrm{grad} , #1} \def\ve{\varepsilon} \def\im{#1}{\mathrm{im}(#1)} \def\tr{#1}{\mathrm{tr}(#1)} \def\norm{#1}{\left\| \cdot \right\|_{#1}} \def\scal{#1#2}{\angle #1, #2 \rangle} \def\ex{#1}{\mathrm{E} , \left(#1 \right)} \def\exv{#1}{\mathrm{E} , \vv{#1}} \$$

Nechť \vv{Y} jsou data, $\hat{\vv{Y}} = \vv{X} \hat{\vv{\beta}}$, $\text{E} \hat{\vv{Y}} = \text{E} \vv{Y}$ je odhad $\text{E} \vv{Y}$ a $\text{E} \vv{e}$ je odhad $\text{E} \vv{e}$.

A máme **celkovou sumu čtverců** $TSS = \sum_{i=1}^n (Y_i - \overline{Y})^2$ také **vysvětlovanou sumu čtverců** $ESS = \sum_{i=1}^n (\hat{Y}_i - \overline{Y})^2$ a neposlední řadě **reziduální sumu čtverců** $RSS = \sum_{i=1}^n (Y_i - \hat{Y}_i)^2$

A platí $TSS = RSS + ESS$

a necht' R^2 je **koeficient determinace** $R^2 = \frac{ESS}{TSS} \in (0, 1]$ a **adjustovaný koeficient determinace** $R^2_{adj} = 1 - \frac{RSS}{n-p} \cdot \frac{n-1}{n-2}$

Dále $\hat{\sigma}^2 = \frac{RSS}{n-p}$ a $\text{var}(\hat{\vv{\beta}}) = \hat{\sigma}^2 (\vv{X}^T \vv{X})^{-1}$ Přičemž $\text{var}(\hat{\vv{\beta}})$ dostaneme pomocí `vcov(<model>)`

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