Modely

Cíle

- Lineární modelování
- Interpretace modelu

Lineární regrese

- Trocha teorie…

$$y_i = \beta_0 + \beta_1 x_{i1} + \ldots + \beta_p x_{ip} + \epsilon_i$$

- V praxi:

```
lm(závislá ~ nezávislá, data
= ... )
```

Práce s modelem

- Shrnutí modelu: `summary(model)`
- Přehled reziduálů: `residuals(model)`
- Uplatnění modelu na nová data: `predict(model, newdata = ...)`

Interpretace lineárního modelu

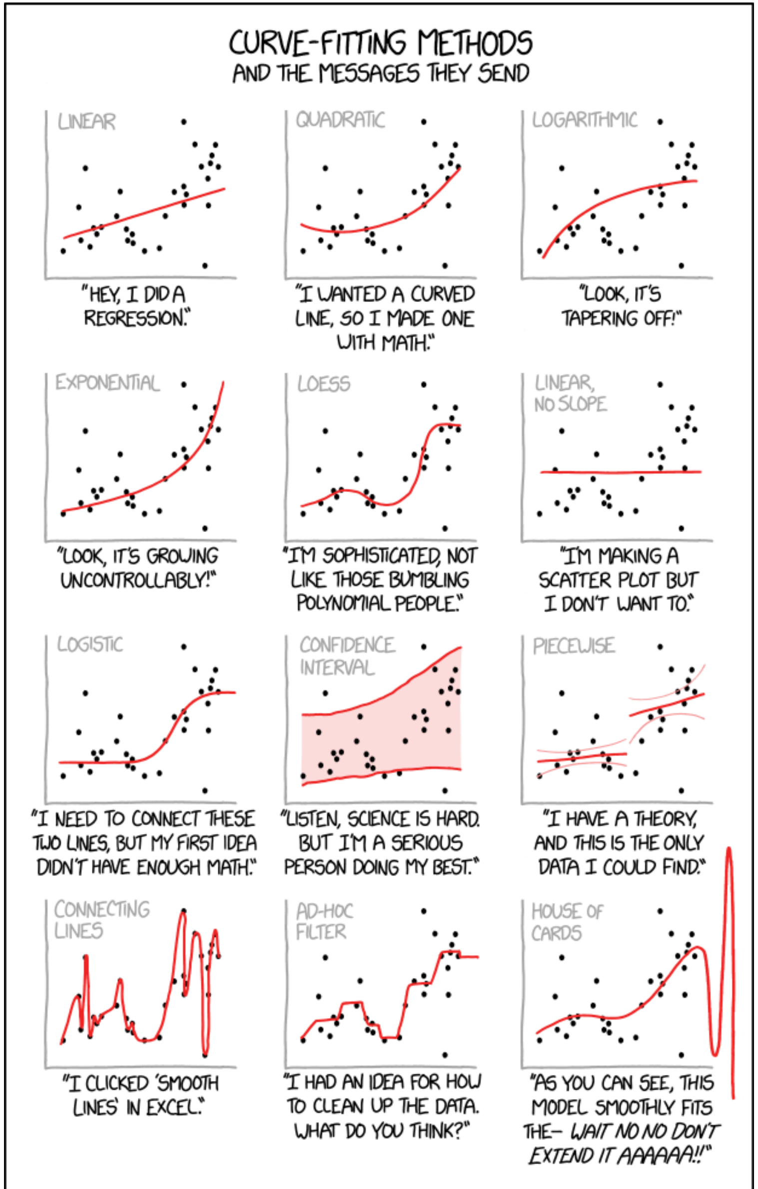
```
Call:
lm(formula = hodnota ~ obdobiod, data = potraviny)

Residuals:
     Min       1Q   Median       3Q      Max 
-0.68944 -0.18439 -0.03149  0.17843  0.76785 

Coefficients:
             Estimate Std. Error t value Pr(>|t|)    
(Intercept) 8.173e-01  1.707e-01   4.789 2.71e-06 ***
obdobiod    6.166e-04  1.152e-05  53.501  < 2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.2635 on 284 degrees of freedom
Multiple R-squared:  0.9097, Adjusted R-squared:  0.9094 
F-statistic:  2862 on 1 and 284 DF,  p-value: < 2.2e-16
```

Nelineární model

- Když na základě dobré teorie vím, že závislost je jiná než lineární (tj. vím jaká, a vím proč)

$$y_t = x_0 (1+r)^t$$

```
nls(zavisla ~ pocatek * (1 + r)^t,
    data = dataset,
    start = list(a = 1, r = .01))
```



CURVE-FITTING METHODS
AND THE MESSAGES THEY SEND
LINEAR
"HEY, I DID A REGRESSION."
QUADRATIC
"I WANTED A CURVED LINE, SO I MADE ONE WITH MATH."
LOGARITHMIC
"LOOK, IT'S TAPERING OFF!"
EXPONENTIAL
"LOOK, IT'S GROWING UNCONTROLLABLY!"
LOESS
"I'M SOPHISTICATED, NOT LIKE THOSE BUMBLING POLYNOMIAL PEOPLE."
LINEAR, NO SLOPE
"I'M MAKING A SCATTER PLOT BUT I DON'T WANT TO."
LOGISTIC
"I NEED TO CONNECT THESE TWO LINES, BUT MY FIRST IDEA DIDN'T HAVE ENOUGH MATH."
CONFIDENCE INTERVAL
"LISTEN, SCIENCE IS HARD. BUT I'M A SERIOUS PERSON DOING MY BEST."
PIECEWISE
"I HAVE A THEORY, AND THIS IS THE ONLY DATA I COULD FIND."
CONNECTING LINES
"I CLICKED 'SMOOTH LINES' IN EXCEL."
AD-HOC FILTER
"I HAD AN IDEA FOR HOW TO CLEAN UP THE DATA. WHAT DO YOU THINK?"
HOUSE OF CARDS
"AS YOU CAN SEE, THIS MODEL SMOOTHLY FITS THE– WAIT NO NO DON'T EXTEND IT AAAAAA!!"