2.1: Introduction to Simple Linear Regression

Dr. Bean - Stat 5100

(Review) What is the difference between a functional and a statistical relationship?

Functional: $Y = f(X)$ (no scatter).

Statistical: $Y = f(X) + \epsilon$ (scatter about the line)

(Review) What does it mean to be linear?

$$Y = \sum_i \beta_i f_i (X_1, \ldots, X_{p-1})$$

If I start with n degrees of freedom, how many DF do I have left after calculating the residuals in the Toluca example?

$n - 2$ since I spent 1 to calculate b_0 and another to calculate b_1.

Now suppose that my model equation was actually $\hat{Y} = b_0 + b_1 X_1 + b_2 X_2$ how many DF would I have left after calculating the residuals?

$n - 3$ since I spent 1 to calculate b_0, another to calculate b_1, and a third to calculate b_2.

In the Toluca Example (notes 2.1.1), what is our best estimate of the variance of the residuals?

Toluca Example: $\hat{\sigma}^2 = 2383.72$