

Regression 1 / Assignment 1 / Chapter 1

Q1. Consider Montgomery's table.b1 from MPV package in R as your dataset. This dataset contains the information related to 28 observations on National Football League 1976 Team Performance.

- b) Which predictor seems to have the most linear relationship with y ?
- c) Fit a simple linear model between the mentioned predictor and response variable. Find a way to test how accurate your model has turned out to be. Use the set of tools you're already familiar with.
- d) Calculate the errors and interpret related plots (You need 2 plots for a complete answer).
- e) Find a way to estimate σ^2 .

Q2. Let's say you have a simple regression linear model in the form of $y_i = \beta_0 + \beta_1 x + \varepsilon_i$. We would like to perform a transformation:

$$x_i^* = \frac{x_i - \bar{x}}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2}}, \quad y_i^* = \frac{y_i - \bar{y}}{\sqrt{\sum_{i=1}^n (y_i - \bar{y})^2}}$$

Estimate β_1 and compare it with the estimation of β_1 in the non standardized version of your model.

Q3. Here you can see the American Phytopathological Society dataset:

Diseases Intensity	12.4	9.8	7.6	6.4	6.1	5.3	4.8	3.3	3.1	1.9
Body Temperature	25	30	10	23	20	20	5	5	1	2

- a) Interpret the scatter plot.
- b) Fit a simple linear model to the data and estimate β_1 and β_2 .
- c) Find the Fitted values and plot them over errors. What is your takeaway from this plot?