

Linear Regression Slope Calculation

We are given the data points (V, I) .

Data Table

Voltage V (V)	Current I (A)
0	0.0
1	0.8
2	1.5
3	1.6
4	2.5
5	2.7
6	3.2
7	3.9
8	4.5
9	5.0
10	5.5

Regression Model

we know that current and voltage are related linearly.

$$I = mV + c,$$

where m is the slope (resistance (Ω)) and c is the intercept.

The least squares slope is given by

$$m = \frac{n \sum(VI) - (\sum V)(\sum I)}{n \sum(V^2) - (\sum V)^2}.$$

Step 1: Compute sums

$$\sum V = 55, \quad \sum I = 31.2, \quad \sum V^2 = 385, \quad \sum(VI) = 214.6.$$

Step 2: Apply formula

$$m = \frac{11(214.6) - (55)(31.2)}{11(385) - (55)^2}.$$

$$m = \frac{2360.6 - 1716}{4235 - 3025} = \frac{644.6}{1210}.$$

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$$m \approx 0.533 \Omega$$

Thus, the slope of the best-fit line is approximately 0.53.