

Supplementary Material to “Designing and Building a Low-Cost Geiger-Müller Detector for Radiation Safety Experiments in Physics Education”

Appendix A

According to the least-squares fitting method [19], the coefficient ***a*** is calculated using the following formula:

$$a = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sum (x_i - \bar{x})^2}, \quad (\text{A1})$$

Where:

$i = 1, 2, 3, \dots$ (index of data points)

x_i, y_i : represent $\log d$ and $\log N$, respectively

$\bar{y}$: mean value of $\log N$

$\bar{x}$: mean value of $\log d$

The coefficient ***b*** is determined by the following formula:

$$b = \bar{y} - a \cdot \bar{x}, \quad (\text{A2})$$

The regression errors of the coefficients ***a*** and ***b*** are calculated using the following formulas:

$$\sigma_a = \sqrt{\frac{1}{n-2} \cdot \frac{\sum (y_i - a \cdot x_i - b)^2}{\sum (x_i - \bar{x})^2}}, \quad (\text{A3})$$

$$\sigma_b = \sigma_a \cdot \sqrt{\frac{1}{n} \cdot \frac{\sum x_i^2}{\sum (x_i - \bar{x})^2}}, \quad (\text{A4})$$