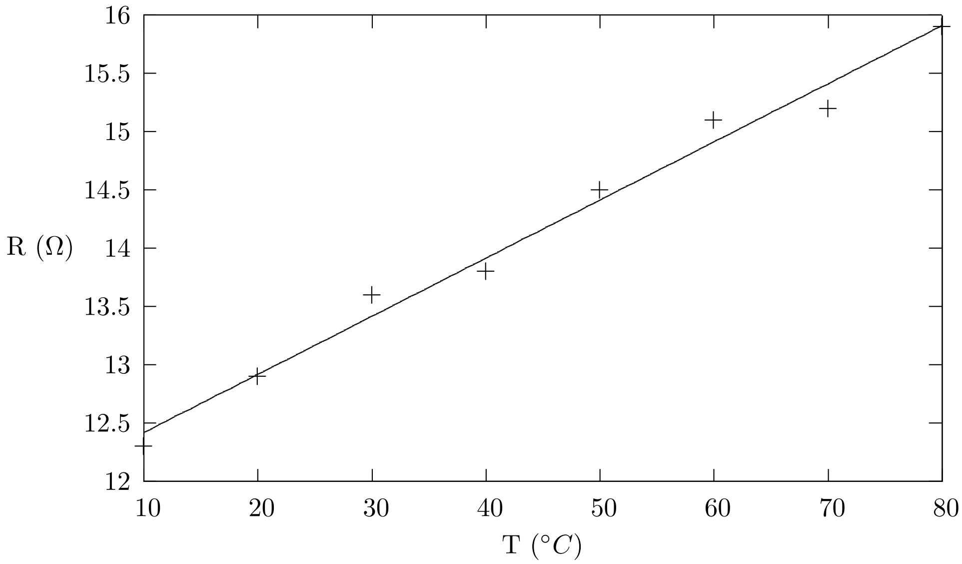

1. Using the method of least squares, evaluate the slope and intercept of the graph of R versus T. Use these results to obtain the best value for α.

$$y = a + bx$$

$$a = 11.9179$$

$$b = 0.049881$$

$$S = \sum_{i=0}^{n} {r_i}^2 = 0.14869$$

$$R = R_0\,(1 + \alpha T)$$

$$R_0 = a = 11.917\Omega$$

$$\alpha = \frac{b}{R_0} = \frac{b}{a} = .00418538\frac{\Omega}{^\circ C}$$

$$R = 11.9\Omega\left(1 + 0.00419^\circ C^{-1} T\right)$$

2. Evaluate the standard deviation for the slope and for the intercept (use equations of section 6.7). From these values, determine the standard deviation for α.

$$\bar{x} = 45, \bar{y} = 14.1625$$

$$S_{xx} = \Sigma\left(x_i - \bar{x}\right)^2 = 4200$$

$$S_{yy} = \Sigma\left(y_i - \bar{y}\right)^2 = 10.59875$$

Standard deviation of the residuals:

$$s_y = \sqrt{\frac{S_{yy} - m^2 S_{xx}}{N-2}} = .1531$$

Standard deviation of the slope:

$$s_m = \frac{s_y}{\sqrt{S_{xx}}} = .00236$$

Standard deviation of the intercept:

$$s_b = s_y \sqrt{\frac{\sum x_i^2}{n \sum \left(x_i - \bar{x}\right)^2}} = .1193$$

3. State the complete result for the experiment with the appropriate number of significant figures in each quantity.

$$s_\alpha = \frac{s_m}{b} = 0.000199$$

$$R = (11.9 \pm 0.1193)\,\Omega \left(1 + (0.00419 \pm 0.00020)^{\circ}\, C^{-1} T\right)$$