SIGNIFICANCE OF THE R^2 VALUE

In statistics, a value is often required to determine how closely a certain function fits a particular set of experimental data. In this module, we have relied on the R^2 value computed in Excel to determine how closely our data conform to a linear relationship. R^2 values range from 0 to 1, with 1 representing a perfect fit between the data and the line drawn through them, and 0 representing no statistical correlation between the data and a line. The R^2 value (often referred to as the goodness of fit) is computed as follows:

$$R^2 = 1 - \frac{\sum (Yi - Yi')^2}{\sum \left(Yi - \overline{Y}\right)^2}$$

where Y_i represents an individual data point value, Y_i' represents the value obtained by when the independent coordinate of this data point is input into the best-fit function (a line in this case). Therefore, Y_i' represents the values of the data points projected onto the line of best fit (the *ideal* values). $\overline{Y}$ represents the average of the Y_i values.