Quality of Fit

$$\boxed{\text{quality of fit } (\%) = 100\left(1 - \frac{\|y_{\text{measured}} - y_{\text{modeled}}\|}{\|y_{\text{measured}} - \text{mean}\{y_{\text{measured}}\}\|}\right)}$$

The formula above involves an abuse of notation (inspired by the Matlab language) that requires explanation. Consider a vector of three measurements

$$y = \begin{bmatrix} a \\ b \\ c \end{bmatrix}$$

and the mean (average) value of these three measurements

$$\text{mean}\{y\} = \frac{a+b+c}{3} \neq 0$$

which will generally be nonzero. If we define a modified version of y by y' such that $y' \sim y - \text{mean}\{y\}$, then what we are intending to indicate is the modified vector

$$y' = \begin{bmatrix} a \\ b \\ c \end{bmatrix} - \frac{a+b+c}{3}\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$$

which by definition will have zero mean (average) value:

$$\text{mean}\{y'\} = \frac{(a+b+c) - (a+b+c)}{3} = 0.$$

In the formula above, the magnitude of a vector is measured according to its Euclidean norm

$$\|y\| = \sqrt{a^2 + b^2 + c^2}.$$