

## Residuals

In the context of [least squares](#) (or any other [fitting](#) method, e.g. [MLE](#)) the residuals are the difference between a model function and the experimental data. In [least squares](#) usually the weighted residuals trace is shown:

$$R_{\text{wgt}}(t_i) = \frac{D(\text{model parameters}, t_i) - D_i^{\text{exp}}}{w_i}$$

$D_i^{\text{exp}} | t_i$  is the  $i$ -th data point of an experimental data set,  $D(\text{model parameters}, t_i)$  is the model equation at the observed points  $t_i$ .

The [weighting](#) factor  $w_i$  describes the experimental uncertainty of each individual data point. For [TCSPC](#) data  $w_i$  is defined as

$$w_i = \sqrt{D_i^{\text{exp}}}$$

The residuals trace is of importance within any framework concerned with fitting, as the [SymPhoTime](#) software or [FluoFit](#).

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