GraphPad Curve Fitting Guide

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R squared

Meaning of R^2

Key points about R^2

- The value R^2 quantifies goodness of fit.

- It is a fraction between 0.0 and 1.0, and has no units. Higher values indicate that the model fits the data better.

- When R^2 equals 0.0, the best-fit curve fits the data no better than a horizontal line going through the mean of all Y values. In this case, knowing X does not help you predict Y.

- When R^2=1.0, all points lie exactly on the curve with no scatter. If you know X you can calculate Y exactly.

- You can think of R^2 as the fraction of the total variance of Y that is explained by the model (equation). With experimental data (and a sensible model) you will always obtain results between 0.0 and 1.0.

- There is really no general rule of thumb about what values of R^2 are high, adequate or low. If you repeat an experiment many times, you will know what values of R^2 to expect, and can investigate further when R^2 is much lower than the expected value.

- By tradition, statisticians use uppercase (R^2) for the results of nonlinear and multiple regression and lowercase (r^2) for the results of linear regression, but this is a distinction without a difference.

Don't overemphasize R2

A common mistake is to use R^2 as the main criteria for whether a fit is reasonable. A high R^2 tells you that the curve came very close to the points. That doesn't mean the fit is "good" in other ways. The best-fit values of the parameters may have values that make no sense (for example, negative rate constants) or the confidence intervals may be very wide. The fit may be ambiguous. You need to look at all the results to evaluate a fit,