
Subject: Re: On errors calculated by curve-fitting routines
Posted by [Craig Markwardt](#) on Sat, 08 Mar 2008 18:27:16 GMT
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Gernot Hassenpflug <gernot@nict.go.jp> writes:

- > I'd just like to ask, since I cannot quite tell if I have grasped the
- > ideas from Numeric Recipes correctly (and so my own IDL code for
- > comparison with the others may be incorrect): the covariance matrix
- > calculation uses the basis functions (e.g., 1, x, x²) and the
- > variances of the dependent (y) variable, but **not** the dependent
- > variable itself nor any quantitative measures of the goodness of the
- > fitting process (presumably the variances of the dependent variable
- > are supposed to contain all such information in theory).

That is the formal definition of the covariance matrix, assuming the measurement uncertainties are appropriate.

- > I ask this because other methods, such as that used by Maple, seem to
- > scale their result by the residual sums of squares, for example. I am
- > still awaiting the book by Bevington (can only get 1st edition from
- > library services, so need to purchase 2nd edition) and the one by
- > Himmelblau from 1970 which is the basis of the Maple method.

This approach **could** be appropriate. The reasoning is that although the fit is formally of bad quality -- indicated by a statistically unacceptable chi-square value -- you **assume** that the fit is good. You do this by multiplying the uncertainties by $\text{SQRT}(\text{CHI}^2 / \text{DOF})$, which produces a modified reduced chi-square value of 1. That may not always be appropriate, and it depends mostly upon scientific judgement.

Craig
