
Subject: Re: On errors calculated by curve-fitting routines
Posted by [Gernot Hassenpflug](#) on Tue, 11 Mar 2008 09:35:57 GMT
[View Forum Message](#) <> [Reply to Message](#)

Craig Markwardt <craigmnet@REMOVEcow.physics.wisc.edu> writes:

> 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, x^2) 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.

Thank you, it seems that as far as that goes, I have understood
(formally) the issue well enough that IDL and my hand-done
calculations give the same output. Hoorah!

>> 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.

OK, I will have to read up more on that, just received Bevington's
First Edition today, and got the later edition on the weekend to
peruse. Very nice easy-to-follow explanatory chapters on what I need
to fill in the gaps in my understanding.

It is funny how after I left IDL for a while to enjoy the ease of the
GUI and object graphics manipulation in Maple, and the symbolic maths
of Mathematica, I come back to IDL for the features that are either
not in the other programs or only available separately at a further
fee. I guess that is the world of commercial applications, and there
is no excuse for not understanding how the underlying maths and

statistics works.

--

BOFH excuse #371:

Incorrectly configured static routes on the corerouters.
