Subject: Re: On errors calculated by curve-fitting routines
Posted by Anthony[1] on Thu, 06 Mar 2008 08:51:40 GMT
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On Mar 6, 3:08 am, Gernot Hassenpflug <ger...@nict.go.jp> wrote:
> Hello all,
>
> I'm using IDL 6.1, as well as Maple 11, Mathematica 6.0, Matlab 7.5
> and the statistical language R. My goal is to calculate the covariance
> matrix of parameters of a second order polynomial curve fit. To
> clarify: I refer to this as linear fitting, since the parameters are
> linear; however, many books, papers and routines refer to this as
> non-linear fitting.
>
> Matlab and Mathematica do not have built-in functions to do this
> (Mathematica has an add-on module which my institute has not bought)
> so I am comparing the parameter covariance matrix from IDL, Maple, R
> and my own programmed output learned from section 15.4 of Numerical
> Recipes, 2nd edition, and a paper by Keith Burrell in the American
> Journal of Physics Vol. 58, No. 2, pp 160--164 (1990) titled "Error
> analysis for parameters determined in nonlinear least-square fits",
> both describing the same method which uses the variances of the
> dependent data combined with the derivatives of the fitting function
> wrt the fitted parameters; i.e., the dependent data values themselves
> are not used, apparently.
>
> I find that in IDL the routines POLY_FIT, LMFIT and CURVEFIT can all
> calculate the parameter covariance matrix and it is documented that
> LMFIT uses the method of Burrell and Numerical Recipes. I cannot tell
> what method the other two routines use.
>
> Maple seems to use a different method apparently described on pp
> 197--198 of David M. Himmelblau's 1970 book titled "Process Analysis
> by Statistical Methods", which I have ordered used but not yet
> received.
>
> I am hoping that contributors to this list could give their comments
> and opinions on what method of parameter variance and covariance is
> most sound, and which routines are therefore preferred for a
> polynomial fitting case (possibly over-determined).
>
> Many thanks in advance,
> Gernot Hassenpflug
> --
> BOFH excuse #72:
>
> Satan did it

Hi Gernot,

It's worth looking into MPFIT ("Robust non-linear least squares curve fitting"):

http://cow.physics.wisc.edu/~craigm/idl/fitting.html

Cheers,
Anthony
