
Subject: Re: CURVEFIT.PRO standard deviations?
Posted by [Craig Markwardt](#) on Mon, 13 May 2002 16:19:30 GMT
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Ralf Flicker <rflicker@gemini.edu> writes:

```
> Andrew Noymer wrote:
>> LINFIT parameters, sigma, and chi-square :
>>   -13.7844    2.91336
>>    1.32243    0.0944590
>>    266.783
>> CURVEFIT parameters, sigma, and chi-square :
>>   -13.7839    2.91333
>>    0.388221    0.0277362
>>    11.5993
>>
```

Here is what MPFITFUN / MPCURVEFIT produces:

```
MPCURVEFIT parameters, sigma, and chi-square :
-14.5118    2.95626
0.388305    0.0277388
200.777
```

```
> A closer inspection reveals something patently absurd with the
> CURVEFIT and LMFIT sigmas: they don't vary with the noise in the
> data, i.e., they are always the same. This means that they must have
> been normalized to the current chi-square (whoever would come up
> with such an idea ought to be flogged in public). Furthermore, they
> sometimes are and sometimes are not divided by the number of degrees
> of freedom (as, indeed, the final value should be). So comparing the
> three procedures LINFIT, CURVEFIT and LMFIT, I surmise the following
> transformations that need to be applied to have them return the same
> numbers (which hopefully are the "right" ones too):
```

Ralph, these are not necessarily patently absurd. The "sigma" values of a fitting program typically mean to find the confidence limits on a parameter based on a change in the chi-squared of +1.

Since you left your fit unweighted, i.e., WEIGHTS=1, the resulting chi-squared value is too high. You have weighted your data so highly that the fit parameters are hypersensitive to any fluctuations in the data. Hence the confidence region is artificially too small. What you need to do is decrease the weights, corresponding to increasing the individual uncertainties, until you achieve a reduced chi-squared of order unity. Then the parameter errors reported by CURVEFIT or MPFITFUN / MPCURVEFIT will be appropriate. This is more or less described in the MPFIT.PRO documentation for the PERROR keyword.

Good luck,
Craig

MPFIT family of fitting functions found at:
<http://cow.physics.wisc.edu/~craigm/idl/idl.html> (under fitting)
