
Subject: Re: How to determine the WEIGHTS in MPFITFUN for distribution function fit?

Posted by [Craig Markwardt](#) on Tue, 11 Sep 2007 05:21:20 GMT

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"duxiyu@gmail.com" <duxiyu@gmail.com> writes:

> On 9 7 , 2 26 , Craig Markwardt
> <craigm...@REMOVEcow.physics.wisc.edu> wrote:
>>
>> If Y is measured counts, then the YERR should be $\sim \text{SQRT}(Y)$, right?
>>
>> But overall I agree, the original poster needs to specify how the
>> numbers were measured in order to estimate the measurement error.
>>
>> Craig
>>
>
> The effect of $\text{Yerr}=\text{SQRT}(Y)$ is the same as the effect of $\text{WEIGHTS}=1/y$
> for the procedure MPFITFUN, isn't it?

Yes.

> The array named D in IDL means the original measured data.
> $Y = \text{histogram}(D, \text{locations} = X)$
> I want use a specified function to fit this curve in the x-y plane.
> The computed function is the distribution function for the measured
> data D, isn't it?

Yes, that's one way of thinking of it.

> If there are not the measurement errors for the data D, I should set
> the $\text{Yerr} = \text{SQRT}(Y)$ when I use the MPFITFUN to fit the curve.
> If there are the measurement errors Derr which have the same
> dimensions as the data D, how do I calculate the Yerr?

I don't know. For HISTOGRAM() either the point falls within a bin or it does not. If your "D" has measurement errors, the bin assignment becomes ambiguous. This is usually solved with Monte Carlo methods and some kind of probability matrix.

> The another question is how to determine the START_PARAMS in the
> procedure MPFITFUN?

That is up to you. As I point out on my "tutorial" page, this is somewhat of an art.

> When I use the matlab to fit the curve, the procedure can select the

> start_value automatically.

That sounds interesting, but I would not trust the automatic method. There are an infinite number of model functions, and for each model, there are an infinite number of parameterizations. How could 'matlab' know about every one?

- > The START_PARAMS in <PFITFUN must be given by user.
- > The START_PARAMS is set to some values, and the procedure can return
- > the results without any error.
- > But when the START_PARAMS change a little, the procedure gives the
- > warning "Program caused arithmetic error: Floating illegal operand"
- > and return the different results.
- > I do not know the criterion of its selection.

MPFIT provides diagnostic information (STATUS and ERRMSG keywords), and numerical errors can be trapped with !EXCEPT. These may help you solve your problem. One possibility to consider is that there may be a numerical problem if Y is zero (so YERR is also zero). In that case, the Gaussian approximation underlying $YERR \sim \sqrt{Y}$ no longer holds.

Good luck,
Craig

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Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response
