
Subject: Re: Fitting an implicit function with IDL
Posted by [Heinz Stege](#) on Tue, 08 Jun 2010 22:29:10 GMT
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On Tue, 8 Jun 2010 03:54:18 -0700 (PDT), Gianluca Li Causi wrote:

> Hi all,
> I have to find the A, B and C parameters which best satisfy (in the
> chi-square sense) the following equation:
>
> $A * g(x) + (W(x) + B) / (X(x) + C) = 0$
>
> where $g(x)$ is a known function of x and $(W \pm \sigma_W)$ and $(Z \pm$
> $\sigma_Z)$ are two sets of measured data together with their measurement
> errors.
>
> This is different from the usual form $F(x, A, B, C) = Y$ where a function
> of x and parameters is to be fitted to a dataset $(Y \pm \sigma_Y)$.
> So, how to use the various IDL fitting routines to solve this
> problem??

>
I think, your equation is not really different from the form
 $y=f(x, A, B, C)$. In your case it is $y=0$. You can use the IDL fitting
routines by using an array $y=fltarr(n_elements(x))$. Possibly CURVEFIT
is your friend.

Greetings, Heinz

Subject: Re: Fitting an implicit function with IDL
Posted by [Craig Markwardt](#) on Tue, 08 Jun 2010 23:47:28 GMT
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On Jun 8, 6:54 am, Gianluca Li Causi <lica...@mporzio.astro.it> wrote:

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> I have to find the A, B and C parameters which best satisfy (in the
> chi-square sense) the following equation:
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> of x and parameters is to be fitted to a dataset $(Y \pm \sigma_Y)$.
> So, how to use the various IDL fitting routines to solve this
> problem??

I think what you really want to use is the FORTRAN library ODRPACK.

As Heinz Stege said, you can use curve fitting programs as equation solvers. I actually did an IDL workshop presentation on this very type of application. [*]

What I am not quite sure is how you include the data uncertainties in the model.

Craig

[*] <http://cow.physics.wisc.edu/~craigm/idl/fitting.html>

Subject: Re: Fitting an implicit function with IDL
Posted by [Gianluca Li Causi](#) on Wed, 09 Jun 2010 11:17:36 GMT
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>
> What I am not quite sure is how you include the data uncertainties in
> the model.

Dear Craig and Heinz,

in fact this is my problem: in the usual form $F(x, A, B, C) = Y$ the data uncertainties are on the right side, i.e. $Y(x) \pm \text{Err}_Y(x)$, even if $Y=0$, while in my case the data $W(x)$ and $Z(x)$ are within a functional form which does not allow to isolate them on the right side.

In general if I have an equation $F(x, \text{Data}(x) \pm \text{Err_Data}(x), \text{Params}) = 0$ and I try to write it as $F \pm \text{Err}_F = 0$, computing Err_F as the error propagation of Err_Data through F , I get a parameter-dependent uncertainty $\text{Err}_F = \text{Err}_F(\text{Params})!$

This is why I cannot use CURVEFIT or the like (even MPFIT if I understand). Can I?

Gianluca
