
Subject: Simultaneous fitting in IDL

Posted by [Gianluca Li Causi](#) on Thu, 14 May 2009 16:54:17 GMT

[View Forum Message](#) <> [Reply to Message](#)

Hi all,

I need to *simultaneously* fit two sets of data, Y1 and Y2, with two functions, F1(X,P) and F2(X,P), having the same set of parameters P, by using the routine LMFIT.

In order to do this I join the two datasets in a uniq vector Y=[Y1,Y2] and do the same for the model F=[F1,F2], as suggested also by Craig Markwardt in a past thread in this group:

http://groups.google.com/group/comp.lang.idl-pvwave/browse_thread/thread/ba341b5169e7557f/498234b82c67279f?hl=en&lnk=gst&q=lmfit#498234b82c67279f

But my datasets contains a different number of points, N1 and N2, with $N2 \ll N1$, so that the smaller one is almost neglected because its weight in the uniq vector Y is proportional to $N2 / N1$.

SO THAT: I've tried to multiply each error vector by the SQRT of its fraction:

```
Y1_err *= SQRT(N1 / (N1+N2))
```

```
Y2_err *= SQRT(N2 / (N1+N2))
```

and now I get a nice fit for the two dataset simultaneously!

BUT: when I compute the Reduced ChiSquare = ChiSquare / (N1 + N2 - N_parameters) I get a completely wrong result (vey high, far from 1.0), due to my modification of the true error vector !

THUS: what I can do ?

One idea is to force the Y1 and Y2 vectors to have the same number of elements M, which must be the minimum multiple of both N1 and N2, but it could be a very large number.....

Could anybody help me ?!

Thanks a lot!

Gianluca

Subject: Re: Simultaneous fitting in IDL

Posted by [Gianluca Li Causi](#) on Wed, 20 May 2009 14:05:22 GMT

[View Forum Message](#) <> [Reply to Message](#)

Dear Allan,

thanks a lot for your test procedure that I've improved to check

what's happening with my data: YOU'RE RIGHT and I WAS WRONG !!

In fact, the test procedure clearly shows that in my limiting hypothesis of two functions depending on complementary parameters the fit is good without the need to modify the data errors as I did: I've realized that I was fitting my data with an incorrect function and I was forcing the fit.

In fact I've realized that my observable, measured in different times, had changed with time, while I assumed it to be static during all the measurements; so that my data couldn't be fitted by a single set of parameters, but I must divide the data in bunches of smaller time intervals.

Thanks a lot for your help, which better clarify to me the data fitting task.

Best regards

Gianluca
