
Subject: Re: using mpfit

Posted by [Craig Markwardt](#) on Mon, 09 Nov 1998 08:00:00 GMT

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

nospam@ll.mit.edu (Joseph Scott Stuart) writes:

>
>
> I'm using Craig Markwardt's excellent fitting routine mpfit, and I'm
> getting strange behavior that I don't understand. It calls the
> function I'm fitting 48 times to do one fitting iteration, but each
> time that it calls it, it passes in the exact same parameters. Then
> mpfit exits with the message about the angle between fvec and the
> jacobian. The fitted parameter values are unchanged from the input
> parameters.
>
> I have specified, via the params structure, that a couple of the
> parameters are to be held fixed, but I've checked the params structure
> as it is going in, and it looks OK to me, only the first few
> parameters have the fixed keyword equal to 1. I don't understand why,
> when I print out the parameters from within my function, they are
> unchanged all 48 times that mpfit calls the routine.
>

Any fitting routine must compute derivatives of the model function with respect to each parameter. MPFIT computes derivatives automatically by performing a finite difference approximation. It's quite a simple routine:

$$\text{derivative} = (f(p+h) - f(p)) / h$$

h is a finite step in the parameter value p, and is chosen *by default* to be very small. It does this one time for each of the parameters in your fit.

Therefore, it may *look* like MPFIT is calling your function with the same parameters each time, but I would bet that they are actually slightly different. [Also, check to be sure that both your parameters and data are the same type, preferably DOUBLE].

If your fitting function is not-so-well behaved, or if it is not sensitive to small changes in the parameter values, then it is possible that MPFIT can't compute a proper automatic derivative. Of course the fitting will fail. Incidentally, the MPFIT code retries several times in one iteration before failing. That's probably why your function is called so many times.

OK, don't worry, there is a simple solution. You can *manually* choose the step size of any parameter using the PARINFO structure. If

the STEP tag is greater than zero, then it is used to compute the derivative. Here's an example:

```
pi = replicate({value:0.D, fixed:0, limited:[0,0], $  
               limits:[0.D,0.D], step:0.D}, 4) ;; Assumes 4 parameters  
pi(0).step = 0.01 ;; Makes 0.01 the derivative step size for parameter 0  
;; All other parameters use default step size
```

The step size should be small enough to capture the relevant scale of interest in your problem, whatever that may be.

Good luck,

Craig

P.S. The parameter itself can still vary on finer scales than the step size. STEP is only used to compute the derivative.

--

Craig B. Markwardt, Ph.D. EMAIL: craigmnet@astro.physics.wisc.edu
Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response

Subject: using mpfit
Posted by [nospam](#) on Tue, 10 Nov 1998 08:00:00 GMT
[View Forum Message](#) <> [Reply to Message](#)

I'm using Craig Markwardt's excellent fitting routine mpfit, and I'm getting strange behavior that I don't understand. It calls the function I'm fitting 48 times to do one fitting iteration, but each time that it calls it, it passes in the exact same parameters. Then mpfit exits with the message about the angle between fvec and the jacobian. The fitted parameter values are unchanged from the input parameters.

I have specified, via the params structure, that a couple of the parameters are to be held fixed, but I've checked the params structure as it is going in, and it looks OK to me, only the first few parameters have the fixed keyword equal to 1. I don't understand why, when I print out the parameters from within my function, they are unchanged all 48 times that mpfit calls the routine.

Thanks for any help!

scott

--
Scott Stuart
stuart at ll mit edu
