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Subject: Re: What is the difference between 'curvefit', 'lmfit' and 'svdfit' procedure?  
Posted by [news.qwest.net](http://news.qwest.net) on Wed, 07 Mar 2007 15:02:11 GMT  
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<duxiyu@gmail.com> wrote in message  
news:1173260085.952428.100150@q40g2000cwq.googlegroups.com.. .  
> I have a set of 'x' and 'y', and want to use a special function 'f(x)'  
> to fit it.  
>  
> The function 'f(x)' contains three parameters.  
>  
> But I'm confused by the three different procedure 'curvefit', 'lmfit'  
> and 'svdfit'.

The difference is essentially between 1) linear least square error fits,  
and 2) non-linear least square error fit.

In 1) you directly calculate the resulting fit.  
You start with the matrix equation  
 $Ax = b$

where x is the unknown. 'A' is a matrix where your  
fitting function is evaluated at each point (and is usually  
not square).

The LSF solution is:

$$A^tAx = A^tb$$
$$x = (A^tA)^{-1}A^tb$$

The svd routines solve this matrix equation.

For 2) you make an error function  
 $\text{error} = \text{data} - \text{nonlinear function}(x)$

and you search around parameter space to try to  
find the minimum error. This may not converge, it probably  
depends on an initial guess, and can be very time consuming.  
This is what curvefit and the others do.

If you can create a linear fit, then 1) is the way to go.  
If it is non-linear, google for mpfit, widely hailed as a superior  
non-linear fitting routine.  
(I'll google: <http://cow.physics.wisc.edu/~craigm/idl/idl.html>)

Cheers,  
bob

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