
Subject: Re: Gauss2DFit question

Posted by [Craig Markwardt](#) on Tue, 09 May 2000 07:00:00 GMT

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"Kenneth P. Bowman" <kbowman@null.net> writes:

> [[This message was both posted and mailed: see
> the "To," "Cc," and "Newsgroups" headers for details.]]
>
> In article <on3dnrl7o9.fsf@cow.physics.wisc.edu>, Craig Markwardt
> <craigmnet@cow.physics.wisc.edu> wrote:
>
>> <http://cow.physics.wisc.edu/~craigm/idl/idl.html>
>
> Thanks, Craig. I greatly appreciate the help.
>
> I was thinking of writing a GAUSS2DFIT replacement using the built-in
> Levenberg-Marquardt algorithm, LMFIT. Have you compared the built-in
> function with your LM algorithm? (For speed, accuracy, etc.?)

I haven't done any direct comparisons, but I would expect any better.
In the speed category it will definitely be a loser, since it does a
function call for *each* data point. For images that's a lot of
points!

MPFIT is based on MINPACK-1 which which was designed to handle more
difficult problems. I believe that LMFIT is descends from Numerical
Recipes which doesn't have that reputation.

Craig

P.S. MPFIT is not the end-all, be-all. It fails this problem
miserably, <<http://www.maxthis.com/curviex.htm>>, but I believe this is
because the initial trial function spans about 8 orders of magnitude.

--

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

Subject: Re: Gauss2DFit question

Posted by [Kenneth P. Bowman](#) on Tue, 09 May 2000 07:00:00 GMT

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In article <on3dnrl7o9.fsf@cow.physics.wisc.edu>, Craig Markwardt
<craigmnet@cow.physics.wisc.edu> wrote:

> <http://cow.physics.wisc.edu/~craigm/idl/idl.html>

Thanks, Craig. I greatly appreciate the help.

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Ken

Subject: Re: Gauss2DFit question

Posted by [Craig Markwardt](#) on Tue, 09 May 2000 07:00:00 GMT

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"K. Bowman" <k-bowman@null.tamu.edu> writes:

> I'm trying to use the library routine GAUSS2DFIT to fit some smooth,
> blobby functions. My experience so far has been ... ah ... suboptimal.
> It does not converge quickly or well.

>

> Example (modified from the example in the manual):

>

...

> yfit = GAUSS2DFIT(z, b, /TILT) ;Fit the function

...

I hope you try MPFIT2DPEAK, which is a drop-in replacement for GAUSS2DFIT, but is based on the MINPACK-1 family of more robust fitting routines at my website. The only change I make was to the function name, otherwise the invocation is the same:

```
yfit = MPFIT2DPEAK(z,b,/tilt)
```

MPFIT2DPEAK also has some other cool peak-like functions, and has all the standard MPFIT-family bells and whistles. Of course you will need to download MPFIT & MPFIT2DFUN, the service routines that make it go.

<http://cow.physics.wisc.edu/~craigm/idl/idl.html>

These are the results I got, much closer to what you probably want:

```
Should be:  5.0000  10.0000  21.3333  10.0000  64.0000  60.0000  0.7854  
Is:         :  5.0089  10.0095  21.3838  9.9872  64.0621  59.9459  0.7790
```

Alas, it took a little longer, but my philosophy is slower and right is better than faster and wrong.

I should also mention that determining the parameters of a peak can be pretty hard to do automatically, especially when noise is present. I believe the approach implemented in MPFIT2DPEAK is actually quite a bit more robust than that of GAUSS2DFIT, but still, it cannot be perfect.

If you can, I strongly recommend supplying starting values that match your problem. For example, if you know where the peak is roughly, or the width of the peak, that can really help the peak finding process.

Good luck!

Craig

--

Craig B. Markwardt, Ph.D. EMAIL: craigmnet@cow.physics.wisc.edu
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Subject: Re: Gauss2DFit question
Posted by [K. Bowman](#) on Tue, 09 May 2000 07:00:00 GMT
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In article <090520001530100771%k-bowman@null.tamu.edu>, K. Bowman
<k-bowman@null.tamu.edu> wrote:

```
> xr = (xx - a[4])*COS(a[6]) - (yy - a[4])*SIN(a[6]) ;Rotate x  
> yr = (xx - a[4])*SIN(a[6]) + (yy - a[4])*COS(a[6]) ;Rotate y
```

should be

```
xr = (xx - a[4])*COS(a[6]) - (yy - a[5])*SIN(a[6]) ;Rotate x  
yr = (xx - a[4])*SIN(a[6]) + (yy - a[5])*COS(a[6]) ;Rotate y
```

but it doesn't fix the problem.

Ken