Subject: MPFIT2DPEAK with constraints
Posted by c.carrano on Thu, 09 Oct 2003 22:40:07 GMT
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Greetings. I'm trying to understand how Craig
Markwardt's peak fitting function MPFIT2DPEAK
works when you wish to require that certain
parameters be held constant.

Specifically, I know that my data should peak
at the origin and so I'd like to force the
fitted Gaussian to peak there as well.

Despite specifying that A[4] and A[5] be
fixed using the PARINFO structure, the fitted
Gaussian is not centered at the origin.
Supplying PARINFO to MPFIT2DPEAK does change
the fit but it actually makes it slighly worse.
Anyone know what I might be doing wrong?

Here's my sample code:

```
;------------------------------------------------
; Construct a sample gaussian surface in range [-5,5] centered at
[0,0]
   x = findgen(100)*0.1 - 5. & y = x
   xx = x # (y*0 + 1)
   yy = (x*0 + 1) # y
   rr = sqrt((xx-0*2.)^2 + (yy+0*3.)^2)

; Gaussian surface with sigma=0.5, peak value of 3, noise with
sigma=0.2
   seed=6
   z = 3.*exp(-(rr/0.5)^2) + randomn(seed,100,100)*.2

   pi = replicate({value:0.D, fixed:0, limited:[0,0], $
                   limits:[0.D,0]}, 7)

   pi(4).fixed = 1
   pi(5).fixed = 1

   a0=[0., 3., 1.0, 1.0, 0.0, 0.0, 0.0]
   pi(*).value = a0

; Fit gaussian parameters A
   zfit = mpfit2dpeak(z, a1, x, y, /tilt, PARINFO=pi)

   zfit = mpfit2dpeak(z, a2, x, y, /tilt)
```

```
  print,a1
  print,a2
-----------------------------------------------
```

IDL prints:

a1=[-0.000156282, 2.82180, 0.382853, 0.347286, -0.0999999, 0.0999999,
0.716917]

a2=[-0.000266513, 3.06073, 0.345753, 0.351519, -0.000407959,
0.00455947,   1.98130]

Subject: Re: MPFIT2DPEAK
Posted by Craig Markwardt on Thu, 23 Jun 2005 07:50:23 GMT
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Greetings,

"angela" <Angeliki.Pollatou@gmail.com> writes:
> Hello,
>
> I was wondering if someone can help me out with a problem I have in
> MPFIT2DPEAK.
> Fist I am describing the problem: I have an image with stars and I am
> trying to fit the distribution to a gaussian and determine the
> coordinates of which there is a peak density of stars.
> I have an array of 400x400 pixels (centered where I believe the center
> shoud be) and I have calculated the number density of the stars in a
> specific radius for all the coordinate combinations starting from the
> (0,0) coordinates.
> I am using the MPFIT2DPEAK to fit a gaussian and to get a better handle
> on the center I am trying to find.
> I have two questions:
>
> 1. When I am using MPFIT2DPEAK without a 'guess' about the center (I
> use it with the tilt keyword), I get:
> 3.02628   3.92726   40.2412   13.1586   37.6854
> 24.7872 2.99398
> I have read from the tutorial that if you do not give an initial guess
> the program will try to guess what is the center. How do I know what
> the program thinks as a center? In other words, this result tells me
> that the center is at
> (x,y)=(37.6854,24.7872) or it understands that the center that I used
> is (200,200), so the result is that the center is at
> (200+37.6854,200+24.7872)?

You assign X and Y according to the arrays you pass when you call MPFIT2DPEAK. The routine returns the centroid using the same coordinate system. So if the command was called like this,
MPFIT2DPEAK(START,A,X,Y)
then (37.6854,24.7872) should refer to a position in the (X,Y) coordinate system.

> 2.I tried to run the MPFIT2DPEAK using the estimates keyword :
> result=mpfit2dpeak(start,B,start(200,*),start(*,200),/TILT)
> where (200,200) is approximately where I think the center is and
> 'start' is my 400x400 array that has all the densities stored (they are
> all integers). ...

First of all, you didn't actually use the ESTIMATES keyword in your example, so it's hard to comment. Second of all, you are not passing proper X and Y values. These should be the *coordinate labels*, not rows and columns of the array itself. Look at how CONTOUR is called... same thing here.

> ... I get this message:
> % Attempt to subscript XX with WHMAX is out of range.
> % Execution halted at: MPFIT2DPEAK 390
> /raid1/home/angeliki/IDL/mpfit2dpeak.pro
> % $MAIN$

Yes, fix the problems above and you should be okay. The other thing is that you passed START(200,*) as a column vector, when it should be a row vector, and vice versa for START(*,200).

Good luck,
Craig

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Craig B. Markwardt, Ph.D. EMAIL: craigmnet@REMOVEcow.physics.wisc.edu
Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response
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Subject: Re: MPFIT2DPEAK
Posted by angela on Mon, 27 Jun 2005 16:24:08 GMT
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Thank you! It works really well now:-)

Angela
