
Subject: Fitting a Gaussian to an "unleveled" histogram: Interpreting the width
Posted by [Maryam](#) on Thu, 12 Feb 2015 00:52:08 GMT

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Hello.

I am trying to fit an inverted Gaussian function to a histogram that is higher at one end than the other. I simply define a function that is a Gaussian with negative amplitude (plus a constant to shift the Gaussian up along the y-axis) and call that function using `mpfitfun` to get the fit. It all works out fine and I do get a fit that looks reasonable. However, I am not sure how to interpret the standard deviation returned by `mpfitfun`. I first thought that IDL uses the lower side to make the fit, but I noticed it is not so. Does anyone know how the Gaussian parameters (in particular, the standard deviation) is calculated by IDL in this case? Please note that I fit the Gaussian to the midpoint of each bin whose coordinates are (xhist, yhist).

Thanks,
Maryam

P.S. See below for the code I wrote. You don't need to have the histogram (i.e. `newr`) to reproduce what I have (that's why I have commented out that line with `plthist`). Just plot, xhist, yhist, `psym=4` (I printed xhist and yhist arrays below) and follow the steps I have copied below to fit the Gaussian to those points.

```
function gaussianfit, x, p
```

```
Amp = p[0]  
xc = p[1]  
W = p[2]  
const = p[3]
```

```
return, Amp*exp(-0.5*(x-xc)^2./W^2.)+const  
end
```

```
Pro GaussResFit
```

```
; plthist, newr, xhist, yhist, bin=.03, color=cgcolor("red"), /overplot
```

```
; yhist*=1.
```

```
; print, xhist, yhist
```

```
xhist=[3.22500, 3.25500, 3.28500, 3.31500, 3.34500, 3.37500, 3.40500, 3.43500, 3.46500,  
3.49500, 3.52500, 3.55500]
```

```
yhist=[82.0000, 79.0000, 63.0000, 54.0000, 46.0000, 46.0000, 48.0000, 64.0000, 68.0000,  
89.0000, 81.0000, 117.000]
```

```
plot, xhist, yhist, psym=4, color=0
```

```
st=[-71.0000, 3.27831, 0.105548, 117.000]  
err=fltarr(n_elements(xhist))+0.001
```

```
name=['amp','xc','w','amp0']  
np=n_elements(name)  
pi = replicate({fixed:0,limited:[0,0],limits:[0.D,0.D],MPMAXSTEP: [0.D,0.D,0.D,0.D],  
parname:['']},np)  
for i=0, np-1 do pi[i].parname=name[i]  
fixed=fltarr(n_elements(name))  
limited = [[1,1],[1,1],[1,1],[1,1]]  
limits=[[st[0]-2.,st[0]+2.],[st[1]-.2,st[1]+.2],[st[2]-.03,st[2]+.03],[st[3]-2.,st[3]+2.]]  
MPMAXSTEP=[1., 0.2, 0.05, 1.]
```

```
pi.limited=limited  
pi.limits=limits  
pi.fixed=fixed  
pi.MPMAXSTEP=MPMAXSTEP
```

```
params = mpfitfun('gaussianfit', xhist, yhist, err, st, parinfo=pi, perror=perror)  
fitg = call_function('gaussianfit', xhist, params)  
oplot, xhist, fitg, color=0, thick=2.
```

```
stop  
END
```
