Subject: LINFIT CHISQ and SIGMA values are correct??
Posted by Krishnakumar M.A on Tue, 04 Aug 2015 19:54:35 GMT
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Hi,

I was trying to do a linfit in the following data (I'm using IDL 6.3).

---

x   = [150.0, 235.0, 325.0, 410.0, 610.0]
y   = [200.0, 35.0, 8.4, 3.0, 0.6]
err = [25.0, 5.0, 2.1, 0.8, 0.2]

result = linfit(alog10(x),alog10(y),MEASURE_ERRORS=alog10(err), CHISQ=chi,
COVAR=covmatrix, SIGMA=error, YFIT=fit)

It gave me surprisingly odd values for CHISQ and SIGMA. The values are given below.

---

result
     11.6899   -4.29070
chisq
  0.00799291
sigma
     4.32894   1.66352

Fit result looked good, but the values of sigma and chisq are way off. I believe that the chisq it gives is reduced chisq. Is there anything went wrong in the fitting procedure, or are there any issues with the linfit algorithm?

Please let me know whether I'm doing it right or not.

Thanks,
Krishnakumar

Subject: Re: LINFIT CHISQ and SIGMA values are correct??
Posted by wlandsman on Wed, 05 Aug 2015 02:19:21 GMT
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You are giving linfit negative errors -- alog10(0.2) = -0.69897

If you use the absolute value of alog10(err) you will get consistent results.

But probably it is better to do your logarithmic transformation correctly

if z = alog10(y) then dz = 0.434*dy/y (I think)

where dy is your original err and dz is your transformed err .

On Tuesday, August 4, 2015 at 3:54:39 PM UTC-4, Krishnakumar M.A wrote:
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Subject: Re: LINFIT CHISQ and SIGMA values are correct??
Posted by Krishnakumar M.A on Wed, 05 Aug 2015 07:07:59 GMT
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On Wednesday, August 5, 2015 at 7:49:24 AM UTC+5:30, wlandsman wrote:
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Thanks for the reply. I did not get any difference by giving abs(alog10(err)).

But I got better values for chisq and sigma when I used dz = 0.434*dy/y. Could you please tell me why a factor of 0.434?

Subject: Re: LINFIT CHISQ and SIGMA values are correct??
Posted by Helder Marchetto on Wed, 05 Aug 2015 07:23:37 GMT
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I think that what he's saying is:

if f(x) = log_b(x) then f'(x) = 1/(x ln(b)) where b is the base of the logarithm. In your case, you're using IDL's alog10(). So the derivative of the function f(x) = alog10(x) is f'(x) = 1/(x*alog(10)) and can be rewritten as:
f'(x) = 0.434/x

So 0.434 = 1/alog(10)

I hope it helps.

Cheers,
Helder

PS: In case you're unsure what or why the step from z=alog10(y) to dz=0.434*dy/y was taken, then you should look at error propagation and differentials. Here are some google result I found:
http://tutorial.math.lamar.edu/Classes/CalcI/Differentials.a spx
 http://www.rit.edu/cos/uphysics/uncertainties/Uncertaintiesp art2.html

On Wednesday, August 5, 2015 at 9:08:05 AM UTC+2, Krishnakumar M.A wrote:
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