
Subject: Displaced errorbars on log-log scale with cgPlot
Posted by [atmospheric physics](#) on Tue, 27 Jan 2015 10:20:58 GMT
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Hello,

I was using cgPlot to make the line plot on a log-log scale. I have included the y-axis errors around each data point. I have followed the Coyote Graphics Gallery - 'Error bar plot'. In my plot, I found that for some points the error bars are displaced and above the data point. I guess this is a bug in log-log scaling of error bars!!!

Thanks in advance,
Madhavan

Subject: Re: Displaced errorbars on log-log scale with cgPlot
Posted by [David Fanning](#) on Tue, 27 Jan 2015 13:13:12 GMT
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Madhavan Bomidi writes:

> I was using cgPlot to make the line plot on a log-log scale. I have included the y-axis errors around each data point. I have followed the Coyote Graphics Gallery - 'Error bar plot'. In my plot, I found that for some points the error bars are displaced and above the data point. I guess this is a bug in log-log scaling of error bars!!!

It seems unlikely in the absences of evidence. :-)

Cheers,

David

--

David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: <http://www.idlcoyote.com/>
Sepore ma de ni thue. ("Perhaps thou speakest truth.")

Subject: Re: Displaced errorbars on log-log scale with cgPlot
Posted by [atmospheric physics](#) on Wed, 28 Jan 2015 15:25:22 GMT
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Hello David,

Please check the below code and the resulting output:

PRO testerr

```
xdt = [5, 10, 20, 40, 80, 160, 320, 640, 1280, 2560, 5120, 10240]
```

```
ymean = [ 5.7071102e-07, 1.9411492e-07, 2.4366391e-07, 3.9646722e-07, $  
8.8304703e-07, 3.6161633e-06, 1.5931371e-05, 6.4912913e-05, $  
0.00019788680, 0.00042545785, 0.00033186864, 0.00031074151 ]
```

```
ystd = [ 4.1662774e-07, 2.7208043e-07, 4.5170846e-07, 7.2870838e-07, $  
1.2310552e-06, 3.6163696e-06, 1.4698943e-05, 6.3878156e-05, $  
0.00023048977, 0.00053752256, 0.00033514162, 0.00018645177 ]
```

```
low_yerr = (ymean - ystd)  
high_yerr = (ymean + ystd)
```

```
FigFile = 'testerrplot.ps'
```

```
cgPS_Open, FigFile  
cgDisplay
```

```
cgPlot, xdt, ymean, Font=-1, /XLOG, XStyle=1, YStyle=1, $  
XRange=[100000, 1], YRange=[0.000000001, 0.1], /YLOG, $  
CharSize=1.2, ERR_YLow=low_yerr, $  
ERR_YHigh=high_yerr, Psym=-16, $  
ERR_Color='red7', SymColor='red7', Color='red7'
```

```
cgPS_Close
```

```
; Create a PNG file  
cgPS2Raster, FigFile, /PNG
```

END

Thanks in advance,
Regards,
Madhavan

Subject: Re: Displaced errorbars on log-log scale with cgPlot
Posted by [Helder Marchetto](#) on Wed, 28 Jan 2015 15:53:59 GMT
[View Forum Message](#) <> [Reply to Message](#)

On Wednesday, January 28, 2015 at 4:25:24 PM UTC+1, Madhavan Bomidi wrote:
> Hello David,
>
> Please check the below code and the resulting output:

```

>
> -----
> PRO testerr
>
> xdt = [5, 10, 20, 40, 80, 160, 320, 640, 1280, 2560, 5120, 10240]
>
>
> ymean = [ 5.7071102e-07, 1.9411492e-07, 2.4366391e-07, 3.9646722e-07, $
> 8.8304703e-07, 3.6161633e-06, 1.5931371e-05, 6.4912913e-05, $
> 0.00019788680, 0.00042545785, 0.00033186864, 0.00031074151 ]
>
> ystd = [ 4.1662774e-07, 2.7208043e-07, 4.5170846e-07, 7.2870838e-07, $
> 1.2310552e-06, 3.6163696e-06, 1.4698943e-05, 6.3878156e-05, $
> 0.00023048977, 0.00053752256, 0.00033514162, 0.00018645177 ]
>
> low_yerr = (ymean - ystd)
> high_yerr = (ymean + ystd)
>
> FigFile = 'testerrplot.ps'
>
> cgPS_Open, FigFile
> cgDisplay
>
> cgPlot, xdt, ymean, Font=-1, /XLOG, XStyle=1, YStyle=1, $
> XRange=[100000,1], YRange=[0.000000001,0.1], /YLOG, $
> CharSize=1.2, ERR_YLow=low_yerr, $
> ERR_YHigh=high_yerr, Psym=-16, $
> ERR_Color='red7', SymColor='red7', Color='red7'
>
> cgPS_Close
>
> ; Create a PNG file
> cgPS2Raster, FigFile, /PNG
>
> END
> -----
>
> Thanks in advance,
> Regards,
> Madhavan

```

Hi,
that's because the errors are automatically added to the y values. According to David's documentation:

```

; err_yhigh: in, optional
;   The high error values that should be added to the dependent or Y data values.
; err_ylow: in, optional

```

; The low error values that should be subtracted from the dependent or Y data values.

therefore if you change:

```
low_yerr = (ymean - ystd)
high_yerr = (ymean + ystd)
```

to

```
low_yerr = ystd
high_yerr = ystd
```

Then comes the real problem... Did you look at the numbers? So here it goes:

```
1.54083e-007
-7.79655e-008
-2.08045e-007
-3.32241e-007
-3.48008e-007
-2.06455e-010
1.23243e-006
1.03476e-006
-3.26030e-005
-0.000112065
-3.27296e-006
0.000124290
```

Now the graphics has to place errorbars for negative values. If you select only positive values (4 of them), the plot looks fine:

```
goodVals = where(ymean-ystd gt 0.0, cnt)
ymean = ymean[goodVals]
ystd = ystd[goodVals]
xdt = xdt[goodVals]
cgDisplay, 600, 600, WID=1, Title='log-log'
cgPlot,xdt,ymean, Font=-1,/XLOG,XStyle=1,YStyle=1, $
  XRange=[100000,1],YRange=[0.000000001,0.1], /YLOG, $
  CharSize=1.2, ERR_YLow=ystd, $
  ERR_YHigh=ystd, Psym=-16, $
  ERR_Color='red7',SymColor='red7',Color='red7'
```

Cheers,
Helder

Subject: Re: Displaced errorbars on log-log scale with cgPlot
Posted by [Helder Marchetto](#) on Wed, 28 Jan 2015 15:55:49 GMT
[View Forum Message](#) <> [Reply to Message](#)

On Wednesday, January 28, 2015 at 4:54:01 PM UTC+1, Helder wrote:
> On Wednesday, January 28, 2015 at 4:25:24 PM UTC+1, Madhavan Bomidi wrote:
>> Hello David,

```

>>
>> Please check the below code and the resulting output:
>>
>> -----
>> PRO testerr
>>
>> xdt = [5, 10, 20, 40, 80, 160, 320, 640, 1280, 2560, 5120, 10240]
>>
>>
>> ymean = [ 5.7071102e-07, 1.9411492e-07, 2.4366391e-07, 3.9646722e-07, $
>> 8.8304703e-07, 3.6161633e-06, 1.5931371e-05, 6.4912913e-05, $
>> 0.00019788680, 0.00042545785, 0.00033186864, 0.00031074151 ]
>>
>> ystd = [ 4.1662774e-07, 2.7208043e-07, 4.5170846e-07, 7.2870838e-07, $
>> 1.2310552e-06, 3.6163696e-06, 1.4698943e-05, 6.3878156e-05, $
>> 0.00023048977, 0.00053752256, 0.00033514162, 0.00018645177 ]
>>
>> low_yerr = (ymean - ystd)
>> high_yerr = (ymean + ystd)
>>
>> FigFile = 'testerrplot.ps'
>>
>> cgPS_Open, FigFile
>> cgDisplay
>>
>> cgPlot, xdt, ymean, Font=-1, /XLOG, XStyle=1, YStyle=1, $
>> XRange=[100000,1], YRange=[0.000000001,0.1], /YLOG, $
>> CharSize=1.2, ERR_YLow=low_yerr, $
>> ERR_YHigh=high_yerr, Psym=-16, $
>> ERR_Color='red7', SymColor='red7', Color='red7'
>>
>> cgPS_Close
>>
>> ; Create a PNG file
>> cgPS2Raster, FigFile, /PNG
>>
>> END
>> -----
>>
>> Thanks in advance,
>> Regards,
>> Madhavan
>
> Hi,
> that's because the errors are automatically added to the y values. According to David's
documentation:
>
> ; err_yhigh: in, optional

```

```

> ;      The high error values that should be added to the dependent or Y data values.
> ;      err_ylow: in, optional
> ;      The low error values that should be subtracted from the dependent or Y data values.
>
> therefore if you change:
> low_yerr = (ymean - ystd)
> high_yerr = (ymean + ystd)
> to
> low_yerr = ystd
> high_yerr = ystd
>
> Then comes the real problem... Did you look at the numbers? So here it goes:
> 1.54083e-007
> -7.79655e-008
> -2.08045e-007
> -3.32241e-007
> -3.48008e-007
> -2.06455e-010
> 1.23243e-006
> 1.03476e-006
> -3.26030e-005
> -0.000112065
> -3.27296e-006
> 0.000124290
>
> Now the graphics has to place errorbars for negative values. If you select only positive values
(4 of them), the plot looks fine:
>
> goodVals = where(ymean-ystd gt 0.0, cnt)
> ymean = ymean[goodVals]
> ystd = ystd[goodVals]
> xdt = xdt[goodVals]
> cgDisplay, 600, 600, WID=1, Title='log-log'
> cgPlot,xdt,ymean, Font=-1,/XLOG,XStyle=1,YStyle=1, $
> XRange=[100000,1],YRange=[0.000000001,0.1], /YLOG, $
> CharSize=1.2, ERR_YLow=ystd, $
> ERR_YHigh=ystd, Psym=-16, $
> ERR_Color='red7',SymColor='red7',Color='red7'
>
> Cheers,
> Helder

```

Ups... a line went missing.
 The values showed are a result of
 print, ymean-ystd
 1.54083e-007
 -7.79655e-008
 -2.08045e-007

-3.32241e-007
-3.48008e-007
-2.06455e-010
1.23243e-006
1.03476e-006
-3.26030e-005
-0.000112065
-3.27296e-006
0.000124290

sorry for missing that.

Cheers,
Helder

Subject: Re: Displaced errorbars on log-log scale with cgPlot
Posted by [David Fanning](#) on Wed, 28 Jan 2015 15:58:32 GMT
[View Forum Message](#) <> [Reply to Message](#)

Madhavan Bomidi writes:

```
>  
> Hello David,  
>  
> Please check the below code and the resulting output:  
>  
> -----  
> PRO testerr  
>  
> xdt = [5, 10, 20, 40, 80, 160, 320, 640, 1280, 2560, 5120, 10240]  
>  
>  
> ymean = [ 5.7071102e-07, 1.9411492e-07, 2.4366391e-07, 3.9646722e-07, $  
> 8.8304703e-07, 3.6161633e-06, 1.5931371e-05, 6.4912913e-05, $  
> 0.00019788680, 0.00042545785, 0.00033186864, 0.00031074151 ]  
>  
> ystd = [ 4.1662774e-07, 2.7208043e-07, 4.5170846e-07, 7.2870838e-07, $  
> 1.2310552e-06, 3.6163696e-06, 1.4698943e-05, 6.3878156e-05, $  
> 0.00023048977, 0.00053752256, 0.00033514162, 0.00018645177 ]  
>  
> low_yerr = (ymean - ystd)  
> high_yerr = (ymean + ystd)  
>  
> FigFile = 'testerrplot.ps'  
>  
> cgPS_Open, FigFile  
> cgDisplay
```

```

>
> cgPlot,xdt,ymean, Font=-1,/XLOG,XStyle=1,YStyle=1, $
>   XRange=[100000,1],YRange=[0.000000001,0.1], /YLOG, $
>   CharSize=1.2, ERR_YLow=low_yerr, $
>   ERR_YHigh=high_yerr, Psym=-16, $
>   ERR_Color='red7',SymColor='red7',Color='red7'
>
> cgPS_Close
>
> ; Create a PNG file
> cgPS2Raster,FigFile,/PNG
>
> END
> -----

```

It appears to me you are giving me numbers that it is impossible to take the log of:

```

IDL> print, alog10(low_yerr)
   -6.81224   -NaN   -NaN   -NaN   -NaN
-NaN  -5.90924  -5.98516   -NaN
   -NaN   -NaN   -3.90556

```

The "problem" values are those that can't be calculated.

I guess the real problem might be understanding why errors are not being thrown by cgPlot. I'll look into it.

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

Coyote's Guide to IDL Programming: <http://www.idlcoyote.com/>

Sepore ma de ni thue. ("Perhaps thou speakest truth.")