
Subject: Re: the sky is falling down again
Posted by [JD Smith](#) on Tue, 30 Jan 2007 17:51:13 GMT
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On Tue, 30 Jan 2007 16:01:31 +0100, Paolo Grigis wrote:

```
>
>
> Reimar Bauer wrote:
>> Hi all
>>
>> here is another example which is very funny if you see it the first time
>>
>> a=indgen(10)*1D-7
>> b=a
>> plot,a,b,psym=1
>> oplot,[0,10],[0,10]
>>
>> because the coordination system is defined by plot it could be a bug too
>> and not only a question about precisions
>>
>>
>> Any idea what is happen here?
>
> I think that maybe plot tries to find out the pixel coordinates
> corresponding to the far end of the line. If it uses long, signed
> integers for that, then it will overflow around pixel  $2^{31}$ , which
> seems roughly where the line is supposed to be with your settings
> (which should be something like 500 pixel times 10 divided by  $1d-6$ ).
```

In fact this has to be the right explanation. If instead of a wide window, you create a tall one:

```
window,xsize=600,ysize=800
```

Then the line falls below the points. And if you make an exactly square plotting window:

```
window,xsize=800,ysize=800
a=indgen(10)*1D-7
b=a
plot,a,b,psym=1,xstyle=3,ystyle=3,POSITION=[.1,.1,.9,.9],/NORMAL
oplot,[0,10],[0,10]
```

Then it all lines up well. The direction with the largest pixel count per unit data value ends up "truncating" first: i.e. the longer dimension of the plotting window. You can see where it truncates by gradually altering the values until the line just starts deviating:

```
for k=2.,5.,.1 do begin & print,k & oplot,[0,k],[0,k] & wait,1 & endfor
```

At some point, both clip, and you get a min and max angle (the size of which is related to the aspect angle of your plotting window). The first deviation for me was near k=2.3. What's close to that number?

```
IDL> print,!X.CRANGE[0]+(!X.CRANGE[1]-!X.CRANGE[0])/ $  
      ((!X.WINDOW[1]-!X.WINDOW[0])*!D.X_SIZE)) * 2.^31  
      2.2700673
```

Aha. This is precisely the data coordinate where the implied device pixel coordinate with this plotting range hits $2.^{31}$, the limit for a signed long integer. At that point, it clips to this value, while the Y-axis, not having clipped yet, continues to move up, until it too clips. Your number may differ depending on your window size.

JD
