Subject: PV-Wave plotting adventures
Posted by luthi on Wed, 02 Jun 1999 07:00:00 GMT
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Here is a little caveat for all users of PV-Wave plotting routines (I hope this is fixed in IDL!). The errors appeard in PV-WAVE v6.10 (Solaris) but as far as I remember were in all earlier versions (however I did not fully realize the reason of this sometimes strange behaviour...)

PV-Wave plotting adventures
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A really annoying plotting bug appears when the range of the plotting region is some orders of magnitude less than the frame offset:

```
x0=1.0     ; frame offset
dx=1.0d-5  ; plotting range
plot,[0],[0],xrange=[x0,x0+dx],yrange=[0,1],/xstyle,/ystyle
```

The plot is either inaccurate, unwanted tick marks appear inside or outside of the plotting region and the axes labeling gets somewhat random (switching between decimal and exponential notation)

Try for example

```
x0=1.0
dx=1.0d-4
plot,[0],[0],xrange=[x0,x0+dx],yrange=[0,1],/xstyle,/ystyle
```

and

```
x0=1.0
dx=3.0d-4
plot,[0],[0],xrange=[x0,x0+dx],yrange=[0,1],/xstyle,/ystyle
```

Unusable annotations and tickmarks outside of the plotting frame can be produced with

```
x0=10.0
dx=1.0d-5
 plot,[0],[0],xrange=[x0,x0+dx],yrange=[x0,x0+dx],/xstyle,/ys tyle
```

getting worse and worse as x0 increases (even if the plotting intervals are always the same size). A fully collapsed plot is produced with

```
x0=1000.0d0
dx=1.0d-5
```

```
 plot,[0],[0],xrange=[x0,x0+dx],yrange=[x0,x0+dx],/xstyle,/ys tyle
```

also using double precision numbers. Increasing dx yields this ugly plot where the tick marks on the vertical axis are NOT EQUALLY SPACED!!!!

```
x0=1000.0d0
dx=1.0d-3
 plot,[0],[0],xrange=[x0,x0+dx],yrange=[x0,x0+dx],/xstyle,/ys tyle
```

Using plot_dbl gives the same crazy results, unless one uses the keyword bits xstyle=32, ystyle=32

```
x0=1000.0d0
dx=1.0d-3
plot_dbl,[0.0d0],[0.0d0],$
  xrange=double([x0,x0+dx]),yrange=double([x0,x0+dx]),xstyle=3 3,ystyle=33
```

To be sure I display the header of plot_dbl here:

```
;$Id: plot_dbl.pro,v 1.1 1995/09/18 15:19:37 landers Exp $
; Copyright 1994 Visual Numerics, Inc.
```

This means that the plotting bugs described above have been known by VNI for at least four years and at least two major releases without fixing them!

Using plot_dbl solves the problem of labeling the axis only partly, since one has to use oplot_dbl (which also works fine) but where are all the other plotting routines like contour_dbl, surface_dbl aso.?

And having all those routines, why not simply fixing this annoying bug in the main plotting routine.

I guess that many of the date-time plotting errors are really caused by the behaviour of the plotting routine when the plotting range is some orders of magnitude smaller than the offset (which is almost always the case since plotting date/time uses julian date for plotting).

PLEASE any people at VNI reading this, PLEASE FIX THIS BUG IMMEDIATELY!!!

Cheers Martin

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