Subject: Re: floating underflow errors
Posted by Paul Van Delst[1] on Thu, 11 Apr 2002 14:19:40 GMT

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Patrick McEnaney wrote:
>
> Greetings All-
>
> I've read through the fairly extensive history of posts regarding
> floating underflow arithmetic error messages on the group and wanted
> to see if anyone can suggest a fix for the problems I'm having. My
> code is a simple interpolation to create a 2d contour of oceanographic
> data values. Strangely enough I haven't always had the floating
> underflow message popping up in my code but the data can be variable
> depending on what coastal area the data is collected in. I believe the
> problem is occurring either because there are actual zeros appearing
> in the data files or as a result of the simple interpolation function
> I'm using. I would ignore the message other than the code sometimes
> crashes.

At what point does it crash? What conditions cause bogus numbers to appear? What numbers in the
input data would you consider bogus?

A small test data file that contains bogus data (you have one, right?) should reveal that.

> Below is an example of the routine I'm running on a number of
> fields and adjusting the scale appropriately. My question is can I
> work around the problem by using a combination of 1) notification
> about a floating underflow occurrence by using the !EXCEPT system
> variable,

For testing, sure. Dunno about "production" runs though.

> and 2) applying the WHERE function to replace occurrences of
> 0 with a NaN or some other null value that won't otherwise affect the
> outcome of my contour plot?

Why not just eliminate the crappy data before the interpolation is done? e.g.

```
crap = some_value_that_will_not_screw_up_interpolation
valid_index = WHERE( ( x1 NE crap ) AND $
            ( y1 NE crap ) AND $
            ( x2 NE crap ) AND $
            ( y2 NE crap ),     valid_count )

IF ( valid_count GT 0 ) THEN BEGIN
 x1 = x1[ valid_index ]
```

```
  y1 = y1[ valid_index ]
  x2 = x2[ valid_index ]
  y2 = y2[ valid_index ]
ENDIF ELSE $
  MESSAGE, 'All the data was crappy'
```

Dunno if the syntax above will work, but you get the idea

(Of course you'll probably need different "crap" values for the different arrays and use a tolerance test rather than a "NE")

paulv

```
>
>  The data are organized as ascii arrays that interpolate between two
>  locations at the same depth for various fields.
>
>  Any suggestions are greatly appreciated,
>
>  Regards,
>
>  Patrick
>
>  code:
>
>  if (event.index eq 1) then begin
>
>  x1 = reform((*pstate).profiledata(4,*,0))  ; depth at 1
>  y1 = reform((*pstate).profiledata(4,*,1))  ; depth at 2
>
>  x2 = reform((*pstate).profiledata(6,*,0))  ; density at 1 f(x1)
>  y2 = reform((*pstate).profiledata(6,*,1))  ; density at 2 f(y1)
>
>
>  x2=x2[sort(x1)]
>  y2=y2[sort(y1)]
>  x1=x1[sort(x1)]
>  y1=y1[sort(y1)]
>
>  ;print,(size(x1))[1],(size(y1))[1]
>  ;print, x1, y1
>
>  x1=x1[0:(size(x1))[1]-1]
>  y1=y1[0:5684]
>  x2=x2[0:(size(x2))[1]-1]
>  y2=y2[0:5684]
>
>  ; interpolate 1st data onto 2nd data alt grid
```

```
> x2i = interpol(x2, x1, y1) ; density at 1 f(y1)
> ;x2i(0) = ABS(x2i(0))
> badnum=fltarr(1)
> badnum = FINITE(x2i, /INFINITY)
> ndepth=(size(x2i))[1]
> nsep=100
>
> print,max(x2i),min(x2i),max(y2),min(y2)
>
> dens=DBLARR(ndepth,nsep)
> for d=0,ndepth-1 do begin
>   for s=0,nsep-1 do begin
>     dens[d,s]=x2i[d]+(y2[d]-x2i[d])*s/(nsep-1)
>   endfor
> endfor
>
> print,min(dens),max(dens)
>
> sep=DINDGEN(nsep)/(nsep-1)
> dep=DINDGEN(ndepth)/(ndepth-1)*(MAX(y1)-MIN(y1))+MIN(y1)
>
> nlevels=10
>  levels=DINDGEN(nlevels)/(nlevels-1)*(max(dens)-min(dens))+mi n(dens)
> labels=INTARR(nlevels)+1
>
> contour,transpose(dens),sep,dep ,YRANGE=[max(y1),min(y1)], $
>        levels = [20.5,21.5,21.6, 21.7, $
>        21.8,21.9,22.0, 22.1] ,c_labels=labels, $
>        c_annotation = ['3.0','3.5','3.6', '3.7', $
>        '4.0','4.1','4.3', '4.6'],XTITLE = 'Space', YTITLE = 'Depth (m)', $
>        c_colors=[60,120,250], TITLE = 'Density (sigma-t)'
>
> endif
```

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