Subject: Re: Inaccuracies
Posted by Hermann Mannstein on Thu, 16 Nov 1995 08:00:00 GMT
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Andy Loughe <afl@cdc.noaa.gov> wrote:
> Ok, I am sure this has been discussed before, but let
> me start this thread again. I wish to create a 15-element
> vector which contains the numbers -1.4 to 1.4 by an increment
> of 0.2 I also wish the sum of these elements to be zero
> (No, this isn't the new math). Here is what I tried...
>
>
> TRIAL #1
> ========
> IDL> a = findgen(15)*.2 - 1.4
> IDL> print, total(a)
> 7.15256e-07
>
> Hmmm! Not so good.
>
>
> TRIAL #2
> ========
> IDL> a = dindgen(15)*(.2D)-1.4D
> IDL> print, total(a, /double)
> 4.4408921e-15
>
> Ok, this is better but not correct.
> And what are the values of a?
>
> IDL> print, a
> -1.4000000 -1.2000000 -1.0000000 -0.80000000
> -0.60000000 -0.40000000 -0.20000000 2.2204460e-16
> 0.20000000 0.40000000 0.60000000 0.80000000
> 1.0000000 1.2000000 1.4000000
>
> I seem to have lost a zero somewhere, and for me this matters!!!
>
>
>
> TRIAL #3
> ========
> What if I only needed 13 numbers between -1.2 and 1.2.
> IDL> a = findgen(13)*.2 - 1.2
> IDL> print, total(a)
> 0.00000
>
> Now how can I get this to work for 15 numbers?

>
> Maybe I am missing something here, but this kind of behavior
> makes IDL a bit problematical for scientific use. With only 15
> numbers and double precision arithmetic, I can't believe this
> would fail in FORTRAN or C!
>
> --
> Andrew F. Loughe (afl@cdc.noaa.gov)
> University of Colorado, CIRES * Campus Box 449 * Boulder, CO 80309
> phone: (303) 492-0707   fax: (303) 497-7013

It get clearer when you type:

```
IDL> a=indgen(15) - 7
IDL> print,double(a*.2)
     -1.4000000      -1.2000000      -1.0000000     -0.80000001
    -0.60000002     -0.40000001     -0.20000000       0.0000000
     0.20000000      0.40000001      0.60000002      0.80000001
      1.0000000       1.2000000       1.4000000
IDL>
```

but you get:

```
IDL> print,total(double(a*.2))
      0.0000000
```

and

```
IDL> print,total(a*.2D)
  -2.2204460e-16
```

by the way,

```
IDL> a=indgen(13) - 6
IDL> print,double(a*.2)
     -1.2000000      -1.0000000     -0.80000001     -0.60000002
    -0.40000001     -0.20000000       0.0000000      0.20000000
     0.40000001      0.60000002      0.80000001       1.0000000
      1.2000000
IDL>
```

it's the multiplication, and the 'total' works with 13 elements, because the deviations cancel each other
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Regards,

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Hermann Mannstein   Tel.: +49 8153 28-2503
Institut fuer Physik der Atmosphaere   or -2558

DLR - Oberpfaffenhofen Fax.: +49 8153 28-1841
Postfach 1116 \ mailto:H.Mannstein@dlr.de
D-82230 Wessling \ 0 http://www.op.dlr.de/~pa64
Germany ________\/|________
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