
Subject: Re: Inaccuracies

Posted by [Hermann Mannstein](#) on Thu, 16 Nov 1995 08:00:00 GMT

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Andy Lough <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 -0.8000000
> -0.6000000 -0.4000000 -0.2000000 2.2204460e-16
> 0.2000000 0.4000000 0.6000000 0.8000000
> 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!
 >
 > --
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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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