Subject: Re: Inaccuracies
Posted by thompson on Wed, 15 Nov 1995 08:00:00 GMT
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Andy Loughe <afl@cdc.noaa.gov> writes:

>> L. Paul Mix wrote:
>> I'm not sure what you want to do, but expecting perfect math with
>> floats is not generally possible.

> I accept the explanation given by Ken Bowman, but it is hard to
> explain the values assigned to
> (1) findgen(15)*.2 -1.4 versus
> (2) dindgen(15)*(.2D)-(1.4D)
> (3) and, taken separately, the results of using the total function
> on (1) and (2) matched with the ability to perform "perfect math"
> with only 13 values.

> I am describing a small permutation of inaccuracies here, (1) looks ok,
> but (2) does not. total((1)) and total((2)) are not accurate for
> the reasons given by Ken.

> BTW one IDL user indicated that there was *no* trouble with this math on
> his VMS system! Now that is interesting.

I believe that I was that user. Specifically, I reported that the expected answer of 0 was seen when the calculation was done in single precision. However, the same was not true in double precision. The only thing this demonstrates is that the problems of computer round-off error shows up in different ways in VMS than on other computers, and is simply because of the difference between the VAX floating point representation and the more standard IEEE one. In other words, it's a hardware difference, not a software one.

I think the discussion of how computer round-off error manifests itself is interesting. However, it's important to remember that this has nothing to do with IDL. Round-off errors are determined solely by the floating point processing done by the CPU. It was stated earlier, without testing, that IDL was deficient in this repect relative to Fortran or C--I showed in an earlier message that this was not the case.

William Thompson