

## Re: Question about precision

**Source:** <http://coding.derkeiler.com/Archive/Fortran/comp.lang.fortran/2004-08/0717.html>

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**From:** Keith Refson – real email address in signature (*nobody\_at\_nowhere.uk*)

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Paul Van Delst <paul.vandelst@noaa.gov> writes:

> *I have code where I need to interpolate several instrument response  
> functions to the same frequency grid and begin and end  
> frequencies. The data I read in from file is at a set spacing,  
> 0.1cm<sup>-1</sup>, but after computing that value from the begin and end  
> frequency and the number of points, the value is always something like  
> 0.1000000000000002cm<sup>-1</sup>. This has caused problems since the extra  
> 0.0000000000000002 makes a test that I use to ensure the interpolation  
> is always within the actual data (extrapolation is a no-no here),  
> fail.*

Might I suggest a different approach. Your problem arises because your grid spacing of 0.1 cm<sup>-1</sup> has no exact representation in binary floating point. But the numerical value depends on the units and can be changed to suit. If your program used internal units of 0.1cm<sup>-1</sup> then the grid spacing would be 1.0 which *\*is\** exactly representable. In fact you could use integers which would eliminate representation and rounding errors entirely.

Keith Refson

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