Subject: Re: mean() function
Posted by Kenneth P. Bowman on Thu, 12 Jan 2006 17:07:00 GMT
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In article <ywkuzmm1l7bv.fsf@snowblower.colorado.edu>, savoie@nsidc.org wrote:

> "Maarten" <maarten.sneep@knmi.nl> writes:
>
>> And the reason you need that page, is in part because IDL uses the
>> moment routine described in Numerical Recipes (take total first, divide
>> later), instead of a proper running average, like the GNU scientific
>> library does.
>>
>> However, since looping is slow in IDL, you don't want to implement that
>> in IDL, so the next best thing is to have that page.

The situation to avoid is adding values with different magnitudes. That results in a loss of precision.

For example, summing a large number of values with similar magnitudes will eventually result in adding small values to large values.

There are several tricks one can use to avoid this, particularly in the case where all the values have similar magnitudes. The simplest is to assume that the mean is close to the first value. Subtract the first value from each value before accumulating, compute the mean, then add the first value back into the total. Alternatively, compute a first approximation to the mean the naive way, then recompute the mean by subtracting the approximate mean from each value before summing. This requires two passes through the data, so the tradeoff is computational time and precision.

Ken Bowman