Subject: Re: arrays in integration (qpint1d)
Posted by Craig Markwardt on Tue, 13 Nov 2012 21:42:38 GMT
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On Tuesday, November 13, 2012 1:28:16 PM UTC-5, lucylim wrote:
> Hi all,
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> I'm trying to set up an integration of spectral emission over a sphere. The problem is that the integral has to be done over longitude and latitude "theta" and "phi", but I need a spectrum to come out as a function of wavelength, "lambda". Wavelength is NOT a variable of integration -- rather, an array of wavelengths goes in and an array of fluxes as a function of wavelength comes out.
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> Right now I have this implemented as a for loop over wavelength inside which are the two nested "qpint1d" function calls. The first "qpint1d" function also has a for loop in it over "theta" to make the inner "qpint1d" call work with "theta" as a scalar. It works but as you can imagine, with nested for loops this is not very efficient.
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> I've tried to pass the wavelength through to the inner integral as a vector within the "private" structure so that instead of a vector over "phi", the inner function would return a matrix of "phi" vs. wavelength, thus eliminating the outermost for loop (over wavelength). No luck, though -- I'm just getting the error message from QPINT1D_QKEVAL about how the integrand function must return a vector of values. Is there a better way to do this?
>
> Many thanks,
> Lucy Lim
> NASA/GSFC

You should just come down the hall and ask :-)

The only vector input to your integrand function should be the variable of integration. You are right the the wavelength part will need to be done as a FOR loop. Sorry.

And yes, you will need to do an inner loop over THETA variable. The "1D" of QPINT1D is there for a reason. Sorry. Since QPINT1D does a fair amount of work per call, I don't think it would be any faster to try to "vectorize" it.

Craig