Subject: Re: GRIDDATA woes
Posted by ben.bighair on Tue, 04 Mar 2008 16:05:59 GMT
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On Mar 3, 9:24 am, "Kenneth P. Bowman" <k-bow...@null.edu> wrote:
> In article
> < 57808cc6-8454-45f1-a104-50e465ef2...@v3g2000hsc.googlegroups .com >,
>
>   "ben.bighair" <ben.bigh...@gmail.com> wrote:
>> I have seen a number of messages on the newsgroup about interpolation
>> from an irregular grid to a regular one. None appear to address the
>> issues around gridding on a sphere. I don't think I can use anything
>> as simple as INTERPOLATE since the input array is sampled at irregular
>> intervals.
>
>> So how is this kind of interpolation supposed to be done?
>
> If your grid is rectangular and separable (in the sense that all the
> longitudes in each "column" of data are the same and all of the
> latitudes in each "row" of data are same), even if the coordinates
> are not regularly spaced, then it is actually quite
> easy to interpolate to any set of points (regular or irregular) using
> INTERPOLATE. This should be much faster than triangulating.
>
> This problem looks just like the one David Fanning was working
> on recently, and here is an outline of the solution
>
>> Assuming that your data is 2-D (x = longitude and y = latitude), create
>> the grids that you want to interpolate to
>> nx = 360
>> ny = 181
>> x = FINDGEN(nx)
>> y = -90.0 + FINDGEN(ny)
>> Compute the "interpolation coordinates" from the original grid
>> j = VALUE_LOCATE(y_original, y)
>> yj = j + (y - y_original[j])/(y_original[j+1] - y_original[j])
>> Since the input and output grids are the same in the x-direction, you
>> don't need to do anything with x. Expand x and yi into 2-D arrays
>> xx = REBIN(x, nx, ny, /SAMPLE)
>> yy = REBIN(REFORM(yi, 1, ny), nx, ny, /SAMPLE)
>> Then interpolate
>> new = INTERPOLATE(original, xx, yy)
>
> By happy chance, the interpolation chapter from my book is the sample
> that is posted online here
>
>   http://idl.tamu.edu/Book.html
>

> Ken Bowman

Thanks Bill and Ken,

I had scoured the c.l.i-p archives but never used "regridding" keyword
which, in hindsight, seems the perfect keyword. The perils of keyword
searches...

The discussion on INTERPOLATE that you reference (see http://tinyurl.com/38mr7k)
is the first time I have ever "gotten" INTERPOLATE. Thank you! The
function has always felt so awkward because the units x and y are in
dimensions - it always left me feeling a little disconnected from the
physical meaning. I'll get over it.

For my purposes the INTERPOLATE method is probably just the ticket,
but I do have this lingering question about the fact that the input
values are drawn from the surface of a sphere. What are the
conditions under which I do need to worry about it? Is it the spacing
between the input values? The extend over the sphere? Some
combination?

I have read that gridding can be as much art as science, but I would
love to have some general principles that tell me when I can rely on
one more than the other.

I agree with David, Ken's book is an excellent resource. Mine is well
thumbed. Come to think of it, all my IDL books are well thumbed.

Cheers and thanks again,
Ben