
Subject: Re: Interpolating a regular grid

Posted by [David Fanning](#) on Tue, 07 Mar 2006 15:10:39 GMT

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Clive Cook writes:

> It seems that the hardest part in asking for help is knowing what to
> ask. I am not sure if my subject header actually corresponds to my
> question, however i though it was close enough.
>
> I have a regularly gridded array of data (calibration data for an
> instument) and i want to extract values from the array. The x-array is
> pressure and the y-array is temperature. The data i require does not
> match with any points in the array. For example the x-array runs from
> 70 to 1050 mb in steps of 9 mb and the x-array goes from 180-330 K ,
> how do i interpolate the array so that i could look at values which
> fall in between the regularly gridded data. So, clarifying this how
> would i extract a value which corresponded to a pressure of 700.6 mb
> and a temperature of 234.56 K.

You don't say what size your gridded array is, but I am going to assume it is a 110x150 array, so that we can get even values in pressure:

```
p = Scale_Vector(Indgen(110), 70, 1051) ; in units of 9 mb.
```

and temperature:

```
t = Scale_Vector(Indgen(150), 180, 329) ; in units of 1 deg.
```

To interpolate your gridded array, you need to know the *indices* of pressure and temperature. One way to find the proper indices is like this:

```
xindex = Value_Locate(p, 700.6)  
xindex = yindex + ((700.6 - p[yindex])/(p[yindex+1] - p[yindex]))
```

```
yindex = Value_Locate(t, 234.56)  
yindex = yindex + ((234.56 - t[yindex])/(t[yindex+1] - t[yindex]))
```

So, now, the value you are looking for is this:

```
interpValue = Interpolate(array, xindex, yindex)
```

Cheers,

David

--

David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Subject: Re: Interpolating a regular grid
Posted by [Mark Hadfield](#) on Wed, 08 Mar 2006 01:34:42 GMT
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David Fanning wrote:

```
> To interpolate your gridded array, you need to know the *indices*  
> of pressure and temperature. One way to find the proper indices  
> is like this:  
>  
> xindex = Value_Locate(p, 700.6)  
> xindex = yindex + ((700.6 - p[yindex])/(p[yindex+1] - p[yindex]))  
>  
> yindex = Value_Locate(t, 234.56)  
> yindex = yindex + ((234.56 - t[yindex])/(t[yindex+1] - t[yindex]))  
>  
> So, now, the value you are looking for is this:  
>  
> interpValue = Interpolate(array, xindex, yindex)
```

For what it's worth, the Motley library at

<http://www.dfanning.com/hadfield/idl/README.html>

has a function called MGH_LOCATE which will calculate one or more "fractional index" values in the way you have shown. It also has cousins MGH_LOCATE2 & MGH_LOCATE2A that do the same thing for 2-D curvilinear arrays.

Note to self: I must update that library.

--

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