
Subject: Re: Reverse interpolation?

Posted by [Craig Markwardt](#) on Wed, 16 Aug 2000 07:00:00 GMT

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Martin Schultz <martin.schultz@dkrz.de> writes:

> Simon de Vet wrote:

...

>> I want to get better results. Instead of finding that entry #5 is the
>> closest match to my known altitude, and using #5 as the subscript in my
>> data array, I'd like to find that, based on a linear interpolation,
>> entry #5.32850 is an exact match, and using this value in an
>> interpolation on my data array.

>>

>> I understand how to use a subscript to find an interpolated value. How
>> would I go in the opposite direction, using a value to find a subscript?

>>

>> Thanks. I hope this isn't too confusing. I'm having a bad brane day.

>>

>> Simon

>

>

> Hi Simon,

>

> I have dealt with similar problems (vertical regridding, to
> give the kid a name), and I tend to resort on the spline routine
> in these instances. Please find attached a piece of code that I
> used to vertically regrid OH concentration fields. Just be
> careful about end effects. For this application I overwrote the
> topmostfour levels of the target grid with the values from the
> top level of the old grid.

>

...

> newxx = Spline(oldy, oldx, newy, 5.)

...

If you are trying to match a lot of values, then I agree that the spline interpolation is one of the best solutions. However, I have had bad experiences with the SPLINE function. It tends to have problems when the points are too far apart, and it's also pretty slow. I found the Numerical Recipes version of spline interpolation to be much better (built in functions SPL_INTERP and SPL_INIT).

If v1 is vector of values sampled at original altitudes a1, and you want to resample at new altitudes a2, then you do something like this:

```
v2 = spl_interp(a1, v1, spl_init(a1, v1), a2)
```

Now v2 has the newly sampled values. In principle a2 can be one value so even if you want a single value the spline interpolation can be useful, and even pretty fast.

IDL version 5.3 apparently has a new function called VALUE Locate which can do fast search of a reference array. From there you can do a linear interpolation. The IDL Astronomy Library procedure called TABINV may do what you want. The versions that use VALUE Locate and don't use it are here, and here, respectively:

<http://idlastro.gsfc.nasa.gov/ftp/v53/tabinv.pro>
<http://idlastro.gsfc.nasa.gov/ftp/pro/math/tabinv.pro>

Craig

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Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response
