Subject: Re: Reverse interpolation? Posted by Craig Markwardt on Wed, 16 Aug 2000 07:00:00 GMT View Forum Message <> Reply to Message

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
Craig B. Markwardt, Ph.D. EMAIL: craigmnet@cow.physics.wisc.edu Astrophysics, IDL, Finance, Derivatives   Remove "net" for better response