Subject: Re: how to extend a vector from size A to size B, (A<B) without "damage" the data in A
Posted by Tito on Thu, 08 Mar 2012 23:42:10 GMT
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Dear David,
Dear Craig,

First of all I want to thank you both for your answers!

David, the "congrid" function did exactly what I wanted! Thank you very much for the tip!

However, another problem just rise and this lead to my answer to Craig....

First let me explain my set up and then I will discus my constrains about the "congrid" function.

I have "A" vector which I use for synthetic mask spectrum, witch I will cross-correlate with my science spectra in order to determine the RV signal.
This "A" vector is actually extracted from the HITRAN catalog (atmosphere absorption line database) for the $CO2$ molecule in the IR. Actually this is teluric lines witch in other hand also present on my science spectra.

So I just extracted all the $CO2$ line in range from 6222 to 6248 cm^-1 for example. I convert them to wavelengths and it turn out that in this range I have around 970 $CO2$ lines, BUT only 20 of them are the sharp and deep lines that I need (the telluric). So this "A" 970 array vector is indeed made on a different grid then the "B" vector. from this 970 element vector I am interested only in about 20 of the lines. The others are noise or very faint lines in that I don't care but I take them in order to represent my experiment more accurate.

The "B" vector is the spectra from the 1024 pixel IR detector so it has 1024 elements.

I want to cross-correlate A and B. that means I have to "extend" the A vector to 1024 elements with out harm the relative distances between those 20 lines. in other words I need to increase the resolution of this vector without damage the intensity of the lines... interpol(A) just make the plot look very different from the original.

Craig, now I can see that you are right...
Vector B extracted from the spectrograph is probably irregular in the sense that the wavelength solution from pixel 1 to pixel 1024 is not linear witch is not the case for the intensity and wavelength base extracted from HITRAN. There the teluric lines are equidistant all over the array for A and for the B vector the may vary a bit over the array on the wave length solution from the pipeline .
In order to cross-correlate correctly two of the vectors B and the expanded A must be on the same grid is that right?

I have to do the same for the stellar lines synthetic template mask, but ones I am done with this I will do it much more easy!

As I can see in "interpol" program is written "....Linearly interpolate vectors with a regular or IRREGULAR grid."

Witch I am not sure "congrid" does.
However I have to experiment....

At last I need a function that will keep the nice shape the intensity lines like "congrid" and to be capable to "interpolate" in irregular grids so I can put in the end the two vectors in the same wavelength or pixel grid and to cross-correlate them.

I really hope I was clear.... I will experiment with "congrid" and also with you suggestions Craig...

I hope I will find the answer of my problems alone, but more help is always welcome and appreciate.

All the best,
Tito