Subject: Interpolation to conserve integrated flux
Posted by jdshaw on Sun, 30 May 2010 01:13:43 GMT
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Hi all,

I am hoping someone out there can help me with this.

I am looking to combine spectra such that the integrated flux between any arbitrary set of points is conserved.

Consider a set of two equal length float arrays, one containing wavelength values (call this x1, x2, x3, ...) and one containing flux values (call these y1, y2, y3,...). So that y1 goes with x1 and y2 goes with x2, and so on.

Unfortunately, the wavelength arrays (x1, x2, x3, ...) have similar values but not the same, e.g.:

x1 = [3212.7, 3215.1, 3217.5, 3219.9, ...]
x2 = [3213.1, 3215.4, 3217.7, 3220.0, ...]

What I want to do is combine x1 and x2 to x_comb and y1 and y2 to y_comb such that if one were to sum between two wavelengths the in the new arrays (x_comb and y_comb) you would get the same as doing them in the original (x1,y1 and x2,y2) and adding the results. That is, if I need to sum up values in y when x is between 3214.0 and 3219.0. For x1, I would linearly interpolate the values in y1 for the two wavelengths and sum under the curve. I then do the same for x2 and y2. I can already do this - that part is simple. What I want to do is have new arrays x_comb and y_comb such that I can do the same sum across such that the same (summed region in y1) + (summed region in y2) = (summed region in y_comb).

Is there an algorithm that anyone knows that will do this?

Or, as an intermediate step, is there a way interpolate the values in x2 to x1, and y2 to an new set of values (y2_new) that keeps the sums of y2 and y2_new the same between any two arbitray points (as described above)?

Thanks - John.