Subject: Re: negative return values after FFT
Posted by James Kuyper on Fri, 28 Jul 2006 12:15:19 GMT
View Forum Message <> Reply to Message

adisn123@yahoo.com wrote:
> The returned (inversely fourier transformed) values are in a complex
> number format, but
> I realized that those imaginary parts are very small, almost close to
> zero with ~10^-8 floating
> point.

OK, that's a normal consequence of the fact that all floating point mathematics have a certain inherent inaccuracy. Values that mathematically should be exactly 0 come out numerically as "almost" 0; it's unfortunately unavoidable. In that case extracting the real component and ignoring the imaginary components is the appropriate solution.

...
> I have another question related to the returned values.
>
> How do I interpret the "negative" spacial pixel values after inverse
> FFT?

If your unfiltered image frequently goes close to zero, filtiering it is likely to cause it to sometimes go negative. That's because each component in the frequency domain represents a function in the spatial domain that oscilates between positive and negative values. No matter how you change the value of a frequency component, either by increasing it or by decreasing it, you'll be increasing the image in some locations, and decreasing it somewhere else. If you're unlucky enough, the places where it decreases the image brightness might be places where the brightness is already so low that the changes made by the filter make it go negative.

If you're sure your filter implements what you want it to implement, I'd recommend treating the negative pixels as zeros. However, if you ever decide to rebin the data to a lower resolution, use the original values, including the negatives - don't replace the negative values with zeros until after re-binning, because otherwise you'll be creating a systematic bias, making the darkest parts of your image slightly brighter than they should be.