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Subject: Butterworth Filtering and Inverse FFT problems

Posted by [jefield](#) on Wed, 22 Jan 2003 14:27:28 GMT

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Hi,

I'd be \*very\* grateful if anyone could help me on this. I am trying to apply a high-pass Butterworth filter to some data and am encountering a couple of problems.

My original data set is so large (~100,000 points), and so dominated by the low-frequency component which I'm trying to remove, that the FFT just looks (at initial magnification) like a couple of spikes at either end of a flat line at  $y=0$ . In order to make the frequency components a bit easier to recognise, I have created a 100-element array which comprises the first 50 and last 50 elements of the FFT array and have applied the Butterworth filter to that. I have then replaced the first 50 and last 50 values of the FFT array with these new values. HOWEVER - when I then take an inverse FFT of the filtered array, the range of values I see is tiny compared with the range present if I simply inverse-FFT the filtered 100-element array. Surely adding in all those extra frequency components would increase the range of values?

My other problem is that in both cases, the final array is (approximately) symmetrical about a vertical line at the centre of the plot, while the original array certainly isn't! Presumably this is something to do with positive/negative frequencies and/or real/imaginary components?

I'm sure that I'm missing something really simple here so please excuse my ignorance. I'm new to DSP, new to IDL and my university physics has become very rusty!

Thanks very much!

Best wishes,

Julian

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Subject: Re: Butterworth Filtering and Inverse FFT problems

Posted by [condor](#) on Thu, 30 Jan 2003 22:22:49 GMT

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jefield@taz.qinetiq.com (Julian Field) wrote in message  
news:<7126861e.0301220627.59052151@posting.google.com>...

- > My other problem is that in both cases, the final array is
- > (approximately) symmetrical about a vertical line at the centre of the
- > plot, while the original array certainly isn't! Presumably this is
- > something to do with positive/negative frequencies and/or
- > real/imaginary components?

I \*think\* you're looking for this:

[http://airs2.ssec.wisc.edu/~paulv/fft/fft\\_comparison.html](http://airs2.ssec.wisc.edu/~paulv/fft/fft_comparison.html)

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