Subject: Re: Inverse FFT
Posted by jeyadev on Mon, 16 Dec 2002 23:56:24 GMT
View Forum Message <> Reply to Message

In article <3DFE131D.6000005@noemail.now>,
R.G. Stockwell <sorry@noemail.now> wrote:
> Colin Ault wrote:
>
>> Hi,
>>
>> I hope someone help me with a problem I am having with the FFT
>> function.
>>
>> I have a signal f_t, which I then take the FFT of to produce its
>> corresponding spectral components. I then want to manually compute its
>> inverse FT, rather than using the IDL FFT(.../inverse) function.
>>
>> The reason for this is that I want each spectral component to
>> propogate at different velocitys over a time period t. Hence, when the
>> signal is recombined t seconds later, the signal *should* look
>> different.

This is quite all right. Consider the problem of the continuity in one
dimension

$$dq/dt + K\, dE/dx = 0$$

where q(x,t) and E(x,t) are functions of both variables of 'x' and 't'
and the derivatives are partials. Also the driving field E(x,t) is a
linear function of q(x,t) in the sense that

$$E(x,t) = \text{Integral}[q(x,t)P(x), x]$$

The solution is obtained exactly as you say. Taking the Fourier
Transform of the entire equation respect to 'x' separates the problem in
'k' space and each 'k' component q(k,t) propagages with a time constant
that depends on 'k', i.e. you get something like

$$dq(k,t)/dt + q(k,t)/a(k) = 0$$

where a(k) is the 'k' dependent time constant.

To solve this, you proceed exactly as you did. Just make sure that
you put the right flag for the reverse transform.

>> I am not having much luck at the moment, so any suggestions on this
>> problem will be gratefully received.

One thing that you should check is whether you are packing the arrays for the transform in the correct fashion. One of the most common mistakes is the treatment of the negative frequencies. (I myself have been guilty of messing them up!) As you are in IDL, it is easy to check and see if they are as expected.

Good luck.
--

Surendar Jeyadev jeyadev@wrc.xerox.bounceback.com

Remove 'bounceback' for email address
