Subject: Re: FFT confusion
Posted by kapoorconsciousness on Sat, 05 Aug 2017 22:13:01 GMT
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Same issue, this chirp peaks at omega0 and omega0 + 2 * chirprate rather then just omega0 + chirprate, have you figured it out why yet?

On Monday, May 19, 2003 at 5:46:19 PM UTC+2, Julian Field wrote:
> Kenneth Bowman <k-bowman@null.tamu.edu> wrote in message news:<k-bowman-FF6825.10385215052003@news.tamu.edu>...
>> In article <7126861e.0305150615.29c97045@posting.google.com>,
>> jefield@taz.qinetiq.com (Julian Field) wrote:
>>
>>> Hi,
>>>
>>> I'd be enormously grateful if anyone could help me with this.
>>>
>>> I'm looking at the power spectra of "chirp" radio signals and am
>>> having problems getting sensible plots. The following code should
>>> generate a complex sinusoidal chirp whose frequency runs from 100 to
>>> 150 Hz and then plot its power spectrum:
>>>
>>> However I'm getting a frequency spectrum running from 100 to *200* Hz
>>> and I'm really confused. This problem has been bugging me for ages and
>>> I'd be very grateful if anyone could point out my mistake(s).
>>
>> Your signal is not a linear combination of frequencies between 100 and
>> 150 Hz. If it were you would get something like this.
>>
>> pro spec
>> time = (2.0/1000)*findgen(1001) ; time (s). NB 1001 samples in 2s
>> ; so sampling freq is 500 Hz thus
>> ; Nyquist freq is 250 Hz
>> i = complex(0,1)
>>
>> freq1 = REPLICATE(100.0, 1001) ; single frequency #1
>> freq2 = REPLICATE(150.0, 1001) ; single frequency #2
>>
>> theta1 = 2*!pi*freq1*time ; chirp phase angle
>> theta2 = 2*!pi*freq2*time ; chirp phase angle
>> signal = exp(i*theta1) + exp(i*theta2)
>>
>> neg_freq_axis = reverse(-((250.0/500)*findgen(501)))
>> pos_freq_axis = ((250.0/499)*findgen(500)) + 1.0
>> freq_axis = [neg_freq_axis,pos_freq_axis] ; x-axis for plot
>>
>> window,2,xsize=500,ysize=250
>> plot,freq_axis,alog10(shift(((abs(fft(signal)))^2),500)),$

>>   xrange=[0,260],$
>>   /xstyle,$
>>   xticklen=1,$
>>   xgridstyle=1,$
>>   yticklen=1,$
>>   ygridstyle=1
>>
>> end
>>
>> Even in this case you do not get perfect delta-function spikes in the
>> power spectrum due to finite signal length and sampling.
>>
>> To construct your frequency-swept chirp, you have to use frequencies
>> over a larger range than the "pure" frequencies contained in your signal.
>>
>> Ken Bowman
>
> Thank you very much for your help.
>
> Best wishes,
>
> Julian
