Subject: Re: time vs longitude FFT
Posted by knielsen73 on Mon, 29 Oct 2007 21:14:29 GMT
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On Oct 29, 2:41 pm, "R.G. Stockwell" <noem...@please.com> wrote:
> <knielse...@gmail.com> wrote in message
>
> news:1193671433.271745.268030@57g2000hsv.googlegroups.com...
>
>> Hi,
>
>> I have a time vs longitude plot and would like to do a 2-D FFT to get
>> a frequency vs wavenumber plot. I used the IDL FFT but I am not sure
>> what the output is...I didn't feel the IDL help was very helpful
>> there. I found a post from 1998 but there were some non-defined
>> functions and I wasn't exactly sure what they did.
>
>> Does anybody have a good example on how to use 2D FFT in IDL or some
>> good documentation?
>
> a little example:nx = 100
> ny = 200
> x = (fltarr(ny)+1) ## findgen(nx)
> y = findgen(ny) ## (fltarr(nx)+1)
> kx = 20.5/nx
> ky = 0./ny
>
> ;image
> a =cos(2*!pi*(kx*x + ky*y))
>
> ;spectrum in 2d
> spe = fft(a)
>
> kxvalues = findgen(nx)/nx - 1./2
> kyvalues = findgen(ny)/ny - 1./2
>
> !p.multi=[0,1,2]
> contour,a,/fill,nlevels=14
>
> ; shift to get the normal representation,
> ; i.e. (neg kx, 0, pos kx)
> shiftspe = shift(spe,nx/2,ny/2)
>
> contour,abs(shiftspe),kxvalues,kyvalues,/fill,nlevels=14
>
> Note: it is symmetric about the origin.
>
> Cheers,

> bob

Thanks Bob,

I works great with your example. However, when I made a wave with a wavenumber larger than 1, the scale no longer agrees. I can plot it "raw", but again, not sure how to read the values with respect to the real wave number and frequency. Here is the wave I gave as input.

```
 ;input a wave number two with an amplitude of 10.
    ;and eastward phase propagation of 1.7 days

    amp = 10.
    wave_number = 2
    wavelength = float(jmax)/wave_number
    period = 6.8333333

    for j=0,jmax-1 do begin
     for n=0,nmax-1 do begin
     data_in[j,n] = amp*sin(2.*!pi*j/wavelength - 2.*!pi*n/period) +$
      amp*.5*cos(2.*!pi*j/wavelength - 2.*!pi*n/period)
 endfor
    endfor
```

Cheers,
Kim
