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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

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