Subject: possible bug with center keyword option for FFT
Posted by astroboy2k on Fri, 11 Feb 2011 17:58:18 GMT
View Forum Message <> Reply to Message

Hello,

I sent the following to ittvis support, but I was wondering if anyone has an insights into this. Basically, setting the center keyword for FFT() gives an output that is shifted incorrectly. I'm doing some really perverse stuff where it's really important to be sure what frequency(angle) an output element from FFT() corresponds to....

Thanks,

Mark

Hello,

I've been looking at the output from the IDL FFT function and I have two things to ask about

1: It would be nice for the function to return the angles/frequencies (ie, zero to 2*pi, or -pi to pi, say) corresponding to the coefficients. There's a formula given for that in the documentation, but I'd feel better if IDL supplied that information, especially considering my second point.

2: According to the documentation, with the center keyword off in FFT(), element(0) is the FFT coefficient for the zero frequency. With the keyword center set, this coefficient is shifted to the 'center' of the array. This is a little ambiguous, especially when an array might have an even or odd number of points in a dimension.

From what I can tell, FFT(/center) isn't working quite as advertised. Here's a code snippet:

```
box=fltarr(8)
box(0:1)=1.
box(6:7)=1.

ff=fft(box,-1)
ff_cent=fft(box,-1,/cent)

ff=float(ff)
ff_cent=float(ff_cent)

;printing the angles/frequencies and ff and ff_cent coefficients I
```

get:

```
 CENTER KEYWORD = 0  CENTER KEYWORD SET
   ANGLE FFT COEFF     ANGLE FFT_COEFF
      0       0   0.75000        0   0.03661
      1      45   0.21339       45   0.00000
      2      90  -0.12500       90   0.03661
      3     135   0.03661      135  -0.12500
      4     180   0.00000      180   0.21339
      5    -135   0.03661      225   0.75000
      6     -90  -0.12500      270   0.21339
      7     -45   0.21339      315  -0.12500
```

For ff, the zero frequency point is .75. However, in ff_cent it appears at index=5. Shouldn't it be at index=4? That is, a shift of 180 degrees?

FFT(arr, 1, /center) seems to work OK, if arr is the output from FFT(arr0,-1,/center), of course.
