Subject: IDL FFT (spec -> interferogram)
Posted by Randall Skelton on Thu, 04 Apr 2002 15:27:40 GMT
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Hi all,

Having read through all of the FFT posts that google groups keeps, I am no closer to understanding why I am unable to transform a spectrum into an interferogram using IDL. All of the data files, procedures, and pictures of this are at http://tulip.atm.ox.ac.uk/~rhskelto/fft-help/

Given two files:

1) 'spec.dat' contains 512 points of complex spectral data

2) 'igm.dat' contains 512 points of complex interferogram data that was derived from 'spec.dat' using a prime factor FFT written in C. This is the correct interferogram as far as I am concerned. The plot

Read in the data:

```
IDL> spec = dcomplexarr(512)
IDL> read_cmplx, 'spec.dat', spec
IDL> igm = dcomplexarr(512)
IDL> read_cmplx, 'igm.dat', igm
```

Plot the expected result:

```
IDL> plot, igm
IDL> write_jpeg,'igm.jpg',tvrd()
```

Do the Fourier Transform in IDL (based on Paul van Delst's examples):

```
IDL> spec2 = temporary( [ spec, reverse( spec[ 1: n_elements(spec) - 2 ] ) ] )
IDL> idl_igm = fft(temporary(spec2), /double, /inverse)
IDL> idl_igm = shift(idl_igm, -1 * (n_elements(spec)-1))
```

Plot the IDL result:

```
IDL> plot, idl_igm
IDL> write_jpeg, 'idl_igm.jpg', tvrd()
```

The result 'idl_igm' contains twice the number of points (minus 2) because of the required reflection about the Nyquist frequency. Moreover, the result appears to be modulated (almost like a frequency chirp)? I recall having a similar problem with a 2pi phase-wrapping in MathCad a number of years ago that gave similar results but I cannot

remember how to fix it. I also cannot seem to reproduce the AIRS interferograms shown on Paul's site...

My question is, how do I get the desired result (i.e. 'igm.jpg') in IDL?

Cheers,
Randall

IDL Version 5.3, Linux RH 7.1
