
Subject: Re: IDL FFT vs MATLAB FFT

Posted by [Paul Van Delst\[1\]](#) on Tue, 08 Oct 2002 17:56:56 GMT

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Randall Skelton wrote:

>

> Argh.... it is a bad day when I need to sort out both Matlab's and IDL's

> FFT functions...

Yes, but once you do you'll sleep better.... :o)

> Assuming that, IDL's FFT function uses a one-sided format, and divides

> by N on the forward transform and MATLAB's FFT function uses a

> one-sided format and divides by N on the inverse transform, I still am

> having difficulty comparing the FFT results from each.

>

> In Matlab:

>

>>> fft(eye(4))

>

> ans =

> 1.0000 1.0000 1.0000 1.0000

> 1.0000 0 - 1.0000i -1.0000 0 + 1.0000i

> 1.0000 -1.0000 1.0000 -1.0000

> 1.0000 0 + 1.0000i -1.0000 0 - 1.0000i

>

> IDL> print, 4*fft(identity(4),/double)

> (1.0000000,0.0000000) (0.0000000, 0.0000000) (0.0000000,0.0000000) (0.0000000,
0.0000000)

> (0.0000000,0.0000000) (0.0000000,-3.0628711e-17) (0.0000000,0.0000000)

(1.0000000,3.0628711e-17)

> (0.0000000,0.0000000) (0.0000000, 0.0000000) (1.0000000,0.0000000) (0.0000000,
0.0000000)

> (0.0000000,0.0000000) (1.0000000,-3.0628711e-17) (0.0000000,0.0000000)

(0.0000000,3.0628711e-17)

>

> Can someone please explain how and why these are different?

Weird. Here's wot I did:

IDL> x=identity(4)

IDL> print, x

1.00000 0.00000 0.00000 0.00000

0.00000 1.00000 0.00000 0.00000

0.00000 0.00000 1.00000 0.00000

0.00000 0.00000 0.00000 1.00000

IDL> xi=complexarr(4,4)

IDL> for i=0,3 do xi[* ,i]=fft(x[* ,i],/double)

```
IDL> print, 4.0*xi
( 1.00000, 0.00000)( 1.00000, 0.00000)( 1.00000, 0.00000)( 1.00000,
0.00000)
( 1.00000, 0.00000)( -6.12574e-17, -1.00000)( -1.00000, -0.00000)( -6.12574e-17,
1.00000)
( 1.00000, 0.00000)( -1.00000, -0.00000)( 1.00000, 0.00000)( -1.00000,
0.00000)
( 1.00000, 0.00000)( 6.12574e-17, 1.00000)( -1.00000, -0.00000)( 6.12574e-17,
-1.00000)
```

Looks the same as the matlab one now (assuming $6.12574e-17 == 0.0$). There are no words in the IDL fft docs about what is done when the input array is not a vector.

I think the matlab result is the correct one (based on my image processing class from 1987...ehem.)

cheers,

paulv

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