
Subject: Re: dissapointing fftw
Posted by [b_gom](#) on Tue, 10 Feb 2004 18:56:36 GMT
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Bob,

I share some of your disapointment, but I don't have Matlab speeds to compare to. The speed of FFTW does rely heavily on the plan, and for some jobs it is just as well to stick with the IDL FT. I suspect the speed advantage will vary quite a bit with the data and hardware at hand.

Here's a plot of a quick test on my machine, using the `fftw_one` function and IDL's FT function on a complex array of various lengths:
<http://people.uleth.ca/~brad.gom/fftw/new-3.png>

Here's the actual times as a function of length. Red is the FFTW.
<http://people.uleth.ca/~brad.gom/fftw/new-1.png>

Arrays less than 2^{16} are faster in IDL.
These data sets were all powers of 2 in length, and the trends will be different for non power of two lengths. For example, here are the results for arrays of $(2^n)+1$ in length:

<http://people.uleth.ca/~brad.gom/fftw/new-4.png>
<http://people.uleth.ca/~brad.gom/fftw/new-5.png>

and for all lengths between 10 and 110:

<http://people.uleth.ca/~brad.gom/fftw/new-6.png>
<http://people.uleth.ca/~brad.gom/fftw/new-6.png>

I haven't dug into my DLM to see where time is being wasted, but it seems as though you still have to carefully consider the size of data going into your FT routine if you want the best performance, no matter which routine you use..

Brad

"R.G. Stockwell" <noemail@please.com> wrote in message
news:<[snRUb.22\\$an2.31659@news.uswest.net](mailto:snRUb.22$an2.31659@news.uswest.net)>...

> Hi all,
> there has been discussions about using fftw in idl through
> external calls recently. Our wonderful SA set it up here,
> and unfortunately the results are a bit dissapointing.
>
> The results:
> 1) there is a step where the fftw algorithm creates a "wisdom" file

> to determine which algorithm is ideal for the given situations
> (depending on length, dimension, variable type, processor, etc.).
> This can be very time consuming, and since it depends on the length
> of the data, it is not very general at all. (perhaps minutes to determine
> wisdom when using the exhaustive search).
> This only needs to be done once (but has to be redone if the length
> of the data changes). There is also a small delay in loading the dlm and
> reading the file, but this is only done once when you start idl.
>
> 2) fftw is slightly slower than IDL fft for some complex 1D time series, slightly
> faster for some complex data. I initially found fftw to be slower, but later tests
> showed it faster, see below.
> 3) fftw is slightly faster than IDL fft for real 1D time series (fftw
> only calculates the positive 1/2 of the spectrum)
> 4) fftw is much (~8) times faster for 2D ffts of real data
> (again fftw calcs only 1/2 the spectrum).
>
> So, imho, use fftw when ffting 2D real-valued images (especially if
> they are the same size). I.E. it is ideal for ffting data from a CCD for instance.
>
> For general fft-ing of general time series (various length), might as
> well stick with IDL fft.
>
> This is disappointing that the fftw is so slow in idl (my guess because of
> the overhead of the external call). When I compare IDL fft to matlab fft
> (which internally uses fftw), matlab smokes idl, almost an order of magnitude
> faster.
>
>
> More detailed results follow.
>
> Cheers,
> bob
>
>
>
> float:
> Elapsed time for /exhaustive = 4832.5616
> SPEW COMPLEX = Array[524289]
> SPEIDL COMPLEX = Array[1048576]
> FFTW: 0.36619304
> IDL fft: 0.53575690
> float,nthreads=2:
> Elapsed time for /exhaustive = 22502.406
> SPEW COMPLEX = Array[524289]
> SPEIDL COMPLEX = Array[1048576]
> FFTW: 0.48127429
> IDL fft: 0.68620352

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> /destroy:
> Elapsed time for /exhaustive =    5364.2469
> SPEW      COMPLEX = Array[524289]
> SPEIDL    COMPLEX = Array[1048576]
> FFTW:     0.36528679
> IDL fft:  0.54512086
> float 2d:
> Elapsed time for /exhaustive =    195.64079
> SPEW      COMPLEX = Array[513, 1024]
> SPEIDL    COMPLEX = Array[1024, 1024]
> FFTW:     0.060319290
> IDL fft:  0.50715707
> float 2d,nthreads=2:
> Elapsed time for /exhaustive =    616.68032
> SPEW      COMPLEX = Array[513, 1024]
> SPEIDL    COMPLEX = Array[1024, 1024]
> FFTW:     0.069700079
> IDL fft:  0.50730018
> float 2d,/destroy:
> Elapsed time for /exhaustive =    196.30516
> SPEW      COMPLEX = Array[513, 1024]
> SPEIDL    COMPLEX = Array[1024, 1024]
> FFTW:     0.073251941
> IDL fft:  0.50794953
> double:
> Elapsed time for /exhaustive =    7275.4535
> SPEW      DCOMPLEX = Array[524289]
> SPEIDL    DCOMPLEX = Array[1048576]
> FFTW:     0.28960719
> IDL fft:  0.73290416
>
> /estimate:
> float:
> % Compiled module: COMPARE_FFT.
> % Loaded DLM: FFTW.
> % FFTW: Imported wisdom from file.
> Elapsed time for wisdom =    0.48689103
> SPEW      COMPLEX = Array[524289]
> SPEIDL    COMPLEX = Array[1048576]
> FFTW:     0.48639197
> IDL fft:  0.53754315
> /destroy:
> Elapsed time for wisdom =    0.49383688
> SPEW      COMPLEX = Array[524289]
> SPEIDL    COMPLEX = Array[1048576]
> FFTW:     0.48593453
> IDL fft:  0.53892898
> % Compiled module: DIST.

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> float 2d:
> Elapsed time for wisdom =      1.1336241
> SPEW      COMPLEX = Array[513, 1024]
> SPEIDL     COMPLEX = Array[1024, 1024]
> FFTW:      0.10067668
> IDL fft:    0.49136082
> float 2d,/destroy:
> Elapsed time for wisdom =      1.0966880
> SPEW      COMPLEX = Array[513, 1024]
> SPEIDL     COMPLEX = Array[1024, 1024]
> FFTW:      0.086122580
> IDL fft:    0.49067524
> double:
> % FFTW: Can't read wisdom file.
> Elapsed time for wisdom =      162.97562
> SPEW      DCOMPLEX = Array[524289]
> SPEIDL     DCOMPLEX = Array[1048576]
> FFTW:      0.57721099
> IDL fft:    0.66078199
> /destroy:
> Elapsed time for wisdom =      163.17508
> SPEW      DCOMPLEX = Array[524289]
> SPEIDL     DCOMPLEX = Array[1048576]
> FFTW:      0.57687245
> IDL fft:    0.66050471
> double 2d:
> Elapsed time for wisdom =      1.3941269
> SPEW      DCOMPLEX = Array[513, 1024]
> SPEIDL     DCOMPLEX = Array[1024, 1024]
> FFTW:      0.12435352
> IDL fft:    0.61359194
> double 2d,/destroy:
> Elapsed time for wisdom =      1.3879058
> SPEW      DCOMPLEX = Array[513, 1024]
> SPEIDL     DCOMPLEX = Array[1024, 1024]
> FFTW:      0.11186049
> IDL fft:    0.61340666
> complex:
> Elapsed time for wisdom =      164.32227
> SPEW      DCOMPLEX = Array[1048576]
> SPEIDL     COMPLEX = Array[1048576]
> FFTW:      0.70433186
> IDL fft:    1.0169743
> /destroy:
> Elapsed time for wisdom =      163.18478
> SPEW      DCOMPLEX = Array[1048576]
> SPEIDL     COMPLEX = Array[1048576]
> FFTW:      0.70836432

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> IDL fft:      1.0172801
> complex 2d:
> Elapsed time for wisdom =      1.9998610
> SPEW          DCOMPLEX = Array[1024, 1024]
> SPEIDL        COMPLEX  = Array[1024, 1024]
> FFTW:         0.22408933
> IDL fft:      0.94814202
> complex 2d,/destroy:
> Elapsed time for wisdom =      1.9922080
> SPEW          DCOMPLEX = Array[1024, 1024]
> SPEIDL        COMPLEX  = Array[1024, 1024]
> FFTW:         0.21766154
> IDL fft:      0.94665491
> dcomplex:
> Elapsed time for wisdom =      278.01961
> SPEW          DCOMPLEX = Array[1048576]
> SPEIDL        DCOMPLEX = Array[1048576]
> FFTW:         0.86303161
> IDL fft:      1.2512911
> /destroy:
> Elapsed time for wisdom =      278.62218
> SPEW          DCOMPLEX = Array[1048576]
> SPEIDL        DCOMPLEX = Array[1048576]
> FFTW:         0.85589477
> IDL fft:      1.2513304
> dcomplex 2d:
> Elapsed time for wisdom =      2.5013170
> SPEW          DCOMPLEX = Array[1024, 1024]
> SPEIDL        DCOMPLEX = Array[1024, 1024]
> FFTW:         0.29264280
> IDL fft:      1.2062091
> dcomplex 2d,/destroy:
> Elapsed time for wisdom =      2.5212729
> SPEW          DCOMPLEX = Array[1024, 1024]
> SPEIDL        DCOMPLEX = Array[1024, 1024]
> FFTW:         0.29645642
> IDL fft:      1.2053123
```
