Subject: computation time for convolution
Posted by fra on Wed, 09 Jul 2014 08:12:30 GMT
View Forum Message <> Reply to Message

I am a little puzzled about the computation time required by different convolution routines. I need to compute several times the convolution of large arrays and I always used the convolve routine of the astrolib. Since I need to speed up the processing I compared the computation time for array of different size (but using sizes power of 2, which should be the best case for FFT) convolved with different routines. The best result (by far) is obtained with the function convol of the IDL standard library, the worst is convol_fft and convolve is somewhat in the middle. This does not make sense to me, I was sure that the FFT approach is the fastest. What am I missing or doing wrong?

These are the results:

```
          4x          4
convolve:     0.038000107
convol:       0.00000000
convol_fft:   0.00099992752
          8x          8
convolve:      0.00000000
convol:       0.00000000
convol_fft:       0.00000000
         16x         16
convolve:      0.00000000
convol:       0.00000000
convol_fft:       0.00000000
         32x         32
convolve:      0.00000000
convol:       0.00000000
convol_fft:    0.0010001659
         64x         64
convolve:      0.00000000
convol:       0.00000000
convol_fft:    0.0019998550
        128x        128
convolve:   0.00099992752
convol:    0.0010001659
convol_fft:    0.0079998970
        256x        256
convolve:    0.0080001354
convol:    0.0019998550
convol_fft:     0.035000086
        512x        512
convolve:     0.036000013
convol:    0.0069999695
convol_fft:       0.28600001
       1024x       1024
convolve:       0.25300002
```

```
convol:     0.026999950
convol_fft:       1.4849999
        2048x        2048
convolve:       1.6410000
convol:      0.11600018
convol_fft:       6.6910000
        4096x        4096
convolve:       7.4190001
convol:      0.43299985
convol_fft:       26.736000
```

and this is the code I used for this test:

```
for i=2,12 do begin
  a=fltarr(2l^i,2l^i)
  b=a
  time0=systime(1)
  c=convolve(a,b)
  time1=systime(1)
  c=convol(a,b)
  time2=systime(1)
  c=convol_fft(a,b)
  time3=systime(1)
  print,2l^i,'x',2l^i
  print,'convolve:', time1-time0
  print,'convol:', time2-time1
  print,'convol_fft:', time3-time2
endfor
```