
Subject: Re: large matrix operations

Posted by [Vince Hradil](#) on Mon, 13 Oct 2008 17:07:47 GMT

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On Oct 13, 11:00 am, Vince Hradil <vincehra...@gmail.com> wrote:

> On Oct 13, 10:08 am, Vince Hradil <vincehra...@gmail.com> wrote:

>

>> On Oct 13, 9:44 am, arp...@gmail.com wrote:

>

>>> It seems that very large matrix, e.g. $1.0e6 \times 1.0e5 \times 100$ operations, such

>>> as multiplication and matrix multiplication, in IDL is very slow.

>>> Anyone know how to speed up large matrix operations ?

>

>> Multiplication should be pretty fast. Matrix multiplication can be

>> slow if you have to transpose the matrices. This can be sped up by

>> using `MatrixMultiply()` instead of `#` or `##`. Perhaps `Temporary()` can be

>> used to avoid allocation of extra memory. I think David has the best

>> ideas, though.

>

> oops, that should be `MATRIX_MULTIPY()`

So much for that theory...

Hardware:

IDL> print, !version

{ x86 Win32 Windows Microsoft Windows 7.0 Oct 25 2007 32 64 }

Results:

% TEST: Allocating A array

% TEST: took 0.14000010 sec

% TEST: Allocating B array

% TEST: took 0.21899986 sec

% TEST: A#B

% TEST: took 40.878000 sec

% TEST: `matrix_multiply(A,B)`

% TEST: took 42.284000 sec

% TEST: `transpose(A)#B`

% TEST: took 42.645000 sec

% TEST: `matrix_multiply(A,B,/atranspose)`

% TEST: took 43.449000 sec

% TEST: `transpose(temporary(A))#B`

% TEST: took 43.387000 sec

% TEST: `matrix_multiply(temporary(A),B,/atranspose)`

% TEST: took 50.029000 sec

Code:

```
.....  
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!  
pro test
```

```

nel = 2000L

t0 = systime(1)
message, 'Allocating A array', /info
a = randomu(seed,[nel,nel])
message, 'took '+strtrim(systime(1)-t0,2)+' sec', /info

t0 = systime(1)
message, 'Allocating B array', /info
b = randomu(seed,[nel,nel])
message, 'took '+strtrim(systime(1)-t0,2)+' sec', /info

t0 = systime(1)
message, 'A#B', /info
c = a#b
message, 'took '+strtrim(systime(1)-t0,2)+' sec', /info

t0 = systime(1)
message, 'matrix_multiply(A,B)', /info
c = matrix_multiply(a,b)
message, 'took '+strtrim(systime(1)-t0,2)+' sec', /info

t0 = systime(1)
message, 'transpose(A)#B', /info
c = transpose(a)#b
message, 'took '+strtrim(systime(1)-t0,2)+' sec', /info

t0 = systime(1)
message, 'matrix_multiply(A,B,/atranspose)', /info
c = matrix_multiply(a,b,/atranspose)
message, 'took '+strtrim(systime(1)-t0,2)+' sec', /info

ahold = a

t0 = systime(1)
message, 'transpose(temporary(A))#B', /info
c = transpose(temporary(a))#b
message, 'took '+strtrim(systime(1)-t0,2)+' sec', /info

a = ahold

t0 = systime(1)
message, 'matrix_multiply(temporary(A),B,/atranspose)', /info
c = matrix_multiply(temporary(a),b,/atranspose)
message, 'took '+strtrim(systime(1)-t0,2)+' sec', /info

return

```

end
