Subject: Re: multiplication by a diagonal matrix
Posted by Paolo Grigis on Fri, 03 Sep 2004 12:32:11 GMT
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Lorenzo Busetto wrote:
> Hi all,
>
> I have the following problem: given a matrix A(n,m) and a vector of
> weighting factors w(n), i need to multiply each row of the matrix
> A(i,*)by the corresponding weighting factor w(i).
>
> I know that I can simply "transform" the w vector into a diagonal
> matrix with diag_matrix and then multiply it with A (e.g.: result =
> A##diag_matrix(w)), but for large values of n this solution is very
> slow.
>
> Can anybody suggest me a faster approach to solve this problem ?
>
> Thanks in advance for the help,
>
> Lorenzo Busetto
>
> Remote Sensing Lab.
> University of Milano-Bicocca.

You could try (if you *really* want to avoid a FOR loop over the rows):

```
N=n_elements(w)
ahelp=replicate(1d,N)##w
res=a*ahelp
```

In the second line, * is much faster than ##, and the first
line is just a 1 by N matrix multiplication, faster than the
N by N you used.

Ciao,
Paolo

Subject: Re: multiplication by a diagonal matrix
Posted by Craig Markwardt on Fri, 03 Sep 2004 14:42:37 GMT
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lbusett@yahoo.it (Lorenzo Busetto) writes:

> Hi all,

>
> I have the following problem: given a matrix A(n,m) and a vector of
> weighting factors w(n), i need to multiply each row of the matrix
> A(i,*)by the corresponding weighting factor w(i).

It sounds like you want to use a FOR loop. When N is small, the
number of loop iterations is small, so it will be fast. When N is
large, the number of loop iterations is larger too, but you also get
more done per iteration (N multiplies per iteration), plus you save
N*(N-1) elements of memory compared to the full matrix approach.

Craig

Good luck,
Craig

--
-- ----------
Craig B. Markwardt, Ph.D. EMAIL: craigmnet@REMOVEcow.physics.wisc.edu
Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response
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Subject: Re: multiplication by a diagonal matrix
Posted by JD Smith on Fri, 03 Sep 2004 15:01:56 GMT
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On Fri, 03 Sep 2004 03:53:06 -0700, Lorenzo Busetto wrote:

> Hi all,
>
> I have the following problem: given a matrix A(n,m) and a vector of
> weighting factors w(n), i need to multiply each row of the matrix A(i,*)by
> the corresponding weighting factor w(i).
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> with diag_matrix and then multiply it with A (e.g.: result =
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>
> Can anybody suggest me a faster approach to solve this problem ?

I have had luck with the SPRSIN and SPRSAB, the numerical recipes sparse
matrix routines IDL includes.

JD

Subject: Re: multiplication by a diagonal matrix
Posted by gnarloo on Fri, 03 Sep 2004 18:03:36 GMT
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guarda,
if you build a matrix with the n vectors (the weights)
and then you write

w*a
idl performs the multiplication element by element
lascia stare diag_matrix che complica solo le cose, idl supporta
le stesse notationi tra matrici e numeri e se scrivi w*a
ti fa direttamente il conto che vuoi tu.

but first you have to build the matrix out of the set of weight vectors

ciao

> I have the following problem: given a matrix A(n,m) and a vector of
> weighting factors w(n), i need to multiply each row of the matrix
> A(i,*)by the corresponding weighting factor w(i).
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> Thanks in advance for the help,
>
> Lorenzo Busetto
>
> Remote Sensing Lab.
> University of Milano-Bicocca.

Subject: Re: multiplication by a diagonal matrix
Posted by lbusett on Wed, 08 Sep 2004 12:50:12 GMT
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Hi all,

thanks for your answers !

I made some tests with different methods and for a matrix
A(10000,10)I had the following results:

"diag_matrix" method : processing time = 1600 seconds (!!)
"for loop" method: processing time = 0.02 seconds
"replicate" method (as suggested by Paolo Grigis in his answer):
processing time = 0.002 seconds

Well, when I posted my message I'd never expected to increase the speed 800000 times ! Can it be possible ?

Thanks for the help.

Lorenzo Busetto

Remote Sensing Lab.
University of Milano-Bicocca
