
Subject: Re: Sparse Matrix Routines

Posted by [K. Bowman](#) on Wed, 21 Jul 2004 14:50:56 GMT

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In article <60b977.0407201455.187d57cb@posting.google.com>, nhagen@optics.arizona.edu (Marius) wrote:

> Does anyone know of any code (in IDL or in any other language) that
> uses such a simple storage scheme or one which is better suited to
> nondiagonal matrices? I'd be happy to hear of any ideas, and thanks in
> advance.
>
> - Marius Hagen

Googling on "sparse matrix library" turned up a lot of potentially useful hits (Java, C, C++, etc.) including this list of libraries

<http://www.scicomp.uni-erlangen.de/SW/linalg.html>

Ken Bowman

Subject: Re: Sparse Matrix Routines

Posted by [Nigel Wade](#) on Thu, 22 Jul 2004 09:27:09 GMT

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On Tue, 20 Jul 2004 15:55:48 -0700, Marius wrote:

> IDL has a suite of sparse matrix routines based on those in Numerical
> Recipes in C, which optimize the algorithms for highly diagonal
> matrices (so that they store the diagonal elements separately from the
> rest of the nonzero elements). In the code I am currently working on,
> however, I have large rectangular matrices (of about 10^{14} elements)
> which are extremely sparse (about 10^5 nonzero elements) and which are
> nothing like diagonal. I would much prefer to work with a set of
> sparse routines better suited to the problem (perhaps something simple
> such as storing the entire matrix as two vectors, one giving the
> nonzero values and the other giving the index locations) than use
> these standard routines, if at all possible.
>
> Does anyone know of any code (in IDL or in any other language) that
> uses such a simple storage scheme or one which is better suited to
> nondiagonal matrices? I'd be happy to hear of any ideas, and thanks in
> advance.
>

I think that's the way that MATLAB stores sparse matrices. I've never used them, but I seem to remember from writing code to read the MATLAB data

files that sparse matrices were stored in two arrays, one of data and the other of indices. Whether MATLAB is in any way optimised for any particular type of sparse matrix I could not say.

Also, you might want to look into whether the sparse matrix extensions for Python/SciPy/Numerical Python are of any use.

--

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Subject: Re: Sparse Matrix Routines
Posted by [nhagen](#) on Mon, 26 Jul 2004 21:16:10 GMT
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Nigel Wade <nmw@ion.le.ac.uk> wrote:

> I think that's the way that MATLAB stores sparse matrices. I've never used
> them, but I seem to remember from writing code to read the MATLAB data
> files that sparse matrices were stored in two arrays, one of data and the
> other of indices. Whether MATLAB is in any way optimised for any
> particular type of sparse matrix I could not say.
>
> Also, you might want to look into whether the sparse matrix extensions
> for Python/SciPy/Numerical Python are of any use.

Thanks (to both responders) for pointing in a helpful direction. I've located two sparse matrix libraries (SparseLib++ and SparseMatrixToolkit) which provide some of the ideas I'm looking for. As you mentioned, Matlab seems to provide a very straightforward sparse matrix storage scheme much like I'm looking for, so I'm going to look into whether they provide any information on the low-level coding of their sparse matrix routines....

- Marius
