

Re: Solving a large sparse system with a single dense row/column?

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goodchild.trevor@xxxxxxxxxx schrieb:

Yes, I should have been more specific: my system has a dense column  
\*and\* a dense row. I.e., the matrix looks somewhat like this:

```
/\
| x x |
| x x |
| x x |
| x x |
| x x |
| x x |
| x x |
| x x x x x x |
\/
```

(though in reality there are more off-diagonal entries and the system  
may have blocks that are not symmetric).

Sorry for the confusion,

Trevor

Hello,

Matrices with this structure are quite common in optimization problems with integral constraints – in that case the matrices are usually symmetric – and also in numerical treatment of bifurcation problems.

Could you tell us more about your application?

I guess, that Govaerts BEMW code is quite suitable for that type.

You could also try to resolve the problem yourself:

Let your equation be

$$A x + B y = b$$

$$C x + D y = c$$

where A is sparse, and B and D are your column and row matrices.

Then you could try to solve the first equation for x:

$$x = G y + H b$$

Inserting that into the second equation, you obtain a small system for y. Of course the resulting system might be worse conditioned than the original one.

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Good luck  
Alois

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