Subject: Re: Adding sparse matrices
Posted by Vince Hradil on Fri, 21 Nov 2008 15:59:55 GMT
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On Nov 21, 9:27 am, Luis <lgmen...@gmail.com> wrote:
> Hi,
>
> Does anyone know how to add two sparse matrices?
>
> Tks,
> Luis

c = a + b ?

Subject: Re: Adding sparse matrices
Posted by Jeremy Bailin on Fri, 21 Nov 2008 16:01:35 GMT
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On Nov 21, 10:27 am, Luis <lgmen...@gmail.com> wrote:
> Hi,
>
> Does anyone know how to add two sparse matrices?
>
> Tks,
> Luis

If nothing else, there's always the slow memory-intensive way:

c = sprsin(fulstr(a) + fulstr(b))

-Jeremy.

Subject: Re: Adding sparse matrices
Posted by Vince Hradil on Fri, 21 Nov 2008 16:10:38 GMT
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On Nov 21, 9:59 am, Vince Hradil <vincehra...@gmail.com> wrote:
> On Nov 21, 9:27 am, Luis <lgmen...@gmail.com> wrote:
>
>> Hi,
>
>> Does anyone know how to add two sparse matrices?
>
>> Tks,
>> Luis

>
> c = a + b ?

Sorry (removing foot from mouth and humbly retreating...)

Subject: Re: Adding sparse matrices
Posted by David Fanning on Fri, 21 Nov 2008 16:22:21 GMT
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Vince Hradil writes:

> Sorry (removing foot from mouth and humbly retreating...)

Yeah, I learned a long time ago to stay far away from
anything that has the word "sparse" in the header. I don't
know a damn thing about it. :-(

Cheers,

David
--
David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: http://www.dfanning.com/
Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: Adding sparse matrices
Posted by colerbe on Fri, 21 Nov 2008 17:15:30 GMT
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On Nov 21, 4:10 pm, Vince Hradil <vincehra...@gmail.com> wrote:
:-) My mail wasn't very detail...

Unfortunately I can not use c = sprsin(fulstr(a) + fulstr(b)) (Out of
memory problems)

> On Nov 21, 9:59 am, Vince Hradil <vincehra...@gmail.com> wrote:
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>> On Nov 21, 9:27 am, Luis <lgmen...@gmail.com> wrote:
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>>> Hi,
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>
> Sorry (removing foot from mouth and humbly retreating...)

Subject: Re: Adding sparse matrices
Posted by Jeremy Bailin on Fri, 21 Nov 2008 18:52:09 GMT
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On Nov 21, 12:15 pm, Luis <lgmen...@gmail.com> wrote:
> Unfortunately I can not use c = sprsin(fulstr(a) + fulstr(b)) (Out of
> memory problems)
>>> On Nov 21, 9:27 am, Luis <lgmen...@gmail.com> wrote:
>
>>>> Hi,
>
>>>> Does anyone know how to add two sparse matrices?
>
>>>> Tks,
>>>> Luis

Try this. It worked for my test cases, but I can't say I tested it
extensively or worked hard to make it particularly efficieint...

```
;+
; NAME:
;    SPRSADD
;
; PURPOSE:
;    Adds two sparse matrices (as generated by SPRSIN).
;
; CATEGORY:
;    Math
;
; CALLING SEQUENCE:
;    Result = SPRSADD(A,B)
;
; INPUTS:
;    A:   Sparse matrix to be added.
;    B:   Sparse matrix to be added.
;
; OUTPUTS:
;    The addition of the matrices, in sparse format. This is
functionally
;    equivalent to:
;      SPRSIN(FULSTR(A) + FULSTR(B))
```

```
;    but can be used even when the full matrices take up too much
memory
;    for that operation.
;
; EXAMPLE:
;    IDL> a = sprsin([[1,0,0],[0,1,0],[0,0,1]])
;    IDL> b = sprsin([[0,0,2],[0,2,0],[2,0,0]])
;    IDL> c = sprsadd(a,b)
;    IDL> print, fulstr(c)
;          1.00000      0.00000      2.00000
;          0.00000      3.00000      0.00000
;          2.00000      0.00000      1.00000
;
; MODIFICATION HISTORY:
;    Written by:   Jeremy Bailin, November 2008
;
;-
function sprsadd, a, b

; what is the size of the matrix?
N = a.ija[0]-2
if b.ija[0]-2 ne N then message, 'SPRSADD: A and B must have the same
size.'

; figure out the full indices of all specified elements
a_i = lonarr(n_elements(a.sa)-1)
b_i = lonarr(n_elements(b.sa)-1)
; diagonal elements
a_i[0] = lindgen(N)*N+lindgen(N)
b_i[0] = lindgen(N)*N+lindgen(N)
an=N & bn=N
for i=0l,N-1 do begin  ; loop through rows
  a_non0 = a.ija[i+1]-a.ija[i]
  b_non0 = b.ija[i+1]-b.ija[i]
  if a_non0 gt 0 then a_i[an:an+a_non0-1] = i*N + a.ija[a.ija[i:i
+a_non0-1]-1]-1
  an += a_non0
  if b_non0 gt 0 then b_i[bn:bn+b_non0-1] = i*N + b.ija[b.ija[i:i
+b_non0-1]-1]-1
  bn += b_non0
endfor

all_index = [a_i,b_i]
if n_elements(a.sa) eq N+1 then a_vals = a.sa[0:N-1] $
  else a_vals = [a.sa[0:N-1],a.sa[N+1:*]]
if n_elements(b.sa) eq N+1 then b_vals = b.sa[0:N-1] $
  else b_vals = [b.sa[0:N-1],b.sa[N+1:*]]
all_vals = [a_vals,b_vals]
```

```
indexsort = sort(all_index)
indexuniq = uniq(all_index[indexsort])
dupes = where(indexuniq-[-1,indexuniq] gt 1, comp=single, $
  ncomp=nsingle)
; we know there are at least N dupes because the diagonals are
; always represented, so we don't need to test the where
combined_index = all_index[indexsort[indexuniq[dupes]]]
combined_vals = all_vals[indexsort[indexuniq[dupes]]]+all_vals
[indexsort[indexuniq[dupes]-1]]
if nsingle gt 0 then begin
  combined_index = [combined_index, all_index[indexsort[indexuniq
[single]]]]
  combined_vals = [combined_vals, all_vals[indexsort[indexuniq
[single]]]]
endif

; create the output array using SPRSIN in col, row, val form
return, sprsin(combined_index mod N, combined_index/N, combined_vals,
N)
end
```

Subject: Re: Adding sparse matrices
Posted by Jean H. on Fri, 21 Nov 2008 18:52:50 GMT
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Luis wrote:
> On Nov 21, 4:10 pm, Vince Hradil <vincehra...@gmail.com> wrote:
> :-) My mail wasn't very detail...
>
> Unfortunately I can not use c = sprsin(fulstr(a) + fulstr(b)) (Out of
> memory problems)

then try chopping it...

```
tmpA = fulstr(a)
a= 0
tmpB = fulstr(b)
b = 0
tmpC = tmpA+tmpB
tmpA=0
tmpB=0
c = sprsin(tmpC)
tmpC=0
```

Jean

Subject: Re: Adding sparse matrices
Posted by pgrigis on Fri, 21 Nov 2008 19:03:59 GMT
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Luis wrote:

> :-) My mail wasn't very detail...
>
> Unfortunately I can not use c = sprsin(fulstr(a) + fulstr(b)) (Out of
> memory problems)

Well, it seems that the algorithm is obvious enough:
if an element is in a and not in b, copy it to c
if an element is in b and not in a, copy it to c
if an element is in a and in b, put the sum in c

Ciao,
Paolo

>

>>

>>
>>>> Hi,
>>
>>>> Does anyone know how to add two sparse matrices?
>>
>>>> Tks,
>>>> Luis
>>
>>> c = a + b ?
>>
>> Sorry (removing foot from mouth and humbly retreating...)

Subject: Re: Adding sparse matrices
Posted by Jeremy Bailin on Fri, 21 Nov 2008 19:24:23 GMT
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On Nov 21, 2:03 pm, Paolo <pgri...@gmail.com> wrote:
> Luis wrote:
>> On Nov 21, 4:10 pm, Vince Hradil <vincehra...@gmail.com> wrote:
>> :-) My mail wasn't very detail...
>
>> Unfortunately I can not use c = sprsin(fulstr(a) + fulstr(b)) (Out of
>> memory problems)

>
> Well, it seems that the algorithm is obvious enough:
> if an element is in a and not in b, copy it to c
> if an element is in b and not in a, copy it to c
> if an element is in a and in b, put the sum in c
>
> Ciao,
> Paolo
>
>
>
>>> On Nov 21, 9:59 am, Vince Hradil <vincehra...@gmail.com> wrote:
>
>>>> On Nov 21, 9:27 am, Luis <lgmen...@gmail.com> wrote:
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>>>> > Hi,
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>>>> > Does anyone know how to add two sparse matrices?
>
>>>> > Tks,
>>>> > Luis
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>>>> c = a + b ?
>
>>> Sorry (removing foot from mouth and humbly retreating...)
>
>

The algorithm may be obvious, but reverse-engineering how the indices are stored in the structure so you can figure out what's what isn't so obvious (even with a copy of NR). :-)=

-Jeremy.
