
Subject: Re: adding sparse arrays
Posted by [zhang.yuji](#) on Thu, 07 Jun 2007 04:29:48 GMT
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On Jun 6, 4:52 pm, nivedita.raghun...@gmail.com wrote:

> Hello all,
>
> How do I add two sparse arrays? The fact that a sparse function to add
> doesn't exist makes me think its pretty simple, but I just can't get
> it. I do not want to use any loops.
>
> Thanks in advance.
>
> -Nivedita

Are these two arrays really huge? Otherwise IDL is really fast in summation...

Subject: Re: adding sparse arrays
Posted by [Gaurav](#) on Thu, 07 Jun 2007 07:30:14 GMT
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Yes, since IDL is an array based language, if you use simple summation procedure to add two arrays (like $A + B$, where A and B are arrays), it would be normally faster than running loops for the arrays and then adding the elements.

Still if you care to find which are the relevent elements in the sparse array, you could create a mask of those elements using `WHERE` command in IDL.

Hope this answers your query.

Cheers!

Subject: Re: adding sparse arrays
Posted by [Paolo Grigis](#) on Thu, 07 Jun 2007 08:36:17 GMT
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nivedita.raghunath@gmail.com wrote:

> Hello all,
>
> How do I add two sparse arrays? The fact that a sparse function to add
> doesn't exist makes me think its pretty simple, but I just can't get
> it. I do not want to use any loops.

Well, it depends where the non-zero, non-diagonal elements of the two arrays are. If they are located in the same positions, you just need to add the sa vectors while keeping the ija vectors fixed.

Ciao,
Paolo

>
> Thanks in advance.
>
> -Nivedita
>

Subject: Re: adding sparse arrays
Posted by [nivedita.raghunath](#) on Thu, 07 Jun 2007 14:32:52 GMT
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Hi all,

Thanks for the suggestions.

The arrays that I'm working with are really huge so there's no option of A+B. I cannot convert to full matrix form using fulstr and have to work only with the sparse arrays A and B to get another sparse array (A+B). The non-zero elements of the two arrays are in different index positions (ija), so the sa vectors cannot be added directly.

Under these constraints, what's the best (and the fastest) way to add them?

-Nivedita

On Jun 7, 4:36 am, Paolo Grigis <pgri...@astro.phys.ethz.ch> wrote:

> nivedita.raghun...@gmail.com wrote:
>> Hello all,
>
>> How do I add two sparse arrays? The fact that a sparse function to add
>> doesn't exist makes me think it's pretty simple, but I just can't get
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>
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> arrays are. If they are located in the same positions, you just need

> to add the sa vectors while keeping the ija vectors fixed.

>

> Ciao,

> Paolo

>

>

>

>

>

>> Thanks in advance.

>

>> -Nivedita- Hide quoted text -

>

> - Show quoted text -

Subject: Re: adding sparse arrays

Posted by [Vince Hradil](#) on Thu, 07 Jun 2007 15:23:23 GMT

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On Jun 7, 9:32 am, nivedita.raghun...@gmail.com wrote:

> Hi all,

>

> Thanks for the suggestions.

>

> The arrays that I'm working with are really huge so there's no option
> of A+B. I cannot convert to full matrix form using fulstr and have to
> work only with the sparse arrays A and B to get another sparse array (A
> +B). The non-zero elements of the two arrays are in different index
> positions (ija), so the sa vectors cannot be added directly.

>

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> them?

>

> -Nivedita

>

> On Jun 7, 4:36 am, Paolo Grigis <pgri...@astro.phys.ethz.ch> wrote:

>

>> nivedita.raghun...@gmail.com wrote:

>>> Hello all,

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>>> doesn't exist makes me think its pretty simple, but I just can't get
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>> to add the sa vectors while keeping the ija vectors fixed.

>
>> Ciao,
>> Paolo
>
>>> Thanks in advance.
>
>>> -Nivedita- Hide quoted text -
>
>> - Show quoted text -

I don't use sprsin, but can you try $c = \text{sprsin}(\text{fulstr}(a)+\text{fulstr}(b))$?
or maybe $c = \text{sprsin}(\text{fulstr}(\text{temporary}(a))+\text{fulstr}(\text{temporary}(b)))$ to
delete a and b from memory?

Subject: Re: adding sparse arrays
Posted by [nivedita.raghunath](#) on Thu, 07 Jun 2007 17:50:36 GMT
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On Jun 7, 11:23 am, hradilv <hrad...@yahoo.com> wrote:
> On Jun 7, 9:32 am, nivedita.raghun...@gmail.com wrote:
>
>
>
>
>
>
>> Hi all,
>
>> Thanks for the suggestions.
>
>> The arrays that I'm working with are really huge so there's no option
>> of A+B. I cannot convert to full matrix form using fulstr and have to
>> work only with the sparse arrays A and B to get another sparse array (A
>> +B). The non-zero elements of the two arrays are in different index
>> positions (ija), so the sa vectors cannot be added directly.
>
>> Under these constraints, whats the best (and the fastest) way to add
>> them?
>
>> -Nivedita
>
>> On Jun 7, 4:36 am, Paolo Grigis <pgri...@astro.phys.ethz.ch> wrote:
>
>>> nivedita.raghun...@gmail.com wrote:
>>>> Hello all,
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>>>> doesn't exist makes me think its pretty simple, but I just can't get

```

>>>> it. I do not want to use any loops.
>
>>> Well, it depends where the non-zero, non-diagonal elements of the two
>>> arrays are. If they are located in the same positions, you just need
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>
>>> Ciao,
>>> Paolo
>
>>>> Thanks in advance.
>
>>>> -Nivedita- Hide quoted text -
>
>>> - Show quoted text -
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> I don't use sprsin, but can you try c = sprsin(fulstr(a)+fulstr(b))?
> or maybe c = sprsin(fulstr(temporary(a))+fulstr(temporary(b))) to
> delete a and b from memory?- Hide quoted text -
>
> - Show quoted text -

```

Ok, here is the REAL problem:

I generate a bunch of x,y,z indices, apply a transformation to the indices and build a matrix of standard vs transformed indices

;img is a 3-d image, tmat is a set of transformation matrices

```

sz=size(img,/dimensions)
tmat_sz=size(tmat,/dimensions)
sz1=sz[0]*sz[1]
npix=sz1*sz[2]

```

```

stan_pts=transpose([[lindgen(npix) mod sz[0]], [lindgen(npix)/sz[0]
mod sz[1]], [lindgen(npix)/sz[1],[replicate(11,npix)]])

```

```

for j=0,tmat_sz[2]-1 do begin

```

```

    mat=tmat[* ,* ,j] ; transformation matrix
    rp=mat#stan_pts
    res_indx=round(rp[0,*])+round(rp[1,*])*sz[0]
    valid_indx=where(res_indx ge 0 and res_indx lt npix)

```

```

    tij=sprsin(stan_indx[valid_indx],res_indx[valid_indx],replicate(1.,n_elements(valid_indx)),npix)

```

```

/* THIS IS WHAT I WANT TO DO BUT CANNOT DO */

```

```
tijsum=tijsum+tij
```

```
endfor
```

So basically I have made tij as a sparse matrix (stan_indx vs res_indx). I would like to sum this matrix over all the transformations tmat[*,*,i].

I cannot do tijsum=tijsum+tij for the foll reasons:

- can't initialize tijsum since I don't have a size (size varies for each iteration). Besides I don't think a sparse structure (created using sprsin) is the same as an ordinary structure (created using create_struct)

- fails since it can't directly add structures.

I do have an idea w/ the use of for/ while but I wouldn't like to use loops, and either ways I need to know how I can initialize tijsum.

Subject: Re: adding sparse arrays

Posted by [nivedita.raghunath](#) on Thu, 07 Jun 2007 18:13:02 GMT

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On Jun 7, 11:23 am, hradilv <hrad...@yahoo.com> wrote:

> On Jun 7, 9:32 am, nivedita.raghun...@gmail.com wrote:

>

>

>

>

>

>> Hi all,

>

>> Thanks for the suggestions.

>

>> Thearraysthat I'm working with are really huge so there's no option
>> of A+B. I cannot convert to full matrix form using fulstr and have to
>> work only with thesparsearraysA and B to get anothersparsearray (A
>> +B). The non-zero elements of the twoarraysare in different index
>> positions (ija), so the sa vectors cannot be added directly.

>

>> Under these constraints, whats the best (and the fastest) way to add
>> them?

>

>> -Nivedita

>

>> On Jun 7, 4:36 am, Paolo Grigis <pgri...@astro.phys.ethz.ch> wrote:

```

>
>>> nivedita.raghun...@gmail.com wrote:
>>>> Hello all,
>
>>>> How do I add twosparsedarrays? The fact that asparsefunction to add
>>>> doesn't exist makes me think its pretty simple, but I just can't get
>>>> it. I do not want to use any loops.
>
>>> Well, it depends where the non-zero, non-diagonal elements of the two
>>> arraysare. If they are located in the same positions, you just need
>>> to add the sa vectors while keeping the ija vectors fixed.
>
>>> Ciao,
>>> Paolo
>
>>>> Thanks in advance.
>
>>>> -Nivedita- Hide quoted text -
>
>>> - Show quoted text -
>
> I don't use sprsin, but can you try c = sprsin(fulstr(a)+fulstr(b))?
> or maybe c = sprsin(fulstr(temporary(a))+fulstr(temporary(b))) to
> delete a and b from memory?- Hide quoted text -
>
> - Show quoted text -

```

I just typed out a long reply, and it didn't post it to the board...
so trying again.

Here is a piece of my code:

```

; img- 3d image, tmat- set of transformation matrices

sz=size(img,/dimensions)
tmat_sz=size(tmat,/dimensions)
sz1=sz[0]*sz[1]
npix=sz1*sz[2]

stan_pts=transpose([[lindgen(npix) mod sz[0]], [lindgen(npix)/sz[0] mod
sz[1]], [lindgen(npix)/sz[1], [replicate(1l,npix)]]])
stan_indx=long(stan_pts[0, *]+stan_pts[1, *]*sz[0]+stan_pts[2, *]*sz[1])

img_est=fltarr(sz[0],sz[1],sz[2])

for j=0,tmat_sz[2]=1 do begin
  mat=tmat[*, *, j]
  rp=mat#stan_pts

```

```
res_indx=round(rp[0,*])+round(rp[1,*])*sz[0]+round(rp[2,*])* sz1
valid_indx=where(res_indx ge 0 and res_indx lt npix)
```

```
tij=sprsin(stan_indx[valid_indx],res_indx[valid_indx],replicate(1.,n_elements(valid_indx)),npix)
```

```
/*THIS IS WHAT I WANT TO DO BUT CANNOT DO*/
```

```
tijsum = tijsum+tij
```

```
endfor
```

So basically I want to add the tij matrices for all transformations tmat[*,* ,j]. But I cannot do tijsum = tijsum+tij for the foll. reasons:

- Can't initialize tijsum since I don't know the size (size varies with each iteration). Besides, initializing w/ create_struct doesn't seem to work (I think a sparse array structure created using sprsin is different from a structure created using create_struct)
- tijsum+tij doesn't work since structures can't be directly added.

I would like to avoid loops since my arrays are really huge. ANY ideas?

Subject: Re: adding sparse arrays
Posted by [Paolo Grigis](#) on Fri, 08 Jun 2007 07:42:12 GMT
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nivedita.raghunath@gmail.com wrote:

```
> [...]
> I just typed out a long reply, and it didn't post it to the board...
> so trying again.
>
> Here is a piece of my code:
>
> ; img- 3d image, tmat- set of transformation matrices
>
> sz=size(img,/dimensions)
> tmat_sz=size(tmat,/dimensions)
> sz1=sz[0]*sz[1]
> npix=sz1*sz[2]
>
> stan_pts=transpose([lindgen(npix) mod sz[0],[lindgen(npix)/sz[0] mod
> sz[1]],lindgen(npix)/sz[1], [replicate(1l,npix)]])
> stan_indx=long(stan_pts[0,*]+stan_pts[1,*]*sz[0]+stan_pts[2,*]*sz1)
```

```

>
> img_est=fltarr(sz[0],sz[1],sz[2])
>
> for j=0,tmat_sz[2]=1 do begin
>   mat=tmat[*,*,j]
>   rp=mat#stan_pts
>   res_indx=round(rp[0,*])+round(rp[1,*])*sz[0]+round(rp[2,*])* sz1
>   valid_indx=where(res_indx ge 0 and res_indx lt npix)
>
>
>   tij=sprsin(stan_indx[valid_indx],res_indx[valid_indx],replac ate(1.,n_elements(valid_indx)),npix)
>
>   /*THIS IS WHAT I WANT TO DO BUT CANNOT DO*/

```

Why don't you keep track of the indices you are using (stan_indx, res_indx) in each iteration? In the next iteration you can compare the new row & column indices with the old ones: if they are different, add the new indices & values to the old list, if they are equal, add the new value to the corresponding old value.

You can then use sprsin only once at the end.

Ciao,
Paolo

```

>
>   tijsum = tijsum+tij
>
>   endfor
>
>   So basically I want to add the tij matrices for all transformations
>   tmat[*,*,j]. But I cannot do   tijsum = tijsum+tij for the foll.
>   reasons:
>
>   - Can't initialize tijsum since I don't know the size (size varies
>   with each iteration). Besides, initializing w/ create_struct doesn't
>   seem to work (I think a sparse array structure created using sprsin is
>   different from a structure created using create_struct)
>
>   - tijsum+tij doesn't work since structures can't be directly added.
>
>   I would like to avoid loops since my arrays are really huge. ANY
>   ideas?
>
>

```
