Subject: Re: the (Moore-Penrose) pseudo-inverse of a matrix - anything like scipy.linalg's pinv2 in IDL?
Posted by Heinz Stege on Wed, 03 Apr 2013 13:33:36 GMT
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On Tue, 2 Apr 2013 22:18:16 -0700 (PDT), JP wrote:

> Is that an equivalent to the scipy pinv2 i am looking for? And if so, I will appreciate if someone will better algebra skills than me (likely 95% of this community) could suggest how to introduce the rcond keyword available in pinv2.
>
I am very sure, that I am one of the 5%. So be very careful with the following code. From the description it looks like the scipy function is doing something like this:

```
function pinv2,a,rcond=rcond
;
compile_opt defint32,strictarr,logical_predicate
;
svdc,a,w,u,v   ; singular value decomposition
;
n=n_elements(w)
threshold=n_elements(rcond)? max(w)*rcond : 0.
ii=where(w gt threshold,count)
if count lt n then begin
  message,/info,strtrim(n-count,2)+' small singular values.'
  if count le 0 then message,'All singular values are too small.'
  end
;
jj=(indgen(n))[ii]*(n+1)   ; diagonal elements
matrix=make_array(n,n,type=size(w,/type))
matrix[jj]=1./w[ii]
result=transpose(u)#matrix#v
;
return,result
end
```

If you want to use double precision, take a look at the IDL function LA_SVD.

Cheers, Heinz

Subject: Re: the (Moore-Penrose) pseudo-inverse of a matrix - anything like scipy.linalg's pinv2 in IDL?
Posted by lecacheux.alain on Wed, 03 Apr 2013 13:46:22 GMT
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Le mercredi 3 avril 2013 07:18:16 UTC+2, JP a écrit :
> Hello IDLers,
>
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>
> I am adapting a code from python to IDL and I got stuck with the pinv2 function:
http://docs.scipy.org/doc/scipy/reference/generated/scipy.li nalg.pinv2.html
>
>
>
> It computes the Moore-Penrose pseudo-inverse of a matrix and I couldn't find anything similar
in IDL.
>
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>
> A search through this group pointed to a post 10 years old where Paul van Delst Lars shared
his svd_matrix_invert function (link to post:
https://groups.google.com/d/msg/comp.lang.idl-pvwave/NNzCI4h MUP4/n9UzWjazT3YJ)
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>
>
>
> thanks a lot.
>
>
>
> JP

Your problem should likely be solved by using the LA_LEAST_SQUARES function and setting
METHOD (to 2 or 3) and RCONDITION keywords
alx.

Subject: Re: the (Moore-Penrose) pseudo-inverse of a matrix - anything like scipy.linalg's pinv2 in IDL?
Posted by Russell Ryan on Wed, 03 Apr 2013 13:52:22 GMT
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On Wednesday, April 3, 2013 1:18:16 AM UTC-4, JP wrote:
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>
>
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>
>
>
> thanks a lot.
>
>
>
> JP

I just read the Wikipedia article on Moore-Penrose Inverses. Sounds like you can just do an SVD then operate on the Sigma matrix and the resulting A+ matrix. I'm unaware of any existing IDL code to do this. There are two routines to do the SVD included in the standard distro.

-Russell

Subject: Re: the (Moore-Penrose) pseudo-inverse of a matrix - anything like scipy.linalg's pinv2 in IDL?
Posted by JP on Wed, 03 Apr 2013 23:06:51 GMT
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Thanks Heinz,

After my post yesterday I tested Paul's svd_matrix_invert comparing with scipy's pinv2 and it looks like they do the same. I added a rcond keyword too and it also mimics pinv2 behaviour.
From a quick look to your code it looks like it's also doing the same thing but haven't tested.

cheers

Juan

On Thursday, 4 April 2013 00:33:36 UTC+11, Heinz Stege wrote:
> On Tue, 2 Apr 2013 22:18:16 -0700 (PDT), JP wrote:
>
>
>
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> svdc,a,w,u,v   ; singular value decomposition
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> ;
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> n=n_elements(w)
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> threshold=n_elements(rcond)? max(w)*rcond : 0.
>
> ii=where(w gt threshold,count)
>
> if count lt n then begin
>
>   message,/info,strtrim(n-count,2)+' small singular values.'
>
>   if count le 0 then message,'All singular values are too small.'
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> end
>
> ;
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> jj=(indgen(n))[ii]*(n+1) ; diagonal elements
>
> matrix=make_array(n,n,type=size(w,/type))
>
> matrix[jj]=1./w[ii]
>
> result=transpose(u)#matrix#v
>
> ;
>
> return,result
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> end
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Subject: Re: the (Moore-Penrose) pseudo-inverse of a matrix - anything like scipy.linalg's pinv2 in IDL?
Posted by JP on Wed, 03 Apr 2013 23:08:23 GMT
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Thanks, will test that

On Thursday, 4 April 2013 00:46:22 UTC+11, alx wrote:
> Le mercredi 3 avril 2013 07:18:16 UTC+2, JP a écrit :
>
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