Subject: Re: MATRIX LOGARITHM (and EXPONENTIAL)
Posted by penteado on Thu, 27 Jan 2011 22:37:41 GMT
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On Jan 27, 7:41 pm, teddyallen <teddyal...@yahoo.com> wrote:
> Just a quick question. Does IDL have a similar command to the popular
> MATLAB logm and expm so that I can take the matrix logarithm (and
> exponential)? I understand that ALOG and EXP will not function in this
> sense.

Can you explain what matrix log and exp are?

Subject: Re: MATRIX LOGARITHM (and EXPONENTIAL)
Posted by pgrigis on Thu, 27 Jan 2011 22:39:11 GMT
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On Jan 27, 4:41 pm, teddyallen <teddyal...@yahoo.com> wrote:
> Just a quick question. Does IDL have a similar command to the popular
> MATLAB logm and expm so that I can take the matrix logarithm (and
> exponential)? I understand that ALOG and EXP will not function in this
> sense.
> Thank you,
> teddy

No, IDL doesn't have those functions built in.

I don't know if anyone has written routines to compute
either of those.

Do you need a solution for general arrays? In special cases
(say, if the determinant is small or the matrix can be
diagonalized) it may not be too hard to write a routine
for it. For more general cases it may be a bit more challenging.

Ciao,
Paolo

Subject: Re: MATRIX LOGARITHM (and EXPONENTIAL)
Posted by pgrigis on Thu, 27 Jan 2011 22:40:35 GMT
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On Jan 27, 5:37 pm, Paulo Penteado <pp.pente...@gmail.com> wrote:
> On Jan 27, 7:41 pm, teddyallen <teddyal...@yahoo.com> wrote:
>
>> Just a quick question. Does IDL have a similar command to the popular

>> MATLAB logm and expm so that I can take the matrix logarithm (and
>> exponential)? I understand that ALOG and EXP will not function in this
>> sense.
>
> Can you explain what matrix log and exp are?

If A is a matrix, and # matrix multiplication

exp(A) = sum over k of A^k/k!

where A^2= A#A, A^3=A#A#A etc.

Ciao,
Paolo

Subject: Re: MATRIX LOGARITHM (and EXPONENTIAL)
Posted by James[2] on Fri, 28 Jan 2011 00:10:35 GMT
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On Jan 27, 1:41 pm, teddyallen <teddyal...@yahoo.com> wrote:
> Just a quick question. Does IDL have a similar command to the popular
> MATLAB logm and expm so that I can take the matrix logarithm (and
> exponential)? I understand that ALOG and EXP will not function in this
> sense.
> Thank you,
> teddy

If the matrix A is diagonalizable, then:

eigenvals = LA_EIGENPROBLEM(A, EIGENVECTORS=evecs)
expA = evecs # diag_matrix(exp(eigenvals)) # invert(evecs)
logA = evecs # diag_matrix(alog(eigenvals)) # invert(evecs)

Subject: Re: MATRIX LOGARITHM (and EXPONENTIAL)
Posted by James[2] on Fri, 28 Jan 2011 00:11:53 GMT
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On Jan 27, 4:10 pm, James <donje...@gmail.com> wrote:
>
> If the matrix A is diagonalizable, then:
>
> eigenvals = LA_EIGENPROBLEM(A, EIGENVECTORS=evecs)
> expA = evecs # diag_matrix(exp(eigenvals)) # invert(evecs)
> logA = evecs # diag_matrix(alog(eigenvals)) # invert(evecs)

sorry, replace INVERT with LA_INVERT to account for complex
eigenvectors.

Subject: Re: MATRIX LOGARITHM (and EXPONENTIAL)
Posted by zhaobw1993 on Wed, 21 Oct 2015 23:04:15 GMT
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On Thursday, January 27, 2011 at 5:11:53 PM UTC-7, James wrote:
> On Jan 27, 4:10 pm, James <donje...@gmail.com> wrote:
>>
>> If the matrix A is diagonalizable, then:
>>
>> eigenvals = LA_EIGENPROBLEM(A, EIGENVECTORS=evecs)
>> expA = evecs # diag_matrix(exp(eigenvals)) # invert(evecs)
>> logA = evecs # diag_matrix(alog(eigenvals)) # invert(evecs)
>
> sorry, replace INVERT with LA_INVERT to account for complex
> eigenvectors.

Does logA need to be transposed?
My way was,
evens = transpose(evens)
logA = evecs ## diag_matrix(eigenvalues) ## invert(evecs)
result of this way seems to be transpose of result of your way.

Thanks

Subject: Re: MATRIX LOGARITHM (and EXPONENTIAL)
Posted by chris_torrence@NOSPAM on Fri, 23 Oct 2015 17:52:57 GMT
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On Wednesday, October 21, 2015 at 5:04:18 PM UTC-6, zhaob...@gmail.com wrote:
> On Thursday, January 27, 2011 at 5:11:53 PM UTC-7, James wrote:
>> On Jan 27, 4:10 pm, James <donje...@gmail.com> wrote:
>>>
>>> If the matrix A is diagonalizable, then:
>>>
>>> eigenvals = LA_EIGENPROBLEM(A, EIGENVECTORS=evecs)
>>> expA = evecs # diag_matrix(exp(eigenvals)) # invert(evecs)
>>> logA = evecs # diag_matrix(alog(eigenvals)) # invert(evecs)
>>
>> sorry, replace INVERT with LA_INVERT to account for complex
>> eigenvectors.
>
> Does logA need to be transposed?

> My way was,
> evens = transpose(evens)
> logA = evecs ## diag_matrix(eigenvalues) ## invert(evecs)
> result of this way seems to be transpose of result of your way.
>
> Thanks

Or, you could use the Python bridge:

```
la = Python.Import('scipy.linalg')
expm = la.expm(A)
logm = la.logm(A)
```

-Chris
