Subject: Infinity matrix determinant
Posted by amin farhang on Mon, 17 Nov 2014 08:23:52 GMT
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Dear all,

I have a big matrix (2000x2000) which every elements of my matrix is of the order of 1.0e12 and i want to compute its inverse. since the data are too big, IDL could not determine the matrix determinant (even with determ(A,/double) command) and return Inf. Is there a way to compute its inverse and determinant?

Cheers,

Subject: Re: Infinity matrix determinant
Posted by Sergey Anfinogentov on Mon, 17 Nov 2014 09:57:16 GMT
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Dear Amin,
Try to divide every element of the matrix by a big factor like
factor = 1e12. Then you can calculate the determinant of a new matrix and use the properties known from linear algebra to restore the determinant of the original one.
IDl code:

factor = 1d12
matrrix = matrix/factor
det = determ(matrix,/double)
det = det * factor^2000d ; here 2000d is the size of the matrix

Cheers, Sergey

> Dear all,
>
> I have a big matrix (2000x2000) which every elements of my matrix is of the order of 1.0e12 and i want to compute its inverse. since the data are too big, IDL could not determine the matrix determinant (even with determ(A,/double) command) and return Inf. Is there a way to compute its inverse and determinant?
>
> Cheers,

Subject: Re: Infinity matrix determinant
Posted by amin farhang on Mon, 17 Nov 2014 10:10:32 GMT
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Dear Sergey,

Thank you for answer.
The point is here that the factor^2000d return Infinity

IDL> print,(1.0d12)^2000d
Infinity

Subject: Re: Infinity matrix determinant
Posted by Sergey Anfinogentov on Mon, 17 Nov 2014 11:24:17 GMT
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If But you can calculate inverse matrix.
because for inverse matrix

(kA)^-1 = 1/k*(A^-1)
and
A^-1 = k*(kA^-1)

IDL code:

factor = 1d12
matrrix = matrix/factor
inverse = invert(matrix) ; invert is a built in function of IDL
inverse = inverse/factor

This should work fine.
For the determinant of such a matrix double precision is not enough. You should probably just memorize that you have a multiplier 1e24000.

> Dear Sergey,
>
> Thank you for answer.
> The point is here that the factor^2000d return Infinity
>
> IDL> print,(1.0d12)^2000d
> Infinity

I made a mistake

Subject: Re: Infinity matrix determinant
Posted by Sergey Anfinogentov on Mon, 17 Nov 2014 11:27:58 GMT
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You can still calculate inverse matrix.

because for inverse matrix you have

(kA)^-1 = 1/k*(A^-1)
 and
A^-1 = k*(kA^-1)

Try the following IDL code:

```
factor = 1d12
matrrix = matrix/factor
inverse = invert(matrix) ; invert is a built in function of IDL
inverse = inverse/factor
```

This should work fine.
For the determinant of such a matrix double precision is not enough. You should probably just memorize that you have a multiplier 1e24000.

> Dear Sergey,
>
> Thank you for answer.
> The point is here that the factor^2000d return Infinity
>
> IDL> print,(1.0d12)^2000d
> Infinity