Subject: Re: Decompose a matrix
Posted by jameskuyper on Wed, 19 Dec 2007 13:16:00 GMT
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d.poreh@gmail.com wrote:
> Folks
> I have a problem could anyone help me?
> Let:
> A = [[0,0,1], $
> [0,1,0], $
> [0,0,0]]
> B = [0.5,0.5,1]
>
> ; Decompose A
> SVDC, A, W, U, V
> ; Solve A.X=B
> X=SVSOL(U, W, V, B)
> new_B=A##X
> IDL> print,new_B
> 0.500000
> 0.500000
> 0.000000
> Why new_B is not equal to B' ?

Because there is no value of X such that A.X=B. That's because one of the eigenvalues of A is 0. What this means is that while the possible values for X fill a three-dimensional universe, the possible values for A.X only cover a flat two-dimensional plane within that universe. Whenever B is not on that plane, A.X = B cannot be solved. Matrix inversion fails in this case, because A doesn't have an inverse. What SVD does in this case is calculate the value of X such that A.X comes as close to B as possible while remaining on that flat plane. That is the advantage of using SVD over ordinary matrix inversion techniques.

Of course, a better solution is to re-define your problem so an exact solution is possible.