

Re: Matrix Minimax, sorta

Source: <http://sci.tech-archive.net/Archive/sci.math/2005-10/msg02297.html>

- *From:* israel@xxxxxxxxxxx (Robert Israel)
 - *Date:* 20 Oct 2005 07:15:03 GMT
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In article <dj572n\$9bs\$2@xxxxxxxxxxxxxxxxxxxxxxxxxxxx>, Hauke Reddmann <fc3a501@xxxxxxxxxxxxxxxx> wrote:
>I have the equation $aA+bB+cC+\dots=\min.$,
>where a,b,c,\dots are scalars, A,B,C are matrices,
> $a=b=c=\dots=0$ is ruled out and "min." isn't
>Euclidean norm but the rank.
>
>For special cases (e.g. two 2×2 matrices – just
>fix a/b so that the determinant vanishes) this
>is easy, but can you give a general approach?

The rank is the size of the largest nonsingular square submatrix. For the rank to be $\leq r$, all the $(r+1) \times (r+1)$ submatrices must have determinant 0. Those determinants are polynomials in a,b,c,\dots . So it's essentially reduced to solving a (maybe rather large) set of polynomials. Groebner basis techniques may help.

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- *References:*
 - ◆ [Matrix Minimax, sorta](#)
 - ◇ *From:* Hauke Reddmann
 - Prev by Date: [Re: relation from A to B. question about prove](#)
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