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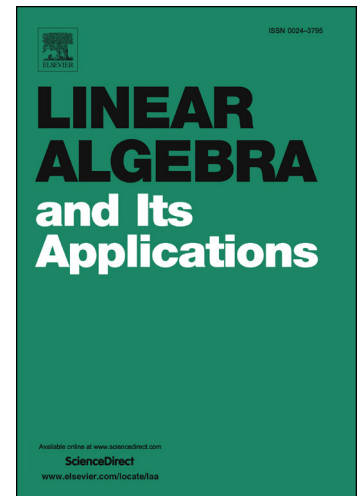
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On the Solvability of Derived Matrix Problems, Including Completions and Duals

Charles R. Johnson*

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Abstract

A class of $m - by - n$ real (complex) matrices is semi-algebraic (SA) if membership in it may be checked via a finite list of polynomial inequalities in the entries (the real and imaginary parts of the entries). Real algebraic geometry is used to show that (1) very many familiar classes of matrices (some perhaps surprising) are SA and (2) that two important derived problems (matrix completions and Hadamard Duals) lead to an SA solution when they come from an SA class. This means that at least there exists a finite solution to these problems though it may be difficult to find. The methodology likely extends to other problems of interest.

AMS-MOS Classification: 14P10, 15A99

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