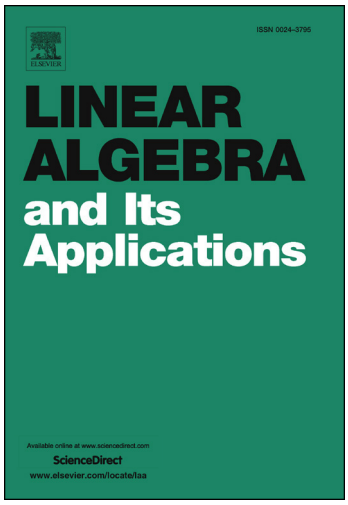

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Solvability and uniqueness criteria for generalized Sylvester-type equations*

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Abstract

We provide necessary and sufficient conditions for the generalized $\star$-Sylvester matrix equation, $AXB + CX^\star D = E$, to have exactly one solution for any right-hand side E. These conditions are given for arbitrary coefficient matrices A, B, C, D (either square or rectangular) and generalize existing results for the same equation with square coefficients. We also review the known results regarding the existence and uniqueness of solution for generalized Sylvester and $\star$-Sylvester equations.

Keywords. Sylvester equation, eigenvalues, matrix pencil, matrix equation

AMS classification: 15A22, 15A24, 65F15

1 Introduction

We consider the *generalized $\star$-Sylvester equation*

$$AXB + CX^\star D = E \tag{1}$$

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