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CANONICAL FORMS FOR DOUBLY STRUCTURED MATRICES AND PENCILS*

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Abstract. In this paper, canonical forms under structure-preserving equivalence transformations are presented for matrices and matrix pencils that have a multiple structure, which is either an H-self-adjoint or H-skew-adjoint structure, where the matrix H is a complex nonsingular Hermitian or skew-Hermitian matrix. Matrices and pencils of such multiple structures arise, for example, in quantum chemistry in Hartree–Fock models or random phase approximation.

Key words. Indefinite inner product, Self-adjoint matrix, Skew-adjoint matrix, Matrix pencil, Canonical form.

AMS subject classifications. 15A21, 15A22, 15A57

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