

SIGN CHARACTERISTICS OF REGULAR HERMITIAN MATRIX PENCILS UNDER GENERIC RANK-1 PERTURBATIONS AND A CERTAIN CLASS OF GENERIC RANK-2 PERTURBATIONS*

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Abstract. The spectral behavior of regular Hermitian matrix pencils is examined under certain structure-preserving rank-1 and rank-2 perturbations. Since Hermitian pencils have signs attached to real (and infinite) blocks in canonical form, it is not only the Jordan structure but also this so-called sign characteristic that needs to be examined under perturbation. The observed effects are as follows: Under a rank-1 or rank-2 perturbation, generically the largest one or two, respectively, Jordan blocks at each eigenvalue λ are destroyed, and if λ is an eigenvalue of the perturbation, also one new block of size one is created at λ . If λ is real (or infinite), additionally all signs at λ but one or two, respectively, that correspond to the destroyed blocks, are preserved under perturbation. Also, if the potential new block of size one is real, its sign is in most cases prescribed to be the sign that is attached to the eigenvalue λ in the perturbation.

Key words. Matrix pencil, Hermitian matrix pencil, Sign characteristic, Rank one perturbation, Rank two perturbation, Generic perturbation.

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