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PERTURBATION OF PURELY IMAGINARY EIGENVALUES OF HAMILTONIAN MATRICES UNDER STRUCTURED PERTURBATIONS*

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Abstract. The perturbation theory for purely imaginary eigenvalues of Hamiltonian matrices under Hamiltonian and non-Hamiltonian perturbations is discussed. It is shown that there is a substantial difference in the behavior under these perturbations. The perturbation of real eigenvalues of real skew-Hamiltonian matrices under structured perturbations is discussed as well and these results are used to analyze the properties of the URV method for computing the eigenvalues of Hamiltonian matrices.

Key words. Hamiltonian matrix, Skew-Hamiltonian matrix, Symplectic matrix, Structured perturbation, Invariant subspace, Purely imaginary eigenvalues, Passive system, Robust control, Gyroscopic system.

AMS subject classifications. 15A18, 15A57, 65F15, 65F35.

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