

## PERTURBATION ANALYSIS FOR COMPLEX SYMMETRIC, SKEW SYMMETRIC, EVEN AND ODD MATRIX POLYNOMIALS\*

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**Abstract.** In this work we propose a general framework for the structured perturbation analysis of several classes of structured matrix polynomials in homogeneous form, including complex symmetric, skew-symmetric, even and odd matrix polynomials. We introduce structured backward errors for approximate eigenvalues and eigenvectors and we construct minimal structured perturbations such that an approximate eigenpair is an exact eigenpair of an appropriately perturbed matrix polynomial. This work extends previous work of Adhikari and Alam for the non-homogeneous case (we include infinite eigenvalues), and we show that the structured backward errors improve the known unstructured backward errors.

**Key words.** Polynomial eigenvalue problem, even matrix polynomial, odd matrix polynomial, complex symmetric matrix polynomial, complex skew-symmetric matrix polynomial, perturbation theory, backward error.

**AMS subject classifications.** 65F15, 15A18, 65F35, 15A12

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