

## NORMAL MATRIX POLYNOMIALS WITH NONSINGULAR LEADING COEFFICIENTS\*

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**Abstract.** In this paper, the notions of weakly normal and normal matrix polynomials with nonsingular leading coefficients are introduced. These matrix polynomials are characterized using orthonormal systems of eigenvectors and normal eigenvalues. The conditioning of the eigenvalue problem of a normal matrix polynomial is also studied, thereby constructing an appropriate Jordan canonical form.

**Key words.** Matrix polynomial, Normal eigenvalue, Weighted perturbation, Condition number.

**AMS subject classifications.** 15A18, 15A22, 65F15, 65F35.

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