

Polynomials that preserve nonnegative matrices

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Abstract

In further pursuit of a solution to the celebrated nonnegative inverse eigenvalue problem, Loewy and London [Linear and Multilinear Algebra 6 (1978/79), no. 1, 83–90] posed the problem of characterizing all polynomials that preserve all nonnegative matrices of a fixed order. If \mathcal{P}_n denotes the set of all polynomials that preserve all n -by- n nonnegative matrices, then it is clear that polynomials with nonnegative coefficients belong to \mathcal{P}_n . However, it is known that \mathcal{P}_n contains polynomials with negative entries. In this presentation, results for \mathcal{P}_n with respect to the coefficients of the polynomials belonging to \mathcal{P}_n . Along the way, a generalization for the even and odd parts of a polynomial are given. This talk concludes with a characterization of \mathcal{P}_2 .

This presentation is based off two papers [Polynomials that preserve nonnegative matrices](#) and [Polynomials that preserve nonnegative matrices of order two](#).