

# Prescribing the Eigenvalues of an Analytic Matrix Function

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## Abstract

Leading figures in numerical linear algebra was interested in the distance from a matrix to a nearest one with a multiple eigenvalue in the 1970s and 1980s. It is now well-established that this distance is closely related to the sensitivity of the eigenvalues.

A singular value (i.e. the singular values of  $A$  are the square-roots of the eigenvalues of  $A^*A$ ) characterization for the distance derived by Malyshev in 1999 was striking. This together with an inverse shape estimation problem aroused my interest in locating nearby matrix functions with prescribed eigenvalues. I will start with linear matrix functions, so called matrix pencils, proceed with matrix polynomials and conclude with analytic matrix functions.