A Fast Algorithm for Computing the Null-Space of Polynomial Matrices

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The knowledge of the null-space of polynomial matrices is important in a variety of applications.

The generalized Schur algorithm allows to compute many classical factorizations of a matrix, such as the QR-factorization, the LDL'-factorization of a symmetric matrix, the Cholesky factorization of a symmetric positive definite matrix. If the involved matrix is Toeplitz-like structured, the computation of such factorizations can be done in a fast way via generalized Schur algorithm.

A fast algorithm to compute the null-space of polynomial matrices, obtained by modifying the generalized Schur algorithm, is proposed in this talk. Some numerical examples are provided.