Symplectic, BVD, and Palindromic Approaches to Discrete-Time Control Problems

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We give several different formulations for the discrete-time linear-quadratic control problem in terms of structured eigenvalue problems, and discuss the relationships among the associated structured objects: symplectic matrices and pencils, BVD-pencils/polynomials, and the recently introduced classes of palindromic matrix pencils/polynomials. We show how these classes can be transformed into each other, and also how their eigenvalues, eigenvectors and invariant/deflating subspaces are related.

This is joint work with Ralph Byers, D. Steven Mackey and Hongguo Xu