

## BLOCK COMPANION MATRICES, DISCRETE-TIME BLOCK DIAGONAL STABILITY AND POLYNOMIAL MATRICES

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**Abstract.** A polynomial matrix  $G(z) = Iz^m - \sum_{i=0}^{m-1} C_i z^i$  with complex coefficients is called discrete-time stable if its characteristic values (i.e. the zeros of  $\det G(z)$ ) are in the unit disc. A corresponding block companion matrix  $C$  is used to study discrete-time stability of  $G(z)$ . The main tool is the construction of block diagonal solutions  $P$  of a discrete-time Lyapunov inequality  $P - C^* P C \geq 0$ .

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