STABILITY REGION FOR DISCRETE TIME SYSTEMS AND ITS BOUNDARY

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In this paper we investigate the Schur stability region of the nth order polynomials in the coefficient space. Parametric description of the boundary set is obtained. We show that all the boundary can be obtained as a multilinear image of three $(n-1)$-dimensional boxes. For even and odd n these boundary boxes are different. Analogous properties for the classical multilinear reflection map are unknown. It is shown that for $n \geq 4$, both two parts of the boundary which are pieces of the corresponding hyperplanes are nonconvex. Polytopes in the nonconvex stability region are constructed. A number of examples are provided.

Keywords: Schur stability, stability region, polytope, boundary set.

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