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STABILITY ANALYSIS FOR THE LINEAR SYSTEM WITH STRUCTURED UNCERTAINTIES USING PSEUDO-REMAINDER SEQUENCES

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Abstract. In this paper, we study the stability conditions for characteristic polynomials whose coefficients are polynomials of interval parameters. We have presented several stability conditions by defining and using the notion of monotonicity of a multivariable polynomial. From the viewpoint of our monotonicity test, we compared the polynomial remainder sequence algorithms such as Routh array, subresultant polynomial remainder sequence algorithm by Brown, and the optimal fraction free Routh array algorithm by Jeltsch. We found the last one is most convenient for our purpose if we combine it with Frazer-Duncan's theorem and our monotonicity test. If the monotonicity conditions hold, we have only to check the positivity of the largest Hurwitz determinant $H_n(\boldsymbol{p})$ only at the endpoints of parameter region. We can check another condition of Frazer-Duncan's theorem by examining the stability of the characteristic polynomial at an endpoint of parameter region. We illustrate our method by an example
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1 Introduction

This paper is concerned with the computational aspect of the stability analysis of a linear system with interval parameters. We assume that the coefficients of the characteristic polynomial $F(s, \boldsymbol{p})$ are polynomials of interval