

Improved criteria on robust analysis for linear system using convex combination and geometric sequence methods

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Abstract

This paper addresses the robust analysis on a delayed system with uncertainties. A geometric sequence division (GSD) method is applied for delay partition. Then, a GSD-dependent Lyapunov-Krasovskii functional (LKF) is newly proposed, in which the integral interval relevant with the state variables forms in geometric progression. In addition, by applying the convex combination method, the parameter uncertainties and the delay derivative $\dot{d}(t)$ can thus be flexibly overcome. As a result, unnecessary enlargement for estimating the LKF derivative is eliminated. Numerical example shows that this proposed work achieves expected results.

Key Words: Convex combination; Delay partition; Geometric sequence; Parameter uncertainties.