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Diagonal solutions for a class of linear matrix inequality

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Abstract

In this paper, we present a characterization of diagonal solutions for a class of linear matrix inequalities. We consider linear hybrid time-delay systems and explore the conditions under which these systems are positive and asymptotically stable. Specifically, we investigate the existence of positive diagonal solutions for a linear inequality when the system matrices are Metzler and nonnegative. Using various mathematical tools, including the Schur complement and separation theorems, we derive necessary and sufficient conditions for the stability of these systems. Our results extend existing stability criteria and provide new insights into the stability analysis of positive timedelay systems

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