



On the PLF Construction for the Absolute Stability Study of Dynamical Systems with Non-Constant Gain

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Abstract: This paper deals with the absolute stability analysis of uncertain systems formulated in linear differential inclusion. It presents an approach based on the representation of a polyhedral positively invariant set by its vertices, allowing to construct the associated Lyapunov function. Efficiency of the method is discussed through a numerical example, where the absolute stability of a third order system has been analyzed via the construction of a Polyhedral Lyapunov Function (PLF). The flexibility of the proposed mesh and the check procedure of Molchanov–Pyatinskii conditions give a larger parameterized absolute stability domain than the one obtained by others existing in the literature.

Keywords: *absolute stability; uncertain systems; polyhedral Lyapunov function; sphere triangulation; linear programming.*

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