

# Quadratic Stabilization for Nonlinear Perturbed Discrete Time-Delay Systems

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**Abstract:** This paper discusses the quadratic stability and quadratic stabilization problem for a class of nonlinear perturbed discrete time-delay systems. Necessary and sufficient conditions for quadratic stability are presented via S-procedure technique and linear matrix inequality (LMI). Both static and dynamic output feedback controllers are constructed respectively. Furthermore, necessary and sufficient conditions for quadratic stabilization via static state feedback are constructed in the form of LMI. Finally, the effectiveness of new approach is demonstrated by numerical examples.

**Keywords:** *Discrete systems; time-delay; nonlinear perturbation; quadratic stabilization; linear matrix inequality.*

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