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Practical Stability and Controllability for a Class of Nonlinear Discrete Systems with Time Delay ⋆

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Abstract: In this paper we first study the problem of practical asymptotic stability for a class of discrete-time time-delay systems via Razumikhin-type Theorems. Further the estimations of solution boundary and arrival time of the solution into a region are also investigated based on the practical stability results. Finally, the result on practical asymptotic stability is used to analyze the practical controllability of a general class of nonlinear discrete systems with input time delay. Some explicit criteria for the uniform practical asymptotic stability are derived via Lyapunov function and Razumikhin technique. For illustration, a numerical example is given to show the effectiveness of the proposed results.

Keywords: *practical stability; practical controllability; Razumikhin techniques; discrete systems; time delay.*

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