

**Delay- Dependent Approach to Robust Stability for Uncertain
Discrete Stochastic Recurrent Neural Networks with Interval
Time-Varying Delays**

Lu, Chien-Yu; Zheng, Kai-Yuan; Liao, Chin-Wen;
Huang, Chuan-Kuei ; Pan, Po-Jung

Abstract

This paper considers the problem of global robust delay-range-dependent stability for uncertain discrete stochastic recurrent neural networks with interval time-varying delays. The parameter uncertainties are assumed to be time-varying norm-bounded in the state equation. The activation functions are assumed to be globally Lipschitz continuous. Based on an appropriate Lyapunov- Krasovskii functional, global robust delay-dependent stability criterion which is dependent on both the lower bound and upper bound of the interval time-varying delays is derived. A sufficient condition for the discrete stochastic recurrent neural networks with interval time-varying delays is presented in terms of the linear matrix inequality (LMI). An example is given to demonstrate the reduced conservatism of the proposed results in this paper.

Key words: Discrete stochastic recurrent neural network;
Interval time-varying delay; Linear matrix inequality;
Uncertainty; Robust stability