

**Delay-dependent approach to robust stability for  
uncertain discrete stochastic recurrent neural networks  
with interval time-varying delays**

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**Abstract**

This paper considers the problem of global robust delay-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 by introducing some slack matrix variables. 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). A numerical example is given to demonstrate the reduced conservatism of the proposed results in this paper.

**Key words:** Discrete stochastic recurrent neural networks;  
Interval time-varying delays; Linear matrix inequality;  
Robust stability; Uncertainty