
Robustness analysis of discontinuous neural networks

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Abstract

Neural networks have been studied widely issuing from the fact that, they have many important applications in pattern recognition, signal processing, associative memory, and optimization problems. All of these applications tediously depend on dynamical behaviors of the network. In the present talk, different from the most existing results, we introduce a more general class of neural networks related to the impulsive phenomena that happen at nonprescribed moments of time. The aim of defining this new class is that in the real world problems the impulses of many systems do not occur at fixed times but depends on the states of the systems, for example, some circuit control systems, saving rate control systems and population control systems and so on. These types of systems are called state-dependent impulsive differential systems or impulsive systems with variable-time impulses. In the current talk, we discuss robustness of the neural networks having impulse times at the hyper surfaces $\Gamma_k : t = \theta_k + \tau_k(x), k \in \mathbb{Z}$, not on the planes $t = \theta_k$. In order to analyze global robust asymptotic stability of such systems, first we reduce the system to a fix time impulsive system by means of B -equivalence method, then we used an appropriate Lyapunov function and linear matrix inequality (LMI). An illustrative example is given to show the effectiveness of the theoretical results.

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