短文

切换线性超循环系统的稳定性分析

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摘要
超循环---生物学中重要模型, 具有广泛的实际背景. 本文将超循环系统扩展为切换超循环系统. 循环矩阵的循环结构为研究切换超循环系统的稳定性提供了有效的方法, 给出切换线性时变超循环系统在任意切换律下渐近稳定的充要条件和切换线性定常超循环系统可切换镇定的充分条件.

关键词　　超循环　循环矩阵　切换系统　稳定性　切换律

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Stability Analysis for the Switched Linear Hypercycle Systems

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Abstract
Hypercycle is an important system model in biology, which extensively exists in real world. In this paper, hypercycle systems are extended into switched hypercycle systems. The circulant structure of the circulant matrices provides an effective method for the stability analysis of the switched hypercycle systems. Two main results of the stability are presented. One is the necessary and sufficient condition of asymptotic stability of the switched linear time-varying hypercycle system under arbitrary switching laws; the other is the sufficient condition of asymptotic stabilization of the switched linear time-invariant hypercycle systems under certain switching law.

Key words　　Hypercycle　circulant matrix　switched system　stability　switching law

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