

论文

江苏-西部能源需求-供给模型及其动力学分析

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收稿日期 2004-10-8 修回日期 2005-10-22 网络版发布日期 2007-1-29 接受日期

摘要 根据江苏省能源需求与西部能源供给及江苏省能源进口量之间相互支持、相互制约的复杂关系建立了江苏--西部能源需求--供给系统. 分析了系统的稳态、周期、分叉、混沌等若干动力学行为. 通过调节参数可以使系统处于稳定发展或周期震荡区域中. 基于Silnikov定理, 应用待定系数法, 求出了能源系统的同宿轨的表达式. 证明了在两个平衡点处均有Silnikov型的同宿轨. 根据Silnikov定理确保了能源系统有Smale马蹄和马蹄形混沌.

关键词 [能源系统](#) [平衡点](#) [Hopf分叉](#) [混沌](#) [Silnikov定理](#) [同宿轨](#)

分类号 [37D45](#)

Energy demand-supply model fo Jiangsu-west and its dynamical analysis

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Abstract

This paper has established an energy demand-supply model for Jiangsu-West in accordance with the complicated relationship of mutual supports and constraints between the demand of Jiangsu energy, the import quantity of Jiangsu energy, and the energy supply of the western regions. The paper has also analyzed the dynamics behavior of the system in different states from equilibrium, periodicity, and bifurcation to chaos, etc. Based on the Silnikov theorem, by applying the undetermined coefficient method, we find homoclinic orbits of the energy system. It analytically demonstrates that the energy system has two homoclinic orbits of Silnikov type in two equilibrium points. The Silnikov theorem guarantees that the energy system has Smale horseshoes and the horseshoe chaos.

Key words [Energy system](#) [equilibrium point](#) [Hopf bifurcation](#) [chaos](#) [Silnikov theorem](#) [homoclinic orbit](#)

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