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Analyses of Bifurcations and Stability in a Predator-prey System

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摘要 In this paper the dynamical behaviors of a

predator-prey system with

Holling Type-IV functional response are investigated in detail

by using the analyses of qualitative method, bifurcation theory, and

numerical simulation. The qualitative analyses and numerical

simulation for the model indicate that it has a unique stable limit cycle.

The bifurcation analyses of the system exhibit static and

dynamical bifurcations including saddle-node bifurcation, Hopf bifurcation,

homoclinic bifurcation and bifurcation of cusp-type with codimension two

(ie, the Bogdanov-Takens bifurcation), and we show the existence of codimension

three degenerated equilibrium and the existence of homoclinic orbit by using

numerical simulation.

关键词 [Predator-prey system, Limit cycle, Bogdanov-Takens bifurcation](#)

分类号

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Abstract

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