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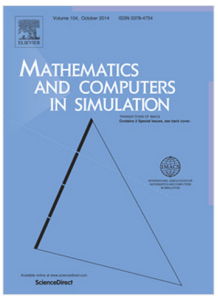

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On the dynamics of an intraguild predator-prey model

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Abstract

An intraguild predator-prey model with a carrying capacity proportional to the biotic resource, is generalized by introducing a Holling type II functional response. The longtime behaviour of solutions is analyzed and, in particular, absorbing sets in the phase space are determined. The existence of biologically meaningful equilibria (boundary and internal equilibria) has been investigated. Linear and nonlinear stability conditions for biologically meaningful equilibria are performed. Finally, numerical simulations on different regimes of coexistence and extinction of the involved populations have been shown.

Keywords: Intraguild predation, Stability, Longtime behavior, Holling type II functional response

1. Introduction

Studies of predator-prey models have been performed in theoretical ecology since the early days of this discipline after the pioneering works of Lotka and Volterra. Many researchers have paid great attention to the dynamics of populations (see for instance [3]-[4], [21], [23]-[25], and references therein) and a number of predator-prey models have been proposed and studied. Such a modeling provides challenges and ideas in many other fields of applied mathematics such as structural engineering, ecology, aerospace science and eco-

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