

Online Biomath Seminar

Friday, September 19 at 11 am

Speaker: Anuraj Singh, Atal Bihari Vajpayee Indian Institute of Information Technology and Management Gwalior

Title: A modified May Holling Tanner Model: the role of dynamic alternative resources on species' survival

Abstract:

The present paper investigates the dynamical behavior of the modified May Holling Tanner model in the presence of dynamic alternative resources. We study the role of dynamic alternative resources on the survival of the species when there is prey rarity. Detailed mathematical analysis and numerical evaluations, including the situation of ecosystem collapsing, have been presented to discuss the coexistence of species', stability, occurrence of different bifurcations (saddle-node, transcritical, and Hopf) in three cases in the presence of prey and alternative resources, in the absence of prey and in the absence of alternative resources. It has been obtained that the multiple coexisting states and their stability are outcomes of variations in predation rate for alternative resources. Also, the occurrence of Hopf bifurcation, saddle-node bifurcation, and transcritical bifurcation are due to variations in the parameters of dynamic alternative resources. The impact of dynamic alternative resources on species' density reveals the fact that if the predation rate for alternative resources increases, then the prey biomass increases (under some restrictions), and variations in the predator's biomass widely depend upon the quality of food items. This study also points out that the survival of predators is possible in the absence of prey. In the theme of ecological balance, the present study suggests some theoretical points of view for the eco-managers.

Zoom:

<https://texastech.zoom.us/j/93886533169?pwd=sJbJSi4BQsy2OM2ow8A4xsELJHgI22.1>

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