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A universal bifurcation diagram for seasonally perturbed predator-prey models. (English)

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Summary: The bifurcations of a periodically forced predator-prey model (the chemostat model), with a prey feeding on a limiting nutrient, are numerically detected with a continuation technique. Eight bifurcation diagrams are produced (one for each parameter in the model) and shown to be topologically equivalent. These diagrams are also equivalent to those of the most commonly used predator-prey model (the Rosenzweig-McArthur model). Thus, all basic modes of behavior of the two main predator-prey models can be explained by means of a single bifurcation diagram.

MSC:

92D40 Ecology

34C23 Bifurcation theory for ordinary differential equations

Cited in 18 Documents

Keywords:

periodically forced predator-prey model; chemostat model; limiting nutrient; continuation technique; bifurcation diagrams; Rosenzweig- McArthur model

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