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Persistence in predator-prey systems with ratio-dependent predator influence. (English)

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Summary: Predator-prey models where one or more terms involve ratios of the predator and prey populations may not be valid mathematically unless it can be shown that solutions with positive initial conditions never get arbitrarily close to the axis in question, i.e. that persistence holds. By means of a transformation of variables, criteria for persistence are derived for two classes of such models, thereby leading to their validity. Although local extinction certainly is a common occurrence in nature, it cannot be modeled by systems which are ratio-dependent near the axes.

MSC:

92D40 Ecology
34C99 Qualitative theory for ordinary differential equations
92D25 Population dynamics (general)

Cited in 45 Documents

Keywords:

predator-to-prey ratio dependence; solutions with positive initial conditions; transformation of variables; criteria for persistence; local extinction

Full Text: DOI

References:

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