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Nonexistence of limit cycles in a predator-prey system with a sigmoid functional response.

(English) [Zbl 0977.92019](#)

Can. Appl. Math. Q. 7, No. 4, 401-408 (1999).

Summary: We consider a predator-prey system with a sigmoid functional response of the form $\varphi(x) = x^n/(a + x^n)$, $n > 1$. Following *J. Sugie* et al. [J. Math. Anal. Appl. 159, No. 1, 224-236 (1991; [Zbl 0731.34042](#)); Appl. Math. Lett. 9, No. 4, 85-90 (1996; [Zbl 0865.34032](#))], by taking advantage of *H.I. Freedman* and *J.W.-H. So's* theorem [Math. Biosci. 76, 69-86 (1985; [Zbl 0572.92025](#))] we present a sufficient and necessary condition for the nonexistence of limit cycles of this system with $n > 1$.

MSC:

[92D25](#) Population dynamics (general)

[34C05](#) Topological structure of integral curves, singular points, limit cycles of ordinary differential equations

[92D40](#) Ecology

Cited in **6** Documents

Keywords:

Lienard system; predator-prey system; sigmoid functional response; limit cycles