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Convergence of solutions for Volterra-Lotka prey-predator systems with time delays. (English) [Zbl 1163.34303](#)

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Summary: This work is concerned with N -species prey-predator systems with time delays. The aim of this work is to obtain a sufficient condition for asymptotic behavior of the time-dependent solution and the existence of a positive steady-state solution. The result of global asymptotic stability implies that all of the model systems coexist; the trivial and all kinds of semitrivial solutions are unstable.

MSC:

[34A12](#) Initial value problems, existence, uniqueness, continuous dependence and continuation of solutions to ordinary differential equations Cited in 3 Documents
[92D25](#) Population dynamics (general)

Keywords:

time delay; upper-lower solutions; asymptotic stability; prey-predator model; coexistence

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References:

- [1] Li, L.; Cao, G.; Liu, Y., The relationships between equilibria and positive solutions of certain nonlinear elliptic systems, *J. math. anal. appl.*, 209, 154-179, (1997) · [Zbl 0884.35032](#)
- [2] Li, L., On positive solutions of general nonlinear elliptic symbiotic interacting systems, *Appl. anal.*, 40, 281-295, (1991) · [Zbl 0757.35023](#)
- [3] Yamada, Y., Stability of steady-states for prey – predator diffusion equations with homogeneous Dirichlet conditions, *SIAM J. math. anal.*, 21, 327-345, (1990) · [Zbl 0702.35123](#)
- [4] Zhou, L.; Pao, C.V., Asymptotic behavior for a competition – diffusion system in population dynamics, *Nonlinear anal.*, 6, 1163-1184, (1982) · [Zbl 0522.92017](#)
- [5] Feng, W., Permanence effect in a three species food chain model, *Appl. anal.*, 54, 195-209, (1994) · [Zbl 0834.92023](#)
- [6] Lakos, N., Existence of steady-state solutions for a one-predator – two-prey system, *SIAM J. math. anal.*, 21, 647-659, (1990) · [Zbl 0705.92019](#)
- [7] Pao, C.V., *Nonlinear parabolic and elliptic equations*, (1992), Academic Press New York · [Zbl 0780.35044](#)
- [8] Pao, C.V., Quasisolutions and global attractor of reaction – diffusion systems, *Nonlinear anal.*, 26, 1889-1903, (1996) · [Zbl 0853.35056](#)
- [9] Ruan, S.G.; Zhao, X.Q., Persistence and extinction in two species reaction diffusion systems with delays, *J. differential equations*, 156, 71-92, (1999) · [Zbl 0936.35092](#)
- [10] Ruan, W.; Feng, W., On the fixed point index and multiple steady-state solutions of reaction diffusion system, *Differ. integral equ.*, 2, 371-391, (1995) · [Zbl 0815.35017](#)
- [11] Pao, C.V., Global asymptotic stability of lotka – volterra 3-species reaction – diffusion systems with time delays, *J. math. anal. appl.*, 281, 186-204, (2003) · [Zbl 1031.35071](#)
- [12] Pao, C.V., Convergence of solutions of reaction – diffusion systems with time delays, *Nonlinear anal.*, 48, 349-362, (2002) · [Zbl 0992.35105](#)
- [13] Pao, C.V., Global asymptotic stability of lotka – volterra competition systems with diffusion and time delays, *Nonlinear anal. RWA*, 5, 91-104, (2004) · [Zbl 1066.92054](#)

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