

Persistence of non-autonomous Nicholson's systems

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Since in 1980 Gurney *et al.* [1] presented the scalar delay equation $x'(t) = -\mu x(t) + p x(t-\tau) e^{-\gamma x(t-\tau)}$, which was called the Nicholson's blowflies equation, many authors have been concerned with the stability, persistence or existence of certain kind of solutions for this equation or for some of its generalizations. More recently Nicholson systems have also been considered, as they fit models for one single species in an environment with a patchy structure or for multiple biological species. For the case of non-autonomous Nicholson systems, with a certain recurrent variation of the time so that the theory of non-autonomous dynamical systems can be applied, we give necessary and sufficient conditions for the presence of uniform persistence and strict persistence. This talk is based on joint works with Sylvia Novo and Rafael Obaya.

References

- [1] W.S.C. GURNEY, S.P. BLYTHE, R.M. NISBET, Nicholson's blowflies revisited, *Nature* **287** (1980), 17–21.
- [2] S. NOVO, R. OBAYA, A.M. SANZ, Uniform persistence and upper Lyapunov exponents for monotone skew-product semiflows. *Nonlinearity* **26** (2013), 1–32.
- [3] R. OBAYA, A.M. SANZ, Uniform and strict persistence in monotone skew-product semiflows with applications to non-autonomous Nicholson systems. *Submitted for publication* (2016).

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