

Non-Existence, Uniqueness of Limit Cycles and Center Problem in a System That Includes Predator-Prey Systems and Generalized Lienard Equations

A. Gasull* and A. Guillamon†

(Submitted by: K.P. Haderler)

Abstract

We study the number of periodic orbits of a family of planar differential equations that includes usual predator-prey systems and generalized Liénard equations. More explicitly, we give conditions for non-existence, uniqueness and hyperbolicity of periodic orbits and also for the existence of centers. The main tool used is a generalization of the Filippov transformation. We apply the results on non-existence of periodic orbits and on the existence of centers to some predator-prey systems found in the literature. The result on uniqueness is applied to some generalized Liénard equations.

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