DEPARTAMENTO DE ANÁLISIS MATEMÁTICO Y MATEMÁTICA APLICADA

Facultad de Ciencias MATEMÁTICAS

Instituto de Matemática Interdisciplinar

SEMINARIO DE ANÁLISIS MATEMÁTICO Y MATEMÁTICA APLICADA

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Prelectura de tesis
Predation

Abstract:

The main purpose of this PhD Thesis is to analyze the phenomena of predation through the study of some paradigmatic periodic heterogeneous and spatially heterogeneous diffusive predator-prey models. Part I is devoted to the study of the Volterra periodic predator-prey models. The main findings of this part are a series of multiplicity results of subharmonics using a variety of topological techniques such as Bifurcation Theory, the Poincaré–Birkhoff Theorem, and chaotic Poincaré maps.

Part II invokes a number of techniques from Nonlinear Analysis and PDEs, headed by the strong maximum principle, to analyze a generalized heterogeneous parabolic predator-prey model with saturation effects that establishes a homotopy between the classical Lotka–Volterra and Holling–Tanner models. In particular, the positive steady states of this model are constructed through local and global bifurcation techniques combined with some global continuation arguments and the fixed point index in cones.

Organized by: Departamento de Análisis Matemático y Matemática Aplicada and Instituto de Matemática Interdisciplinar (IMI)

Date: Friday, April 14, 2023,11:00h
Place: Room 209 (Seminario Alberto Dou)
Facultad de CC. Matemáticas, UCM