Seminário de Análise

Refuge versus dispersion in the logistic equation

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Abstract. In this talk we consider a logistic equation with nonlinear diffusion arising in population dynamics. In this model, there exists a refuge where the species grows following a Malthusian law and, in addition, there exists also a nonlinear diffusion representing a repulsive dispersion of the species based on [2]. We prove existence and uniqueness of positive solution and study the behavior of this solution with respect to the parameter λ, the growth rate of the species. Mainly, we use bifurcation techniques, the sub-supersolution method and a construction of appropriate large solutions.

We also compare our results with the classical logistic equation with linear diffusion and interpreting in the context of population dynamics.

Joint work with Antonio Suárez (Universidad de Sevilla - Spain) and Cristian Morales-Rodrigo (Universidad de Sevilla - Spain).

References

[1] Cantrell, R. S. and Cosner, C.: Spatial Ecology via Reaction-Diffusion Equations, Wiley series in mathe-matical and computational biology, J. Wiley, 2003.

[2] Cintra, W; Morales-Rodrigo, C. and Suárez A.: Refuge versus dispersion in the logistic equation, J. of Differential Equations, 262, 5606-5634 (2017)

[3] Cîrstea, F. and Radulescu, V. D.: Existence and uniqueness of blow-up solutions for a class of logisticequations, Commun. Contemp. Math. 4 (2002) 559–586

[4] López-Gómez, J.: Metasolutions of Parabolic Equations in Population Dynamics, Taylor and Francis Group (2016).

[5] Turchin, P.: Population consequences of aggregative movement, J. of Animal Ecol., 58, 75–100 (1989).