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Universidade de Aveiro

CIDMA CENTRO DE I&D EM MATEMÁTICA E APLICAÇÕES
CENTER FOR R&D IN MATHEMATICS AND APPLICATIONS

SEMINAR

Grupo de Análise Funcional e Aplicações
Functional Analysis and Applications Group

A weighted anisotropic spectral optimization problem arising in population dynamic

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Abstract

I will present some recent results obtained in collaboration with B. Pellacci and G. Pisante on a weighted eigenvalue problem with anisotropic diffusion in bounded Lipschitz domains under Robin boundary conditions. We prove the existence of two positive eigenvalues $\lambda^\pm$ respectively associated with a positive and a negative eigenfunction, and we analyze the minimization of $\lambda^\pm$ with respect to the sign-changing weight, showing that the optimal weights are of bang-bang type, namely piece-wise constant functions, each one taking only two values. Then, we completely solve the optimization problem in one dimension, in the case of homogeneous Dirichlet or Neumann conditions, showing new phenomena induced by the presence of the anisotropic diffusion. The optimization problem for λ^+ naturally arises in the study of the optimal spatial arrangement of resources for a species to survive in an heterogeneous habitat. I will also discuss some partial results and currently ongoing work in the higher dimensional case.

Room Sousa Pinto
May 28, 2024 - 14:30

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