

## Asymptotic spherical shapes in some spectral optimization problems

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We study the positive principal eigenvalue of a weighted problem associated with the Neumann Laplacian. This analysis is related to the investigation of the survival threshold in population dynamics. When trying to minimize such eigenvalue with respect to the weight, one is led to consider a shape optimization problem, which is known to admit spherical optimal shapes only in very specific cases. We investigate whether spherical shapes can be recovered in general situations, in some singular perturbation limit. These are joint works with Dario Mazzoleni and Benedetta Pellacci.