Singular analysis of the optimizers of the principal eigenvalue of the Laplacian with an indefinite weight

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When analyzing the survival threshold for a species in population dynamics, one is led to consider the principal eigenvalue of some indefinite weighted problems in a bounded domain. We study the minimization of such eigenvalue, associated with either Dirichlet or Neumann boundary conditions, performing the analysis of the singular limit in case of arbitrarily small favorable region. We show that, in this regime, the favorable region is connected and it concentrates at points depending on the boundary conditions. Moreover, we investigate the interplay between the location of the favorable region and its shape. Joint works with Lorenzo Ferreri, Dario Mazzoleni and Benedetta Pellacci.