

Eloi Martinet: Numerical maximization of Neumann eigenvalues on domains on the sphere

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We consider the numerical optimization of the first three eigenvalues of the Laplace-Beltrami operator of domains on the sphere with Neumann boundary conditions. We address two approaches : one is a shape optimization procedure via the level-set method and the other one is a relaxation of the initial problem leading to a density method. These computations give some strong insight on the optimal shapes of those eigenvalue problems and show a rich variety of shapes regarding the proportion of the surface area of the sphere occupied by the domain.