

INEQUALITIES FOR THE MINIMAL EIGENVALUE OF THE LAPLACIAN IN AN ANNULUS

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Abstract. We discuss the behavior of the minimal eigenvalue λ of the Dirichlet Laplacian in the domain $D_1 \setminus D_2 := D$ (an annulus) where D_1 is a circular disc and $D_2 \subset D_1$ is a smaller circular disc. It is conjectured that the minimal eigenvalue λ has a maximum value when D_2 is a concentric disc. If h is a displacement of the center of the disc D_2 and $\lambda(h)$ is the corresponding minimal eigenvalue, then $\frac{d\lambda(h)}{dh} < 0$ so that $\lambda(h)$ is minimal when ∂D_2 touches ∂D_1 , where ∂D is the boundary of D . Numerical results are given to back the conjecture. Upper and lower bounds are given for $\lambda(h)$.

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