Extrema of Low Eigenvalues of the Dirichlet–Neumann Laplacian on a Disk

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Abstract. We study extrema of the first and the second mixed eigenvalues of the Laplacian on the disk among some families of Dirichlet–Neumann boundary conditions. We show that the minimizer of the second eigenvalue among all mixed boundary conditions lies in a compact 1-parameter family for which an explicit description is given. Moreover, we prove that among all partitions of the boundary with bounded number of parts on which Dirichlet and Neumann conditions are imposed alternately, the first eigenvalue is maximized by the uniformly distributed partition.

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