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# Isoperimetric Inequalities for Convex Cones and Wedge-Like Domains

By introducing geometric factors and physical parameters which lend themselves to the Payne interpretation in Weinstein fractional space, we prove new isoperimetric inequalities for the fundamental eigenvalue of the Dirichlet problem for wedge-like membranes in two dimensions, and convex cones in higher dimensions. These inequalities generalize and improve sharp inequalities that date back to the works of Payne-Weinberger (1960), Payne-Rayner (1973), Crooke-Sperb (1978), and Chiti (1982). We also motivate, conjecture, and prove an isoperimetric inequality relating the fundamental eigenvalue of a wedge-like membrane to its “relative torsional rigidity”. This new sharp inequality beats both Faber-Krahn and Payne-Weinberger at the isoperimetric game. The central tool of this recent development is the use of a new weighted form of the Kohler-Jobin symmetrization method, which we introduce. (Joint work with A. Hasnaoui)