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MR710944 (85f:35159) 35P15 (49Fxx 49G05 73K12 73K15)

Joó, I. (H-SZEG); **Stachó, L. L.** (H-SZEG)

Generalization of an inequality of G. Pólya concerning the eigenfrequences of vibrating bodies.

Publ. Inst. Math. (Beograd) (N.S.) **31(45)** (1982), 65–72.

This paper applies geometric measure theory to extend the "method of interior parallels" (Makai, Polya, Payne-Weinberger) to higher dimensions, which gives upper bounds for the first eigenvalue of an "N-dimensional membrane" with fixed boundary in terms of its N-dimensional volume and the $(N-1)$-dimensional volume of the boundary, under the condition that the Minkowski curvature be nonnegative. As in 2 dimensions, the main point is geometrical: the $(N-1)$-volume of the "interior parallels" is a decreasing function of their distance from the boundary.

{Reviewer's remarks: (a) In the case $N=2$, Makai, Polya and Payne-Weinberger used essentially a geometrical inequality of B. Sz.-Nagy [Acta Sci. Math. (Szeged) 20 (1959), 36–47; MR0107213 (21 #5938)]. (b) Polya's result (3) is valid not only for convex domains but for simply or doubly connected plane domains. (c) The relation attributed to Payne and Weinberger on the first page is not their isoperimetric theorem given in the quoted paper.}

Reviewed by *J. Hersch* (Nürensdorf/Zürich)

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