
A reverse quantitative isoperimetric type inequality for the Dirichlet Laplacian

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A stability result in terms of the perimeter is obtained for the first Dirichlet eigenvalue of the Laplacian operator. In particular we prove that, once we fix the dimension $n \geq 2$, there exists a constant $c > 0$, depending only on n , such that, for every $\Omega \subset \mathbb{R}^n$ convex set with volume equal to 1, it holds

$$\lambda_1(\Omega) - \lambda_1(B) \geq c(P(\Omega) - P(B))^2,$$

where by $\lambda_1(\cdot)$ we denote the first Dirichlet eigenvalue of a set, by $P(\cdot)$ its perimeter and by B a ball of \mathbb{R}^n with unitary volume.