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The Minimal Gap Between $\Lambda_2(\Omega)$ and $\Lambda_\infty(\Omega)$ in a Class of Convex Domains

We consider the minimization problem

$$\min_{\Omega \in X} \left(\Lambda_2 - \Lambda_\infty \right)(\Omega),$$

where $\Lambda_2(\Omega)$ and $\Lambda_\infty(\Omega)$ are the (square root of the) first eigenvalue of the Laplacian and the first eigenvalue of the $\infty-$Laplacian respectively. X is the class of convex domains with prescribed diameter. We prove existence of a solution, and we provide several geometrical properties of minimizers.