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Regularity of minimizers of shape optimization problems involving perimeter

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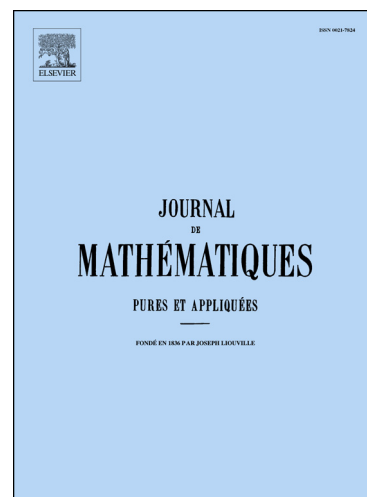
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Résumé. Nous démontrons l'existence et la régularité des formes optimales pour le problème

$$\min \left\{ P(\Omega) + \mathcal{G}(\Omega) : \Omega \subset D, |\Omega| = m \right\},$$

où P désigne le périmètre, $|\cdot|$ le volume et la fonctionnelle $\mathcal{G}$ est l'une des suivantes:

- l'énergie de Dirichlet E_f , associée à une fonction $f \in L^p$ qui peut changer de signe.
- une fonctionnelle spectrale de la forme $F(\lambda_1, \dots, \lambda_k)$, où λ_k est la k -ième valeur propre du Laplacien Dirichlet et $F : \mathbb{R}^k \rightarrow \mathbb{R}$ est localement lipschitzienne et strictement croissante en chacune des variables.

Keywords: Shape optimization, Dirichlet energy, spectral functional, regularity.

MSC2010: 49Q10, 49N60, 35P99, 35R35.

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