

## On the quantitative isoperimetric inequality in the plane with the barycentric asymmetry

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**Abstract.** In this paper we study a quantitative isoperimetric inequality in the plane, related to the isoperimetric deficit  $\delta$  and the barycentric asymmetry  $\lambda_0$ . Our aim is to prove that there exists an absolute constant  $C$  such that for every planar (convex or compact and connected) set  $\Omega$  it holds:  $\lambda_0^2(\Omega) \leq C \delta(\Omega)$ . This generalizes some results obtained by B. Fuglede in 1993 [12]. For that purpose, we consider a shape optimization problem in which we minimize the ratio  $\delta(\Omega)/\lambda_0^2(\Omega)$  both in the class of compact connected sets and in the class of convex sets.

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