On Relative Geometric Inequalities

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Resumen

Let E be a subset of a convex, open, bounded, planar set G. Let $P(E, G)$ be the relative perimeter of E (the length of the boundary of E contained in G). We obtain relative geometric inequalities comparing the relative perimeter of E with the relative diameter of E and with its relative inradius. We prove the existence of both extremal sets and maximizers for these inequalities and describe the geometric properties of them. We also give a characterization of planar convex sets of constant width in terms of the geometric constant corresponding to the relative diameter.