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An Integral Identity with Applications to Convex Sets

We propose a notion of "orientation" for $(n - 1)$ -rectifiable sets in \mathbb{R}^n . Using the classical methods of geometric measure theory, we prove that the integral of a certain Riesz-type kernel over these "oriented" sets is an absolute constant, from which a formula for surface measure immediately follows. Geometric interpretations are given, and the solution to a geometric variational problem characterizing the family of convex sets follows as a corollary.