An integral invariant for star-shaped domains

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Abstract

Integral invariants are expected to be useful for shape recognition, but a rigorous analysis of the underlying mathematical framework is missing so far. We focus our attention to the cone area invariant, which measures the area of intersection of a cone with the characteristic function of the object of interest. We present theoretical results concerning the injectivity of the mapping of the shape to its invariant in arbitrary space dimension. Furthermore, we show some numerical results refering to the reconstruction of the original shape based upon its invariant by using an appropriate numerical method.