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Two methods for discretizing a delta function supported on a level set. (English)

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Let $f : \mathbb{R}^n \rightarrow \mathbb{R}$ and $u : \mathbb{R}^n \rightarrow \mathbb{R}$ be smooth functions which are given by their data on a grid. Let Γ be the zero level set of u . The author considers the problem of approximating the integral $\int_{\Gamma} f(x) ds$. It is common practice to replace the integral above by

$$\int_{\mathbb{R}^n} f(x) \delta(u(x)) \|\nabla u(x)\| dx,$$

where δ denotes the Dirac delta function. Then one approximates this integral using the available grid-defined function values. The author proposes two methods for discretization of $\delta(u(x))$.

Reviewer: [Manfred Tasche \(Rostock\)](#)

MSC:

[65D32](#) Numerical quadrature and cubature formulas
[58C35](#) Integration on manifolds; measures on manifolds
[46F10](#) Operations with distributions and generalized functions
[41A55](#) Approximate quadratures

Cited in **1** Review
Cited in **22** Documents

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Dirac delta function; zero level set; numerical integration; discretization; convergence

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