

Asymptotics as $s \rightarrow 0^+$ of the fractional s -perimeter on Riemannian manifolds

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Abstract. In this work, we study the asymptotics of the fractional Laplacian as $s \rightarrow 0^+$ on any complete Riemannian manifold (M, g) , both of finite and infinite volume. Surprisingly enough, when M is not stochastically complete, this asymptotics is related to the existence of bounded harmonic functions on M .

As a byproduct, we can find the asymptotics of the fractional s -perimeter on (essentially) every complete manifold, generalizing both the existing results [10] for $\mathbb{R}^n$ and [7] for the Gaussian space. In doing so, for many sets $E \subset M$, we are able to produce a bounded harmonic function associated with E , which, in general, can be non-constant.

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