Nonlocal characterization of Sobolev spaces and convergence of solutions to elliptic Integrodiferential Equations

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Abstract

We introduce a class of concentrated p-Lévy integrable functions approximating the unity, which serves as the core tool to characterize the Sobolev spaces and the space of functions of bounded variation in the spirit of Bourgain–Brezis–Mironescu. We provide this characterization for a class of unbounded domains satisfying the extension property. This characterization will play a decisive role while studying the asymptotic of solutions to elliptic IntegroDifferential Equations (IDEs). We will focus on (non)local elliptic problems subject to Neumann type condition.