A NEW FUNCTIONAL SPACE RELATED TO THE RIESZ FRACTIONAL GRADIENT IN BOUNDED DOMAINS

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ABSTRACT. The Riesz fractional gradient is attracting a renewed attention nowadays in the context of nonlocal variational problems and PDE. The fact that the space of Lp functions whose Riesz fractional gradient coincides with the Bessel potential space, and that the Riesz fractional gradient of a Sobolev function converges to its classical as the fractionality parameter, s, goes to 1, makes this object very interesting and relevant in a variety of situations. In this talk we will briefly report on recent advances on the Riesz fractional gradient in the fractional case, i.e. in the whole space, and introduce a truncated version of it, suitable for applications in bounded domains, and the natural functional space associated to this object, showing that this space enjoys the structural properties required for addressing variational problems and PDE.

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