



SEMINÁRIO DE EQUAÇÕES DIFERENCIAIS

On nonlocal fractional problems with lack of compactness

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Resumo: In this talk we introduce existence results and asymptotic behavior for nontrivial weak solutions of different nonlinear problems driven by fractional integro-differential operators and presenting also difficulties due to intrinsic lack of compactness, which could arise from different reasons. A model of our main nonlocal operator is the *fractional Laplacian*, which may be defined by the Riesz potential as

$$(-\Delta)^s \varphi(x) = c(N, s) \int_{\mathbb{R}^N} \frac{2\varphi(x) - \varphi(x+y) - \varphi(x-y)}{|y|^{N+2s}} dy, \quad x \in \mathbb{R}^N,$$

for any $\varphi \in C_0^\infty(\mathbb{R}^N)$, with $c(N, s) > 0$ a suitable normalizing constant. To overcome the nonlocal nature of the problems as well as the lack of compactness, we present different strategies mainly based on a tricky qualitative analysis on mountain pass levels.

The works presented in the talk are written in collaboration with Giuseppina Autuori, Enrico Valdinoci and Patrizia Pucci.