

The Brezis-Nirenberg Problem: from the Local to the Nonlocal Setting

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Abstract

This talk is devoted to the famous Brezis-Nirenberg problem, firstly studied by these authors in their celebrated paper appeared in *Commun. Pure Appl. Anal.*, 36 (1983). Since then, critical equations have been widely studied from many perspectives and in various contexts, including, among others, general local operators, nonlocal operators, mixed local and nonlocal operators, higher-order operators, and operators in non-Euclidean contexts. It is interesting to note that, regardless of the context, most results concerning critical Dirichlet problems are obtained through suitable adaptations of the original argument of Brezis and Nirenberg. The purpose of this talk is to consider the nonlocal counterpart of the Brezis-Nirenberg problem (in which the classical Laplace operator is replaced by its fractional version), focusing on the similarities and differences between the local and nonlocal cases, highlighting the innovations and adaptations to consider in the treatment of the fractional case.