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A Struwe-Type Decomposition for Weighted p-Laplace equations of the Caffarelli-Kohn-Nirenberg Type

In this talk, we establish a Struwe-type decomposition result for a class of critical p-Laplace equations of the Caffarelli-Kohn-Nirenberg type in smoothly bounded domains $\Omega \subset \mathbb{R}^n$ for $n \geq 3$. More precisely, we investigate the relative compactness of Palais-Smale sequences associated to the critical elliptic problem

$$\begin{cases} -\operatorname{div}\left(|\nabla u|^{p-2}\,\nabla u\,|x|^{-ap}\right) = |u|^{q-2}\,u\,|x|^{-bq} & \text{in } \Omega, \\ u = 0 & \text{on } \partial\Omega. \end{cases}$$

Here, $1 < p < n$ and $q := np/(n - p(1 + a - b))$ under suitable conditions for a, b. In doing so, we highlight crucial differences between the weighted setting and the pioneering work of Michael Struwe in the unweighted model $p = 2$ case.