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Strongly Nonlinear Elliptic Unilateral Problems Without Sign Condition and L^1 Data

We prove the existence of solutions of unilateral problems involving nonlinear operators of the form

$$Au + H(x, u, \nabla u) = f$$

where A is a Leray Lions operator from $W_0^{1,p}(\Omega)$ into its dual $W^{-1,p'}(\Omega)$ and $H(x, u, \nabla u)$ is a nonlinearity which satisfies the following growth condition $|H(x, s, \xi)| \leq \gamma(x) + g(s)|\xi|^p$ with $\gamma \in L^1(\Omega)$ and $g \in L^1(\mathbb{R})$, and without assuming any sign condition on $H(x, s, \xi)$. The right hand side f belongs to $L^1(\Omega)$.

Keywords: Sobolev spaces, strongly nonlinear inequality, truncations, unilateral problems.

MSC: 35J25; 35J60, 35J65