Quasilinear singular elliptic equations

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Resumen

We are going to deal with following quasilinear singular (model) problem, studied in [1] and in [2]:

$$\begin{cases} -\Delta u + \frac{|\nabla u|^2}{u^\gamma} = f & \text{in } \Omega, \\ u = 0 & \text{on } \partial\Omega. \end{cases}$$

Here Ω is a bounded open subset of $\mathbb{R}^N$, $N \geq 2$, $\gamma > 0$, and $f \geq 0$ belongs to some Lebesgue space. We will give existence and nonexistence results (depending on the values of γ). Links with critical points for functionals like

$$J(v) = \frac{1}{2} \int_\Omega [a(x) + |v|^\theta] |\nabla v|^2 - \int_\Omega f\, v\,,$$

with $\theta > 0$, and $0 < \alpha \leq a(x) \leq \beta$, will also be discussed.
Sección en el CEDYA 2011: EDP

Bibliography

[1] D. Arcoya, J. Carmona, T. Leonori, P. Martínez-Aparicio, L. Orsina and F. Petitta, Existence and nonexistence of solutions for singular quadratic quasilinear equations, *J. Diff. Eq.* **246** (2009), 4006–4042.

[2] L. Boccardo, Dirichlet problems with singular and quadratic gradient lower order terms, *ESAIM Control Optim. Calc. Var.* **14** (2008), 411–426.