EXISTENCE OF POSITIVE SOLUTION FOR A SINGULAR SYSTEM INVOLVING GENERAL QUASILINEAR OPERATORS

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Abstract. In this paper we study a result of existence of positive solution the following class of singular system:

\[
\begin{aligned}
(P) \quad & -\text{div}(a_1(|\nabla u|^{p_1})|\nabla u|^{p_1-2}\nabla u) = h_1(x)v^{-\gamma_1} + k_1(x)u^{\alpha_1} \quad \text{in} \ \Omega, \\
& -\text{div}(a_2(|\nabla v|^{p_2})|\nabla v|^{p_2-2}\nabla v) = h_2(x)u^{-\gamma_2} + k_2(x)v^{\alpha_2} \quad \text{in} \ \Omega, \\
& u, v > 0 \quad \text{in} \ \Omega, \\
& u = v = 0 \quad \text{on} \ \partial \Omega,
\end{aligned}
\]

where \( \Omega \) is a bounded smooth domain in \( \mathbb{R}^N \) with \( N \geq 3, \ 2 \leq p_1, p_2 < N \). For \( i = 1, 2 \), \( \alpha_i, \gamma_i \in (0, p_i - 1) \) and \( h_i \) and \( k_i \) are continuous functions. The hypotheses on the functions \( a_i : \mathbb{R}^+ \rightarrow \mathbb{R}^+ \) allow to show that \( (P) \) includes a large class of systems. We use topological arguments to show the main result.


Keywords and phrases: p&q-Laplacian, singular problem, global continuum.

REFERENCES