EXISTENCE OF POSITIVE SOLUTIONS FOR QUASILINEAR ELLIPTIC SYSTEMS WITH SOBOLEV CRITICAL EXPOIENTS

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Abstract. In this paper, we consider the existence of positive solutions to the following problem

\[
\begin{align*}
-\text{div}(|\nabla u|^{p-2}\nabla u) &= \frac{\partial F}{\partial u}(u,v) + \varepsilon^{p-1}g(x) \quad \text{in} \ \Omega, \\
-\text{div}(|\nabla v|^{q-2}\nabla v) &= \frac{\partial F}{\partial v}(u,v) + \varepsilon^{q-1}h(x) \quad \text{in} \ \Omega, \\
u, v &> 0 \quad \text{in} \ \Omega, \\
u = v = 0 \quad \text{on} \ \partial\Omega,
\end{align*}
\]

where \(\Omega\) is a bounded smooth domain in \(\mathbb{R}^N\); \(F \in C^1((\mathbb{R}^+)^2,\mathbb{R}^+)\) is positively homogeneous of degree \(\mu\); \(g, h \in C^1(\Omega)\setminus\{0\}\); and \(\varepsilon\) is a positive parameter. Using sub-supersolution method and comparison principle, we prove the existence of positive solutions for the above problem.


Keywords and phrases: elliptic systems, subsolutions, supersolutions, comparison principle.

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