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Multiplicity of Positive Solutions for an Anisotropic Problem via Sub-Supersolution Method and Mountain Pass Theorem

We use the sub-supersolution method and the Mountain Pass Theorem in order to show existence and multiplicity of solution for an anisotropic problem given by

$$
\begin{cases}
-\Big[\sum_{i=1}^{N} \frac{\partial}{\partial x_i}\Big(\Big| \frac{\partial u}{\partial x_i} \Big|^{p_i-2} \frac{\partial u}{\partial x_i} \Big) \Big] = a(x)u + h(x,u) \text{ in } \Omega, \\
u > 0 \text{ in } \Omega, \quad u = 0 \text{ on } \partial\Omega.
\end{cases}
$$

We also prove the uniqueness of the solution for the linear anisotropic problem, a Comparison Principle for the anisotropic operator and a regularity result.

Keywords: Anisotropic operator, sub-supersolution method, Mountain Pass Theorem.

MSC: 35J60; 35J66.