ON THE DIRICHLET PROBLEM FOR THE GENERALIZED $n$–LAPLACIAN: SINGULAR NONLINEARITY WITH THE EXPONENTIAL AND MULTIPLE EXPONENTIAL CRITICAL GROWTH RANGE

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Abstract. Let $\Omega \subset \mathbb{R}^n$, $n \geq 2$, be a bounded domain containing the origin. Applying the Mountain Pass Theorem and a singular version of the generalized Moser-Trudinger inequality we prove the existence of a non-trivial weak solution to the problem

$$u \in W^{1}_0 L^{\Phi}(\Omega) \quad \text{and} \quad -\text{div}\left(\Phi'(\|\nabla u\|) \frac{\nabla u}{\|\nabla u\|}\right) = \frac{f(x,u)}{|x|^a} \quad \text{in} \ \Omega,$$

where $a \in [0,n)$, $\Phi$ is a Young function such that the space $W^{1}_0 L^{\Phi}(\Omega)$ is embedded into exponential or multiple exponential Orlicz space and $f(x,t)$ has the corresponding critical growth.


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REFERENCES