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Boccardo, Lucio; Marcellini, Paolo; Sbordone, Carlo

L^∞-regularity for variational problems with sharp non- standard growth conditions. (English)

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Boll. Unione Mat. Ital., VII. Ser., A 4, No. 2, 219-225 (1990).

Summary: It is proved that the solutions of Dirichlet problems related to a class of differential equations which includes the following

$$\sum_{i=1}^{n}\frac{\partial}{\partial x_i}(|u_{x_i}|^{q_i-2}u_{x_i})=\sum_{i=1}^{n}\frac{\partial}{\partial x_i}(f_i)\text{ in }\Omega,\quad u=u_0\text{ on }\partial\Omega$$

where Ω is a bounded open subset of $\mathbb{R}^n$, μ is a scalar function, $f_i\in L^\infty(\Omega)$ and $q_i>1$ for $i=1,2,\dots,n$, are bounded in $\bar\Omega$ (if u_0 given on the boundary is bounded), under the assumption that the exponents q_i satisfy the inequality $\bar q^*>q$, where

$$q=\max_i\{q_i\},\quad \frac{1}{\bar q}=\frac{1}{n}\sum_{i=1}^{n}\frac{1}{q_i},\quad \bar q^*=\frac{n\bar q}{n-\bar q}\quad (\bar q<n).$$

An analogous result is also given for integrals of variational calculus.

MSC:

49N60 Regularity of solutions in optimal control
35B65 Smoothness and regularity of solutions to PDEs
35J20 Variational methods for second-order elliptic equations

Cited in **44** Documents

Keywords:

L^∞-regularity; Dirichlet problems

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