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ANISOTROPIC NONLINEAR ELLIPTIC SYSTEMS WITH VARIABLE EXPONENTS, DEGENERATE COERCIVITY AND $L^{q(\cdot)}$ DATA*

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Abstract

The aim of this paper is to study the existence and maximal regularity for distributional solutions of degenerate anisotropic nonlinear elliptic systems with variable exponents where the right-hand side f is in $L^{q(\cdot)}$, $q(\cdot) : \overline{\Omega} \to (1, +\infty)$. The functional setting involves anisotropic Sobolev spaces with variable exponents as well as weak Lebesgue (Marcinkiewicz) spaces with variable exponents.

MSC: 35J60, 35J67, 35J70.

keywords: Degenerate system, elliptic, anisotropic, nonlinear, variable exponents, distributional solution

1 Introduction

Let Ω be a bounded open set in $\mathbb{R}^N$ $(N \geq 2)$ with Lipschitz boundary $\partial\Omega$, and let's consider the anisotropic nonlinear elliptic system

$$\begin{aligned} -\sum_{i=1}^{N} D_i\big(a_i(x,u)\sigma_i(x,D_iu)\big) + g(x,u) = f, \quad &\text{in } \Omega, \\ u = 0, \quad &\text{on } \partial\Omega, \end{aligned} \tag{1}$$

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