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RENORMALIZED SOLUTIONS TO THE PARABOLIC INITIAL BOUNDARY VALUE PROBLEM INVOLVING VARIABLE EXPONENTS AND L1 DATA

Author(s): Mykola Ivanovich Yaremenko[1]

Abstract:
This paper examines nonlinear parabolic initial boundary value problems. Our focus is on generalized porous medium equations that include a variable exponent, and additional terms, which includes L^1 data term. We establish the existence and uniqueness of the renormalized solution to such a class of problems under the Leray-Lions type conditions on the variable exponent elliptic operator. We assume that a nonlinear function $b: R \to R, b \in C^1(R)$ is a strictly increasing function such that

$$0 < \varepsilon \le b'(\tau) \le \sup b'(\tau) < \infty, \qquad \tau \in R, \qquad b(0) = 0.$$

The uniqueness follows from the monotony of the elliptic operator and the strict increase of the function $b \in C^1(R)$.

Keywords:
Parabolic equation, Variable exponent Lebesgue space, Leray-Lions condition, Renormalized solution, Measure data.

[1] Researcher, Igor Sikorsky Kyiv Polytechnic Institute, National Technical University of Ukraine, 37, Prospect Beresteiskyi (former Peremohy), Kyiv, Ukraine, 03056. Ph.: +380442049494, Email: math.kiev@gamil.com