

ICRAMCS 2026

THE EIGHTH EDITION OF THE INTERNATIONAL CONFERENCE ON
RESEARCH IN APPLIED MATHEMATICS AND COMPUTER SCIENCE
April 23-24-25, 2026 | Marrakech, Morocco



Entropy Solutions for Noncoercive Parabolic Problems in Weighted Anisotropic Sobolev Spaces with Variable Exponents

Communication Info

Authors:

Brahim EL OMARI¹
Youssef HAJJI²
Hassane HJIAJ³
Ismail JAMIAI⁴

¹ Abdelmalek Essaadi
University, Tétouan, Morocco
² Abdelmalek Essaadi
University, Tétouan, Morocco
³ Abdelmalek Essaadi
University, Tétouan, Morocco
⁴ Abdelmalek Essaadi
University, Tétouan, Morocco

Keywords:

- (1) Noncoercive parabolic equation
- (2) Weighted Sobolev spaces
- (3) Entropy solution.

Abstract

The focus of this paper is on a class of parabolic equations characterized by degenerate coercivity, given by the following prototype:

$$\begin{aligned} \frac{\partial u}{\partial t} - \operatorname{div}(a(x, t, u, \nabla u)) &= f & \text{in } \Omega \times (0, T) \\ u &= 0 & \text{on } \partial\Omega \times (0, T) \end{aligned}$$

where Ω is a bounded open set of \mathbb{R}^N ($N \geq 2$) with a Lipschitz boundary $\partial\Omega$. We will prove the existence of entropy solutions for this class of equation, and we will show some regularity results. The functional framework is based on anisotropic Sobolev spaces with variable exponents and degenerate weights. We develop an entropy formulation to prove existence of entropy solution to our problem using truncation, approximation, and compactness tools adapted to weighted anisotropic variable exponent Sobolev space.

© ICRAMCS 2026 Proceedings ISSN: 2605-7700

References

- [1] E. Harjulehto and P. Hasto, Orlicz Spaces and Generalized Orlicz Spaces, Lecture Notes in Mathematics, Vol. 2236, Springer, 2019.
- [2] X. Fan and D. Zhao, On the spaces $L^{p(x)}(\Omega)$ and $W_m^{p(x)}(\Omega)$, Journal of Mathematical Analysis and Applications, 263(2), 424–446, 2001.
- [3] V.V. Zhikov, On Lavrentiev's phenomenon, Russian Journal of Mathematical Physics, 3(2), 249–269, 1995.
- [4] E. Harjulehto, P. Hasto, M. Koskenoja, and S. Varonen, Sobolev embeddings in metric measure spaces with variable dimensions, Math. Z., 254 (2006), 591–609.
- [5] X. Fan and Q.H. ZhaNG, Existence of solution for $p(x)$ -Laplacian Dirichlet problems, Nonlinear Analysis, 52 (2003), 1843–1852.