



Pole for Doctoral Studies  
Center for Doctoral Studies  
Sciences, Technologies, and Medical Sciences

## ANNOUNCEMENT OF DOCTORAL THESIS DEFENSE



**Ms. ZEROUALI Rajae**

**Will present here research work with the aim of earning a  
Doctorate**

**Doctoral program: Mathematics, Physics and New Technologies  
(SMPNT)**

**Discipline: Mathematics  
Specialty: Applied Mathematics**

**On 16/07/2025 at 11H00 at the Defense Hall of the Faculty of  
Sciences of Tetouan, UAE  
Under the Theme**

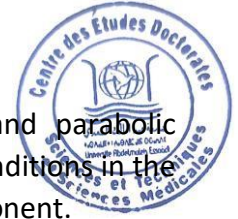
**On the study of some quasilinear elliptic and parabolic problems  
with degenerate coercivity in generalized Sobolev spaces**

**Front of the jury composed of :**

| First Name & Last Name       | Establishment      | Designation   |
|------------------------------|--------------------|---------------|
| Pr. ZERTITI Abderrahim       | FS of Tetouan, UAE | President     |
| Pr. BOUZELMATE Arij          | FS of Tetouan, UAE | Reviewer      |
| Pr. YEBARI Naji              | FS of Tetouan, UAE | Reviewer      |
| Pr. ZINE EL ABIDINE Abdelali | FS of Rabat, UM5   | Reviewer      |
| Pr. ABERQI Ahmed             | ENSA of Fes, USMBA | Examiners     |
| Pr. CHABABI Fadil            | FS of Tetouan, UAE | Examiners     |
| Pr. HJIAJ Hassane            | FS of Tetouan, UAE | Co-Supervisor |
| Pr. FERRAHI Bouchaib         | FS of Tetouan, UAE | Supervisor    |

**Research Laboratory:** Research Laboratory of Numerical Analysis, Nonlinear Analysis and Applications (LaR2A).

## Abstract



This thesis investigates some nonlinear and non-coercive elliptic and parabolic problems with data or  $+$  in a bounded domain with Dirichlet-type boundary conditions in the framework of anisotropic Sobolev spaces or parabolic spaces with variable exponent.

This work, composed of five chapters, In the first chapter, we present some definitions and results required for the following chapters, and then we provide some examples of applications of elliptic and parabolic problems in many fields like: image restoration, electrorheological fluids, and elasticity.

In the second chapter, we prove the existence results of renormalized solutions for a nonlinear non-coercive elliptic equation with Hardy potential. In the third chapter, we study the existence and uniqueness of renormalized solutions for some quasilinear and noncoercive elliptic problem.

In the fourth chapter, we prove the existence of entropic solutions for unilateral problem associated to some quasilinear elliptic equation with degenerate coercivity. In the five and last chapter, we study the existence of entropic solution for some quasilinear  $p(x)$ -parabolic and non-coercive problem with the lower-order term in the framework of the parabolic Sobolev spaces with variable exponent.

**Keywords:** Elliptic equation, renormalized solutions, entropic solutions, Hardy potential, obstacle problem, anisotropic Sobolev spaces, anisotropic Sobolev spaces with variable exponent, parabolic equation..