



Inverse Problem of a Semilinear Parabolic Equation with an Integral Overdetermination Condition

Amal Benguesmia¹, Iqbal M. Batiha^{2,3*}, Taki-Eddine Oussaeif¹, Adel
Ouannas¹ and Waseem G. Alshanti²

¹ *Department of Mathematics and Computer Science, University of Larbi Ben M'hidi,
Oum El Bouaghi, Algeria.*

² *Department of Mathematics, Al Zaytoonah University of Jordan, Amman 11733, Jordan.*

³ *Nonlinear Dynamics Research Center (NDRC), Ajman University, Ajman, UAE.*

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Abstract: The solvability of the semilinear parabolic problem with integral overdetermination condition for an inverse problem is investigated in this work. Accordingly, we solve the generated direct problem by using the so-called “energy inequality” method and then the inverse problem is handled with the use of the fixed point technique.

Keywords: *inverse problem; nonlocal integral condition; fixed point theorem.*

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1 Introduction

The goal of this research was to investigate the solvability of a pair of functions $\{y, f\}$ that satisfy the following semilinear parabolic problem:

$$y_t - a \frac{\partial^2 y}{\partial x^2} + by + cy^3 = f(t)h(x, t), \quad (x, t) \in \Omega \times (0, T), \quad (1)$$

with the initial condition

$$y(x, 0) = \varphi(x), \quad x \in \Omega, \quad (2)$$

the boundary condition

$$y(x, t) = 0, \quad (x, t) \in \partial\Omega \times (0, T), \quad (3)$$

* Corresponding author: <mailto:i.batiha@zu.edu.jo>