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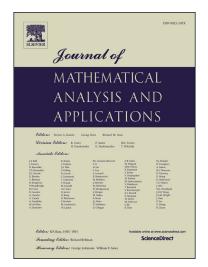
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ACCEPTED MANUSCRIPT

THE EXISTENCE AND THE ASYMPTOTIC BEHAVIOR OF A PLATE EQUATION WITH FRICTIONAL DAMPING AND A LOGARITHMIC SOURCE TERM

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ABSTRACT. In this paper, we consider a plate equation with a logarithmic nonlinearity in the presence of a frictional damping. We prove, for a suitably chosen initial data, a global existence as well as a decay result.

Keywords: Exponential decay, Logarithmic nonlinearity, Frictional damping, Plate equation.

AMS Classification: 35B35, 35L55, 75D05, 74D10, 93D20.

1. INTRODUCTION

The uniform stabilization of Kirchhoff plates was investigated by several authors; for example, Rivera et al. [32] considered the following equation

$$u_{tt} - \gamma \Delta u_{tt} + \Delta^2 u - \int_0^t g(t-s) \Delta^2 u(s) ds = 0, \text{ in } Q_T = \Omega \times (0,T),$$

together with initial and dynamical boundary conditions and proved that the sum of the first and second energies decays exponentially (respectively polynomially) if the kernel g decays exponentially (respectively polynomially). Alabau-Boussouira et al. [1] looked into the following problem

$$u_{tt} + \Delta^2 u - \int_0^t g(t-s)\Delta^2 u(s)ds = f(u), \text{ in } Q_T = \Omega \times (0,T),$$
(1.1)

and established exponential and polynomial decay results for sufficiently small initial data. Lin and Li $\left[25\right]$ discussed

$$u_{tt} - \gamma \Delta u_{tt} + \Delta^2 u - \int_0^t g(t-s)\Delta^2(s)ds = div(C(f(\nabla u)\nabla u)), \text{ in } Q_T = \Omega \times (0,T).$$

together with initial and dynamical boundary conditions similar to those imposed by Rivera et al. [32], and established similar decay results. Messaoudi [31] studied the following problem Download English Version:

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