

## ATTRACTOR FOR A MODEL OF EXTENSIBLE BEAM WITH DAMPING ON TIME-DEPENDENT SPACE

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ABSTRACT. In this paper, we study the asymptotic behavior of the following extensible beam equations:

$$\varepsilon(t)u_{tt} + \Delta^2 u - M\left(\int_{\Omega} |\nabla u|^2 dx\right)\Delta u + \alpha u_t + \varphi(u) = f, \quad t > \tau,$$

where  $\varepsilon(t)$  is a decreasing function of time vanishing at infinity. After generalizing the abstract results on time dependent space, we establish an invariant time-dependent global attractor for the equation by proving the well-posedness (thereby, the existence of process), dissipativity and the compactness of the process. Our work supplements the theoretical results on time-dependent space and the results on the longtime behavior of the model.

### 1. Introduction

In this paper, we study the following extensible beam equation with standard dissipations:

$$(1.1) \quad \varepsilon u_{tt} + \Delta^2 u - M\left(\int_{\Omega} |\nabla u|^2 dx\right)\Delta u + \alpha u_t + \varphi(u) = f, \quad t > \tau,$$

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