J. of Ramanujan Society of Mathematics and Mathematical Sciences
Vol. 8, No. 2 (2021), pp. 109-132

ISSN (Online): 2582-5461

ISSN (Print): 2319-1023

THE DECAY ESTIMATE AND ASYMPTOTIC BEHAVIOUR OF THE BLOW UP TIME FOR EVOLUTION EQUATION WITH A NON LINEAR SOURCE

Halima. Nachid, N'takpe Jean Jacques and Yoro. Gozo

Université Nangui Abrogoua, UFR-SFA,
Département de Mathématiques et Informatiques,
02 BP 801 Abidjan 02, (Côte d'Ivoire)

Orcid:https://orcid.org/0000-0003-1244-8139

E-mail : nachid.h@iugb.edu.ci, njjlabellsfauna225@gmail.com, yorocarol@yahoo.fr

(**Received:** *Apr. 29, 2021* **Accepted:** *Jun. 23, 2021* **Published:** *Jun. 30, 2021)*

Abstract: In this paper, we consider the following initial-boundary problem

$$(P)\begin{cases} u_{tt}(x,t) - \xi Lu(x,t) + b|u_t(x,t)|^q = f(u(x,t)) \quad \text{in} \quad \Omega \times (0,T), \\ u(x,t) = 0 \quad \text{on} \quad \partial\Omega \times (0,T), \\ u(x,0) = 0 \quad \text{in} \quad \Omega, \\ u_t(x,0) = 0 \quad \text{in} \quad \Omega, \end{cases}$$

where Ω is a bounded domain in $\mathbb{R}^N$ with smooth boundary $\partial\Omega$, L is an elliptic operator, where initial data in which our initial energy can take positive values, with initial and boundary conditions of Dirichlet type, and the nonlinear function $f(s)$ is a positive, increasing and convex function for the nonnegative values of s and b, ξ is a positive parameter.
This work is concerned with a nonlinear wave equation with nonlinear source terms acting in this equation. We will prove that the solution of our considered problem blows up in finite time provided that the initial data and the parameter ξ are small enough.