

NONLOCAL ELLIPTIC SYSTEMS OF N -KIRCHHOFF TYPE WITH EXPONENTIAL GROWTH

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ABSTRACT. In this work, we are devoted to establishing the existence of positive solutions for a nonlocal elliptic system of N -Kirchhoff type on bounded domains in \mathbb{R}^N with $N \geq 2$. The nonlinearity considered in the equation combined a nonlocal term with an exponential term governed by the Trudinger–Moser inequality, which may be subcritical, critical or supercritical. We use the Galerkin approximation together with a variant of the Brouwer Fixed Point Theorem in the product of Sobolev spaces.

1. Introduction

Nonlocal systems are related to the stationary analogue of the wave equation

$$(1.1) \quad u_{tt} - M\left(\int_{\Omega} |\nabla u|^2\right) \Delta u = f(t, x, u),$$

proposed by Kirchhoff [17] as a generalization of the D'Alembert equation that model the free vibrations of elastic strings. The Kirchhoff model takes into account the length changes of the string produced by transverse vibrations. This is one of the motivations why problems like this were investigated by several authors, beginning with Lions [19], Pohožaev [24] and Bernstein [2]. In particular,

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