

CRITICAL KIRCHHOFF–CHOQUARD SYSTEM INVOLVING THE FRACTIONAL p -LAPLACIAN OPERATOR AND SINGULAR NONLINEARITIES

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ABSTRACT. In this paper we study a class of critical fractional p -Laplacian Kirchhoff–Choquard systems with singular nonlinearities and two parameters λ and μ . By discussing the Nehari manifold structure and fibering maps analysis, we establish the existence of two positive solutions for above systems when λ and μ satisfy suitable conditions.

1. Introduction

In this paper, we investigate the following critical Kirchhoff–Choquard system involving negative exponents and the fractional p -Laplacian operator:

$$(1.1) \quad \begin{cases} \mathcal{L}(u) = \lambda f(x)u^{-\gamma} + \left(\int_{\Omega} \frac{|v(y)|^{p_{\mu,s}^*}}{|x-y|^{\mu}} dy \right) u^{p_{\mu,s}^*-1} & \text{in } \Omega, \\ \mathcal{L}(v) = \mu g(x)v^{-\gamma} + \left(\int_{\Omega} \frac{|u(y)|^{p_{\mu,s}^*}}{|x-y|^{\mu}} dy \right) v^{p_{\mu,s}^*-1} & \text{in } \Omega, \\ u = v = 0 & \text{in } \mathbb{R}^N \setminus \Omega, \\ u > 0, v > 0 & \text{in } \Omega, \end{cases}$$

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Key words and phrases. p -Laplacian operator; negative exponent; Choquard system; Kirchhoff term; upper critical exponent.

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