Accepted Manuscript

A note on coupled elliptic systems involving different Hardy–type terms

Dongsheng Kang, Xiaonan Liu

PII: S0893-9659(18)30331-8
DOI: https://doi.org/10.1016/j.aml.2018.09.017
Reference: AML 5655

To appear in: *Applied Mathematics Letters*

Received date : 29 August 2018
Revised date : 24 September 2018
Accepted date : 24 September 2018

Please cite this article as: D. Kang, X. Liu, A note on coupled elliptic systems involving different Hardy–type terms, Appl. Math. Lett. (2018), https://doi.org/10.1016/j.aml.2018.09.017

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

*Manuscript
Click here to view linked References

A note on coupled elliptic systems involving different Hardy–type terms

Dongsheng Kang*, Xiaonan Liu

School of Mathematics and Statistics, South–Central University for Nationalities, Wuhan 430074, P. R. China

Abstract

In this paper, a system of Hardy–type critical elliptic equations is studied, asymptotic properties at the origin of positive solutions are proved by the Moser iteration method and an open problem proposed in [1] is solved.

Keywords: system of elliptic equations; solution; asymptotic property; variational method.
Mathematics Subject Classification 2000. 35J47, 35J60

1 Introduction

In this paper, we study the following elliptic system:

$$\begin{cases} -\Delta u - \mu_1 \dfrac{u}{|x|^2} = u^{2^*-1} + \dfrac{\alpha}{2^*} u^{\alpha-1} v^{\beta} + a_1 u + a_2 v & \text{in } \Omega, \\ -\Delta v - \mu_2 \dfrac{v}{|x|^2} = v^{2^*-1} + \dfrac{\eta\beta}{2^*} u^{\alpha} v^{\beta-1} + a_2 u + a_3 v & \text{in } \Omega, \\ u, v > 0 \text{ in } \Omega \setminus \{0\}, \quad u = v = 0 \text{ on } \partial\Omega, \end{cases} \tag{1.1}$$

where $\Omega \subset \mathbb{R}^N (N \geq 3)$ is a bounded domain with smooth boundary such that $0 \in \Omega$ and the parameters satisfy the following assumption:

$$(\mathcal{H}_1) \quad N \geq 3, \quad \eta > 0, \quad 0 \leq \mu_2 \leq \mu_1 < \bar{\mu} := (\tfrac{N-2}{2})^2, \quad a_i \geq 0, \ i = 1, 2, 3,$$
$$\alpha > 1, \quad \beta > 1, \quad \alpha + \beta = 2^* := \tfrac{2N}{N-2}.$$

Let $H := H_0^1(\Omega)$ be the completion of $C_0^\infty(\Omega)$ with respect to $(\int_\Omega |\nabla \cdot|^2 \,\mathrm{d}x)^{1/2}$. The functional corresponding to (1.1) is defined on $H \times H$ by

$$J(u, v) := \frac{1}{2} \int_\Omega \Big(|\nabla u|^2 + |\nabla v|^2 - \frac{\mu_1 u^2 + \mu_2 v^2}{|x|^2} - \big(a_1 u^2 + 2a_2 uv + a_3 v^2\big) \Big) \mathrm{d}x$$
$$- \frac{1}{2^*} \int_\Omega \big(|u|^{2^*} + |v|^{2^*} + \eta |u|^\alpha |v|^\beta \big) \mathrm{d}x.$$

*Corresponding author. E-mail address: dongshengkang@scuec.edu.cn. This work is supported by the Fundamental Research Funds for the Central Universities of China, South–Central University for Nationalities (No. CZT18008).

Download English Version:

https://daneshyari.com/en/article/11262908

Download Persian Version:

https://daneshyari.com/article/11262908

Daneshyari.com