

The existence of nontrivial solutions for a critically coupled Schrödinger system in a bounded domain of \mathbb{R}^3

Hongyu Ye¹ and Lina Zhang¹

¹Wuhan University of Science and Technology

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Abstract

In this paper, we consider the following coupled Schrödinger system with doubly critical exponents, which can be seen as a counterpart of the Brezis-Nirenberg problem
$$\begin{cases} -\Delta u + \lambda_1 u = \mu_1 u^5 + \beta u^2 v^3, & \text{in } \Omega \\ -\Delta v + \lambda_2 v = \mu_2 v^5 + \beta v^2 u^3, & \text{in } \Omega \\ u = v = 0, & \text{on } \partial\Omega \end{cases}$$
 where Ω is a ball in \mathbb{R}^3 , $\lambda_1, \lambda_2 < \frac{1}{4}$, $\mu_1, \mu_2 > 0$ and $\beta > 0$. Here $\lambda_1(\Omega)$ is the first eigenvalue of $-\Delta$ with Dirichlet boundary condition in Ω . We show that the problem has at least one nontrivial solution for all $\beta > 0$.

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The existence of nontrivial solutions for a critically coupled Schrodinger system in a bounded domain of \mathbb{R}^3 is available at <https://authorea.com/users/312571/articles/524205-the-existence-of-nontrivial-solutions-for-a-critically-coupled-schr-o-dinger-system-in-a-bounded-domain-of-r-3>