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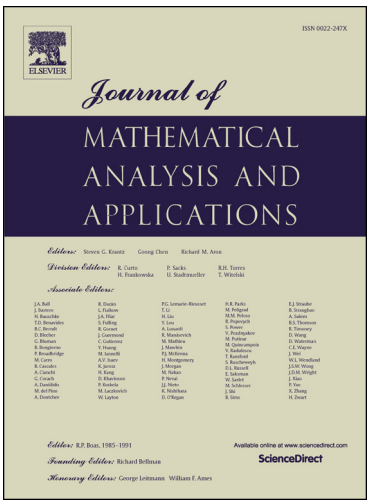

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Multiplicity of solutions for a class of non local regional elliptic equations

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Abstract

In this article we are interested in the nonlinear Schrödinger equation with non-local regional diffussion

Eq00 (0.1) $$(-\Delta)^{\alpha}_{\rho}u + u = f(x,u) \text{ in } \mathbb{R}^n,$$
$$u \in H^{\alpha}(\mathbb{R}^n),$$

where $\alpha \in (0,1)$ and $(-\Delta)^{\alpha}_{\rho}$ is a variational version of the regional Laplacian, whose range of scope is a ball with radius $\rho(x) > 0$. By using symmetric mountain pass theorem and the genus properties in critical point theory we show that problem (0.1) has infinitely many solutions. Recent results in the literature are complement and significantly improved.

Key words: Regional fractional Laplacian; fractional Sobolev spaces; symmetric mountain pass theorem; genus theory.

MSC: 45G05, 35J60, 35B25.

1. Introduction

The aim of this article is to study the existence of infinitely many solutions for a class of non-linear Schrödinger equation with non-local regional difussion

Eq01 (1.1) $$(-\Delta)^{\alpha}_{\rho}u + u = f(x,u) \quad \text{in} \quad \mathbb{R}^n, \quad u \in H^{\alpha}(\mathbb{R}^n),$$

where $0 < \alpha < 1$, $n \geq 2$. The operator $(-\Delta)^{\alpha}_{\rho}$ is a variational version of the non-local regional Laplacian, defined by

Eq02 (1.2) $$\int_{\mathbb{R}^n} (-\Delta)^{\alpha}_{\rho} uv dx = \int_{\mathbb{R}^n} \int_{B(0,\rho(x))} \frac{[u(x+z)-u(x)][v(x+z)-v(x)]}{|z|^{n+2\alpha}} dz dx,$$

where $\rho \in C(\mathbb{R}^n, (0,+\infty))$.

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