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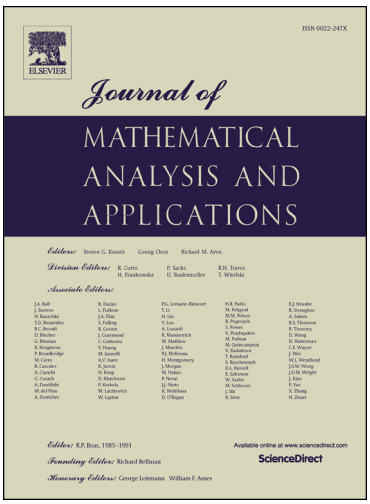

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Ground state sign-changing solutions for the Schrödinger–Kirchhoff equation in $\mathbb{R}^3$*

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Abstract

In this paper, with the help of variational methods in association with the deformation lemma and Miranda's theorem, we investigate the existence of a least energy sign-changing solution which has precisely two nodal domains for the following Schrödinger–Kirchhoff equation in $\mathbb{R}^3$:

$$\begin{cases} -\Big(a+b\displaystyle\int_{\mathbb{R}^3}|\nabla u|^2dx\Big)\Delta u+V(x)u=f(u) \quad \text{in } \mathbb{R}^3,\\ u\in H^1(\mathbb{R}^3), \end{cases}$$

where $a,b>0$ and the potential $V:\mathbb{R}^3\to\mathbb{R}^+$ is locally Hölder continuous and not necessarily radially symmetric.

Keywords: Schrödinger–Kirchhoff; Ground state; Sign-changing solution; Variational methods.
2010 MSC: 35A15, 35J60, 46E35.

1 Introduction and main result

In this paper, we study the existence of a least energy sign-changing solution for the following Schrödinger–Kirchhoff equation:

$$\begin{cases} -\Big(a+b\displaystyle\int_{\mathbb{R}^3}|\nabla u|^2dx\Big)\Delta u+V(x)u=f(u) \quad \text{in } \mathbb{R}^3,\\ u\in H^1(\mathbb{R}^3), \end{cases} \tag{1.1}$$

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