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Three solutions for a perturbed sublinear elliptic problem in \mathbb{R}^N . (English) Zbl 1180.35190
Glasg. Math. J. 47, No. 1, 205-212 (2005).

The authors deal with the following perturbation problem

$$\begin{cases} -\Delta u = h(x)|u|^{s-2}u + \lambda f(x, u) & \text{in } \mathbb{R}^d \\ u \in \mathcal{D}^{1,2}(\mathbb{R}^d), \end{cases} \quad (1)$$

where $s \in (1, 2)$, $d \geq 3$, $\lambda \in \mathbb{R}_+$, $f : \mathbb{R}^d \times \mathbb{R} \rightarrow \mathbb{R}$ is a Caratheodory function and h is a given function.

$$\mathcal{D}^{1,2}(\mathbb{R}^d) = \{u \in L^{\frac{2d}{d-2}}(\mathbb{R}^d) \mid \nabla u \in L^2(\mathbb{R}^d)\}$$

is the completion of

$$C_0(\mathbb{R}^d) = \{u \in L^{\frac{2d}{d-2}}(\mathbb{R}^d) \mid \nabla u \in L^2(\mathbb{R}^d)\}$$

is the completion of

$$C_0(\mathbb{R}^d) = \{u \in C(\mathbb{R}^d) \mid \text{supp } u \text{ is compact}\}$$

with respect to the norm $\|u\| = \left(\int_{\mathbb{R}^d} |\nabla u|^2 dx\right)^{1/2}$. Using variational methods, the authors establish a result that ensures the existence of at least three weak solutions.

Reviewer: [Messoud A. Efendiev \(Berlin\)](#)

MSC:

35J20 Variational methods for second-order elliptic equations

Cited in **3** Documents

Keywords:

sublinear elliptic problem; variational method; three weak solutions

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