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On a class of critical $p$-biharmonic Kirchhoff type problems with indefinite weights. (English)
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Summary: Using the genus theory introduced by Krasnoselskii and a variant of the mountain pass theorem due to Rabinowitz [24], we study the existence of solutions for the following Kirchhoff-type problem:

$$\int_{\Omega} |\Delta u|^p \, dx \Delta \left( \int_{\Omega} |\Delta u|^{p-2} \Delta u \right) = \lambda |u|^{p^*-2} u + a(x)|u|^{p-2} u + f(x, u), \quad x \in \Omega,$$

where $\Omega$ is a bounded domain in $\mathbb{R}^N$ ($N \geq 3$) with $C^2$ boundary, $1 < p < \frac{N}{2}$, $p^* = \frac{Np}{N-2p}$ is the critical exponent, $\Delta$ is the Laplace operator and $\frac{\partial}{\partial \nu}$ is the outer normal derivative, $\lambda$ is a positive parameter, $M : [0, +\infty) \to \mathbb{R}$ and $f : \Omega \times \mathbb{R} \to \mathbb{R}$ are continuous functions, and $a \in L^{2\infty}(\Omega)$ is a weight function.

MSC:

- 47A75 Eigenvalue problems for linear operators
- 35B38 Critical points of functionals in context of PDEs (e.g., energy functionals)
- 35P30 Nonlinear eigenvalue problems and nonlinear spectral theory for PDEs

Keywords:

- Kirchhoff-type problems; $p$-biharmonic operators; critical exponents; indefinite weight; variational methods

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[21] Lions, PL, The concentration compactness principle in the calculus of variations, the limit case (II), Rev. Mat. Iberoamericana, 1, 2, 45-121 (1985) · Zbl 0704.49006 · doi:10.4171/RMI/12


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