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Eigenvalues of the Laplace operator and evolution equations in presence of an obstacle.

(Italian) Zbl 0613.35024
Differential problems and theory of critical points, Meet. Bari/Italy 1984, 137-155 (1984).

[For the entire collection see Zbl 0594.00007.]

The paper studies the eigenvalue problem: $u \in K \cap S_\rho$, $\lambda \in R$ satisfying:

$$\int_\Omega Du.D(v-u) + g(u).(v-u) \geq \lambda \int_\Omega u(v-u)$$

for all $v \in K = \{u \in H_0^1(\Omega) : \phi_1 \leq u \leq \phi_2 \text{ in } \Omega\}$ where Ω is open and bounded in R^n, $\phi_1, \phi_2 \in H^2(\Omega) \cap C^0(\Omega)$, $S_\rho = \{u \in L^2(\Omega) : \int_\Omega u^2 = \rho^2\}$ and g is lipschitzian. The problem is in fact equivalent to finding $u \in H^2(\Omega)$ with $\lambda u + \Delta u - g(x,u) \leq, =, \geq 0$ respectively for x so that $\phi_1 = u < \phi_2$, $\phi_1 < u < \phi_2$, $\phi_1 < u = \phi_2$. The problem is studied by means of an evolution problem. Methods similar to those of Lusternik- Schnirelman are employed. Unfortunately no proofs are available in the paper, so that the reader has to look for them in other of the authors' papers.

Reviewer: B.Vernescu

MSC:

35J20	Variational methods for second-order elliptic equations
35J85	Unilateral problems; variational inequalities (elliptic type) (MSC2000)
49R50	Variational methods for eigenvalues of operators (MSC2000)
35G30	Boundary value problems for nonlinear higher-order PDEs

Keywords:

unilateral problems; eigenvalue problem; evolution problem; Lusternik- Schnirelman