Shibata, Tetsutaro

Deformation of domain and the limit of the variational eigenvalues of semilinear elliptic operators. (English) Zbl 0865.35099

Int. J. Math. Math. Sci. 19, No. 4, 679-688 (1996).

The author studies the following semilinear elliptic eigenvalue problem:

$$Lu + f(x,u) = 0 \quad \text{in } \Omega_r, \quad u = 0 \quad \text{on } \partial\Omega_r,$$

where $\Omega_r \subset \mathbb{R}^N$ is a bounded domain with a smooth boundary with a positive parameter r and L is a second-order uniformly elliptic selfadjoint operator. The main problem is the domain dependency of the set of eigenvalues $\{\mu_n(r,\alpha)\}_{n=1}^{\infty}$ defined through the Lyusternik-Schnirelman theory. The author proves under a certain kind of smoothness of the deformation of Ω_r that $\mu_n(r,\alpha)$ varies continuously in r. The condition on Ω_r for $\mu_n(r,\alpha)$ to go to ∞ is also given.

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MSC:

35P30 Nonlinear eigenvalue problems and nonlinear spectral theory for PDEs
35J65 Nonlinear boundary value problems for linear elliptic equations

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