

Minimax methods for elliptic problems with a parameter

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Resumo

Consider the nonlinear eigenvalue problem:

$$\begin{cases} -\Delta u + q(x)u = \lambda f(u) & \text{in } \Omega, \\ u = 0 & \text{on } \partial\Omega \end{cases}$$

where $\Omega \subset \mathbb{R}^N$ is a bounded open set, $q \in L^\infty(\Omega)$ and $q \geq 0$, $p \in (2, 2^*)$. In many mathematical problems derived from applications in different areas such as chemistry, physics, economics and biology, the presence of a parameter (or more) is a relevant feature. We study how these solutions depend on parameters are important for semilinear elliptic problems. Most of the work on these questions use tools other than those explained in [1], such as bifurcation theory. However, some interesting results can also be obtained in a variational structure. Furthermore, we give some examples exploring the behavior of these solutions depending on the parameter $\lambda > 0$.

Referências

- [1] Marino Badiale and Enrico Serra. *Semilinear elliptic equations for beginners*. Universitext. Springer, London, 2011. Existence results via the variational approach.