Principal Eigenvalue for a Quasilinear Elliptic Problem in an Unbounded Domain

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[1]

Abstract. In this talk, we will be concerned with the existence of a positive principal eigenvalue for the following quasilinear elliptic equation:

$$\Delta_p u + q(x)|u|^{p-2}u = \lambda g(x)|u|^{p-2}u \text{ in } \Omega, \; u = 0 \text{ in } \partial\Omega. \tag{1}$$

Here Ω is an unbounded smooth domain in $\mathbb{R}^{\mathbb{N}}, \Delta_p$, $1 < p < \infty$, is the p-Laplacian, λ is the eigenvalue parameter and g, q are given weight functions; whose properties will be specified later. Our purpose in the present talk is to derive the principal eigenvalue in some situation where Ω is unbounded, g and q are not necessarily negative at infinity. The validity on Ω of a weighted poincaré inequality is of importance in this study. We proceed our talk by presenting the Ljusternik-Schnirlmann theory to compare our results.

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