THE EXISTENCE OF AN UNBOUNDED SEQUENCE OF EIGENVALUES FOR A NONLINEAR TRANSMISSION PROBLEM

Luminiţa Barbu[1], Raluca Gabriela Turtoi[2*]

[1] *University „Ovidius" of Constanţa*
[2] *Romanian Naval Academy "Mircea cel Bătrân", University „Ovidius" of Constanţa*

ABSTRACT

Let $\Omega \subset \mathbb{R}^N$, $N \geq 2$, be a bounded domain with Lipschitz boundary. This paper studies a nonlinear transmission eigenvalue problem driven by nonhomogeneous operators with different p-growth in two subdomains Ω_1 and Ω_2, separated by an interface Σ. The model incorporates continuity and flux transmission conditions across the interface, while the eigenvalue parameter λ appears both in the differential equations and in the nonlinear boundary conditions.

The main result establishes the existence of an unbounded sequence of eigenvalues for the transmission problem. The proof combines the Krasnosel'skii genus with a Lusternik–Schnirelmann type minimax principle on a suitable C^1-manifold and exploits compactness and coercivity properties of the associated energy functional. As a consequence, infinitely many eigenpairs are obtained and the corresponding eigenvalues tend to infinity.

The obtained result extends several known eigenvalue existence results for nonlinear elliptic equations to a transmission setting involving nonhomogeneous operators

***K*eywords** Nonlinear transmission eigenvalue problem, nonhomogeneous operators with p-growth, Krasnosel'skii genus

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* *raluca.turtoi@365.univ-ovidius.ro*