

MULTIPLICITY RESULTS OF AN ELLIPTIC EQUATION WITH NON-HOMOGENEOUS BOUNDARY CONDITIONS

A. M. CANDELA — A. SALVATORE

1. Introduction

In this paper we study the nonlinear elliptic problem

$$(1.1) \quad \begin{cases} \Delta u + |u|^{p-2} u = 0 & \text{in } \Omega, \\ u = g & \text{on } \partial\Omega, \end{cases}$$

where Ω is an open smooth bounded subset of \mathbb{R}^N , $N \geq 2$, $g : \partial\Omega \rightarrow \mathbb{R}$ is a given continuous function and $p > 2$ is fixed.

If $g \equiv 0$, it is well known that (1.1) has infinitely many distinct solutions for $2 < p < 2N/(N-2)$ if $N \geq 3$ or $p > 2$ if $N = 2$. Such results have been proved by using variational methods also for more general odd nonlinearities at the beginning of 70's (see e.g. [2], [3], [6], [9], [11] and references therein). In all these papers a fundamental role is played by the fact that the energy functional is even in a Banach space, hence it is possible to use a modified version of the classical Ljusternik–Schnirelman theory and the properties of the genus for symmetric sets.

On the contrary, if $g \not\equiv 0$ the more general boundary value problem (1.1) loses its symmetry and the previous recalled arguments do not hold. In fact, it is well

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