

Positive solutions of a slightly subcritical elliptic problem via Orlicz spaces

Mabel Cuesta, Rosa Pardo²,

SUMMARY

We consider the following elliptic problem

$$\begin{cases} -\Delta u = \lambda u + a(x) \frac{u^{2^*-1}}{[\ln(e+u)]^\alpha}, & \text{in } \Omega, \\ u > 0 & \text{in } \Omega, \\ u = 0, & \text{on } \partial\Omega, \end{cases}$$

where λ is a real parameter, $\alpha > 0$ is a constant and $a \in C^1(\overline{\Omega})$ changes sign. We use standard variational methods to prove the existence of positive solutions where the main issue is the validity of the Palais-Smale condition. We propose here an Orlicz spaces approach to get the necessary compact embedding.

Keywords: Positive solutions, subcritical nonlinearity, changing sign weight

AMS Classification: 58E07, 35J20, 35B32, 35J25, 35J61

¹LMPA

Universit du Littoral Cte d'Opale 62100 Calais, France
email: cuesta-1@univ-littoral.fr

²Departamento de Análisis Matemático y Matemática Aplicada
Universidad Complutense de Madrid, 28040–Madrid, Spain
email: rpardo@ucm.es