Existence and multiplicity of solutions for nonlocal $p(x)-$biharmonic problem in $\mathbb{R}^N$

ABDELMALEK Brahim[1], DJELLIT Ali[2], TAMRABET Sameh[1]
[1] University of Souk-Ahras 41000 (Algeria).
[2] MDM Laboratory, University of Annaba 23000 (Algeria).
i.abdelmalek@univ-soukahras.dz

Abstract

We are concerned in this paper with nonlinear elliptic problems of the following type

$$\begin{cases} -M\left(\int_{\mathbb{R}^N} \frac{1}{p(x)} |\Delta u|^{p(x)}\, dx\right) \operatorname{div}\left(|\Delta u|^{p(x)-2}\, \Delta u\right) = f(x,u), & \text{in } \mathbb{R}^N \\ u \in W^{2,p(x)}\left(\mathbb{R}^N\right) \end{cases} \tag{1.1}$$

the existence and multiplicity of solutions for the problem (1.1) are obtained by variational methods.

Keywords

$p(x)$-bi-harmonic problem, generalized Sobolev space, Mountain Pass Theorem, Fountain Theorem.