Some new weighted compact embeddings results and existence of weak solutions for eigenvalue Robin problem

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Abstract

In this paper, we prove the existence and multiplicity of solutions for the following Robin problem
$$\begin{cases} -\text{div}(a(x)|\nabla u|^{p(x)-2}\nabla u) = \lambda b(x)|u|^{q(x)-2}u, & x \in \Omega \\ a(x)|\nabla u|^{p(x)-2}\frac{\partial u}{\partial \nu} + \beta(x)|u|^{p(x)-2}u = 0, & x \in \partial\Omega \end{cases}$$
 under some appropriate conditions in double weighted variable exponent Sobolev space by applying Mountain Pass Lemma, Ekeland's variational principle and Fountain Theorem.

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