

Multiple solutions for a class of non-cooperative critical nonlocal equation system with variable exponents

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Abstract

In this paper, we consider a class of non-cooperative critical nonlocal equation system with variable exponents of the form:
$$\begin{cases} (-\Delta)_{p(\cdot,\cdot)}^s |u|^{p(x)-2}u = F_u(x,u,v) + |u|^{q(x)-2}u, & \text{in } \mathbb{R}^N, \\ (-\Delta)_{p(\cdot,\cdot)}^s |v|^{p(x)-2}v = F_v(x,u,v) + |v|^{q(x)-2}v, & \text{in } \mathbb{R}^N, \end{cases}$$
 where $\nabla F = (F_u, F_v)$ is the gradient of a C^1 -function $F: \mathbb{R}^N \times \mathbb{R}^2 \rightarrow \mathbb{R}^+$ with respect to the variable $(u, v) \in \mathbb{R}^2$. We also assume that $\{x \in \mathbb{R}^N: q(x) = p_s^*(x)\} \neq \emptyset$, here $p_s^*(x) = Np(x, x)/(N - sp(x, x))$ is the critical Sobolev exponent for variable exponents. With the help of the Limit index theory and the concentration-compactness principles for fractional Sobolev spaces with variable exponents, we establish the existence of infinitely many solutions for the problem under the suitable conditions on the nonlinearity.

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