

HIGHER FRACTIONAL ORDER p -LAPLACIAN BOUNDARY VALUE PROBLEM AT RESONANCE ON AN UNBOUNDED DOMAIN

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Abstract

In this work, we use the Ge and Ren extension of Mawhin's coincidence degree theory to investigate the solvability of the p -Laplacian fractional order boundary value problem of the form $(\phi p(D_0 + \alpha x(t)))' = f(t, x(t), D_0 + \alpha - 3x(t), D_0 + \alpha - 2x(t), D_0 + \alpha - 1x(t), D_0 + \alpha x(t)), t \in (0, +\infty), x(0) = 0 = D_0 + \alpha - 3x(0), D_0 + \alpha - 2x(0) = \int_0^1 D_0 + \alpha - 2x(t) dA(t), \lim_{t \rightarrow +\infty} D_0 + \alpha - 1x(t) = \sum_{i=1}^m \mu_i D_0 + \alpha - 1x(\xi_i), D_0 + \alpha x(\infty) = 0$, where $3 < \alpha \leq 4$. The conditions $\int_0^1 dA(t) = 1, \int_0^1 t dA(t) = 0, \sum_{i=1}^m \mu_i = 1$ and $\sum_{i=1}^m \mu_i \xi_i - 1 = 0$ are critical for resonance.

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