EXISTENCE OF POSITIVE SOLUTIONS FOR NONLINEAR FRACTIONAL NEUMANN ELLIPTIC EQUATIONS

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Abstract. This article is devoted to study the fractional Neumann elliptic problem
\[
\begin{cases}
\varepsilon^2 (-\Delta)^s u + u = u^p & \text{in } \Omega, \\
\partial_\nu u = 0 & \text{on } \partial \Omega, \\
u > 0 & \text{in } \Omega,
\end{cases}
\]
where \(\Omega\) is a smooth bounded domain of \(\mathbb{R}^N\), \(N > 2s, 0 < s \leq s_0 < 1, 1 < p < (N + 2s)/(N - 2s), \varepsilon > 0\) and \(\nu\) is the outer normal to \(\partial \Omega\). We show that there exists at least one nonconstant solution \(u_\varepsilon\) to this problem provided \(\varepsilon\) is small. Moreover, we prove that \(u_\varepsilon \in L^\infty(\Omega)\) by using Moser-Nash iteration.


Keywords and phrases: Fractional Laplacian, Neumann problem, existence, a priori estimates.

REFERENCES


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