Seminário de Análise

Fractional Kirchhoff problem with critical indefinite nonlinearity

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Abstract. We study the existence and multiplicity of positive solutions for a family of fractional Kirchhoff equations with critical nonlinearity of the form

$$M \left(\iint_{\mathbb{R}^{2N}} \frac{|u(x) - u(y)|^2}{|x - y|^{N+2s}} dxdy \right) (-\Delta)^s u = \lambda f(x)|u|^{q-2}u + |u|^{2_s^*-2}u \ \text{ in } \Omega, \ u = 0 \text{ in } \mathbb{R}^N \backslash \Omega,$$

where $\Omega \subset \mathbb{R}^N$ is a smooth bounded domain, $N > 2s$, $0 < s < 1$ and $1 < q < 2$. Here M is a Kirchhoff coefficient and $2_s^* = 2N/(N - 2s)$ is the fractional critical Sobolev exponent. The parameter λ is positive and the $f(x)$ is a real valued continuous function which is allowed to change sign. By using a variational approach based on the idea of Nehari manifold technique, we combine effects of a sublinear and a superlinear term to prove our main results.