Multiplicity result for a class of elliptic equations with singular term

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Abstract:

We consider the existence of nontrivial solutions of the equation

$$-\Delta u - \frac{\lambda}{|x|^2} u = |u|^{2^*-2} u + \mu |x|^{\alpha-2} u + f(x)|u|^{\gamma}, \quad x \in \Omega \backslash \{0\}, \quad u \in H_0^1(\Omega),$$

where $0 \in \Omega$ is a smooth bounded domain in $\mathbb{R}^N$ ($N \geq 3$). By variational methods and Nehari set techniques, we show that this equation, under some additional hypotheses on $\lambda > 0$, $\mu > 0$, $\alpha > 0$, $0 \leq \gamma < 1$ and $f \in L^\infty(\Omega)$, has four nontrivial solutions in $H_0^1(\Omega)$, and that least one of them is sign-changing.