Compactness of radial solutions to the Lin-Ni-Takagi equation in the asymptotically critical regime

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Talk Abstract

I will consider the Lin-Ni-Takagi equation in the ball $B_R = B(0,R) \subset \mathbb{R}^N$, $N \geq 3$, for some $R > 0$ under a Neumann boundary condition:

$$\begin{cases} -\Delta u + u = |u|^{p-2}u & \text{in } B_R \\ \partial_\nu u = 0 & \text{in } \partial B_R. \end{cases}$$

More precisely, I will focus on radial solutions in the asymptotically critical case i.e. when $p = \frac{2N}{N-2} + \varepsilon$, for some $0 \neq \varepsilon \to 0$. I obtain a complete picture of the behavior of radial solutions with finite energy. In particular, I prove that if $\varepsilon > 0$ and $N \geq 7$ then solutions with finite energy are precompact. I will interprete this result in term of a bifurcation analysis done for radial solutions with respect to the parameter p. This is based on a joint work with Denis Bonheure and Bruno Premoselli.

Keywords: Asymptotically critical equation, Neumann boundary condition, blowing-up solutions.

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