Concentration with a single sign-changing layer at the higher critical exponents

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Abstract

We exhibit a new concentration phenomenon for the supercritical problem

-Delta v = lambda v + vertical bar v vertical bar(p-2) v in Omega, v = 0 on partial derivative Omega,

as p -> 2*(N,m) from below, where 2*(N, m) := 2 (N-m)/N-m-2, 1 <= m <= N - 3, is the so-called (m + 1)-th critical exponent. We assume that Omega is of the form

Omega := {(x(1), x(2)) is an element of Rm+1 x RN-m-1 : (vertical bar x(1)vertical bar|, x(2)) is an element of circle dot},

where circle dot is a bounded smooth domain in RN-m such that (circle dot) over bar subset of (0, infinity) x RN-m-1. Under some symmetry assumptions, we show that there exists lambda(*) >= 0 such that for each lambda is an element of (-infinity, lambda(*)) boolean OR {0}, there exist a sequence p(k) is an element of (2, 2*(N, m)) with p(k) -> 2*(N, m) and a sequence of solutions vk which concentrate and blow up along an m-dimensional sphere of minimal radius contained in partial derivative Omega, developing a single sign-changing layer as p(k) -> 2*(N, m). In contrast with previous results, the asymptotic profile of this layer on each space perpendicular to the blow-up sphere is not a sum of positive and negative bubbles, but a rescaling of a sign-changing solution to the critical problem

-Delta u = vertical bar u vertical bar(4/(N-m-2)) u, u is an element of D-1,D- 2 (RN-m).

Moreover, lambda(*) > 0 if m >= 2.

Palabras clave

Palabras clave de autor: Supercritical elliptic problem; nodal solution; concentration along spheres; blow-up; asymptotic profile of solutions
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