ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ

ΤΜΗΜΑ ΜΑΘΗΜΑΤΙΚΩΝ

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Boundary singularities of solutions of semilinear elliptic equations with critical Hardy potentials

Konstantinos T. Gkikas

Ακολουθεί η περίληψη στην επόμενη σελίδα.

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Abstract

We study the boundary behaviour of positive functions u satisfying (E) $-\Delta u - \frac{\kappa}{d^2(x)}u + g(u) = 0$ in a bounded domain Ω of $\mathbb{R}^N$, where $0 < \kappa \leq \frac{1}{4}$, g is a continuous nonndecreasing function and $d(.)$ is the distance function to $\partial\Omega$. We first construct the Martin kernel associated to the the linear operator $\mathcal{L}_\kappa = -\Delta - \frac{\kappa}{d^2(x)}$ and give a general condition for solving equation (E) with any Radon measure μ for boundary data. When $g(u) = |u|^{q-1}u$ we show the existence of a critical exponent $q_c = q_c(N, \kappa) > 1$ whith the following properties: when $0 < q < q_c$ any measure is eligible for solving (E) with μ for boundary data; if $q \geq q_c$, a necessary and sufficient condition is expressed in terms of the absolute continuity of μ with respect to some Besov capacity. The same capacity characterizes the removable compact boundary sets. At end any positive solution (F) $-\Delta u - \frac{\kappa}{d^2(x)}u + |u|^{q-1}u = 0$ with $q > 1$ admits a boundary trace which is a positive outer regular Borel measure. When $1 < q < q_c$ we prove that to any positive outer regular Borel measure we can associate a positive solutions of (F) with this boundary trace. [1]

[1] joint work with Laurent Véron