

On the positive radial solutions of a class of singular semilinear elliptic equations

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Abstract: In this paper, we consider the following elliptic equation

$$\operatorname{div}(A(|x|)\nabla u) + B(|x|)u^p = 0 \quad \text{in } \mathbb{R}^n, \quad (0.1)$$

where $p > 1$, $n \geq 3$, $A(|x|) > 0$ is differentiable in $\mathbb{R}^n \setminus \{0\}$ and $B(|x|)$ is a given nonnegative Hölder continuous function in $\mathbb{R}^n \setminus \{0\}$. The asymptotic behavior at infinity and structure of separation property of positive radial solutions with different initial data for (0.1) are discussed. Moreover, the existence and separation property of infinitely many positive solutions for Hardy equation and an equation related to Caffarelli-Kohn-Nirenberg inequality are obtained respectively, as special cases.