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ESTIMATE OF THE CONFORMAL SCALAR CURVATURE EQUATION VIA THE METHOD OF MOVING PLANES. II

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1. Introduction

In this paper, we consider a sequence of positive C^2 solutions u_i of

$$\Delta u_i + K_i(x) u_i^{p_i} = 0 \quad \text{in } B_2 \ , \tag{1.1}$$

where $K_i(x)$ is a sequence of C^1 positive functions defined in $\overline{B}_2$, the ball with center at 0 and radius 2, $\Delta = \sum_{j=1}^{n} \frac{\partial^2}{\partial x_j^2}$ denotes the Laplacian of $\mathbb{R}^n$ with $n \geq 3$, and $1 < p_i \uparrow \frac{n+2}{n-2}$. *Throughout this paper, we always assume that K_i is bounded between two fixed positive constants.* One of the motivations in studying equation (1.1) arises from the problem of finding a metric conformal to the standard metric of $\mathbb{R}^n$ such that $K(x)$ is the scalar curvature of the new metric. Recently, there have been many works devoted to this problem. For details please see [2], [3], [6], [11], [15], [16], [23], $\cdots$, and the references therein. It has been shown that for a sequence of solution u_i of (1.1), the blow-up does not occur at a noncritical point of $\{K_i\}$. We refer [15] and [8] for a proof of this statement. Hence in this article, we will assume that 0 is the only critical point of $\{K_i\}$, that is, K_i satisfies the following:

(1.2) For any $\epsilon > 0$, there exists $c(\epsilon) > 0$ such that

$$c(\epsilon) \leq |\nabla K_i(x)| \leq c_1$$

for $|x| \geq \epsilon$, where c_1 is a positive constant independent of i and ϵ.

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