

WEIGHTED L^p ESTIMATES OF KATO SQUARE ROOTS ASSOCIATED TO DEGENERATE ELLIPTIC OPERATORS

DACHUN YANG AND JUNQIANG ZHANG

Abstract: Let w be a Muckenhoupt $A_2(\mathbb{R}^n)$ weight and $L_w := -w^{-1} \operatorname{div}(A\nabla)$ the degenerate elliptic operator on the Euclidean space \mathbb{R}^n , $n \geq 2$. In this article, the authors establish some weighted L^p estimates of Kato square roots associated to the degenerate elliptic operators L_w . More precisely, the authors prove that, for $w \in A_p(\mathbb{R}^n)$, $p \in (\frac{2n}{n+1}, 2]$ and any $f \in C_c^\infty(\mathbb{R}^n)$, $\|L_w^{1/2}(f)\|_{L^p(w, \mathbb{R}^n)} \sim \|\nabla f\|_{L^p(w, \mathbb{R}^n)}$, where $C_c^\infty(\mathbb{R}^n)$ denotes the set of all infinitely differential functions with compact supports and the implicit equivalent positive constants are independent of f .

2010 Mathematics Subject Classification: Primary: 47B06; Secondary: 46E30, 35J70, 42B30, 42B35.

Key words: Kato square root, degenerate elliptic operator, Riesz transform, Lebesgue space, Hardy space, square function, Muckenhoupt weight.