COMMUTATORS OF MARCINKIEWICZ INTEGRALS
ASSOCIATED WITH SCHRÖDINGER OPERATOR
ON GENERALIZED WEIGHTED MORREY SPACES

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Abstract. Let $L = -\Delta + V$ be a Schrödinger operator, where $\Delta$ is the Laplacian on $\mathbb{R}^n$, while nonnegative potential $V$ belongs to the reverse Hölder class. Let also $\Omega \in L_q(S^{n-1})$ be a homogeneous function of degree zero with $q > 1$ and have a mean value zero on $S^{n-1}$. In this paper, we study the boundedness of the Marcinkiewicz operators $\mu_{j,\Omega}^L$ and their commutators $\mu_{j,\Omega, b}$ with rough kernels associated with Schrödinger operator on generalized weighted Morrey spaces $M_p,\varphi(w)$. We find the sufficient conditions on the pair $(\varphi_1, \varphi_2)$ with $q' < p < \infty$ and $w \in A_p/q'$ or $1 < p < q$ and $w^{1-p'} \in A_{p'/q'}$ which ensures the boundedness of the operators $\mu_{j,\Omega}^L$ from one generalized weighted Morrey space $M_{p,\varphi_1}(w)$ to another $M_{p,\varphi_2}(w)$ for $1 < p < \infty$. We find the sufficient conditions on the pair $(\varphi_1, \varphi_2)$ with $b \in BMO(\mathbb{R}^n)$ and $q' < p < \infty$, $w \in A_{p'/q'}$ or $1 < p < q$, $w^{1-p'} \in A_{p'/q'}$ which ensures the boundedness of the operators $\mu_{j,\Omega, b}^L$, $j = 1, \ldots, n$ from $M_{p,\varphi_1}(w)$ to $M_{p,\varphi_2}(w)$ for $1 < p < \infty$. In all cases the conditions for the boundedness of the operators $\mu_{j,\Omega}^L$, $\mu_{j,\Omega, b}^L$, $j = 1, \ldots, n$ are given in terms of Zygmund-type integral inequalities on $(\varphi_1, \varphi_2)$ and $w$, which do not assume any assumption on monotonicity of $\varphi_1(x, r)$, $\varphi_2(x, r)$ in $r$.

Keywords and phrases: Marcinkiewicz operator, rough kernel, Schrödinger operator, generalized weighted Morrey spaces, commutator, $A_p$ weights.

REFERENCES


