$L^p$-BOUNDEDNESS OF A SINGULAR INTEGRAL OPERATOR

ABDELNASER J. AL-HASAN AND DASHAN FAN

ABSTRACT. Let $b(t)$ be an $L^\infty$ function on $\mathbb{R}$, $\Omega(y)$ be an $H^1$ function on the unit sphere satisfying the mean zero property (1) and $Q_m(t)$ be a real polynomial on $\mathbb{R}$ of degree $m$ satisfying $Q_m(0) = 0$. We prove that the singular integral operator

$$T_{Q_m,b}(f)(x) = \text{p.v.} \int_{\mathbb{R}} b(t) |\Omega(y)| y^m f(x - Q_m(t)y) \, dy$$

is bounded in $L^p(\mathbb{R}^n)$ for $1 < p < \infty$, and the bound is independent of the coefficients of $Q_m(t)$. 

Received by the editors June 4, 1997; revised May 6, 1998.
AMS subject classification: 42B20.
Key words and phrases: singular integral, rough kernel, Hardy space.

404