A NOTE ON SINGULAR INTEGRALS ASSOCIATED WITH A VARIABLE SURFACE OF REVOLUTION

DASHAN FAN AND SHUICHI SATO

Abstract. We prove L^p boundedness of certain singular integral operators associated with a variable surface of revolution assuming a boundedness of related lower dimensional maximal operators. The singular integrals are defined by rough kernels satisfying certain size and cancellation conditions.

Mathematics subject classification (2000): Primary 42B20.
Keywords and phrases: singular integral, rough kernel, surface of revolution.

REFERENCES

[1] A. P. CALDERÓN AND A. ZYGMUND, *On singular integrals*, Amer. J. Math., **78** (1956), 289–309.

[2] A. CARBERY, A. SEEGER, S. WAINGER AND J. WRIGHT, *Classes of singular integral operators along variable lines*, J. Geometric Analysis, **9** (1999), 583–605.

[3] J. DUOANDIKOETXEA AND J. L. RUBIO DE FRANCIA, *Maximal and singular integral operators via Fourier transform estimates*, Invent. Math., **84** (1986), 541–561.

[4] D. FAN, K. GUO AND Y. PAN, *A note of a rough singular integral operator*, Math. Inequal. Appl., **2** (1999), 73–81.

[5] D. FAN AND Y. PAN, *Singular integral operators with rough kernels supported by subvarieties*, Amer. J. Math., **119** (1997), 799–839.

[6] D. FAN AND S. SATO, *Remarks on Littlewood-Paley functions and singular integrals*, J. Math. Soc. Japan, **54** (2002), 565–585.

[7] D. FAN AND S. SATO, *Singular and fractional integrals along variable surfaces*, Hokkaido Math. J., **35** (2006), 61-85.

[8] D. FAN AND Q. ZHENG, *Maximal singular integral operators along surfaces*, J. Math. Anal. Appl., **267** (2002), 746–759.

[9] R. FEFFERMAN, *A note on singular integrals*, Proc. Amer. Math. Soc., **74** (1979), 266–270.

[10] L. GRAFAKOS AND A. STEFANOV, *L^p bounds for singular integrals and maximal singular integrals with rough kernels*, Indiana Univ. Math. J., **47** (1998), 455–469.

[11] G. HU, *$L^p(\mathbb{R}^n)$ boundedness for the Marcinkiewicz integral*, Approx. Theory Appl. (N. S.), **18**, 4 (2002), 93–100.

[12] W. KIM, S. WAINGER, J. WRIGHT AND S. ZIESLER, *Singular integrals and maximal functions associated to surfaces of revolution*, Bull. London Math. Soc., **28** (1996), 291–296.

[13] S. LU, Y. PAN AND D. YANG, *Rough singular integrals associated to surfaces of revolution*, Proc. Amer. Math. Soc., **129** (2001), 2931–2940.

[14] S. SATO, *Estimates for singular integrals along surfaces of revolution*, arXiv:0809.3315v1 [math.CA], to appear in J. Aust. Math. Soc.

[15] S. SATO, *Estimates for Littlewood-Paley functions and extrapolation*, Integr. equ. oper. theory, **62** (2008), 429–440.

[16] E. M. STEIN, *Harmonic Analysis: Real-Variable Methods, Orthogonality and Oscillatory Integrals*, Princeton University Press, Princeton, NJ, 1993.

[17] T. WALSH, *On the function of Marcinkiewicz*, Studia Math., **44** (1972), 203–217.

[18] M. WEISS AND A. ZYGMUND, *An example in the theory of singular integrals*, Studia Math., **26** (1965), 101–111.

Mathematical Inequalities & Applications
www.ele-math.com
mia@ele-math.com