

AREA INTEGRALS AND THE EXPONENTIAL SQUARE THEOREM FOR ELLIPTIC OPERATORS WITH COEFFICIENTS SUPPORTED IN WHITNEY TYPE CUBES

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Abstract. We provide a direct proof of a result comparing the area functions of solutions of two second order linear elliptic operators, when the discrepancy between their main coefficients is supported on Whitney type cubes of the unit ball of n dimensional Euclidean space. Our arguments are specialized to this type of operators, and the vanishing Carleson condition that we adopt is inspired by work of C. Sweezy. The comparison between area functions implies the preservation of the so called exponential square theorem assuming the aforementioned discrepancy of the coefficients.

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REFERENCES

- [1] S. Y. A. CHANG, J. M. WILSON, AND T. H. WOLFF, *Some weighted norm inequalities concerning the Schrödinger operators*, Comment. Math. Helvetici **60** (1985), 217–246.
- [2] M. DINDOS, C. E. KENIG, AND J. PIPHER, *BMO solvability and the A_∞ condition for elliptic operators*, J. Geom. Anal. **21** (2011), 78–95.
- [3] R. FEFFERMAN, C. E. KENIG, AND J. PIPHER, *The theory of weights and the Dirichlet problem for elliptic equations*, Ann. of Math. **134** (1991), 65–124.
- [4] C. E. KENIG, *Harmonic analysis techniques for second order elliptic boundary value problems*, CBMS Regional Conference Series, no. 83, Amer. Math. Soc., Providence, 1994.
- [5] C. E. KENIG, B. KIRCHHEIM, J. PIPHER, AND T. TORO, *Square functions and the A_∞ property of elliptic measures*, J. Geom. Anal. **16** (2016), 2383–2410.
- [6] C. E. KENIG, H. KOCH, J. PIPHER, AND T. TORO, *A new approach to absolute continuity of elliptic measure with applications to non-symmetric equations*, Adv. in Math. **153** (2000), 231–298.
- [7] C. E. KENIG AND J. PIPHER, *The absolute continuity of elliptic measure revisited*, J. Fourier Anal. Appl. **4** (1998), 463–468.
- [8] B. MUCKENHOUT AND R. WHEEDEN, *Weighted bounded mean oscillation and the Hilbert transform*, Studia Math. **54** (1976), 221–237.
- [9] M. NAVARRO-BURRUEL AND J. RIVERA-NORIEGA, *The A_∞ property of elliptic measures for operators with coefficients supported in Whitney-type cubes*, J. Math. Anal. Appl. **420** (2014), 515–531.
- [10] C. SBORDONE AND G. ZECCA, *The L^p solvability of the Dirichlet problem for planar elliptic equations*, J. Fourier Anal. Appl. **15** (2009), 871–903.
- [11] C. SWEETZ, *Elliptic functions, area integrals and the exponential square class on $B_1(0) \subset \mathbb{R}^n$, $n > 2$* , Studia Math. **164** (2004), 1–28.