

BOUNDEDNESS FOR MULTILINEAR OPERATORS OF PSEUDO-DIFFERENTIAL OPERATORS FOR THE EXTREME CASES

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Abstract. We prove the boundedness of the multilinear operators associated to the pseudo-differential operator for the extreme cases.

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REFERENCES

- [1] S. CHANILLO AND A. TORCHINSKY, *Sharp function and weighted L^p estimates for a class of pseudo-differential operators*, Ark. Math., **24** (1986), 1–25.
- [2] W. G. CHEN AND G. E. HU, *Weak type (H^1 , L^1) estimate for multilinear singular integral operator*, Adv. in Math.(China), **30** (2001), 63–69.
- [3] J. COHEN, *A sharp estimate for a multilinear singular integral on R^n* , Indiana Univ. Math. J., **30** (1981), 693–702.
- [4] J. COHEN AND J. GOSELIN, *On multilinear singular integral operators on R^n* , Studia Math., **72** (1982), 199–223.
- [5] J. COHEN AND J. GOSELIN, *A BMO estimate for multilinear singular integral operators*, Illinois J. Math., **30** (1986), 445–465.
- [6] R. COIFMAN AND Y. MEYER, *Au delà des opérateurs pseudo-différentiels*, Astérisque, **57** (1978).
- [7] R. COIFMAN AND Y. MEYER, *Wavelets, Calderón-Zygmund and multilinear operators*, Cambridge Studies in Advanced Math., **48**, Cambridge University Press, Cambridge, 1997.
- [8] C. FEFFERMAN, *L^p bounds for pseudo-differential operators*, Israel J. Math., **14** (1973), 413–417.
- [9] J. GARCIA-CUERVA AND J. L. RUBIO DE FRANCIA, *Weighted norm inequalities and related topics*, North-Holland Math., **16**, Amsterdam, 1985.
- [10] E. HARBOURE, C. SEGOVIA AND J. L. TORREA, *Boundedness of commutators of fractional and singular integrals for the extreme values of p* , Illinois J. Math., **41** (1997), 676–700.
- [11] N. MILLER, *Weighted Sobolev spaces and pseudo-differential operators with smooth symbols*, Trans. Amer. Math. Soc., **269** (1982), 91–109.
- [12] E. M. STEIN, *Harmonic Analysis: real variable methods, orthogonality and oscillatory integrals*, Princeton Univ. Press, Princeton NJ, 1993.
- [13] C. PÉREZ AND R. TRUJILLO-GONZALEZ, *Sharp weighted estimates for multilinear commutators*, J. London Math. Soc., **65** (2002), 672–692.
- [14] M. SAIDANI, A. LAHMAR-BENBERNOU AND S. GALA, *Pseudo-differential operators and commutators in multiplier spaces*, African Diaspora J. of Math., **6** (2008), 31–53.
- [15] M. E. TAYLOR, *Pseudo-differential operators and nonlinear PDE*, Birkhauser, Boston, 1991.