

A NOTE ON VECTOR-VALUED MAXIMAL MULTILINEAR OPERATORS AND THEIR COMMUTATORS

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Abstract. Let T^* be the maximal multilinear Calderón-Zygmund operator with kernels of Dini's type and $T_q^*(\vec{f})$ be the vector-valued version of T^* . In this paper, we consider the weighted norm inequalities for $T_q^*(\vec{f})$. As applications, the weighted strong type and weighted end-point weak type estimates for the commutators of $T_q^*(\vec{f})$ were established respectively.

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REFERENCES

- [1] T. A. BUI, X. T. DUONG, *Weighted norm inequalities for multilinear operators and applications to multilinear Fourier multipliers*, Bull. Sci. Math. **137** (2013), 63–75.
- [2] X. CHEN, *Weighted estimates for maximal operator of multilinear singular integral*, Bull. Polish Acad. Sci. Math. **58** (2010), 129–135.
- [3] R. R. COIFMAN AND Y. MEYER, *On commutators of singular integrals and bilinear singular integrals*, Trans. Amer. Math. Soc. **212** (1975), 315–331.
- [4] R. R. COIFMAN AND Y. MEYER, *Commutateurs d'intégrales singulières et opérateurs multilinéaires*, Ann. Inst. Fourier, Grenoble **28** (1978), 177–202.
- [5] R. R. COIFMAN AND Y. MEYER, *Au-delà des opérateurs pseudo-différentiels*, Asterisque 57, 1978.
- [6] D. CRUZ-URIBE, J. M. MARTELL AND C. PÉREZ, *Extrapolation from A_∞ weights and applications*, J. Func. Anal. **213** (2004), 412–439.
- [7] J. DUOANDIKOETXEA, *Fourier Analysis*, Graduate Studies in Math. 29, Amer. Math. Soc., Providence, Rhode Island, 2001.
- [8] X. T. DUONG, L. GRAFAKOS, L. YAN, *Multilinear operators with non-smooth kernels and commutators of singular integrals*, Trans. Amer. Math. Soc. **362** (2010), 2089–2113.
- [9] C. FEFFERMAN AND E. STEIN, *Some maximal inequalities*, Amer. J. Math. **93** (1971), 107–115.
- [10] L. GRAFAKOS AND R. TORRES, *Multilinear Calderón-Zygmund theory*, Adv. Math. **165** (2002), 124–164.
- [11] L. GRAFAKOS AND J. M. MARTELL, *Extrapolation of weighted norm inequalities for multivariable operators*, J. Geom. Anal. **14** (2004), 19–46.
- [12] L. GRAFAKOS, L. LIU AND D. YANG, *Multiple weighted norm inequalities for maximal multilinear singular integrals with non-smooth kernels*, Proc. Roy. Soc. of Edinburgh Sect. A **141** (2011), 755–775.
- [13] L. GRAFAKOS, R. H. TORRES, *Maximal operator and weighted norm inequalities for multilinear singular integrals*, Indiana Univ. Math. J. **51** (2002), 1261–1276.
- [14] G. HU, C.-C. LIN, *Weighted norm inequalities for multilinear singular integral operators and applications*, Anal. Appl. **12** (2014), 269–291.
- [15] A. K. LERNER, S. OMBROSI, C. PÉREZ, R. H. TORRES AND R. TRUJILLO-GONZÁLEZ, *New maximal functions and multiple weights for the multilinear Calderón-Zygmund theory*, Adv. Math. **220** (2009), 1222–1264.

- [16] G. LU, P. ZHANG, *Multilinear Calderón-Zygmund operators with kernels of Dini's type and applications*, *Nonlinear Anal.* **107** (2014), 92–117.
- [17] B. MOUKENHOUP, *Weighted norm inequalities for the Hardy maximal function*, *Trans. Am. Math. Soc.* **165** (1972), 207–226.
- [18] D. MALDONADO, V. NAIBO, *Weighted norm inequalities for paraproducts and bilinear pseudodifferential operators with mild regularity*, *J. Fourier Anal. Appl.* **15** (2009), 218–261.
- [19] C. PÉREZ AND R. H. TORRES, *Sharp maximal function estimates for multilinear singular integrals*, *Harmonic Analysis at Mount Holyoke, Contemporary Mathematics* **320** (2003), 323–331.
- [20] C. PÉREZ AND R. TRUJILLO-GONZÁLEZ, *Sharp weighted estimates for multilinear commutators*, *J. London Math. Soc.* **65** (2002), 672–692.
- [21] C. PÉREZ, G. PRADOLINI, R. H. TORRES AND R. TRUJILLO-GONZÁLEZ, *End-point estimates for iterated commutators of multilinear singular integrals*, to appear in *Journal of London Math. Soc.*
- [22] C. PÉREZ AND R. H. TORRES, *Minimal regularity conditions for the end-point estimate of bilinear Calderón-Zygmund operators*, *Proc. Amer. Math. Soc. Ser. B* **1** (2014), 1–13.
- [23] Z. SI AND Q. XUE, *Weighted estimates for commutators of vector-valued maximal multilinear operators*, *Nonlinear Anal.* **96** (2014) 96–108.
- [24] Z. SI AND Q. XUE, *Weighted estimates for vector-valued of commutators multilinear operators*, *Taiwanese J. Math.* **17** (2013), 661–674.
- [25] L. TANG, *Weighted estimates for vector-valued commutators of multilinear operators*, *Proceedings of the Royal Society of Edinburgh* **138A** (2008), 897–922.
- [26] Q. XUE, *Weighted estimates for the iterated commutators of multilinear maximal and fractional type operators*, *Studia Math* **217** (2013), 97–122.