

LOCAL ONE-SIDED MAXIMAL FUNCTION ON FRACTIONAL SOBOLEV SPACES

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Abstract. In this article we study the boundedness of local one sided maximal operators on weighted fractional Sobolev Spaces. As a consequence we obtain a Lebesgue differentiation theorem for functions in fractional Sobolev spaces.

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REFERENCES

- [1] L. FORZANI, F. J. MARTÍN-REYES, S. OMBROSI, *Weighted inequalities for the two-dimensional one-sided Hardy-Littlewood maximal function*, Trans. Amer. Math. Soc. **363** (2011), no. 4, 1699–1719. 42B25 (37A40 47A35).
- [2] PIOTR HAJŁASZ, JANI ONNINEN, *On boundedness of maximal functions in Sobolev spaces*, Ann. Acad. Sci. Fenn. Math. **29** (2004), no. 1, 167–176. 42B20 (42B25 46E35).
- [3] JUHA KINNUNEN, *The Hardy-Littlewood maximal function of a Sobolev function*, Israel J. Math. **100** (1997), 117–124, 30C65.
- [4] JUHA KINNUNEN, EERO SAKSMAN, *Regularity of the fractional maximal function*, Bull. London Math. Soc. **35** (2003), no. 4, 529–535. 42B35 (46E35 47G10).
- [5] JUHA KINNUNEN, PETER LINDQVIST, *The derivative of the maximal function*, J. Reine Angew. Math. **503** (1998), 161–167. 42B25.
- [6] HANNES LUIRO, *On the regularity of the Hardy-Littlewood maximal operator on subdomains of \mathbb{R}^n* , Proc. Edinb. Math. Soc. (2) **53** (2010), no. 1, 211–237. 42B25 (47H09).
- [7] HANNES LUIRO, *Continuity of the maximal operator in Sobolev spaces*, Proc. Amer. Math. Soc. **135** (2007), no. 1, 243–251. 42B25 (46E35 47B38).
- [8] HANNES LUIRO, ANTTI V. VHANGAS, *Local maximal operators on fractional Sobolev spaces*, J. Math. Soc. Japan **68** (2016), no. 3, 1357–1368. 42B25 (46E35).
- [9] HANNES LUIRO, ANTTI V. VHANGAS, *Beyond local maximal operators*, Potential Anal. **46** (2017), no. 2, 201–226. 42B25 (46E35 47H99).
- [10] F. J. MARTÍN-REYES, *New proofs of weighted inequalities for the one-sided Hardy-Littlewood maximal functions*, Proc. Amer. Math. Soc. **117** (1993), no. 3, 691–698. 42B25.
- [11] ONDŘEJ KURKA, *On the variation of the Hardy-Littlewood maximal function*, Ann. Acad. Sci. Fenn. Math. **40** (2015), no. 1, 109–133. 42B25 (42B30 46E35).
- [12] B. MUCKENHOUPT, *Weighted norm inequalities for the Hardy maximal function*, Trans. Amer. Math. Soc. **165** (1972), 207–226.
- [13] E. SAWYER, *Weighted inequalities for the one-sided Hardy-Littlewood maximal functions*, Trans. Amer. Math. Soc. **297** (1986), no. 4, 367–374.
- [14] TANAKA HITOSHI, *A remark on the derivative of the one-dimensional Hardy-Littlewood maximal function*, Bull. Austral. Math. Soc. **65** (2002), no. 2, 253–258, 42B25.
- [15] B. O. TURESSON, *Nonlinear potential theory and weighted Sobolev spaces*, Lecture Notes in Mathematics, **1736**, Springer-Verlag, Berlin, 2000. xiv+173 pp. 31C45 (35J70 46E35).