

## THE FRACTIONAL INTEGRAL OPERATORS ON MORREY SPACES WITH VARIABLE EXPONENT ON UNBOUNDED DOMAINS

KWOK-PUN HO

*Abstract.* The boundedness of fractional integral operator on Morrey spaces with variable exponent on unbounded domains is established.

*Mathematics subject classification (2010):* 42B20, 46E30, 47B38.

*Keywords and phrases:* Fractional integral operator, Morrey spaces, variable exponent analysis.

### REFERENCES

- [1] D. ADAMS, *A note on Riesz potentials*, Duke Math. J. **42** (1975), 765–778.
- [2] A. ALMEIDA, J. HASANOV, AND S. SAMKO, *Maximal and potential operators in variable exponent Morrey spaces*, Georgian Math. J. **15** (2008), 195–208.
- [3] C. BENNETT, AND R. SHARPLEY, *Interpolation of Operators*, Academic Press, 1988.
- [4] C. CAPONE, D. CRUZ-URIBE, AND A. FIORENZA, *The fractional maximal operator and fractional integrals on variable  $L_p$  spaces*, Rev. Mat. Iberoam. **23** (2007), 743–770.
- [5] F. CHIARENZA, AND M. FRASCA, *Morrey Spaces and Hardy-Littlewood Maximal Function*, Rend. Mat. Appl. (7) **7** (1987), 273–279.
- [6] D. CRUZ-URIBE, SFO, A. FIORENZA, J. MARTELL, AND C. PÉREZ, *The boundedness of classical operators on variable  $L^p$  spaces*, Ann. Acad. Sci. Fenn. Math. **31** (2006), 239–264.
- [7] D. CRUZ-URIBE, L. DIENING, AND P. HÄSTÖ, *The maximal operator on weighted variable Lebesgue spaces*, Frac. Calc. Appl. Anal. **14** (2011), 361–374.
- [8] L. DIENING, *Riesz potential and Sobolev embeddings on generalized Lebesgue and Sobolev spaces  $L^{p(\cdot)}$  and  $W^{k,p(\cdot)}$* , Math. Nachr. **268** (2004), 31–43.
- [9] L. DIENING, *Maximal function on Orlicz-Musielak spaces and generalized Lebesgue space*, Bull. Sci. Math. **129** (2005), 657–700.
- [10] L. DIENING, P. HARJULEHTO, P. HÄSTÖ, AND M. RUŽIČKA, *Lebesgue and Sobolev spaces with variable exponents*, Lecture Notes in Mathematics, vol. 2017, Springer-Verlag, Berlin, 2011.
- [11] D. EDMUNDS, AND J. RÁKOSNÍK, *Sobolev embeddings with variable exponent*, Studia Math. **143** (2000), 267–293.
- [12] D. EDMUNDS, AND J. RÁKOSNÍK, *Sobolev embeddings with variable exponent II*, Math. Nachr. **246–247** (2002), 53–67.
- [13] A. ERIDANI, V. KOKILASHVILI, AND A. MESKHI, *Morrey spaces and fractional integral operators*, Expo. Math. **27** (2009), 227–239.
- [14] P. HÄSTÖ, *Local-to-global results in Variable Exponent spaces*, Math. Res. Lett. **16** (2009), 263–278.
- [15] K.-P. HO, *Littlewood-Paley spaces*, Math. Scand. **108** (2011), 77–102.
- [16] K.-P. HO, *Atomic decompositions of Weighted Hardy-Morrey Spaces*, accepted by Hokkaido Mathematical Journal.
- [17] K.-P. HO, *Vector-valued singular integral operators on Morrey type spaces and variable Triebel-Lizorkin-Morrey spaces*, preprint.
- [18] K.-P. HO, *Vector-valued maximal inequalities for Variable Morrey spaces and Variable Triebel-Lizorkin-Morrey spaces*, preprint.
- [19] J. GARCÍA-CUERVA, AND A. GATTO, *Boundedness properties of fractional integral operator associated to non-doubling measure*, Studia. Math. **162** (2004), 245–261.

- [20] V. GULIYEV, J. HASANOV, AND S. SAMKO, *Boundedness of the maximal, potential and singular operators in the generalized variable exponent Morrey spaces*, Math. Scand. **107** (2010), 285–304.
- [21] M. IZUKI, *Boundedness of commutators on Herz spaces with variable exponent*, Rend. Circ. Mat. Palermo (2) **59** (2010), 199–213.
- [22] M. IZUKI, *Fractional integrals on Herz-Morrey spaces with variable exponent*, Hiroshima Math. J. **40** (2010), 343–355.
- [23] V. KOKILASHVILI, AND A. MESKHI, *Boundedness of Maximal and Singular operators in Morrey Spaces with Variable Exponent*, Armen. J. Math. **1** (2008), 18–28.
- [24] V. KOKILASHVILI, AND A. MESKHI, *Maximal functions and potentials in variable exponent Morrey spaces with non-doubling measure*, Complex Var. Elliptic Equ. **55** (2010), 923–936.
- [25] O. KOVÁČIK AND J. RÁKOSNÍK, *On spaces  $L^{p(\cdot)}$  and  $W^{k,p(\cdot)}$* , Czechoslovak Math. J. **41** (1991), 592–618.
- [26] V. KOKILASHVILI, AND S. SAMKO, *On Sobolev Theorem for Riesz-type Potentials in Lebesgue Spaces with Variable Exponent*, Z. Anal. Anwend. **22** (2003), 899–910.
- [27] Y. MIZUTA AND T. SHIMOMURA, *Sobolev embeddings for Riesz potentials of functions in Morrey spaces of variable exponent*, J. Math. Soc. Japan **60** (2008), 583–602.
- [28] Y. MIZUTA AND T. SHIMOMURA, *Continuity properties for Riesz potentials of functions in Morrey spaces of variable exponent*, Math. Inequal. Appl. **13** (2010), 99–122.
- [29] Y. MIZUTA, E. NAKAI, T. OHNO, AND T. SHIMOMURA, *Boundedness of fractional integral operators on Morrey spaces and Sobolev embeddings for generalized Riesz potentials*, J. Math. Soc. Japan **62** (2010), 707–744.
- [30] E. NAKAI, *Hardy-Littlewood Maximal Operator, Singular Integral Operators and the Riesz Potentials on Generalized Morrey Spaces*, Math. Nachr. **166** (1994), 95–104.
- [31] E. NAKAI, *Recent Topics of Fractional Integrals*, Sugaku Expositions **20** (2007), 215–235.
- [32] A. NEKVINDA, *Hardy-Littlewood maximal operator on  $L^{p(x)}(\mathbb{R}^n)$* , Math. Inequal. Appl. **7** (2004), 255–265.
- [33] P. OLSEN, *Fractional integration, Morrey spaces and a Schrödinger equation*, Comm. Partial Differential Equations **115** (1995), 2005–2055.
- [34] J. PEETRE, *On the Theory of  $\mathcal{L}_{p,\lambda}$  Spaces*, J. Funct. Anal. **4** (1969), 71–87.
- [35] S. SAMKO, *Convolution and potential type operators in  $L^{p(x)}(\mathbb{R}^n)$* , Integral Transform. Spec. Funct. **7** (1998), 261–284.
- [36] Y. SAWANO, AND H. TANAKA, *Morrey spaces for nondoubling measures*, Acta Math. Sinica **21** (2005), 1535–1544.
- [37] H. TANAKA, *Morrey spaces and Fractional operators*, J. Aust. Math. Soc. **88** (2010), 247–259.