

CONTINUITY PROPERTIES OF RIESZ POTENTIALS FOR FUNCTIONS IN $L^{p(\cdot)}$ OF VARIABLE EXPONENT

TOSHIHIDE FUTAMURA AND YOSHIHIRO MIZUTA

Abstract. Our aim in this paper is to deal with 0-Hölder continuity for Riesz potentials of functions belonging to Lebesgue's L^p space of variable exponent, in the borderline case of Sobolev's theorem. We are also concerned with exponential integrability for Riesz potentials.

Mathematics subject classification (2000): 31B15, 46E35.

Key words and phrases: Riesz potentials, Sobolev's embedding theorem, Trudinger's exponential integrability.

REFERENCES

- [1] D. R. ADAMS AND L. I. HEDBERG, *Function spaces and potential theory*, Springer, 1996.
- [2] L. DIENING, *Maximal functions on generalized Lebesgue spaces $L^{p(\cdot)}$* , Math. Inequal. Appl., **7**, 2 (2004), 245–253.
- [3] L. DIENING, *Riesz potentials and Sobolev embeddings on generalized Lebesgue and Sobolev spaces $L^{p(\cdot)}$ and $W^{k,p(\cdot)}$* , Math. Nachr., **268**, (2004), 31–43.
- [4] D. E. EDMUNDS AND J. RÁKOSNÍK, *Sobolev embedding with variable exponent, II*, Math. Nachr. **246-247** (2002), 53–67.
- [5] N. FUSCO, P. L. LIONS AND C. SBORDONE, *Sobolev embedding theorems in borderline cases*, Proc. Amer. Math. Soc. **124** (1996), 561–565.
- [6] T. FUTAMURA, Y. MIZUTA AND T. SHIMOMURA, *Sobolev embeddings for Riesz potential space of variable exponent*, preprint.
- [7] P. HARJULEHTO AND P. HÄSTÖ, *A capacity approach to the Poincaré inequality and Sobolev imbeddings in variable exponent Sobolev spaces*, Rev. Mat. Complut., **17**, (2004), 129–146.
- [8] L. I. HEDBERG, *On certain convolution inequalities*, Proc. Amer. Math. Soc. **36** (1972), 505–510.
- [9] O. KOVÁČIK AND J. RÁKOSNÍK, *On spaces $L^{p(x)}$ and $W^{k,p(x)}$* , Czechoslovak Math. J. **41** (1991), 592–618.
- [10] Y. MIZUTA, *Potential theory in Euclidean spaces*, Gakkōtoshō, Tokyo, 1996.
- [11] Y. MIZUTA AND T. SHIMOMURA, *Exponential integrability for Riesz potentials of functions in Orlicz classes*, Hiroshima Math. J. **28** (1998), 355–371.
- [12] Y. MIZUTA AND T. SHIMOMURA, *Continuity and differentiability for weighted Sobolev spaces*, Proc. Amer. Math. Soc. **130** (2002), 2985–2994.
- [13] M. RŮŽIČKA, *Electrorheological fluids : modeling and Mathematical theory*, Lecture Notes in Math. **1748**, Springer, 2000.