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A GLOBAL VERSION OF GEHRING LEMMA IN ORLICZ SPACES ON SPACES OF HOMOGENEOUS TYPE

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Abstract. We extend a global version of Gehring lemma in Orlicz spaces, proved by T. Iwaniec, from the Euclidean case to the setting of spaces of homogeneous type.

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REFERENCES

[1] A. BJÖRN AND J. BJÖRN, *Nonlinear Potential Theory on Metric Spaces*, EMS Tracts in Mathematics **17**, 2011, 403 pp.
[2] A. CIANCHI, *Some results in the theory of Orlicz spaces and applications to variational problems*, Nonlinear Analysis, Function Spaces and Applications **6** (1999), 50–92.
[3] A. CIANCHI AND N. FUSCO, *Gradient regularity for minimizers under general growth conditions*, J. Reine Angew. Math., **507** (1999), 15–36.
[4] R. COIFMAN AND G. WEISS, *Analyse Harmonique Non-commutative sur Certaines Espaces Homogènes: Etude de Certaines Integrals Singulieres*, Lecture Notes in Mathematics, book 242, Springer, 1971, 162 pp.
[5] B. FRANCHI AND F. SERRA CASSANO, *Gehring's lemma for metrics and higher integrability of the gradient for minimizers of noncoercive variational functionals*, Studia Math. **120**, 1 (1996), 1–22.
[6] F. W. GEHRING, *The L^p- integrability of the partial derivatives of a quasiconformal mapping*, Acta Math. **130** (1973), 265–277.
[7] U. GIANAZZA, *The L^p integrability on homogeneous spaces*, Ist. Lombardo Accad. Sci. Lett. Rend. A, **126** (1992), 83–92.
[8] L. GRECO AND G. ZECCA, *A version of Gehring lemma in Orlicz spaces*, Rendiconti Lincei. Matematica e Applicazioni, vol. **23**, 1 (2012), 29–50.
[9] L. GRAFAKOS, L. LIU, D. MALDONADO AND D. YANG, *Multilinear analysis in metric spaces*, Dissertationes Math. **497** (2014), 121 pages, doi:10.4064/dm497-0-1
[10] P. HAJŁASZ AND P. KOSKELA, *Sobolev met Poincaré*, Mem. Amer. Math. Soc. vol. **145**, no. 688 (2000), 103 pp.
[11] J. KINNUNEN, *Higher integrability with weights*, Ann. Acad. Sci. Fenn., Ser. A.I. Math., **19** (1994), 355–366.
[12] T. IWANIEC, *The Gehring lemma*, in *Quasiconformal Mappings and Analysis,* Springer, 1998, pp. 181–204.
[13] T. IWANIEC AND G. MARTIN, *Geometric Function Theory and Nonlinear Analysis*, Oxford Science Publications, Clarendon Press, 2001, 552 pp.
[14] O.E. MAASALO, *Self-improving phenomena in the calculus of variations on metric spaces*, Ph.D. thesis, Helsinki University of Technology, 2008.
[15] J. MARTIN AND M. MILMAN, *Gehring's lemma for nondoubling measures*, Michigan Math. J. **47**, 3 (2000), 559–573.
[16] M. MASTYŁO AND M. MILMAN, *A new approach to Gehring's lemma*, Indiana Univ. Math. J. **49**, 2 (2000), 655–680.
[17] M. MILMAN, *A note on Gehring lemma*, Ann. Acad. Sci. Fenn., Ser. A.I. Math., **21** (1996), 389–398.

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[18] H. TUOMINEN, *Orlicz-Sobolev spaces on metric measure spaces*, Ann. Acad. Sci. Fenn. Math. Dissertationes **135** (2004), 279 pp.
[19] A. ZATORSKA-GOLDSTEIN, *Very weak solutions of nonlinear elliptic equations*, Ann. Acad. Sci. Fenn., Ser. A.I. Math., **30** (2005), 407–436.