# LECTURES ON ANALYSIS ON METRIC SPACES. ERRATA.

JUHA HEINONEN

0.1. **Exercises 2.10 and 2.11, p. 13.** In Exercise 2.11, one needs the additional assumption that the balls $B_i$ are all pairwise disjoint. Otherwise it is easy to see that the claim is not true. (This extra assumption is not needed in Exercise 2.10.)

I learned the fact in Exercise 2.11 from Mario Bonk many years ago. It appears in [2, Appendix]. This reference and credit should have been mentioned. Similarly, there is no reference for the fact in Exercise 2.10. It was proved by Bojarski in [1] (reference [14] in the book).

0.2. **Theorem 9.5, pp. 69–70.** In Theorem 9.5, in the implication (5) $\Rightarrow$ (1), the conclusion in (1) has to be changed to: (1') *for every point $x \in B$ there exists a point $z_x \in B$ such that $B_x := B(z_x, \frac{1}{16}\operatorname{diam} B) \subset B$ and that*

$$|u(x) - u_{B_x}| \leq C_1 \, (\operatorname{diam} B)^{p-1} I_{1,B}\rho^p(x)\,. \tag{0.1}$$

The proof of the implication (5) $\Rightarrow$ (1) on pp. 72– 73 gives the implication (5) $\Rightarrow$ (1'). I do not know if the implication (5) $\Rightarrow$ (1) is true as stated in the book.

I thank Tero Mäkäläinen for pointing out this error. See [3, Lemma 2.9].

0.3. **Equation (14.20), p. 113.** Equation (14.20) and the line before it should read:

measure if and only if there exists a constant $C \geq 1$ such that

$$\inf \sum_{i=0}^{k} \mu(B_{x_i,x_{i+1}})^{1/n} \geq C^{-1} \mu(B_{x,y})^{1/n} > 0\,, \tag{14.20}$$

## References

[1] Bojarski, B. Remarks on Sobolev imbedding inequalities. In *Complex analysis, Joensuu 1987*, no. 1351 in Lecture Notes in Mathematics. Springer-Verlag, Berlin, 1988, pp. 52–68.

[2] Bonk, M., Koskela, P., and Rohde, S. Conformal metrics on the unit ball in Euclidean space. *Proc. London Math. Soc. (3) 77*, 3 (1998), 635–664.

[3] Mäkäläinen, T. Adams inequality on metric spaces. *Preprint, University of Jyväskylä* (2005).