Accepted Manuscript

Sobolev spaces on warped products

Nicola Gigli, Bang-Xian Han

PII: S0022-1236(18)30138-1
DOI: https://doi.org/10.1016/j.jfa.2018.03.021
Reference: YJFAN 7997

To appear in: *Journal of Functional Analysis*

Received date: 27 June 2017
Accepted date: 30 March 2018

Please cite this article in press as: N. Gigli, B.-X. Han, Sobolev spaces on warped products, *J. Funct. Anal.* (2018), https://doi.org/10.1016/j.jfa.2018.03.021

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Sobolev spaces on warped products

Nicola Gigli* Bang-Xian Han †

April 5, 2018

Abstract

We study the structure of Sobolev spaces on the cartesian/warped products of a given metric measure space and an interval.

Our main results are:

- the characterization of the Sobolev spaces in such products
- the proof that, under natural assumptions, the warped products possess the Sobolev-to-Lipschitz property, which is key for geometric applications.

The results of this paper have been needed in the recent proof of the 'volume-cone-to-metric-cone' property of RCD spaces obtained by the first author and De Philippis.

Keywords: warped product, Sobolev space, metric measure space.

MSC2010: 53C23, 46E35

Contents

1 Introduction **1**

2 Preliminaries **3**
2.1 Metric measure spaces 3
2.2 Sobolev functions 4
2.3 Product spaces 5

3 The results **7**
3.1 Cartesian product 7
3.2 Warped product 13
3.3 Sobolev-to-Lipschitz property 19

1 Introduction

There is a well established definition of the space $W^{1,2}(X,\mathrm{d},\mathfrak{m})$ of real valued Sobolev functions defined on a metric measure space $(X,\mathrm{d},\mathfrak{m})$ ([8], [14], [3]). A function $f\in W^{1,2}(X,\mathrm{d},\mathfrak{m})$

*SISSA, ngigli@sissa.it
†Universität Bonn, han@iam.uni-bonn.de

Download English Version:

https://daneshyari.com/en/article/8896569

Download Persian Version:

https://daneshyari.com/article/8896569

Daneshyari.com