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TOPOLOGY PROCEEDINGS

Volume 53, 2019

Pages 201–207

http://topology.nipissingu.ca/tp/

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Electronically published on January 18, 2019

Topology Proceedings

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E-mail:	topolog@auburn.edu
ISSN:	(Online) 2331-1290, (Print) 0146-4124

http://topology.auburn.edu/tp/
http://topology.nipissingu.ca/tp/

TOPOLOGY PROCEEDINGS
Volume 53 (2019)
Pages 201-207

E-Published on January 18, 2019

COARSE DIRECT PRODUCTS AND PROPERTY C

G. BELL AND A. LAWSON

Abstract. We show that coarse property C is preserved by finite coarse direct products. We also show that the coarse analog of Dydak's countable asymptotic dimension is equivalent to the coarse version of straight finite decomposition complexity and is therefore preserved by direct products.

1. Introduction and Preliminaries

The coarse category was described by Roe [9] as a generalization of the large-scale approach to discrete groups begun by Gromov [7]. Coarse spaces are sets that are equipped with a so-called coarse structure that provides a measure of proximity without referring to a metric. Coarse structures can be derived from metric structures [9, 11], topological structures [9], or group structures [8]. Coarse versions of asymptotic dimension [6, 9] as well as property C and finite decomposition complexity [1] have been established and studied [12].

The primary goal of this short note is to show that coarse property C is stable with respect to finite coarse direct products (defined below); this was shown in the metric case recently [2, 3]. We also show that the coarse analog of Dydak's countable asymptotic dimension [4] coincides with the coarse version of straight finite decomposition complexity (sFCDC); as a result, this notion is also stable with respect to coarse direct products.

A coarse structure can be defined on any set X. Take the multiplication (referred to here as composition) and inverse operations from the pair groupoid structure on the product $X \times X$. A collection $\mathcal{E}$ of subsets of $X \times X$ is called a **coarse structure** on X if it contains the diagonal and is closed under subsets, finite unions, inverses, and compositions [9].

2010 *Mathematics Subject Classification.* Primary 54F45; Secondary 54E15.
Key words and phrases. Coarse geometry, property C.