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

TOPOLOGY PROCEEDINGS

Volume 55, 2020

Pages 13–33

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

# Folders of continua

by

C.L. Hagopian, M.M. Marsh and J.R. Prajs

Electronically published on February 12, 2019

This file contains only the first page of the paper. The full version of the paper is available to Topology Proceedings subscribers.
See http://topology.auburn.edu/tp/subscriptioninfo.html for information.

**Topology Proceedings**

| | |
|---|---|
| **Web:** | http://topology.auburn.edu/tp/ |
| **Mail:** | Topology Proceedings<br>Department of Mathematics & Statistics<br>Auburn University, Alabama 36849, USA |
| **E-mail:** | topolog@auburn.edu |
| **ISSN:** | (Online) 2331-1290, (Print) 0146-4124 |

COPYRIGHT © by Topology Proceedings. All rights reserved.

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

TOPOLOGY PROCEEDINGS
Volume 55 (2020)
Pages 13-33

E-Published on February 12, 2019

# FOLDERS OF CONTINUA

C.L. HAGOPIAN, M.M. MARSH, AND J.R. PRAJS

Abstract. This article is motivated by the following unsolved fixed point problem of G.R. Gordh, Jr. If a continuum $X$ admits a map onto an arc such that the preimage of each point is either a point or an arc, then must $X$ have the fixed point property? We call such a continuum an arc folder. This terminology generalizes naturally to the concept of a continuum folder.

We give several partial solutions to Gordh's problem. The answer is yes if $X$ is either planar, one dimensional, or an approximate absolute neighborhood retract. We establish basic properties of both continuum folders and arc folders. We provide several specific examples of arc folders, and give general methods for constructing continuum folders. Numerous related questions are raised for further research.

## 1. Introduction

The main focus of this paper is arc folders; that is, continua admitting maps onto an arc with point preimages being an arc or a point. In conversation (circa 1980) with a number of topologists, G.R. Gordh, Jr. asked the following question, which is still open.

**Question 1.** *Do all arc folders have the fixed point property?*

We find this question challenging and intriguing, and the class of arc folders interesting and more diverse than its rather restrictive definition may suggest. In this paper, we give some partial answers to Gordh's question. We establish some general properties and unexpected examples of arc folders and their generalizations.

---

2010 *Mathematics Subject Classification.* Primary 54F15, 54B15, 54D80; Secondary 54C10, 54B17.

*Key words and phrases.* continuum folder, arc folder.

©2019 Topology Proceedings.

This file contains only the first page of the paper. The full version of the paper is available to Topology Proceedings subscribers.
See http://topology.auburn.edu/tp/subscriptioninfo.html for information.