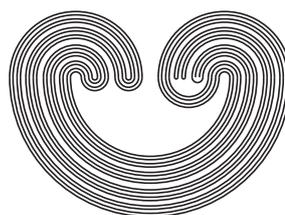


<http://topology.auburn.edu/tp/>

---

# TOPOLOGY PROCEEDINGS



Volume 55, 2020

Pages 1–12

---

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

## A BANACH-STONE TYPE THEOREM AND TOPOLOGICAL DIMENSION

by

KAZUHIRO KAWAMURA

Electronically published on February 3, 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  
Department of Mathematics & Statistics  
Auburn University, Alabama 36849, USA

**E-mail:** [topolog@auburn.edu](mailto:topolog@auburn.edu)

**ISSN:** (Online) 2331-1290, (Print) 0146-4124

COPYRIGHT © by Topology Proceedings. All rights reserved.



## A BANACH-STONE TYPE THEOREM AND TOPOLOGICAL DIMENSION

KAZUHIRO KAWAMURA

**ABSTRACT.** We prove a Banach-Stone type theorem for linear isometries of vector-valued continuous function spaces in connection with topological dimensions of underlying spaces, generalizing a previous result of the author. Some related problems are discussed.

### 1. INTRODUCTION AND PRELIMINARIES

This paper is a continuation of [9] and studies linear isometries between vector-valued continuous function spaces. The classical Banach-Stone theorem states that every surjective linear isometry between the Banach spaces of all complex-valued continuous functions on compact Hausdorff spaces is a unimodular weighted composition operator (see [5], [6] and [8] for background). Seeking for analogous theorems for isometries between vector-valued continuous function spaces and being motivated by [1], [2], [7] and [15], we ask the following question. For a compact Hausdorff space  $X$  and a Banach space  $E$ ,  $C(X, E)$  denotes the Banach space of all  $E$ -valued continuous functions on  $X$  with the sup norm  $\|f\|_\infty = \sup_{x \in X} \|f(x)\|$ . Undefined notation will be explained later.

**Question 1.1.** Let  $X$  and  $Y$  be compact Hausdorff spaces, let  $E$  be a real or complex Banach space and let  $A$  and  $B$  be linear subspaces of  $C(X, E)$  and  $C(Y, E)$  respectively. Find a set of conditions on  $X, Y, A, B$  and  $E$  which implies that every surjective linear isometry  $T : A \rightarrow B$

---

2010 *Mathematics Subject Classification.* Primary 46E15; Secondary 54F45.

*Key words and phrases.* isometry, real-linearity, weighted composition operator, dimension theory, decomposition space.

The author is supported by JSPS KAKENHI Grant Number 17K05241.

©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.