Rupture Survey Of A Metric Space With Infinite Cardinal, If Only Finite Subsets Are Compact

R. jalal shokuhy, S.A. Kazemipour, S. Madady

Department of Mathematics, Ali Abad Katoul Branch ,Islamic Azad University, Ali Abad, Iran

Abstract: In this paper, this is a fresh new approach to the topological behavior occurs in discrete spaces. Thus, the topological properties such as compression, and connective.... On specific subsets of finite, infinite, bounded, unlimited and ...Be a subset of a discrete space with finite or infinite Cardinal are compressed only if you are finite. If we want to study in an infinite space with the Cardinal are the only compact subsets of a finite discrete space?

Key words: Topology - Compact - finite - infinite - discrete - countable complement topology

INTRODUCTION

The one metric on a set X is functions \( d : X \times X \rightarrow R \) with the following properties: A) for each \( x \) and \( y \) distinct in \( X \), \( d(x, y) > 0 \) and \( d(x, x) = 0 \) B) for each \( x \) and \( y \) distinct of the \( X \), \( d(x, y) = d(y, x) \) C) for each \( x, y, z \) in \( X \), \( d(x, z) \leq d(x, y) + d(y, z) \)

1 - \( R^n \) with metric \( d_p \) is a metric space.

\[ x = (x_1, ..., x_n), y = (y_1, ..., y_n), d_p(x, y) = \left( \sum_{i=1}^{n} |x_i - y_i| \right)^{\frac{1}{p}} \]

2- Suppose \( X \) is arbitrary set then function defined as \( d(x, y) = \begin{cases} 1 & x \neq y \\ 0 & x = y \end{cases} \) \((X, d)\) is a metric space and \( d \) is Obviously or discrete meter on \( X \)

Definition: suppose \( d \) is meter on \( X \) then \( B(x, \delta) = \{ y : d(x, y) < \delta \} \) is a Open sphere of radius \( \delta \) and \( x \) Center.

Definition: a set \( U \) open in the induced topology is called the meter, if any \( x \in U \), \( 0 < \delta \), is available since \( B(x, \delta) \subseteq U \).

Compression:

Definition: Suppose \((X, d)\) Let be a metric space and \( A \subseteq X \) cover \( \{G_{\alpha}\}_{\alpha=1} \) for A covering an open call when any member of this family is open subsets of \( X \).

Definition: Suppose \((X, d)\) Let be a metric space and \( K \subseteq X \) a compact \( K \) set. When you open the cover, the cover is finite. Otherwise, \( K \) the non-compressed or uncompressed call.

Theorem: The discrete metric space \((X, d)\) is compact such as a set \( K \) only when it is finite.

Theorem: Every compact set \( K \) is closed in \((X, d)\) metric space.
Theorem:
Every compact set is bounded in \((X, d)\) space metric. Each set is packed in \((X, d)\) closed and bounded. Every closed subset of a compact set is compact.

Question:
In any metric space if every closed bounded set is compact? NO. In response to this question, we provide a counterexample.
Suppose that \((X, d)\) a set of X discrete space is infinite. In this case is closed and bounded X but not compact.

Theorem:
In \(\mathbb{R}^n\) a closed and bounded subsets are compact. Note: with the help of compact closed categories can also be defined.

Note:
The following compressed space of a compact space is not necessarily for example \(X = [0,1]\). a compact with the usual topology is compact, \(Y = (0,1)\) as the space X is not compact because \((0,1)\) it is not closed.

Main question:
In an infinite space with the Cardinal, if only sub-compact subset is finite and discrete space is the m? NO. We have previously shown that in discrete space is compact if and only if a set is finite. Countable complement topology but also the only sub-compact sets are finite, so the answer to this question is negative.

Example:
Suppose X is finite space. Whatever X it is compact in topology X.

Example:
Let's X set and \(\tau\) the finite complement topology in X then X is compact. For proof Let C be an arbitrary open cover for members of C as c we consider non-empty. A, c complement is finite. now assume
\(X - c = \{a_1,..,a_k\} \subseteq \bigcup_{i=1}^{k} c_i\) for every i, that \(1 \leq i \leq k\).
\(x = \bigcup_{c \in C} c\), for every i that \(a_i \in c_i : 1 \leq i \leq k\). Therefore \(X - C = \{a_1,..a_k\} \subseteq \bigcup_{i=1}^{k} c_i\) so \(X = C \cup (X - C) = C \cup c_1 \cup ... \cup c_k\) it means \(\{c, c_1, ..., c_k\}\) is a sub cover.

Conclusion:
In this article we have shown that in an infinite space with the Cardinal, if only sub-compact subset of meter is a finite space is not necessarily discrete. We have previously shown that in discrete space is compact if and only if a set is finite. Countable complement topology but also the only sub-compact sets are finite.

REFERENCES