Poincare Journal of Analysis & Applications
Vol. 7(1), 2020, 79-88

θ_ω-CONNECTED SPACE AND θ_ω-CONTINUITY IN THE PRODUCT SPACE

LYLE LEON L. BUTANAS AND MHELMAR A. LABENDIA†

Date of Receiving : 21.03.2020
Date of Revision : 12.05.2020
Date of Acceptance : 18.05.2020

Abstract. In this paper, the concepts of θ_ω-connected space and θ_ω-continuous function from an arbitrary topological space into the product space will be introduced and characterized.

1. Introduction and Preliminaries

Substituting several concepts in topology with concepts acquiring either of weaker or stronger properties is often studied. The first attempt was done by Levine [23] when he introduced the concepts of semi-open sets, semi-closed sets, and semi-continuity of a function. Since then, several mathematicians became interested in presenting new topological concepts which can substitute the concept of the classical open set.

In 1968, Velicko [26] introduced the concepts of θ-continuity between topological spaces and subsequently defined the concepts of θ-closure and θ-interior of a subset of topological space. The concept of θ-open sets and its related topological concepts had been deeply studied and investigated by numerous authors, see [2, 6, 7, 14, 15, 19, 20, 21, 24, 25].

Let $(X, \mathcal{T})$ be a topological space and $A \subseteq X$. The *θ-closure* and *θ-interior* of A are, respectively, denoted and defined by $Cl_\theta(A) = \{x \in X : Cl(U) \cap A \neq \varnothing$ for every open set U containing $x\}$ and $Int_\theta(A) = \{x \in X : Cl(U) \subseteq A$ for some open set U containing $x\}$, where $Cl(U)$ is the closure of U in X. A subset A of X is *θ-closed* if $Cl_\theta(A) = A$ and *θ-open* if $Int_\theta(A) = A$. Equivalently, A is θ-open if and only if $X \setminus A$ is θ-closed.

In 1982, Hdeib [17] introduced the concepts of ω-open and ω-closed sets and ω-closed mappings on a topological space. He showed that ω-closed mappings are strictly weaker than closed mappings and also showed that the Lindelöf property is preserved by counter

2010 *Mathematics Subject Classification.* 54A10, 54A05.
Key words and phrases. θ_ω-open, θ_ω-closed, θ_ω-connected, θ_ω-continuous.
Communicated by. Saeid Jafari
†Corresponding author.