

P^* - \ast -Connectedness in Ideal Bitopological Spaces

S. A. El-Sheikh and M. Hossny*

Department of Mathematics, Faculty of Education, Ain Shams University, Egypt

Received: 5 Mar. 2013, Revised: 20 Jun. 2014, Accepted: 4 Aug. 2014

Published online: 1 Jan. 2015

Abstract: The aim of this paper is to use the concepts of ideal \mathcal{J} , bitopological space (X, τ_1, τ_2) and its associated supra topological space (X, τ_{12}) to introduce a new local function, A_{12}^* . The properties of these local function A_{12}^* and some important results related to it have obtained. The local function A_{12}^* is used to generate a family τ_{12}^* which is finer than τ_1, τ_2 and τ_{12} . τ_{12}^* is a supra topology not a topology in general. In addition, a supra topology τ_{12}^* is used to study connectedness in the ideal bitopological space $(X, \tau_1, \tau_2, \mathcal{J})$. Examples have introduced to illustrate the concepts in a friendly way. Finally, the relationship between the current study and the previous one has been given.

Keywords: Bitopological spaces, Ideal, Supra-topological spaces, P^* -Continuous mappings, P^* -separated set, P^* -Connected spaces, P^* - \ast -separated set, P^* - \ast -Connected spaces.

Mathematics Subject Classification (2010): 54A05, 54A10, 54E55.

1 Introduction

In 1963 Kelly [10] was introduced a bitopological space (X, τ_1, τ_2) as a richer structure than topological space. A study of bitopological space is a generalization of the study of general topological space as every bitopological space (X, τ_1, τ_2) can be regarded as a topological space (X, τ) if $\tau_1 = \tau_2 = \tau$.

The concept of ideals in topological spaces has been introduced and studied by Kuratowski [11] and Vaidyanathaswamy [17]. An ideal is a nonempty collection of subsets closed under heredity and finite additivity. The study of ideal bitopological spaces was initiated by Jafari and Rajesh [6].

As a generalized to topological spaces, Mashhour et al. [13] introduced supra-topological spaces by dropping only the intersection condition. Kandil et al. [9] generated a supra-fuzzy topological space (X, τ_{12}) from the fuzzy bitopological space (X, τ_1, τ_2) and studied some properties of the space (X, τ_1, τ_2) via properties of the space (X, τ_{12}) .

The notion of connectedness in bitopological spaces has been studied by Pervin [14], Reilly [15] and Swart [16]. In

2014 Mandira Kar and Thakur [12] have been studied the notion of connectedness in ideal bitopological spaces, but the studying of such spaces by using the supra-topological space has not been considered.

In this paper, given a bts (X, τ_1, τ_2) and its associated supra topological space (X, τ_{12}) [13]. Also, let \mathcal{J} be an ideal on a space X , we introduce a new local function, $A_{12}^* : P(X) \rightarrow P(X)$, $A_{12}^*(A) = \{x \in X : O_\alpha \cap A \not\subseteq \bigcup_{\alpha \in \mathcal{J}} O_\alpha \in \tau_{12}(x)\}$, where $\tau_{12} = \{U_1 \cup U_2 : U_i \in \tau_i, i = 1, 2\}$ is a supra topology [13] generated by τ_1 and τ_2 . (X, τ_{12}) is a supra topological space associate to the bts (X, τ_1, τ_2) . The properties of the operator A_{12}^* have obtained. In addition, we show that $A_{12}^*(A) = A_1^*(A) \cap A_2^*(A)$. Moreover, we show that the operator $cl_{12}^*(A) = A \cup A_{12}^*(A)$ is a supra closure operator [8, 9] and then induces a supra topology τ_{12}^* which is finer than τ_1, τ_2 and τ_{12} . τ_{12}^* is not a topology in general. Furthermore, a supra topology τ_{12}^* is used to study connectedness in the ideal bitopological space $(X, \tau_1, \tau_2, \mathcal{J})$, since the dealing with one family is easier than the dealing with two families. Also, the class of all supra-topological spaces is wider than the class of topological spaces. So, the study of supra-topological spaces is a generalization of the study of topological spaces. The notions of P^* - \ast -connected spaces, P^* - \ast -separated sets and P^* - \ast -connected sets in ideal

* Corresponding author e-mail: msouna.hossny@gmail.com

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