International Journal of Scientific Research in Science, Engineering and Technology
© 2017 IJSRSET | Volume 3 | Issue 8 | Print ISSN: 2395-1990 | Online ISSN : 2394-4099

Separation Axioms in Bitopological Spaces

Dr. Sanjay Kumar Roy
Shankar Bigha,
Jehanabad, Bihar, India

In the present section we discuss separation axioms for bitopological spaces and study their behaviour under continuity and compactness.

First of all we give definitions of different types of pairwise (T_o)- axioms.

Definition (2.1) : A bitopological space (X, T_1, T_2) is said to be pairwise (T_0) – space if for every pair of distinct points of X, there exists either a T_1, - openset or a T_2 – open set containing one of them but not the other.

Definition (2.2) : A bitopological space (X, T_1, T_2) is said to be strictly pairwise (T_o) – space [stp- (T_o)] if neither (X,T_1) nor (X, T_2) is T_o – space but for every pair of distinct points of X, there exists either a T_1- open set or a T_2 – open set containing one of them but not the other.

Definition (2.3) : A bitopological space (X, T_1, T_2) is said to be quasi pairwise (T_o)- space if for every pair of distinct point of X, there exists a quasi open set which contains one of them but not the other.

Definition (2.4) : A bitopological space (X, T_1, T_2) is said to be- * - pairwise (T_o) – space if for every pair of distinct point of X, there exists either a 12- pre open set or a 21 – pre open set which contains one of them but not the other.

NOTE (2.1) : From the definitions it is clear that bitopological space (X, T_1, T_2) is pairwise (T_o) space if it is either Stp (T_o) – space or quasi pairwise (T_o) space or * - pairwise (T_o) space.

NOTE (2.2) : From examples it can be seen that definitions (2.2), (2.3) and (2.4) are independent concepts.

The concepts of different types of pairwise (T_1) spaces are given below:

Definition (2.5) : A bitopological space (X, T_1, T_2) is said to be pairwise (T_1) – space (p – (T_1) – space) if for every pair of distinct point x and y of X, there exist $G \in T_1$ and $H \in T_2$ such that

$X \in G,\ y \notin G$ and $y \in H,\ X \notin H$, ... (2.1)

Definition (2.6) : A bitopological space (X, T_1, T_2) is said to be strictly pairwise (T_1) space (stp – (T_1) – space) if neither (X, T_1) nor (X, T_2) is (T_1) – space but the condition of definition (2.5) are satisfied.

Definition (2.7) : A bitopological space (X, T_1, T_2) is said to be week pairwise (T_1) – space (wp – (T_1) – space) if for every pair of distinct points x and y of X there exist sets G and H, open either in T_1 or in T_2 satisfying condition (2.1).

Definition (2.8) : A bitopological space (X, T_1, T_2) is said to be weak* pairwise (T_1) (w* p- (T_1) – space) if each singlet in X is either T_1 – closed or T_2 – closed.

Definition (2.9) : A bitopological space (X, T_1, T_1) is said to be quasi pairwise (T_1) space if for each pair of distinct points x and y of X there exist quasi open sets G and H satisfying condition (2.1).

Definition (2.10) : A bitopological space (X, T_1, T_2) is said to be quasi* pairwise (T_1) if each singlet of X is quasi – closed.

Definition (2.11) : A bitopological space (X, P_1, P_2) is said to be ij- almost T_1 if for any two distinct points x and y of X there exists an ij- roset U such that $y \in U$ and $x \notin U$.

Now we mention an important result which appears in [Nandi, 1994].

THEOREM (2.1) : If any function f from (X, Q_1, Q_2) onto (Y, P_1, P_2) has ij δ_2 - closed graph then (Y, P_1, P_2) is ij- almost T_1.

Nandi (1994) proves the following characterization of ij – nearly compactness for an ij – almost T_1 – space.

THEOREM (2.2) : An ij- almost T_1 – space (Y, P_1, P_2) is ij – nearly compact if each function f from any space (X, Q_1, Q_2) into (Y, P_1, P_2) with ij- δ_2 - closed graph is ij- almost continuous.

THEOREM (2.3) : An ij- almost T_1 – space (Y, P_1, P_2) is ij – nearly compact if for any space (X, Q_1, Q_2) and any functions f, g from X into Y with if - δ_2 - closed graph, the set

$A = \{x \in X : f(x) = g(x)\}$,...............................)2.2)

is Q_1 – closed subset of X.

REFERENCE

1. NANDI J.N : Bitopological near compactness II. Bull. Cal.math.86(1994).
2. Reilly I.L : On bitopological separation properties.
3. Prasad, Satendra: Some Contribution to covering and Separation axioms in bitopological spaces, Ph.D thesis (1989).
4. Patty C.W : Bitopologycal spaces. Duke math.vol.J. 34 (1967) P.P.387-392
5. W.J PERVIN : Connectedness in bitopological spaces. i. Indag.Math.29 (1967) P.P 369-72.
6. DESNAVI T.A : A study of pair wise continuous and Open mapping PhD thesis (2000).
7. KIN, Y.W : Pair wise connectness, Publ.Math.15 i. (1968)
8. KELL J.C : Bitopologycal spaces. Landon Math. i. Soc. (3) 13 (1963).