INTRODUCTION

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"The essence of mathematics is not to make simple things complicated, but to make complicated things simple"

Closed sets are fundamental objects in topological spaces. For example, one can define the topology on a set by using either the axioms for the closed sets or the Kuratowski closure axioms. In 1970, Levine [21] initiated the study of so- called generalized closed sets. By definition, a subset S of a topological space X is called generalized closed if cl(A) $\subseteq$A whenever A$\subseteq$U and U is open. This notion has been studied extensively in recent years by many topologies because generalized closed sets are not only natural generalizations closed sets. More importantly, they also suggest several new properties of topological spaces.

Most of these new properties are separation axioms weaker than T_1, some of which have been found to be useful in computer science and digital topology. For example, the well-known digital line is $T_{3/4}$ but not T_1.Other new properties are defined by variations of the property of sub maximality. The study of generalized closed sets also provides new characterizations of some known classes of spaces, for example, the class of extremely disconnected spaces.

S.P.Arya and T.Noiri [34] defined gs-closed sets which were used for characterizing S-normal spaces .Dontchev ,Ganambal and Palaniappan and Rao[14,17,31]introduced gsp-closed sets ,gpr-closed sets and r-g-closed sets respectively.Veerakumar [48] introduced a new class of sets called g*-closed sets .As an application of g*-closed sets. Veerakumar [48] introduced four new spaces namely $T^*_{1/2}$-spaces,$^*T_{1/2}$-spaces,$_\alpha T_c$-spaces and T_c-spaces. Njasted [33] has introduced generalized α-closed sets and α-generalized closed sets have been as generalizations of α-closed sets and generalized closed sets respectively by Devi, Balachandran and Maki [24,25,26].

The aim of this dissertation is to analyze g-closed sets, g*-closed sets, g* α-closed sets, g* α-continuous maps, τ*-g-closed sets and to extend various topological ideals to τ*-topological spaces.

The following articles are chosen for our study

(i) Generalized closed sets in topological spaces by N.Levine [21].

(ii) g*-closed sets in topological spaces by M.K.R.S.Veerakumar [48].

(iii) On g*α-closed sets in topological spaces by Viswanadhan.A, Ramasamy.K and Sivakamasundari.K [53].

(iv) On g*α-continuous maps in topological spaces by Ramasamy.K, Viswanadhan.A and Sudha.R [44].

(v) τ*-generalized closed sets in topological spaces by A.Pushpalatha,S.Eswaran and P.Rajarubi [40].

Chapter 1 deals with g-closed set due to Levine [21] and g*-closed set due to Veerakumar [48].In the first section properties and characterizations of g-closed sets are analyzed. The class of all g*-closed sets lies between the class of all closed sets and the class of all g-closed sets and such sets are analyzed in section two.

In chapter 2, g*α-closed sets and g*α-continuous maps in topological spaces due to Viswanathan et.al.[44,53] are analyzed. In the first section g*α-closed sets, properties of g*α-closed sets, g*α-open sets and applications of g*α-closed sets are discussed. In the second section, properties and characterizations of g*α-continuous maps are analyzed.

It is interesting to note that

(i) every g*α-closed set is gα-closed, αg-closed, wαg-closed, wgα-closed, αgr-closed, gpr-closed.

(ii) every g*α-continuous maps is αg-continuous, gα-continuous, gs-continuous, wαg-continuous, wgα-continuous.

In chapter 3, the author has defined τ*g*-closed sets and τ*α-generalized closed sets which are generalization of τ*-g-closed sets due to Pushpalatha et.al [40].In the first section τ*-generalized closed sets are discussed. Properties and characterizations of τ*-g-closed sets are analyzed. In section two τ*g*-closed sets and in section three τ*α-generalized closed sets in topological spaces are analyzed. Properties, characterizations and relations of τ*g*-closed sets and τ*α-g-closed sets with other generalized closed sets are discussed in section two and section three.

Viswanathan et.al. [44, 53] have defined $g^*\alpha$-closed sets and $g^*\alpha$-continuous maps in topological spaces. In chapter 4, we have generalized these concepts to τ^*-topological spaces and have defined $\tau^*g^*\alpha$-closed sets and $\tau^*g^*\alpha$-continuous maps. In the first section $\tau^*g^*\alpha$-closed sets, properties of $\tau^*g^*\alpha$-closed sets and $\tau^*g^*\alpha$-open sets are discussed. In the second section, $\tau^*g^*\alpha$-continuous maps, its relations with other generalized continuous maps are discussed.

It is interesting to note that

(i) every $\tau^*g^*\alpha$-closed set is $\tau^*g\alpha$-closed, $\tau^*\alpha g$-closed, $\tau^*w\alpha g$-closed, $\tau^*wg\alpha$-closed, $\tau^*\alpha gr$-closed, τ^*gpr-closed.

(ii) every $\tau^*g^*\alpha$-continuous maps is $\tau^*\alpha g$-continuous, $\tau^*g\alpha$-continuous, τ^*gs-continuous, $\tau^*w\alpha g$-continuous, $\tau^*wg\alpha$-continuous.