Chapter - 0

INTRODUCTION

Topology is the branch of mathematics through which we elucidate and investigate the ideas of continuity, within the framework of mathematics. The study of topological spaces, their continuous mappings and general properties make up one branch of topologies known as general topology.

The objectives of this Ph. D work are of the following three fold

1. Obtaining new results,
2. Sharpening known results and
3. Exploring generalizations of certain known results.

The thesis consists of six chapters, the details of which are given below.

Njastad [37] introduced the concept of an $\alpha$-sets and Mashhour et al [34] introduced $\alpha$-continuous mappings in topological spaces. The topological notions of semi-open sets and semi-continuity, and preopen sets and precontinuity were introduced by Levine [25] and Mashhour et al [33] respectively. After advent of these notions, Reilly [50] and Thivagar [22] obtained many interesting and important results on $\alpha$-continuity and
α-irresolute mappings in topological spaces. Lellis Thivagar [22] introduced the concepts of α-quotient mappings and α*-quotient mappings in topological spaces. The notion of supra topological spaces was introduced by Mashhour et al [32] in 1983.

In this first chapter, we introduce new classes of supra topological mappings called supra α-quotient and supra-α*-quotient mappings in supra topological spaces. At every places the new notions have been substantiated with suitable examples.

In 1983, Mashhour et al. [32] introduced the supra topological spaces and studied S-continuous maps and S*-continuous functions. In 2008, Devi et al. [10] introduced and studied a class of sets and maps between topological spaces called supra α-open sets and sα-continuous maps, respectively. In 2010, Sayed and Noiri [51] introduced and studied a class of sets and maps between topological spaces called supra b–open sets and supra b-continuous maps respectively. Now we introduce the concept of supra β-open sets and study some basic properties of it. Also, we introduce the concepts of supra β-continuous maps, supra β-open maps and supra β-closed maps and investigate several properties for these classes of maps. In this second chapter, we study the relation between supra β-continuous maps and supra β-open maps [supra β-closed maps].
Maps and of course open maps stand among the most important notions in the whole of mathematical sciences. Many different forms of open maps have been introduced over the years. Various interesting problems arise when one considers openness. Its importance is significant in various areas of mathematics and related sciences.

In this third chapter we will continue the study of related maps by involving supra sg-open sets. We introduce and characterize the concepts of quasi supra sg-open maps and quasi supra sg-closed maps.

Njastad [37] initiated the concept of nearly open sets in topological spaces. Following it many research papers were introduced by Tong [59, 60], Przemski [17] and Ganster [19] in the name of “Decompositions of Continuity” in topological spaces. In 1983, Mashhour et al. [32] introduced the supra topological spaces and studied S-continuous maps and S*-continuous maps. In 2008, Devi et al. [10] introduced and studied a class of sets called supra α-open and a class of maps called α-continuous maps between topological spaces, respectively. Ravi et al. introduced and studied a class of sets called supra β-open and a class of maps called supra β-continuous, respectively. Kamaraj et al. [46] introduced and studied the concept of supra regular-closed sets. It is an effort based on them to bring out a paper in the name of “Decompositions of supra M-continuity and completely supra continuity” using the new
sets like supra semi-reguar set, supra locally-closed set and new mappings like supra LC-continuous map, supra $\alpha^*$-continuous map, quasi supra sg$^*$-continuous map.

In this fourth chapter, we obtain some important results in supra topological spaces. In most of the occasions, our ideas are illustrated and substantiated by suitable examples.

In this fifth chapter, supra A-sets, supra t-sets, supra h-sets, supra C-sets and some new supra topological maps are introduced. Characterizations and properties of such new notions are studied. Also investigate the relationships with other mappings like supra $\alpha^*$-continuous. Finally, we obtain decompositions of supra M-continuity.

In this sixth chapter, we introduce a new classes of sets called wsg-closed and classes of maps called wsg-continuous, wsg-closed and wsg$^*$-continuous. In most of the occasions, our ideas are illustrated and substantiated by suitable examples.