
Introduction

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Decision making is one of the most complex issues that need scientific analysis of various factors both tangibles and intangibles like attitude, belief, taste and preferences of people involved. Real world decision making problems are very often uncertain or vague in a number of ways. In 1965, Zadeh introduced the concept of fuzzy set theory to meet those problems.

In 1999, a Russian researcher, Molodtsov proposed a new mathematical tool called "Soft set" for dealing with uncertainty.

Soft set theory is one of the recent topics gaining significance in finding rational and logical solutions to real life problems which involve uncertainty, impreciseness and vagueness.

Applications of Soft set theory in other disciplines and in real life problems are now catching momentum. Molodtsov successfully applied Soft set Theory into several directions, such as Smoothness of functions, Game Theory, Operations Research, Riemann Integration, Perron Integration, Theory of probability and so on.

Maji et al. (2001) initiated the concept of fuzzy soft sets.

"A Fuzzy set on a non-empty set U is a function with domain U and values in the closed unit interval $I=[0, 1]$."

"Given an initial universe U and a set of parameters E , a pair (F,A) is called a Soft set over U if F is a mapping given by $F : A \rightarrow P(U)$ where $A \subseteq E$ and $P(U)$ is the power set of U . (F,A) is called a Fuzzy Soft set over U if F is a mapping given by $F : A \rightarrow I^U$ where I^U is the collection of all Fuzzy subsets of U "

The topological structures of set theories dealing with uncertainties were first studied by Chang in 1968.

Shabir and Naz (2011) introduced the notion of Soft Topology (Definition 1.1.12) which is defined over an initial universe with a fixed set of parameters. They studied some basic concepts of Soft Topological Spaces and also some related concepts such as soft interior, soft closure, soft subspace and soft separation axioms.

In 2011, Tanay and Kandemir introduced the concept of Fuzzy Soft Topology. Mahanta and Das (2012) continued working on Fuzzy Soft Topology and studied separation axioms and connectedness in Fuzzy Soft Topological Spaces.

In 2014, El-Sheikh, S. A. and Abd. El-Latif, A. M introduced the notion of supra soft topological spaces, which is wider and more general than the class of soft topological spaces.

" A collection μ of soft sets over a universe X and with the fixed set of parameters E is called a Supra soft topology on X if $\tilde{X}, \tilde{\emptyset} \in \mu$ and the union of any number of soft sets in μ belongs to μ (\tilde{X} - absolute soft set, $\tilde{\emptyset}$ - null soft set)"

Abbas, S.E. introduced the concept of Intuitionistic supra fuzzy topological spaces and Vildan Cetkin and Halis Aygun introduced the concept of intuitionistic supra fuzzy topological spaces.

Many researchers have contributed towards the study of different types of subsets of Supra soft topological spaces.

The following are some of the articles published on different types of subsets of Supra soft topological spaces:

1) "Supra b-Open Soft Sets and Supra b-Soft Continuity on Soft Topological Spaces", A.M. Abd El-Latif and Serkan Karatas., (2015).

2)" Decomposition of Some Types of Supra Soft Sets and Soft Continuity" , S.A. El- Sheikh, A.M. Abd El-Latif., (2014)

3)"On γ - Induced Fuzzy Supra Topological Spaces and Fuzzy Supra γ -S-Closed Spaces", Baby Bhattacharya and Sunny Biswas., (2013)

4) "Supra Generalized Closed Soft Sets with respect to an Ideal in Supra Soft Topological Spaces ", A. Kandil, O.A.E. Tantawy, S.A. El-Sheikh and A. M. Abd El- Latif., (2014)

5) "Supra Semi*Generalized closed soft sets", A.M. Abd El-Latif., (2015)

6) "Supra Regular Generalized Closed Soft Sets in Supra Soft Topological Spaces", Zehra Guzel Ergul, Saziye Yuksel., (2015)

The main aim of this thesis is to study supra soft topological spaces, fuzzy soft topological spaces, fuzzy supra soft topological spaces and different types of subsets of supra soft topological spaces.

The plan of study is as follows:

1. Supra Soft Sets and Supra Soft Topological Spaces
2. Supra Generalized Closed (Open) Soft Sets in Supra Soft Topological Spaces

3. Supra Semi* Generalized Closed (Open) Soft Sets in Supra Soft Topological Spaces

4. Supra Regular Generalized Closed (Open) Soft Sets in Supra Soft Topological Spaces

5. Supra b-Open Soft Sets in Soft Topological Spaces

6. Fuzzy Soft Sets and Fuzzy Soft Topological Spaces

7. Application of Fuzzy Soft Sets - A Mathematical Model for Identifying the Effects of using Electronic Gadgets by School Children.

The first chapter deals with the preliminary definitions and notations regarding soft sets, soft topological spaces and supra soft topological spaces. Different kinds of subsets of Supra Soft topological spaces and the relations between subsets of supra soft topological spaces are discussed and decomposition of some forms of supra soft continuity is studied.

Second chapter deals with Supra generalized closed (open) soft sets in supra soft topological spaces. In this chapter, the concept of supra generalized close soft sets in a supra soft topological space introduced by Kandil. et.al., A are studied in detail. Also the concept of supra generalized closed soft sets with respect to a soft ideal (supra- $\tilde{I}g$ -closed soft for short) in supra topological space are introduced and their properties are studied in detail. Interesting characterizations of supra generalized closed soft sets are proved and are given in theorem 2.1.8, 2.1.11, 2.2.7, 2.3.3 and 2.3.8.

Supra semi* generalized closed (open) soft sets in Supra Soft topological spaces are studied in chapter III. In 2015, Abd. El-Latif. A.M introduced the notion of supra semi* generalized closed soft sets. In this chapter, the properties of these sets are studied in detail. Also some relationships among various types of supra semi* generalized closed soft sets are investigated. Important results proved here are given in theorems 3.1.11, 3.1.13, 3.1.14 and 3.2.5.

Chapter IV is devoted to the study of Supra Regular Generalized Closed (Open) Soft Sets in Supra Soft Topological Spaces. Supra regular generalized closed soft sets are introduced by Yuksel, S and Guzel Ergul, Z. The relation between Supra regular generalized closed soft sets with different types of subsets of supra soft topological space are discussed with counter examples. Section 4.1 deals with Supra Regular Generalized Closed (Open) Soft Sets and section 4.2 deals with Supra

Regular Generalized Closed (Open) Soft Sets with respect to a Soft Ideal. Interesting characterizations proved here are given in the theorems 4.1.13, 4.1.16 and 4.2.13.

Chapter V deals with Supra b-Open Soft Sets and Supra b-Soft Continuity on Soft Topological Spaces. In this chapter the properties of supra b-open (closed) soft sets and supra b - soft interior (closure) are investigated. In particular, the relationship between supra b - soft interior and supra b - soft closure are studied. The relations between the class of supra b - open soft sets and some special subsets of a supra soft topological space are introduced. Further the concepts of supra b- continuous soft functions, supra b-open soft functions, supra b - closed soft functions are introduced and some of their properties are studied.

The VI chapter deals with preliminary definitions and notations regarding Fuzzy soft sets and Fuzzy soft Topological spaces .In this chapter the concepts of Fuzzy soft sets, Fuzzy soft open sets, Fuzzy soft closed sets, Fuzzy soft closure, Fuzzy soft interior, Fuzzy soft subspace and Fuzzy soft neighborhood are studied with some interesting properties. The important results are given in theorems 6.1.10, 6.2.19, and 6.2.24.

Chapter VII deals with Application of Fuzzy Soft Sets. Electronic media have become essential for comfort living of every Indian, rural or urban, male or female, children or elders, rich or poor and educated or illiterate. The technology developments gifted the society various electronic devices, particularly Television, Computer, Cell Phone and Video games. Though the devices are used by all for information and entertainment purpose, the usage by children and youth causes great concern, especially when the devices are misused by them.

Research studies in sociology reveal that children use television and computers for more than six hours a day. Also they found that they prefer to use such devices in the absence of their parents or elders. Television, Computer and Cell phone are easily accessible to the children and they gain better exposure to the academic information, scientific developments, current affairs, sports and games and international affairs. Many parents are particular to see that the electronic devices should cause cognitive development and academic excellence to their children. Supervised use of electronic media by children is the one of the ways to reap the fruits of these scientific innovation. Of all electronic media, television is widely used in almost all houses and it is rare to find a house without television. Due to conflicting taste and preference of channels between elders and children it is common to find

more than one television in many houses. A long time of television viewing is common, especially in the case of children. However, research studies reveal that excessive and unsupervised use of electronic gadgets by children results in poor academic performance, aggression, lack of concentration and lack of social mobility.

Here the author attempted to develop a mathematical model, using fuzzy soft sets that helps to identify favourable and adverse effects caused by the usage of the Electronic Gadgets by School Children.

The details of this model are given in Chapter VII.

It is worth mentioning that the author of this thesis has submitted an article entitled "IMPACT OF ELECTRONIC MEDIA ON SCHOOL CHILDREN-AN ANALYTICAL STUDY USING FUZZY SOFT SETS" to International Journal of Mathematics Trends and Technology and the same has been accepted for publication.