SUMMARY

Since Zadeh has introduced the concept of fuzzy sets, the study of fuzzy sets and related problems has become a special branch in pure and applied mathematics. In 1968, Chang has found that the concept of fuzzy sets provides a natural frame work for generalizing many concepts of general topology to what he called fuzzy topology. In his paper [3] Chang introduced the notion of fuzzy topological space. Subsequently, the derived fuzzy topological notions such as closed fuzzy sets, interior and closure of a fuzzy set ... etc., were defined. Chang was followed by other mathematicians such as Wong [32, 33], Lowen [21, 23] and others in studying fuzzy topological spaces. At the present time there is a great deal of activities in the area of fuzzy topological spaces. According to the one-one corespondence between the family of characteristic functions on a set X and the power set of X, we identify each subset of X with its characteristic function. Consequently an ordinary subset (resp an ordinary topological space) is a special type of fuzzy sets (resp. Fuzzy topological spaces) (see Definitions 1.1.1 and 1.2.1). Therefore, one would expect some deviations of fuzzy topology from ordinary topology.

As a continuation to the study of fuzzy topology initiated by Chang, this thesis is devoted to study some concepts in fuzzy topology, Viz., separation properties, and fuzzy supratopological spaces. Also, we introduce a new notions of : Neighbourhoods,

interior and closure operators, by using the new relation " >>".

We divided this thesis into the following three chapters:

In chapter I, we give the basic concepts of fuzzy sets and fuzzy topological spaces.

In Section 1.1, we state the basic concepts and properties of fuzzy sets, which we use in the thesis.

In Section 1.2., we give a brief summary of all fuzzy topological concepts necessary in the sequal. This section contains, as far as we know, many new results which we have obtained independently, Viz., Proposition 1.2.21., Lemma 1.2.27., 1.2.28 and Theorem 1.2.29.

In Section 1.3., we give a brief summary of the F-continuous, open, closed and homeomorphism maps.

In Section 1.4., we give a survey of the relative fuzzy topology given by Ghanim.

In Section 1.5., we give a survey of five methods of generating fuzzy topology and give some examples.

In Section 1.6., we give a survey of fuzzy separation axioms. This section contains, as far as we know, many new results which we have obtained independently, Viz., Propositions 1.6.8, 1.6.9, 1.6.10, 1.6.12, 1.6.13, 1.6.14, 1.6.15, 1.6.16, 1.6.17 and 1.6.18.

In Section 1.7., we give a survey of P-compactness given by Kandil and we obtain a new result given in Proposition 1.7.7.

In Chapter II, we introduced a new definition of neighbourhood by means of the binary relation ">>"and we use it to define interior and clasure operators of a fuzzy topological space. We divided this chapter into two sections :

In section 2.1., we introduce the binary relation ">>" and we deduce many new results, viz., Lemmas 2.1.3, 2.1.4., 2.1.9, 2.1.10. , Propositions 2.1.5., 2.1.6.. 2.1.7., 2.1.8.and 2.1.12.

In section 2.2., we introduce some new separation properties by using the binary relation ">>".

Chapter III, is a continuation of the study of fuzzy supra-topological spaces initiated by Mashhour et. al [19]. We divide this chapter into two sections.

In section 3.1., we have used the definition of pre-open, β-open, α-open and semi-open fuzzy sets given in [19] to obtain some new results, viz Theorems 3.1.2., 3.1.3., 3.1.4., 3.1.6., 3.1.14. and 3.1.18.

In section 3.2., we give a survey of fuzzy supratopological spaces given in [2]. Two new results appeared in this section in Theorem 3.2.4. and Proposition 3.2.5.