

RESUMEN INGLES

Mujahid Abbas

Mathematical models have extensively been used in problems related to engineering, computer sciences, economics, social, natural and medical sciences etc. It has become very common to use mathematical tools to solve, study the behavior and different aspects of a system and its different sub-systems. Because of various uncertainties arising in real world situations, methods of classical mathematics may not be successfully applied to solve them. Thus, new mathematical theories such as probability theory and fuzzy set theory have been introduced by mathematicians and computer scientists to handle the problems associated with the uncertainties of a model. But there are certain deficiencies pertaining to the parametrization in fuzzy set theory. Soft set theory aims to provide enough tools in the form of parameters to deal with the uncertainty in a data and to represent it in a useful way. The distinguishing attribute of soft set theory is that unlike probability theory and fuzzy set theory, it does not uphold a precise quantity. This attribute has facilitated applications in decision making, demand analysis, forecasting, information sciences, mathematics and other disciplines.

In this thesis we will discuss several algebraic and topological properties of soft sets and fuzzy soft sets. Since soft sets can be considered as set-valued maps, the study of fixed point theory for multivalued maps on soft topological spaces and on other related structures will be also explored.

The contributions of the study carried out in this thesis can be summarized as follows:

- i) Revisit of basic operations in soft set theory and proving some new results based on these modifications which would certainly set a new dimension to explore this theory further and would help to extend its limits further in different directions. Our findings can be applied to develop and modify the existing literature on soft topological spaces

- ii) Defining some new classes of mappings and then proving the existence and uniqueness of such mappings which can be viewed as a positive contribution towards an advancement of metric fixed point theory
- iii) Initiative of soft fixed point theory in framework of soft metric spaces and proving the results lying at the intersection of soft set theory and fixed point theory which would help in establishing a bridge between these two flourishing areas of research.
- iv) This study is also a starting point for the future research in the area of fuzzy soft fixed point theory.