S.m.n. 7. RAMACHANDRAN, P.T.—Some problems in set topology relating group of Homeomorphisms and order—1986—Dr. T. Thrivikraman

In this thesis, some problems in set topology, related to the concepts of group of homeomorphisms and order are investigated. Order theoretic methods are extensively used to investigate problems which are directly or indirectly related to the concepts of group of homeomorphisms of a topological space onto itself.

De Groot (1959) proved that any group is isomorphic to the group of homeomorphisms of a topological space. A related problem is to determine the subgroups of the group of permutations of a fixed set X, which can be represented as the group of homeomorphisms of a topological space (X,T) for some topology T on X. In chapter I of this thesis, some results along this direction are given. These include the result that no nontrivial proper normal subgroup of the group of permutations of a fixed set X can be represented as the group of homeomorphisms of a topological space (X,T) for some topology T on X.

Homogeneity and rigidity are two topological properties closely related to the group of homeomorphisms. Bankston, P. defined (1979) an antiproperty for any topological property and discussed the antiproperties of compactness, Lindelofness, sequential compactness and so on. Reilly, I.L. and Vamanamurthy M.K. (1980) and (1981) obtained the antiproperties of separation axioms and compactness properties. In chapter II of this thesis, anti-homeomorphic spaces are investigated and several characterizations are given. In particular it is proved that a space is anti-homeomorphic if and only if it is hereditarily rigid. The study is based on a pre-order associated with a topology (studied earlier by A.K. Steiner (1965), Loran, F.(1969), S.J. Andima and Thon W.J. (1978). The notions of homogeneity, anti-homeogeneity and rigidity are introduced for preordered sets also. It is proved that a topological space is anti-homeomorphic if and only if the associated preordered set is anti-homeomorphic. A structure theorem for semi-well ordered sets (i.e. linearly ordered sets in which every nonempty subset has either a first element or a last element) is the main order theoretic tool established and used.

Chapter III deals with the Čech closure spaces. Here an attempt is made to extend some results of the first two chapters to Čech closure spaces. These include the characterization of completely homogeneous spaces and results related to the pre-order associated with them.

In chapter IV, investigation is done on the lattice of closure operators on a fixed set X, with special attention to complementation. The atoms and the dual atoms of the lattice are determined first. The complementation problem is solved in the negative, using this. The lattice is dually atomic, but no element in it has more than one complement. Finally, some sublattices of this lattice and the fixed points of the automorphisms of the lattice are discussed.

A new technique for ARMA (p,q) model of spectral density function is presented in seven chapters.

In the first chapter a brief historical summary of the new technique is given, with autoregressive models. He was followed by Beale (1962) for fitting autoregressive models by exponential smoothing, Box G.E.P. and Jenkins, G.M. (1970) for ARIMA models and other recent developments in the field. The second chapter contains the summary of the presented in this thesis.

Notations and definitions are given in that autoregressive and partial autoregressive operators, ARMA (p,q) models, ARIMA (p,d,q) forms of the spectral density functions of a stationary series and ARIMA models. An algorithm is developed to solve the now. These p+q+1 parameters uniquely determine the stationary time series.

In the first part of chapter four, the new approach is using theoretical autocorrelations for an estimate that the error between the theoretical values and the estimates of the parameters are very small. A technique for ARMA model estimation is then developed in the new technique is applied to analyse simulations. The original time series data for the stationarity is the procedure is highly suitable.

The fifth chapter gives some results in combining technique. It is shown that the relationship the parameters in ARMA (p,q) model are same. A Multivariate version of the procedure is taken.

Comparison of the new method with prominent methods like Box-Jenkins's method chapter six. It shows that this new technique is a definite improvement for a given stationary time series, whereas ARIMA (p,d,q) model is the same.

In the concluding chapter, a brief discussion of the ARMA (p,q) model representing a stationary