PREFACE

Information Theory is the result of crucial contributions made by many distinct individuals, from a variety of backgrounds, who took their ideas and expanded upon them. Indeed the diversity and directions of their perspectives and interests shaped the direction of Information Theory. In the beginning, research was primarily theoretical, with little perceived practical applications. Information Theory was sponsored in anticipation of what it could provide. This perseverance and continued interest eventually resulted in the multitude of technologies we have today.

This Thesis deals with the study of "characterization of entropy of type (α,β,γ) and its application in information theory". It contains six chapters as a whole.

Chapter 1. This chapter is an introductory which gives the idea on some basics of information theory, historical background of information theory, Shannon entropy and its generalization by different authors, characterization of various generalized information measures, coding theory some standard inequalities which are used in information theory and literature survey.

Chapter 2. The second chapter "axioms for (α,β,γ) entropy of a generalized probability scheme", deals with characterization of a measure of information of type (α,β,γ) by taking certain axioms parallel to those considered earlier by Havrda and Charvat along with the recursive relation. Some properties of this measure are also studied. This measure includes Shannon information measure as a special case and a triparametric self information function is defined based on this triparametric information measure. Some familiar entropies are derived as particular cases. A measure called information deviation and some generalization of Kullback's information are obtained under some boundary conditions.

Chapter 3: The third chapter "On 'Useful' Relative Information Measures of order α and type β", deals with study of some new generalized measures of useful relative information and their particular cases have been discussed. From these measures new useful information measures have also been derived and their relations with different measures of entropy have been obtained.

Chapter 4. In this chapter some new generalized R-Norm measures of useful relative information have been defined and their particular cases have been studied. From these measures new useful R-Norm information measures have also been derived and

corresponding to each measure of useful relative R-norm information J-divergence measure have been obtained. In the end, an equality satisfied by useful J-divergence of type β has been proved.

Chapter 5. In this chapter an optimality characterization of non-additive generalized mean-value entropies from suitable non-additive and generalized mean-value properties of the measure of average length have been given. The results obtained cover many results obtained by other authors as particular cases, as well as the ordinary length due to Shannon. In this characterization the main instrument is $l(n_i)$, which is the function of the word lengths in obtaining the average length of the code.

Chapter 6. In this chapter a simple non-additive model based on λ non-additivity is considered. We characterize average charge for heterogeneous questionnaires under λ-non-additivity and show that there are only two forms of the measure of charge for one parameter and the other two. Limiting and particular cases cover those studied earlier. The average charge are shown to be bounded below by two non-additive mean value entropies of order 1 and type α, other order α respectively in case of one parameter also in case of two parameter these are bounded below by two non-additive mean value entropies of order 1, type β and order α type β respectively.

At the end a bibliography is being mentioned.