Preface

Newton set the example of re-proverbial modesty of the genius. I dare not emulate him. For oceans divide us and the waste of seas. I vouchsafe for sincerity and meticulous care that has gone into the making of this thesis as also for my involvement in the intricacies of Finsler spaces. Whatever little contribution I have made is for others to judge. It is a statement of the fact and not of proverbial modesty.

The present thesis is an outcome of my investigations in the Department of Mathematics and Statistics, D.D.U.Gorakhpur University, Gorakhpur under the supervision of Prof. T.N.Pandey. The purpose of the present thesis is to study Finsler spaces with special metric.

The thesis consists of six chapters, each chapter has been further subdivided into number of articles. References to the equations are of the form, (C.A.E), where $C$ denotes the number of the chapter, $A$- stands for the number of the article and $E$-stands for the number of the equation in the article. The numbers in square brackets in a chapter correspond to the references given at the end of the thesis. The symbol $\partial_i$ and $\dot{\partial}_i$ denote the partial derivative with respect to $x^i$ and $y^i$ respectively. Small and long vertical lines | and | stand for the $h$- and $v$-covariant derivative to Cartan connection respectively.
First chapter is introductory in nature and start with the origin of geometry. It has been divided broadly into two parts. The first part deals with brief historical development of geometry, starting from Euclid to Finsler. In the second part, some basic used formulas, results and definitions such as Finsler space, connections, special Finsler space, intrinsic fields of orthonormal frame we discuss two, three and four dimensional Finsler spaces.

In the second chapter, we have studied the special forms of T-tensor in four dimensional Finsler spaces in the Miron’s frame, in terms of scalars.

In the third chapter, we have studied a special Finsler metric $(\delta, \beta)$ and workout some classes of $(\delta, \beta)$—metric whose T-tensor has a special form.

Fourth chapter of the thesis deals the study of hypersurface of a Finsler spaces with special metric $L = \beta + \frac{\alpha^3 + \beta^3}{\alpha(\alpha - \beta)}$ which is obtained by using metric of Douglous $(\alpha + \frac{\beta^2}{\alpha})$ and Matsumoto type $(\frac{\alpha^2}{\alpha - \beta})$ which is the generalization of Matsumoto metric.

The fifth chapter of the thesis is “On Finsler Spaces with a Quartic Metric and differential 1-form”. In this chapter, it deals to study a Finsler spaces with $(\delta, \beta)$—metric on the lines of M.Matsumoto as done by him in the papers ([62],[100] from the stand point of Finsler geometry.

Second article of the chapter is devoted in developing a fundamental treatment of $(\delta, \beta)$—metric and a characterization of such Finsler spaces is in terms well known tensors of Finsler geometry.

Third article of the chapter deals with the condition under which $(\delta, \beta)$—metric Finsler space is Berwald and Landsberg space.
In the last and sixth chapter of the thesis, we have considered Hypersurface of a Finsler space with a quatric metric and a differential 1-form i.e. $(\delta, \beta)$—metric by using field of linear frame ([47],[46]). The purpose of the chapter is to study the Finslerian hypersurface of $(\delta, \beta)$—metric from the standpoint of Finsler Geometry. We also obtained three types of hypersurface invariant under certain condition in a Finsler space with $(\delta, \beta)$—metric.

Throughout the thesis, we shall confine ourselves to Cartan’s connection until, unless, otherwise stated. Notations and terminology of the monograph [66] will be used without comment. In the thesis, monograph of M.Matsumoto[66] will be quoted by (♯).

In the last a selected bibliography is given which consists a list of number of books and papers on the subject.