ABSTRACT

(Ph.D. Thesis)

Title : On Certain Aspects of new theoretical Developments in Hypergeometric functions.
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The thesis comprises of seven chapters. The developments presented in the thesis on the multiple Hypergeometric functions, provide insight into the structure of Special function in general and Hypergeometric function in special. So, we hereby aim to trace a brief history of the development of the Gamma and Hypereometric functions, to establish the close relationship between them, and to present a range of their most useful properties and identities from the earliest ones to those developed in more recent years.

The several classes of Special functions have been studied, which occur rather more frequently in the study of summations, transformations and generating functions. we have studied different forms of Gamma function, Legendre duplication and triplication formulae, Psi function, Ordinary Hypergeometric function of one variable, its convergence conditions, Wright's generalized hypergeometric function, summation theorems, Hypergeometric forms and integral representation of some special functions that commonly arise in practice and explore many of their salient properties.

Amazing developments have been furthermore established using contiguous relation and formula of Salahuddin in some summation formulae based on half argument in connection with Hypergeometric function. The explicit expression of ${}_2F_1\left[a,\ n-a\ ;\ \frac{1}{2}\right]$ is established. The results are derived with the help of Contiguous relation and the result from Prudnikov et al.

Hypergeometric forms of different elliptic type integrals have been studied due to their importance and applications in certain problems involving computations of the radiation field off axis from a uniform circular disc radiating according to an arbitrary angular distribution law.