ABSTRACT

The present work is devoted to the study of “A Study on Certain Subclasses of Analytic Functions in Geometric Function Theory”. This work consists of seven chapters and references.

Chapter 1 forms a general introduction of the subject matter of the thesis. In addition, basic definitions and notions and important properties of several subclasses of functions (relevant to the present work) are stated in the form of theorems without proof.

In Chapter 2, we employed the Rafid-operator, to define a new subclass, further, Characterization property exhibited by the functions in the class and radius of starlikeness and convexity are discussed. Results on growth and distortion theorems, closure property, extreme points, class preserving integral operators, integral means results, convolution properties and Holder’s inequality of the class are also included. Further, the study is extended by fixing the second coefficient and the distortion bounds are discussed.

In Chapter 3, two new subclasses \( C_{\Sigma,\mu}(\alpha, \lambda) \) and \( F_{\Sigma,\mu}(\beta, \lambda) \) of analytic and bi-univalent functions in the open unit disk \( U \) are defined in the first section. Further, inspired by the works of Xu et al. [139, 141] in the following section of this chapter an interesting general subclass of analytic and bi-univalent functions in the open unit disk \( U \) is introduced and investigated. For aforementioned classes, the estimates on the first two Taylor-Maclaurin coefficients \( |a_2| \) and \( |a_3| \) are obtained. The results presented in this chapter would generalize and improve some recent works.

Chapter 4 is devoted to study analytic univalent functions with missing coefficients. In first section of this chapter, a new subclass of starlike functions is defined. Further, another subclass of \( k \)-uniformly starlike and \( k \)-uniformly convex functions is defined in second section of this chapter. For these classes the coefficient estimates, results on modified Hadamard product and other properties are discussed.
In Chapter 5, a new subclass of multivalent functions associated with generalized fractional calculus is defined and coefficient estimates, distortion bounds, extreme points, neighborhood property, inclusion results, modified Hadamard product are discussed. Further, radii of starlikeness and convexity, results on quasi Hadamard product and class preserving integral operator are obtained.

In Chapter 6, a unified subclass of meromorphic functions with positive coefficients is defined based on generalized Liu-Srivastava operator. The coefficient bound, extreme points, radii of meromorphically close to convexity, meromorphically starlikeness and meromorphically convexity, partial sums are discussed. It is a remarkable fact that the second coefficient plays an important role in univalent function theory; indeed, it influences growth and distortion bounds for functions in the class of univalent functions. For this reason, there is a continued interest in the investigations of how the second coefficient shaped the geometric properties of important subclasses of functions. Motivated by this, a new subclass is defined by fixing the second coefficient we have extended the study.

In first section of the last chapter, a subclass of harmonic functions of complex order with negative coefficients defined by using dual convolution. Further, a new subclass of meromorphic harmonic starlike functions of complex order involving a new operator is defined in the following section. For functions in these classes, coefficient estimates, extreme points and distortion bounds, convolution and convex combination properties and the closure property of the class under integral operator are determined.