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University of Baghdad
College of Science
Department of Mathematics

A Study of Some Topics in Geometric Function Theory Related to Certain Classes of Analytic Functions Associated with Differential Operators

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By
Ali Musaddak Delphi Ali

Supervised by
Assist. Prof. Dr. Kassim Abdulhameed Jassim

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Abstract

The goal of this dissertation is to present new results on subclasses of univalent, multivalent, and bi-univalent analytic functions with geometric properties defined on a unit disk. A new subclass of analytic univalent functions defined by the q −derivative operator was investigated to find coefficients bounds, distortion and growth theorems. A new subclass defined by the nonhomogeneous Cauchy-Euler differential equation of order m was found to prove many inclusion relations connected with (n, δ) −neighborhoods and coefficients bounds theorem. Also, a new subclass of analytic multivalent functions associated with $q-$ derivative and $q-p$ −valent Cătaş operator was introduced to obtain some geometric properties, such as coefficients bounds, growth , distortion, convolution property, extreme points, radii of starlikeness, convexity, and close to convexity theorems.

New subclasses of higher derivatives harmonic for univalent and multivalent functions associated with linear differential operator, general linear operator, and generalized differential operator were examined to get some geometric properties.

Also, the differential sandwich theorems on a unit disk for univalent analytic functions with a linear operator, for multivalent analytic functions with Wanas differential operator and for higher-order derivatives of multivalent analytic functions with generalized multiplier transformation were used to obtain new results for new subclasses by the technique of admissible functions.

Finally, new general subclasses of m-fold symmetric bi-univalent functions were presented and examined to compute Taylor-Maclaurin coefficients estimates $|a_{m+1}|$ &$|a_{2m+1}|$, and Fekete-Szego problems. In addition, we studied and improved upper bounds estimates for the coefficients $|a_{m+1}|$ &$|a_{2m+1}|$, in a new subclass of m-fold symmetric bi-univalent functions.