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SOME PROPERTIES OF HARMONIC UNIVALENT FUNCTIONS USING Q-CALCULUS AND ERROR FUNCTION

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Abstract: This paper investigates a subclass of harmonic univalent functions using q-calculus and error functions. We determine the necessary condition for the complex valued harmonic, univalent and sense-preserving function f to be the class of harmonic error functions. Further, the necessary and sufficient conditions for functions f to be a member of the subfamily and its characterization, followed by extreme points of the class are determined. Additionally, we prove that the class is closed under convex combinations, indicating that linear combinations of functions within the class also belong to the class. These estimates illuminate the growth and deformation of functions within the unit disk. These findings enhance our understanding of the geometric and analytic properties of harmonic error functions and their significance in the field of geometric function theory.

Keywords and Phrases: Harmonic function, holomorphic function, univalent function, q-calculus, convolution, error function.

2020 Mathematics Subject Classification: 30C45, 30C50, 30C80.

1. Introduction

A continuous complex-valued function $f = u + iv$ is said to be harmonic in a simply-connected domain D if both u and v are real and harmonic in D. If h and g are analytic in D, then f can be expressed in the form:

$$f = h + \overline{g}, \tag{1.1}$$