

## DIFFERENTIAL SANDWICH THEOREMS FOR HIGHER-ORDER DERIVATIVES OF $p$ -VALENT FUNCTIONS INVOLVING A GENERALIZED DIFFERENTIAL OPERATOR

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In the present article, we obtain some applications of first order differential subordination, superordination and sandwich results for higher-order derivatives of  $p$ -valent functions involving a generalized differential operator. Some of our results improve and generalize previously known results.

### 1. Introduction

Let  $H(U)$  be the class of analytic functions in the open unit disk  $U = \{z \in \mathbb{C} : |z| < 1\}$  and let  $H[a, p]$  be the subclass of  $H(U)$  consisting of functions of the form:

$$f(z) = a + a_p z^p + a_{p+1} z^{p+1} \dots \quad (a \in \mathbb{C}; p \in \mathbb{N} = \{1, 2, \dots\}).$$

For simplicity  $H[a] = H[a, 1]$ . Also, let  $\mathcal{A}(p)$  be the subclass of  $H(U)$  consisting of functions of the form:

$$f(z) = z^p + \sum_{k=p+1}^{\infty} a_k z^k \quad (p \in \mathbb{N}), \quad (1)$$

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Entrato in redazione: 2 aprile 2013

AMS 2010 Subject Classification: 30C45.

Keywords: Analytic function, Hadamard product, Differential subordination, Superordination, Sandwich theorems, Linear operator.