

**Higher order derivative on meromorphic functions in terms of subordination**

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*Dedicated to Prof. Hari M. Srivastava on his 75<sup>th</sup> birth anniversary*

**Abstract:** This paper investigates sharp coefficient bounds, integral representation, extreme point and operator properties of a certain class associated with functions which are meromorphic in the punctured unit disk.

**keywords and phrases:** Meromorphic function, Coefficient estimate, Extreme point, Integral representation, Integral operator.

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**1. INTRODUCTION**

Let  $\Sigma$  denote the class of meromorphic functions of the form

$$f(z) = \frac{1}{z} + \sum_{n=3}^{\infty} a_n z^n \quad (a_n \geq 0, \quad n \in \mathbb{N}), \quad (1.1)$$

which are analytic and univalent in the punctured unit disk  $\Delta^* = \{z : 0 < |z| < 1\}$ .

For  $f(z) \in \Sigma$ , Ghanim and Darus [3] were defined a linear operator  $I^k$  ( $k = 0, 1, 2, \dots$ ) as follows:

$$\begin{aligned} I^0 f(z) &= f(z) \\ I^k f(z) &= z(I^{k-1} f(z))' + \frac{2}{z} = \frac{1}{z} + \sum_{n=3}^{+\infty} n^k a_n z^n. \end{aligned} \quad (1.2)$$

For  $A = B + (C - B)(1 - D)$ ,  $-1 \leq B < C \leq 1$  and  $0 \leq D < 1$ , we let  $\Sigma_{A,B}^K$  consists of function  $f \in \Sigma$  satisfying the condition

$$-\frac{zF^{(4)}(z)}{F'''(z)} < 4\frac{1 + Az}{1 + Bz}, \quad (1.3)$$

where  $F(z) = I^k f(z)$  is defined by (1.2).

For other subclass of meromorphic univalent functions, we can see the recent works of many authors in [1] and [2].