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AN EXTENSION OF SOME GROWTH PROPERTIES OF COMPOSITE ENTIRE AND MEROMORPHIC FUNCTIONS

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Abstract: In this paper we study some growth properties of composite functions formed with entire and meromorphic functions and their derivatives to generalise some earlier results of Banerjee and Adhikary.

Keywords and Phrases: Entire Function, Meromorphic Function, Growth, Composition.

2020 Mathematics Subject Classification: 30D20.

1. Introduction and Definitions

Let f and g be two transcendental entire functions in the open complex plane $\mathbb{C}$. In [6], Clunie showed that $\lim_{r\to\infty}\frac{T_{f\circ g}(r)}{T_f(r)}=\infty$ and $\lim_{r\to\infty}\frac{T_{f\circ g}(r)}{T_g(r)}=\infty$. In 1991, Singh and Baloria [12] investigated some comparative growth properties of $\log T_{f\circ g}(r)$ and $T_f(r)$ and raised the question for comparative growth of $\log T_{f\circ g}(r)$ and $T_g(r)$. After this, some results on comparative growth of $\log T_{f\circ g}(r)$ and $T_g(r)$ are closely investigated in [9] and [5]. In 2018, Banerjee and Adhikary [1] studied on comparative growth of composite function of the form $\psi\circ g$, where ψ is defined in [1] and g is an entire function. Very recently Banerjee and Adhikary [2] made close investigation on comparative growth properties of the functions $\psi\circ\phi$ with g, where ψ and ϕ formed by the functions f and g and their derivatives respectively.

In this paper, first we construct n functions $\psi_1,\psi_2,\cdots,\psi_n$ formed from the functions $f_1,f_2,\cdots,f_n$ and $a_{1i},a_{2i},\cdots,a_{ni}$, where the later functions are small