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A NOTE ON GENERALIZED GROWTH ANALYSIS OF COMPOSITE ENTIRE FUNCTIONS

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Abstract. In this paper we wish to prove some results relating to the growth rates of maximum modulus and maximum terms of composition of two entire functions with their corresponding left and right factors on the basis of their generalized order (α, β) and generalized lower order (α, β) where α and β are continuous non-negative functions on $(-\infty, +\infty)$.

1. Introduction, Definitions and Notations

We denote by $\mathbb{C}$ the set of all finite complex numbers. Let f be an entire function defined on $\mathbb{C}$. The maximum modulus function $M_f(r)$ and the maximum term $\mu_f(r)$ of $f = \sum_{n=0}^{+\infty} a_n z^n$ on $|z| = r$ are defined as $M_f = \max_{|z|=r} |f(z)|$ and $\mu_f(r) = \max_{n \geq 0} (|a_n| r^n)$ respectively. We use the standard notations and definitions of the theory of entire functions which are available in [10] and [11], and therefore we do not explain those in details. For $x \in [0, +\infty)$ and $k \in \mathbb{N}$ where $\mathbb{N}$ be the set of all positive integers, define iterations of the exponential and logarithmic functions as $\exp^{[k]} x = \exp(\exp^{[k-1]} x)$ and $\log^{[k]} x = \log(\log^{[k-1]} x)$, with convention that $\log^{[0]} x = x$, $\log^{[-1]} x = \exp x$, $\exp^{[0]} x = x$, and $\exp^{[-1]} x = \log x$. Now considering this, let us recall that Juneja et al. [3] defined the (p, q)-th order and (p, q)-th lower order of an entire function, respectively, as follows:

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