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ON $(p,q)^{th}$ GOL'DBERG ORDER AND $(p,q)^{th}$ GOL'DBERG TYPE OF AN ENTIRE FUNCTION OF SEVERAL COMPLEX VARIABLES REPRESENTED BY MULTIPLE DIRICHLET SERIES

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Abstract: Introducing the idea of $(p,q)^{th}$ Gol'dberg order and $(p,q)^{th}$ Gol'dberg type of an entire function f of several complex variables in a domain D we generalise some earlier results.

Keywords and Phrases: Entire function, Multiple Dirichlet series, Gol'dberg order, Gol'dberg type.

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1. Introduction

In this paper we denote complex and real n-space by $\mathbb{C}^n$ and $\mathbb{R}^n$ respectively. We write the elements $(s_1, s_2, ..., s_n)$, $(Re\ s_1,\ Re\ s_2, ..., Re\ s_n)$, $(\sigma_1, \sigma_2, ..., \sigma_n)$, $(m_1, m_2, ..., m_n)$ etc. of $\mathbb{C}^n$ by their corresponding unsuffixed symbols s, $Re\ s$, σ, m etc. respectively.
For $x, y \in \mathbb{C}^n$, we define $x = (x_1, x_2, ..., x_n)$, $y = (y_1, y_2, ..., y_n)$, $xy = (x_1y_1, x_2y_2, ..., x_ny_n)$, $||x|| = x_1 + x_2 + ... + x_n$, $x + r = (x_1 + r, x_2 + r, ..., x_n + r)$ for $r \in \mathbb{R}$. By I^n we shall mean the Cartesian product of n copies of I where I is the set of non-negative integers. For $k \in I$, $\bar{k}$ will denote the real n-tuple $(k, k, ..., k)$. For an entire function f with domain $\mathbb{C}^n$, f^k will denote the function $\frac{\partial^{||k||} f}{\partial_{s_1}^{k_1} ... \partial_{s_n}^{k_n}}$, where $k \in I^n$ and $f^{(\bar{0})} = f$. Consider the multiple Dirichlet series

$$f(s_1, s_2, ..., s_n) = \sum_{m_1, m_2, ..., m_n = 1}^{\infty} a_{m_1, m_2, ..., m_n} exp(s_1\lambda_{1m_1} + s_2\lambda_{2m_2} + ... + s_n\lambda_{nm_n})$$