

**SOME PROPERTIES OF q -ANALOGUE OF GENERALIZED
MITTAG-LEFFLER FUNCTION ASSOCIATED WITH
FRACTIONAL CALCULUS**

Krishna Gopal Bhadana and Ashok Kumar Meena

Department of Mathematics,
SPC Government College, Ajmer, Rajasthan,
Maharshi Dayanand Saraswati University, Ajmer,
Rajasthan - 305001, INDIA

E-mail : drbhadanakg@gmail.com, ashokmeena428@gmail.com

(Received: Apr. 30, 2020 Accepted: Feb. 22, 2021 Published: Apr. 30, 2021)

Abstract: In the present paper we will establish some results and properties of q -generalized Mittag-Leffler function $E_{\alpha,\beta,r}^{\gamma,\delta,s}(z; q)$. We will get its convergence condition, recurrence relation and many other results associated with fractional calculus such as q -Laplace transform, Riemann-Liouville fractional q -integral operator. We will also discuss some important special cases of main results.

Keywords and Phrases: Generalized q -Mittag Leffler Function, q -Gamma Function, q -Beta Function, q -Laplace transform, q -Derivative, q -Integral.

2020 Mathematics Subject Classification: 33E12, 33D05, 44A20.

1. Introduction

The Mittag-Leffler function has wide applications in many areas of physical sciences, especially in fractional calculus and special functions. The Classical Mittag-Leffler Function [7] (CMLF) is introduced by Swedish Mathematician Gosta Mittag Leffler in 1903. This function was defined as follows for $z \in \mathbb{C}$, $\alpha \in \mathbb{C}$

$$E_{\alpha}(z) = \sum_{n=0}^{\infty} \frac{z^n}{\Gamma(\alpha n + 1)}; \quad \operatorname{Re}(\alpha) > 0 \quad (1.1)$$