

**STUDY ON  $k$ -GAUSS SECOND SUMMATION THEOREMS AND  
 $k$ -KUMMER'S TRANSFORMATION**

**Ekta Mittal and Sunil Joshi\***

Department of Mathematics,  
IIS Deemed to be University, Jaipur - 302020, INDIA

E-mail : ekta.mittal@iisuniv.ac.in

\*Department of Mathematics and Statistics,  
Manipal University Jaipur, Jaipur - 303007, INDIA

E-mail : sunil.joshi@jaipur.manipal.edu

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**Abstract:** The aim of the present investigation is to create some summation theorems like Gauss, Bailey, and Kummer in the form of  $k$ - hypergeometric function. Further, we develop a new class of Kummer's differential equation of  $k$ -parameter and Kummer's transformations formulae in terms  $k$ - confluent hypergeometric function.

**Keywords and Phrases:**  $k$ -Gamma function,  $k$ -Beta function,  $k$ -hypergeometric functions,  $k$ -pochhammer symbols.

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### 1. Introduction and Preliminaries

Recently, the extension of the special functions has been painstaking by numerous authors. The generalization of the gamma and beta functions presented by number of researchers (See [2, 3, 5, 8]) in the form of a new parameter  $k$ , where  $k > 0$ , called  $k$ -gamma and  $k$ -beta functions respectively.

The  $k$  -Pochhammer symbol and  $k$  -Gamma function demarcated as

$$\Gamma_k(x) = \lim_{n \rightarrow \infty} \frac{n!k^n (nk)^{\frac{x}{k}-1}}{x_{n,k}}, \quad k > 0, x \in C \setminus kZ^-, \quad (1)$$