J. of Ramanujan Society of Mathematics and Mathematical Sciences
Vol. 10, No. 2 (2023), pp. 37-44

DOI: 10.56827/JRSMMS.2023.1002.3 **ISSN (Online): 2582-5461**

ISSN (Print): 2319-1023

ON CERTAIN RESULTS ASSOCIATED WITH THE TRANSFORMATIONS OF GENERALIZED HYPERGEOMETRIC SERIES

Satya Prakash Singh and Akash Rawat

Department of Mathematics,
T. D. P. G. College, Jaunpur,
Jaunpur - 222002, Uttar Pradesh, INDIA

E-mail : snsp39@gmail.com, arofficial26@gmail.com

(**Received:** *Mar. 05, 2023* **Accepted:** *May 30, 2023* **Published:** *Jun. 30, 2023*)

Abstract: In this paper, certain transformation formulas for ordinary hypergeometric series and also for q-hypergeometric series have been established.

Keywords and Phrases: Ordinary hypergeometric series, basic (q-) hypergeometric series, transformation formula, summation formula, Bailey's transform, identity.

2020 Mathematics Subject Classification: 33C15, 33C20, 33D15.

1. Introduction, Notations and Definitions

The theory of generalized hypergeometric series is the most important topic in the entire special function theory. In 1812, Gauss presented to the Royal Society of Sciences at Göttingen his famous paper in which he considered the infinite series

$$1+\frac{ab}{c}z+\frac{a(a+1)b(b+1)}{c(c+1)1.2}z^2+\frac{a(a+1)(a+2)b(b+1)(b+2)}{c(c+1)(c+2)1.2.3}z^3+...,\qquad(1.1)$$

as a function of a, b, c, z where it is assumed that $c \neq 0, -1, -2, ...$, so no zero factors appear in the denominators of the terms of the series (1.1). It is now customary to use ${}_2F_1(a, b; c; z)$ or ${}_2F_1\left[\begin{array}{c} a, b; z \\ c \end{array}\right]$ for this series. Now, ${}_2F_1(a, b; c; z)$ stands thus,

$${}_2F_1(a,b;c;z)=\sum_{n=0}^{\infty}\frac{(a)_n(b)_n}{(c)_n}\frac{z^n}{n!},\qquad(1.2)$$