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CERTAIN TRANSFORMATION FORMULAS FOR BASIC HYPERGEOMETRIC SERIES

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Abstract: The object of this paper is to establish some transformation formulas for basic hypergeometric series by making use of some known results.

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1. Introduction

The generalized basic hyper geometric series ${}_r\phi_s$ is defined by

$${}_r\phi_s\left[\begin{matrix} a_1, a_2, \ldots, a_r \\ & ; q, z \\ b_1, b_2, \ldots, b_s \end{matrix}\right] = \sum_{n=0}^{\infty} \frac{(a_1, a_2, \ldots, a_n)_n}{(q, b_1, b_2, \ldots, b_n)_n} [(-1)^n q^{n(n-1)/2}]^{1+s-r} z^n \tag{1}$$

If $0 < |q| < 1$, the above series converges absolutely for all z if $r \leq s$ and for $|z| < 1$ if $r = s + 1$.
The abnormal type of generalized basic hyper geometric series ${}_r\phi_s(.)$ is defined as

$${}_r\phi_s\left[\begin{matrix} a_1, a_2, \ldots, a_r; q, z \\ b_1, b_2, \ldots, b_s; q^\lambda \end{matrix}\right] = \sum_{n=0}^{\infty} \frac{(a_1, a_2, \ldots, a_r; q)_n}{(b_1, b_2, \ldots, b_s; q)_n} z^n q^{\lambda n(n+1)/2} \tag{2}$$

where $\lambda > 0$ and $|q| < 1$.
As usual, the q -shifted factorial is defined by

$$(a, q)_n = \begin{cases} 1 & \text{if } n = 0; \\ (1-a)(1-aq)(1-aq^2)\ldots,(1-aq^{n-1}) & \text{if } n \in N. \end{cases} \tag{3}$$