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Certain Transformation Formulae for Bilateral Basic Hypergeometric Series

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Abstract: Bilateral expansions of the results of Satya Prakash Singh, Amit Kumar Singh[1] and Soni Singh[2] have been carried out.
Keywords: Bilateral basic hypergeometric series, Basic hypergeometric series.

1. Introduction, Notation and Definition:

Throughout this paper we shall adopt the following notations and definitions; For any numbers a and q real or complex and $|q| < 1$, let

$$(a)_n := \begin{cases} 1, & if\, n = 0 \\ (1-a)(1-aq)\left(1-aq^2\right)\ldots\left(1-aq^{n-1}\right), & if\, n \geq 1 \end{cases} \tag{1.1}$$

and

$$(a)_\infty := \prod_{n=0}^{\infty}(1-aq^n) \tag{1.2}$$

The basic hypergeometric series ${}_{r+1}\varphi_r$ and the bilateral basic hypergeometric series ${}_r\psi_r$ are given by

$${}_{r+1}\varphi_r\left[\begin{matrix} a_1, a_2, \ldots, a_{r+1} & ; z \\ b_1, b_2, \ldots, b_r & \end{matrix}\right] := \sum_{n=0}^{\infty}\frac{(a_1)_n(a_2)_n\ldots(a_{r+1})_n}{(q)_n(b_1)_n(b_2)_n\ldots(b_r)_n}z^n \tag{1.3}$$

and

$${}_{r+1}\psi_r\left[\begin{matrix} a_1, a_2, \ldots, a_r & ; z \\ b_1, b_2, \ldots, b_r & \end{matrix}\right] := \sum_{n=-\infty}^{\infty}\frac{(a_1)_n(a_2)_n\ldots(a_r)_n}{(b_1)_n(b_2)_n\ldots(b_r)_n}z^n \tag{1.4}$$