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On summation and transformation formulae for basic hypergeometric series

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Abstract: In this paper, making use of some known WP-Bailey pairs and theorems for constructing new WP-Bailey pairs from a known WP-Bailey pair, we have established transformation formulae for basic hypergeometric series.
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1. Introduction, Notations and Definitions

As usual, for a and q complex numbers with $|q| < 1$, define

$$[a;q]_0 = 1,$$

$$[a;q]_n = (1-a)(1-aq)...(1-aq^{n-1}), \quad n \in N,$$

.

$$[a_1, a_2, ..., a_k; q]_n = [a_1;q]_n[a_2;q]_n...[a_k;q]_n,$$

$$[a;q]_\infty = \prod_{r=0}^{\infty}(1-aq^r)$$

and

$$[a_1, a_2, ..., a_r; q]_\infty = (a_1;q)_\infty(a_2;q)_\infty...(a_r;q)_\infty.$$

A basic hypergeometric series is defined by

$${}_r\Phi_s\left[\begin{array}{l} a_1, a_2, ..., a_r; q; z \\ b_1, b_2, ..., b_s \end{array}\right] = \sum_{n=0}^{\infty}\frac{[a_1, a_2, ..., a_r; q]_n z^n}{[q, b_1, b_2, ..., b_s; q]_n}, \quad |z| < 1, \tag{1.1}$$

where as a very well poised basic hypergeometric series defined by,

$${}_{r+3}W_{r+2}\,[a; b_1, b_2, ..., b_r; q; z]$$