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On Transformation Formulae for q-Series

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Abstract: In this paper, we have established two identities by making use of Bailey transform and bilateral Bailey transform. Using these identities and some known summation formulae, certain transformation formulae for basic hypergeometric series as well as for poly-basic hypergeometric series have been established.
Key words and phrases: Bailey transform, summation and transformation formulae, Bilateral basic hypergeometric series, poly-basic hypergeometric series and q-series.
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1. Introduction, Notations and Definitions

Let q be a fixed complex parameter with $|q| < 1$. The q-shifted factorial for any complex parameter 'a' is defined by

$$[a,q]_k = \begin{cases} 1 & \text{for } k=0 \\ (1-a)(1-aq)(1-aq^2)\ldots,(1-aq^{k-1}), & \text{k=1,2,3,...,} \end{cases}$$

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

Also as usual, we write

$$[a_1, a_2, ..., a_r]_k = [a_1;q]_k[a_2;q]_k...[a_r;q]_k.$$

A basic hypergeometric series is defined by

$${}_r\Phi_s\left[\begin{array}{l} a_1, a_2, ..., a_r; q; z \\ b_1, b_2, ..., b_s \end{array}\right] = \sum_{k=0}^{\infty}\frac{[a_1, a_2, ..., a_r; q]_k z^k}{[q, b_1, b_2, ..., b_s; q]_k}\left[(-)^k q^{k(k-1)/2}\right]^{1+s-r}, \qquad (1.1)$$