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WP BAILEY PAIRS AND DOUBLE SERIES IDENTITIES

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Abstract: In this paper, using WP Bailey pairs and conjugate WP Bailey pairs, certain double series identities have been established.

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1. Introduction

We begin by recalling some standard notations and terminology. Let a and q be complex numbers with $|q| < 1$. Then the q- shifted factorial is defined by

$$(a;q)_0 = 1,\ (a;q)_n = (1-a)(1-aq)...(1-aq^{n-1}),\ \ n \in N \ \text{ and } \ (a;q)_\infty = \prod_{r=0}^{\infty}(1-aq^r).$$

Also, for the sake of brevity, we often write

$$(a_1, a_2, ..., a_r; q)_n = (a_1; q)_n (a_2; q)_n ... (a_r; q)_n.$$

The basic q- hypergeometric series is defined by

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