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CERTAIN DOUBLE SERIES ROGERS - RAMANUJAN TYPE IDENTITIES

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Abstract: This paper contains certain double series Rogers- Ramanujan type identities which are derived as special cases of an application of Bailey's transform.

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1. Introduction

Throughout this paper we shall adopt certain notation and definitions which are stated below. Let α, β and q be complex numbers and $|q| < 1$, then

$$(\alpha; q)_n = (1-\alpha)(1-\alpha q)...(1-\alpha q^{n-1}), \quad n = 1, 2, 3, ... \tag{1.1}$$

$$(\beta; q)_\infty = \prod_{k=1}^{\infty}(1-\beta q^k), \tag{1.2}$$

and

$$(\alpha_1, \alpha_2, \alpha_3, ..., \alpha_m; q)_n = (\alpha_1; q)_n(\alpha_2; q)_n(\alpha_3; q)_n...(\alpha_m; q)_n \tag{1.3}$$

With the above notations we define basic hypergeometric series as:

$${}_r\Phi_s\left[\begin{matrix}\alpha_1, \alpha_2, ..., \alpha_r\\ \beta_1, \beta_2, ..., \beta_s\end{matrix}; q; z\right] = \sum_{n=0}^{\infty}\frac{(\alpha_1, \alpha_2, ..., \alpha_r; q)_n z^n}{(\beta_1, \beta_2, ..., \beta_s; q)_n}\left\{(-1)^n q^{n(n-1)/2}\right\}^{1+n-r} \tag{1.4}$$