TRANSFORMATIONS OF UNILATERAL BASIC HYPERGEOMETRIC SERIES

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Abstract: A known series identity due to Fine [equ 20.4, [2]] has been used as a tool to develop certain new transformations of basic hypergeometric series.

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1. Introduction and preliminaries

Fine [2] has recorded a useful identity [eq 20.4; [2]] which can be stated as follows. If

$$g(t) := \sum_{n=0}^{\infty} A_n t^n \tag{1}$$

then

$$\sum_{n=0}^{\infty} \frac{(aq;q)_n}{(bq;q)_n} A_n t^n = \frac{(aq;q)_\infty}{(bq;q)_\infty} \sum_{k=0}^{\infty} \frac{(b/a;q)_k (aq)^k}{(q;q)_k} g(q^k t). \tag{2}$$

It may be observed that with a proper choice of A_n in (1), we may get a transformation and summation from (2). We have used this fact to establish a number of transformations of basic hypergeometric series in the next section which are presumably appear to be new.

In the sequel, we shall use the notation and definition of [3]. We define a basic hypergeometric series as