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PRODUCT FORMULAS FOR MOCK THETA FUNCTIONS

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Abstract: In this paper, we have established an identity by making use of the Bailey's transform and used it for obtaining the product formulas of mock theta functions.

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1. Introduction Notations and Definitions

In his last letter to G.H. Hardy, Ramanujan mentioned 20 mock theta functions out of which seven are of order three, ten are of order five and three are of order seven. The main aim of this paper is to establish product formulas for these mock theta functions. Taking two at a time one can establish 190 product formulas. We shall here give few examples only.

As usual, for a and q complex numbers and $|q| < 1$, we define q-rising factorial as,

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

$$(a;q)_0 = 1 \tag{1.2}$$

and

$$(a;q)_\infty = \prod_{r=0}^{\infty}(1-aq^r). \tag{1.3}$$

Following are the lists of mock theta functions and corresponding partial mock theta functions of different orders.