CERTAIN RESULTS INVOLVING RAMANUJAN'S THETA FUNCTIONS AND CONTINUED FRACTIONS

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Abstract: In this paper certain continued fractions associated with Ramanujan's theta functions have been discussed.

1. Introduction, Notation and Definitions

The Ramanujan theta function is a fundamental theory in basic hypergeometric series that extends the structure of the Jacobi theta functions [1, 3, 7], while retaining their essential characteristics. Specifically, the Jacobi triple product exhibits a very sophisticated structure when expressed using the Ramanujan theta functions [2, 10]. The Ramanujan theta function is typically employed to identify the critical dimensions in theories such as bosonic string theory, superstring theory, and M-theory.

On the other hand, continued fractions play an important role in various branches of mathematics. They naturally arise in long division and in the theory of approximating real numbers with rational numbers [4, 5]. A continued fraction is an