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A NOTE ON RAMANUJAN'S GENERAL THETA FUNCTION

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Abstract: In this paper, Ramanujan's general theta function has been generalized and its properties have been discussed.

Keywords and Phrases: Jacobi's theta functions, identities, Ramanujan's general theta function, generalized Ramanujan's theta function.

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1. Introduction

Jacobi in 1829 [3] defined following four functions which are called Jacobi's theta functions, \sim

$$\theta_1(z,q) = 2\sum_{n=0}^{\infty} (-1)^n q^{\left(n+\frac{1}{2}\right)^2} \sin(2n+1)z, \qquad (1.1)$$

$$\theta_2(z,q) = 2\sum_{n=0}^{\infty} q^{\left(n+\frac{1}{2}\right)^2} \cos(2n+1)z,$$
(1.2)

$$\theta_3(z,q) = 1 + 2\sum_{n=1}^{\infty} q^{n^2} \cos 2nz$$
(1.3)

and

$$\theta_4(z,q) = 1 + 2\sum_{n=1}^{\infty} (-1)^n q^{n^2} \cos 2nz.$$
(1.4)