South East Asian J. of Math. & Math. Sci. **ISSN : 0972-7752**
Vol.12, No.1 2016, pp. 25-44

CERTAIN IDENTITIES RELATED TO THE ROGERS-RAMANUJAN CONTINUED FRACTION

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Abstract: In this paper, we employ some theta function identities of Ramanujan to establish certain new theta function identities related to the Rogers-Ramanujan continued fraction. Furthermore, we derive certain general formulas for explicit evaluations of the Rogers-Ramanujan continued fraction.

Keywords and Phrases: Theta-function, modular equations, Rogers-Ramanujan continued fraction.

2000 Mathematics Subject Classification: 11B65, 11A55, 30B70, 11F27, 40A15.

1. Introduction

The well-known Rogers-Ramanujan continued fractions $R(q)$ and $S(q)$ are defined by

$$R(q) := \frac{q^{1/5}}{1+}\ \frac{q}{1+}\ \frac{q^2}{1+}\ \frac{q^3}{1+\cdots} \qquad |\, q \,| < 1$$

and

$$S(q) := -R(-q).$$