Applications of the Heine and Bauer-Muir transformations to Rogers-Ramanujan type continued fractions.

It is shown that various continued fractions for the quotient of general Ramanujan functions \( G(aq, b, \lambda q)/G(a, b, \lambda) \) may be derived from each other via Bauer-Muir transformations. The separate convergence of numerators and denominators play a key part in showing that the continued fractions and their Bauer-Muir transformations converge to the same limit.

We also show that these continued fractions may be derived from Heine’s continued fraction for a ratio of \( 2 \phi_1 \) functions and other continued fractions of a similar type, and by this method derive a new continued fraction for \( G(aq, b, \lambda q)/G(a, b, \lambda) \).

New versions of some beautiful continued fraction expansions of Ramanujan are derived, for example:

If \(|q| < 1\) and \(|bq| < |a| < 1/|b|\), then

\[
\frac{(a^2q, b^2q; q^4)_\infty}{(a^2q^3, b^2q^3; q^4)_\infty} = 1 + ab - \frac{(a + bq)(b + aq)}{(1 + q^2)(1 + q^4)} - \frac{(a + bq^3)(b + aq^3)q^2}{(1 + q^6)(1 + q^8)} + \cdots.
\]

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