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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

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

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