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ON CERTAIN CONTINUED FRACTION REPRESENTATION FOR RATIO OF POLY-BASIC HYPERGEOMETRIC SERIES

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Abstract: In this paper we shall attempt to establish a continued fraction representation for the ratio of two poly-basic series with finite number of parameters each on a different base. In the sequel we also establish a continued fraction representation for a well-poised basic bi-lateral hypergeometric function.

Keywords: Continued fraction, poly-basic hypergeometric series, bilateral hypergeometric series, well-poised.

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1. Introduction

Continued fraction representations for the ratio of two hypergeometric functions occupy prominent place in Ramanujan's contribution to mathematics. In an attempt to prove as well as generalize these results several mathematicians, namely, Bhagirathi [1,2], Bhargava and others [3-5], Denis [6-10] and Singh [14-17] established a large number of results which provide continued fraction representation for the ratio of two ${}_2\phi_1'^s$ and ${}_3\phi_2'^s$ of which the former involve general arguments while the later involve constant arguments. There are some scattered results (cf. Denis[10-12]involving bi-basic series with base q and q^2 with general arguments which have their continued fraction representations.

Recently, Denis, Singh and Singh [12] established certain continued fraction representations for the ratio of ${}_{r+1}\phi_r'^s$ $(3 \leq r \leq 7)$. In the same communication they expressed the ratio of multiple series in terms of continued fraction. In another publication Denis and Singh [11] succeeded in representing ${}_{5k+1}\phi_{5k}$ in terms of k^{th}