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FRACTIONAL $q-$ DERIVATIVE AND $q-$ SERIES TRANSFORMATIONS

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Abstract: In this paper, making use of fractional $q-$ derivative for the product of two functions, transformation formulas involving $q-$ hypergeometric series have been established.

Keywords and Phrases: Fractional $q-$derivative, q-hypergeometric series, summation formula, transformation formula.

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1. Introduction, Notations and Definitions

Throughout this paper we shall use the standard notation and terminology for $q-$ series. As customary, the $q-$shifted factorials are given as,

$$\begin{aligned}(a;q)_\infty &= \prod_{r=0}^{\infty}(1-aq^r), \quad |q|<1,\\ (a;q)_n &= \frac{(a;q)_\infty}{(aq^n;q)_\infty} = (1-a)(1-aq)...(1-aq^{n-1}),\end{aligned}$$