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Relationship between q-Weyl operator and basic analogue of I-function in preview of q-Laplace transform

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Abstract: The q-derivatives and q-integrals are part of so called quantum calculus [1]. In this paper, we investigate how such derivatives and integrals can be possible used in establishing a formula exhibiting relationship between basic analogue of q-Weyl operator and q-Laplace transform, which allows the straight forward derivation of some useful results involving Weyl operator and basic analogue of I-function in terms of q-gamma function [2]. Also some special cases has been discussed.
Keywords: Weyl fractional q-integral operator, q-Laplace transform, basic analogue of I-function.
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Introduction:

The fractional q-calculus is the q-extension of the ordinary fractional calculus. The subject deals with the investigations of q-integrals and q-derivatives of arbitrary order and has gained importance due its various applications in the areas like ordinary fractional calculus, solution of the q-differential and q-integral equations, q-transform analysis [4,5 and 6]. Motivated by these avenues of applications, a number of workers have made use of these operators to evaluate fractional q-calculus, basic analogue of H-function, basic analogue of I-function, general class of q-polynomials etc. Al-Salam [7,8] introduced the q-analogue of Weyl fractional integral operator in the following manner.

$$W^{\alpha}_{q,x}f(x) = \frac{q^{\frac{-\alpha(\alpha-1)}{2}}}{\Gamma_q(\alpha)}\int_x^{\infty}(x-qt)_{\alpha-1}f(tq^{1-\alpha})d_q(t) \quad ; Re(\alpha) > 0. \qquad (1.1)$$