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EXPANSION FORMULAE INVOLVING THE MULTIVARIABLE I-FUNCTION

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Abstract: Kant et al [2] have given several expansions formulae concerning the multivariable H-function. In this paper, we will give six results concerning the expansion formulas involving the multivariable I-function defined by Prasad [5].

Keywords and Phrases: Multivariable I-function, generalized hypergeometric function, expansion formulae, Laplace transform, inverse Laplace transform.

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1. Introduction and preliminaries

As explained by Srivastava [6], linearization relations of the Clebsch-Gordan involving the sequence of polynomials $\{p_n(x)\}_{n=0}^{\infty}$ and $\{q_n(x)\}_{n=0}^{\infty}$ and their generalizations play an important role in various physical situations. Motivated by the usefulness of such results, Srivastava presented a unified study of various classes of polynomials expansions and multiplication theorems involving the generalized Kampe de Fériet function of several variables. As applications of his results, Srivastava [6] provided extensions of various Clebsch-Gordan type and Niukkanen type linearization relations involving products of several Jacobi and Laguerre polynomials. Inspired by the usefulness of the above mentioned results and works of Kant et al [2], we aim to provide further generalizations of these results to the case of the multivariable I-function defined by Prasad [5]. The results established here are expected to be useful in various physical situations.
The multivariable I-function is defined in term of multiple Mellin-Barnes type integral

$$I(z_1, ..., z_r) = I^{0,n_2;0,n_3;...;0,n_r:m',n';...;m^{(r)},n^{(r)}}_{p_2,q_2,p_3,q_3;...;p_r,q_r:p',q';...;p^{(r)},q^{(r)}} \left(\begin{array}{c|c} z_1 & (a_{2j};\alpha'_{2j},\alpha''_{2j})_{1,p_2};...; \\ \cdot & \\ \cdot & \\ \cdot & \\ z_r & (b_{2j};\beta'_{2j},\beta''_{2j})_{1,q_2};...; \end{array} \right)$$