REVIEW OF LITERATURE

Mishra, (1990). This paper, evaluate an Integrals involving Legendre l function, generalized hypergeometric series and Fox's H-function and employed it to evaluate a double integral involving Legendrel function , generalized hypergeometric series and H-function . We have further utilized the integral to establish two Fourier -Legendre series. and two double Fourier –Legendre series for products of generalized hypergeometric function

Srivastava, Goyal and Jain, (1990). In this paper derive a number of interesting expressions for the composition of certain multidimensional fractional integral operators involving a general class of polynomials with essentially arbitrary coefficients. It is shown how these fractional integral operators can be identified with elements of the algebra of functions having the multidimensional Mellin convolution as the product. Inversion formulas for the multidimensional fractional integrals are also established. The fractional integral operators studied here are fairly general in character, since (by suitably specializing the coefficients involved) the general class of polynomials can be reduced to each of the classical orthogonal polynomials, the Bessel polynomials, and numerous other classes of generalized hypergeometric polynomials studied in the literature.

Chandel,Agarwal,and Kumar,(1992). In this paper, make an application of an integral involving sine functions, exponential functions, the product of the Kampe de Feriet functions and the multivariable H-function of Srivastava and Panda to evaluate three Fourier
series. Also evaluate a multiple integral involving the multivariable H-function of Srivastava and Panda and make its application to derive a multiple exponential Fourier series.

Anderson, Haubold, Mathai, (1994). As theoretical knowledge and experimental verification of nuclear cross sections increases it becomes possible to refine analytic representations for nuclear reaction rates. In this paper mathematical/statistical techniques for deriving closed-form representations of thermonuclear functions are summarized and numerical results for them are given. The purpose of the paper is also to compare numerical results for approximate and closed-form representations of thermonuclear functions.

Srivastava, Hussain, (1995). The main object of the paper is to derive a number of key formulas for the fractional integration of the multivariable H-function. Each of the general Eulerian integral formulas are shown to yield interesting new results for various families of generalized hypergeometric functions of several variables. Some of these applications of the key formulas would provide potentially useful generalizations of known results in the theory of fractional calculus.

Rathie, (1997). In this paper a natural generalization of the familiar H-function of Fox namely the I-function is proposed. Convergence conditions, various series representations, elementary properties and special cases for the I-function have also been given.
**Haubold, and Mathai, (2000).** The paper discusses the solution of a simple kinetic equation of the type used for the computation of the change of the chemical composition in stars like the Sun. Starting from the standard form of the kinetic equation it is generalized to a fractional kinetic equation and its solutions in terms of H-functions are obtained. The role of thermonuclear functions, which are also represented in terms of G- and H-functions, in such a fractional kinetic equation is emphasized. Results contained in this paper are related to recent investigations of possible astrophysical solutions of the solar neutrino problem.

**Chaurasia, Singhal, (2004).** In this paper an Eulerian integral and a main theorem based upon the fractional integral operator associated with generalized polynomials given by Srivastava and H-function of several complex variables given by Srivastava and Panda which provide unification and extension of numerous results in the theory of fractional calculus of special functions in one and more variables. Certain interesting special cases (known and new) have also been discussed.

**Garg, Singh, Ramawat, (2004).** This paper deals with the evaluation of an integral involving product of Bessel polynomials and the H-function. By making use of this integral the solution of the time domain synthesis problem is investigated.

**Mathai, Saxena, Haubold, (2004).** In this paper an analytic proof of the integrals for astrophysical thermonuclear functions which are derived on the basis of Boltzmann-Gibbs
statistical mechanics. Among the four different cases of astrophysical thermonuclear functions, those with a depleted high-energy tail and a cut-off at high energies find a natural interpretation in q-statistics.

**Gupta, (2007).** Introduce and study a new pair of fractional integral operators involving the product of H bar-function, Fox H-function and the general sequence of functions as their kernels. Here we establish two theorems. The theorem1 is analogous to the Parseval-Goldstein theorem and relationships between H-function integral transform and our fractional integral operators. On account to the general nature of the functions that occur as kernel of our operators, a large number of results for fractional integral operators involving simpler functions as kernels follow as special cases of the results obtained in this paper.

**Singh, Khan, (2007).** The aim of this paper is to obtain some formulae involving the $r^{th}$ derivative of the $\bar{H}$-function with the help of operational calculus.

**Purohit, Yadav, Kalla, (2008).** Certain expansion formulae for a basic analogue of the Fox’s H-function have been derived by the applications of the q-Leibniz rule for the Weyl type q-derivatives of a product of two functions. Expansion formulae involving a basic analogue of Meijer’s G-function and MacRobert’s E-function have been derived as special cases of the main results.
**Saxena, Ram, Chandak and Kalla, (2008).** The object of this article is to evaluate two unified fractional integrals involving the product of Fox-Wright generalized hypergeometric function, Appell function, and a general class of multivariable polynomials. These integrals are further applied in proving two theorems on Saigo – Maeda operators of fractional integration.

**Yadav, Purohit, Kalla,(2008).** Fractional q-integral operators of generalized Weyl type, involving generalized basic hypergeometric functions and a basic analogue of Fox's H-function have been investigated. A number of integrals involving various q-functions have been evaluated as applications of the main results.

**Mathai, Saxena, Haubold (2009)** Two main topics emphasized in this book, special functions and fractional calculus, are currently under fast development in theory and application to many problems in statistics, physics, and engineering, particularly in condensed matter physics, plasma physics, and astrophysics. The book begins by setting forth definitions, contours, existence conditions, and particular cases of the H-function. The authors then deal with Laplace, Fourier, Hankel, and other transforms. As these relations are explored, fractional calculus and its relations to H-functions emerge with important results on fractional differentiation and fractional integral operators. The latter chapters explore applications of H-functions in statistical distribution theory, structures of random variables, generalized distributions, Mathai's pathway models, and versatile integrals. The authors also present an introduction to functions of matrix argument, with special focus on the space of
Hermitian positive matrices. The book concludes with the most recent applications of \(H\)-functions and fractional calculus to physical problems in reactions, diffusion, reaction-diffusion theory, statistics, superstatistics, and generalized entropies.

**Bhattar, Shekhawat, (2010).** In this paper find a pair of multidimensional fractional integral operators whose kernels involve the product of multivariable polynomial \(H\)-function. First obtain images of two useful functions in our operator of study. Next, establish two theorems giving the multidimensional generalized Stieltjes transform of fractional integral operators and conversely, the fractional integrals of multidimensional generalized Stieltjes transform. Finally, the fractional integral operators studied by us are quite general in nature and may be considered as extensions and unifications of a number of (known or new) results for simpler fractional integral operators.

**Chaurasia, and Agnihotri, (2010).** The aim of this paper is to derive a relation between the two dimensional \(I\)-transform involving a general class of polynomials and the Weyl type two dimensional Saigo operators of fractional integration.

**Chaurasia, Saxena,(2010).** This paper is to evaluate certain triple integral relations involving \(H\)-function and the multivariable \(H\)-function. Three Theorems containing the product of \(H\)-function, with the help of our main findings and using the Mellin integral transform. The results obtained here are quite general in nature due to the presence of functions which are basic in nature.
**Gupta, Agarwal, (2010).** This paper deals a general theorem that gives the image of a modified H-transform in the fractional integral operator involving the multivariable H-function. Next, we deduce two important corollaries involving Wright generalized Bessel function, Mittag-Leffer function, Appell function F1 and the product of Whittaker functions which are also quite general in nature and of interest by themselves. Several other new and known results can also be obtained from our main theorem. We record here exact reference to one such known result.

**Sharma, and Singh. (2010).** In this paper, an attempt has been made to derive finite summation formulae for the H-function introduced by Srivastava and Panda. Since the multivariable H-Function includes a large number of a special function of one and more variables as its particular cases. Therefore, the results established here serve as key formulas giving as a large number of new and interesting results by specializing the parameter involved.

**Yadav and Purohit, (2010).** In this paper, introduce two generalized operators of fractional q-integration, which may be regarded as extensions of Riemann-Liouville, Weyl and Kober fractional q-integral operators. Certain interesting connection theorems involving these operators and q-Mellin transform are also discussed.

**Bhattar, Shekhawat, (2011).** In this paper establish a generalized fractional derivative operator formula involving a general multivariable polynomial and multivariable H-function. On account of the most general nature of the polynomial and function occurring in our main findings a large number of fractional derivative formulas involving simpler polynomials and functions can be obtained as simple special cases of main result. Further on
reducing generalized fractional derivative operator to well known Riemann-Liouville fractional derivative operator we get Riemann-Liouville fractional derivative operators involving product of several polynomials and functions.

Garg, Chanchlani, (2011). In this paper, right and left sided Kober fractional q-derivative operators and show that these derivative operators are left inverse operators of Kober fractional q-integral operators. Obtain the images of generalized basic hypergeometric function and basic analogue of Fox H-function under these operators. Also deduce several interesting results involving q-analogues of some classical functions as special cases are findings.

Purohit, Kalla, Suthar, (2011). The aim of this paper is to study some properties of multiindex Mittag-Leffer type function $E(1/pj),(\mu j)(z)$. Establish certain theorems which provide the image of this function under the Saigo’s fractional integral operators. The results derived are of general character and give rise to a number of known results in the theory of multiindex Mittag-Leffer functions.

Saha, Arora, (2011). The aim of this paper is to establish a theorem on Weyl fractional derivatives of the product of hypergeometric function and the H-function. Certain special cases of theorem have also been discussed.
Satyanarayana, Kumar (2011). This paper establishes the integrals involving the product of two general classes of polynomial, H-function of one variable and H-function of ‘r’ variables. These integrals are unified in nature and we can derive from them by a large number of integrals involving simpler functions and polynomials as their particular cases.

Shehata and Abul-Dahab (2011) This paper deals with the composite Humbert matrix function with matrix arguments. The convergence and integral form this function is established. An operational relation between a Humbert matrix function and Kummer matrix function is studied. Integral expressions of this relation are deduced. Finally, define and study of the composite Humbert Kummer matrix functions.