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ON CERTAIN CLASS OF EULER TYPE INTEGRALS INVOLVING EXTENDED AND MULTIPARAMETER HURWITZ LERCH ZETA FUNCTIONS

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Abstract: In this paper we establish some new class of Beta integrals for functions involving extended and multi-parameter Hurwitz-Lerch Zeta functions and hypergeometric functions. Our results would generalize and extend the work by Srivastava[10] and Bin-Saad[1]. We also obtain certain known and unknown new results as applications of our main results.

Keywords: Riemann Zeta function, Fox Wright- ψ-function, Generalized hypergeometric function, Hurwitz-Lerch Zeta function, Beta function.

Subject Classification: Primary 11M06, 11M35, 33B15; Secondary 11B68, 33E20, 33E30.

1. Introduction and Preliminaries

The familiar general Hurwitz-Lerch Zeta function is defined as follows Srivastava [7]:

$$\phi(z,s,a)=\sum_{l=0}^{\infty}\frac{z^l}{(l+a)^s} \tag{1.1}$$

($a\in C/Z_0^-; s\in C$ when $|z|<1; R(s)>1$ when $|z|=1$)
The integral representation of above defined Hurwitz-Lerch Zeta function is given by (Erdelyi et al [1]p.27, Equation 1.11(3)):

$$\phi(z,s,a)=\frac{1}{\Gamma(s)}\int_0^{\infty}\frac{t^{s-1}e^{-at}}{1-ze^{-t}}\,dt \tag{1.2}$$

$Re(a)>0, Re(s)>0$ when $|z|\leq 1(z\neq 1); Re(s)>1$ when z = 1. At $a=0$,