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New Results for Multiparameter Generating Function Involving Gauss Hypergeometric Function

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ABSTRACT: In this paper we have evaluated some results for generating function $\theta(z,t;s,a)$, which is established by Srivastava for multiparameter Hurwitz Lerch Zeta function $\phi^{(\rho_1,....,\rho_p;\sigma_1,.....,\sigma_q)}_{(\lambda_1,.....,\lambda_p;\mu_1,......,\mu_q)}(z,s,a)$ involving Gauss hypergeometric function. We can easily obtain some known and new integrals as special cases of our main results.

KEYWORDS: Beta functions, Generalized Hyper geometric function, Wrights generalized hyper geometric function, Zeta function, Riemann Zeta function, Hurwitz- Lerch Zeta function.

I. INTRODUCTION AND PRELIMINARIES

The generalized Hypergeometric function ${}_pF_q$ is defined as follows:

$$ {}_pF_q\left[\begin{matrix}\alpha_1,........,\alpha_p; \\ \beta_1,.......,\beta_q;\end{matrix} z\right]=\sum_{n=0}^{\infty}\frac{(\alpha_1)_n\,........(\alpha_p)_n\,z^n}{(\beta_1)_n\,.........(\beta_q)_n\,n!} \tag{1.1} $$

Where $(\lambda)_n$ is the Pochhammer symbol with relation

$$ (\lambda)_n=\frac{\Gamma(\lambda+n)}{\Gamma(\lambda)} $$

The series in (1.1) is known as generalized Gauss series, or simply, the generalized hypergeometric series. Here p and q are positive integers or zero and we assume that the variable z, the numerator parameter $\alpha_1,........,\alpha_p$ and the denominator parameter $\beta_1,.......,\beta_q$ may be complex values, provided that $\beta_j\neq 0,-1,-2.......;(j=1,.....q)$

Fox and Wright studied and introduced a function ${}_p\psi_q$ which is known as Wright's generalized hypergeometric function. The function ${}_p\psi_q^*$ is Fox -Wright function defined by Erdelyi et al.[1] as

$$ {}_p\psi_q^*\left[\begin{matrix}(a_1,A_1),.......,(a_p,A_p); \\ (b_1,B_1),.........,(b_q,B_q);\end{matrix} z\right]==\sum_{n=0}^{\infty}\frac{(a_1)_{A_1n}.....(a_p)_{A_pn}\,z^n}{(b_1)_{B_1n}......(b_q)_{B_pn}\,n!} \tag{1.2} $$

At $A_i=1(i=1,.....,p)$, $B_j=1(j=1,.....,q)$ it reduces to generalized hypergeometric function ${}_pF_q$.
The well-known general Hurwitz-Lerch zeta function is defined as follows in the series form [5]:

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$$\phi(z,s,a)=\sum_{l=0}^{\infty}\frac{z^l}{(l+a)^s} \tag{1.3}$$

($a\in C/Z_0^-; s\in C$ when |z|<1; $R(s)>1$ when |z|=1)

According to [1, P.27, eq. 1.11(3)], the integral representation of Hurwitz-Lerch zeta function which is defined above (1.1) is given in the following manner,

$$\phi(z,s,a)=\frac{1}{\Gamma s}\int_0^{\infty}\frac{t^{s-1}e^{-at}}{1-ze^{-t}}dt \tag{1.4}$$

$\operatorname{Re}(a)>0$, Re(s) >0 when $|z|\le 1(\ z\neq 1)$, Re(s) >1 when z = 1 at a =0

The Hurwitz-Lerch zeta function contains, as its special cases, the Riemann zeta function $\varsigma(s)$, the Hurwitz zeta function $\varsigma(s,a)$ and the Lerch zeta function $l_s(\xi)$ defined by

$$\zeta(s)=\sum_{n=1}^{\infty}\frac{1}{n^s}=\phi(1,s,1)=\zeta(s,1)\left(\operatorname{Re}(s)>1\right)$$

$$\zeta(s,a)=\sum_{n=0}^{\infty}\frac{1}{(n+a)^s}=\phi(1,s,a)\left(\operatorname{Re}(s)>1; a\in C\setminus Z_0^-\right),$$

$$l_s(\xi)=\sum_{n=0}^{\infty}\frac{e^{2n\pi i\xi}}{(n+1)^s}=\phi\left(e^{2\pi i\xi},s,1\right)\left(\operatorname{Re}(s)>1;\xi\in R\right)$$

A generalization of the Hurwitz-Lerch Zeta function is also studied by Goyal and Laddha [10] as follows

$$\phi_\mu^*(z,s,a)=\sum_{n=0}^{\infty}\frac{(\mu)_n z^n}{n!(n+a)^s} \tag{1.5}$$

Where $\operatorname{Re}(\mu)>0$ and $(\mu)_n$ is the Pochhammer symbol.

An another representation is

$$\phi_\mu^*(z,s,a)=\frac{1}{\Gamma s}\int_0^{\infty}t^{s-1}e^{-at}\left(1-ze^{-t}\right)^{-\mu}dt, \tag{1.6}$$

$$\min\{R(a),R(s)\}>0;|z|<1$$

Further generalization of the above defined Hurwitz-Lerch Zeta function $\phi_\mu(z,s,a)$ and $\phi_\mu^*(z,s,a)$ is recently studied in the following form by Garg et al [7];

$$\phi_{\lambda,\mu,\gamma}(z,s,a)=\sum_{n=0}^{\infty}\frac{(\lambda)_n(\mu)_n\quad z^n}{(\gamma)_n n!(n+a)^s} \tag{1.7}$$

and

$$\phi_{\lambda,\mu,\gamma}(z,s,a)=\frac{1}{\Gamma s}\int_0^{\infty}t^{s-1}e^{-at}{}_2F_1\left[\begin{matrix}\lambda,\mu\\ \gamma\end{matrix};ze^{-t}\right]dt \tag{1.8}$$

where $\lambda,\mu\in C, a\in C/Z_0^-, s\in C$ when $|z|<1$ $\operatorname{Re}(s+\upsilon-\lambda-\mu)$ when $|z|=1$

Lin and Srivastava [9] also extended the Hurwitz-Lerch zeta function in the following form.

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$$\phi_{\mu,\gamma}^{\rho,\sigma}(z,s,a)=\sum_{n=0}^{\infty}\frac{(\mu)_{\rho n}\,z^n}{(\gamma)_{\sigma n}(n+a)^s}$$

$$=\frac{1}{\Gamma s}\int_0^{\infty}t^{s-1}e^{-at}\,{}_2\psi_1^*\left[\begin{matrix}(\mu,\rho)\ (1,1)\\ (\gamma,\sigma)\end{matrix};ze^{-t}\right]dt \qquad (1.9)$$

$\mu\in C;a,\lambda\in C|Z_0^-;\ \rho,\sigma\in R^+;\rho<\sigma$ when $s,z\in C;\rho=\sigma$ and $s\in C$ when $|z|<\delta=\rho^{-p}\sigma^{\sigma};\ \rho=\sigma$ and $\mathrm{Re}(s-\mu+v)>1$ when $|z|=\delta$

Bin-Saad [8] established the following generating function for the Hurwitz – Lerch zeta function defined in (1.1)

$$\sum_{n=0}^{\infty}\frac{(\lambda)_n}{n!}\phi(z,s+n,a)t^n=\sum_{n=0}^{\infty}\frac{z^n}{(n+a)^{s-\lambda}(n+a-t)^{\lambda}}=V_{\lambda}(z;t,s,a)$$

$$|t|<|a| \qquad (1.10)$$

When $t\to t/\lambda$ and $|\lambda|\to\infty$, (1.8) becomes

$$\sum_{n=0}^{\infty}\phi(z,s+n,a)\frac{t^n}{n!}=\sum_{n=0}^{\infty}\frac{z^n}{(n+a)^s}\exp\left(\frac{t}{n+a}\right)=\psi(z,t,s,a),|t|<\infty \qquad (1.11)$$

The extension of Hurwitz Lerch zeta function in multiparameter is defined by Srivastava [5] as follows.

$$\phi\begin{pmatrix}\rho_1,\ldots\ldots,\rho_p;\sigma_1,\ldots\ldots,\sigma_q\\ \lambda_1,\ldots\ldots,\lambda_p;\mu_1,\ldots\ldots,\mu_q\end{pmatrix}(z,s,a)=\sum_{n=0}^{\infty}\frac{\prod_{j=1}^{p}(\lambda_j)_{n\rho_j}}{n!\prod_{j=1}^{q}(\mu_j)_{n\sigma_j}}\bullet\frac{z^n}{(n+a)^s} \qquad (1.12)$$

$p,q\in N_0;\lambda_j\in C(j=1,\ldots\ldots,p)$; $a,\mu_j\in c/z_0^-(j=1,\ldots,q)$

$\rho_j,\sigma_k\in R^+(j=1,\ldots,p,k=1,\ldots\ldots,q)$

They also introduced the following generating relations associated with multiparameter Hurwitz- Lerch zeta function defined in (1.10)

$$\sum_{n=0}^{\infty}\frac{(\lambda)_n}{n!}\phi_{(\lambda_1,\ldots,\lambda_p;\mu_1,\ldots\ldots,\mu_q)}^{(\rho_1,\ldots,\rho_p;\sigma_1,\ldots\ldots,\sigma_q)}(z,s+n,a)t^n$$

$$=\sum_{k=0}^{\infty}\frac{E_k z^k}{(k+a)^{s-\lambda}(k+a-t)^{\lambda}}=\Omega_{\lambda}(z,t;s,a) \qquad |t|<|a| \qquad (1.13)$$

where

$$E_k=\frac{\prod_{j=1}^{p}(\lambda_j)_{k\rho_j}}{k!\prod_{j=1}^{q}(\mu_j)_{k\sigma_j}} \qquad (1.14)$$

$k\in N_0$,

When $t\to\frac{t}{\lambda}$ and $|\lambda|\to\infty$ the generating (1.11) yields

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$$\sum_{n=0}^{\infty}\phi\begin{matrix}(\rho_1,....,\rho_p;\sigma_1,.....,\sigma_q)\\(\lambda_1,.....,\lambda_p;\mu_1,....,\mu_q)\end{matrix}\left(z,s+n,a\right)\frac{t^n}{n!}=\sum_{k=0}^{\infty}\frac{E_k z^k}{(k+a)^s}\exp\left(\frac{t}{k+a}\right)$$
$$=\theta\left(z,t;s,a\right)\qquad (|t|<\infty)\qquad (1.15)$$

The truncated form of the generating function $\theta(z,t;s,a)$ are also defined by Srivastava [6] respectively.

$$\theta^{0,r}(z,t;s,a)=\sum_{k=0}^{r}\frac{E_k z^k}{\left(k+a\right)^s}\exp\left(\frac{t}{k+a}\right)\quad ,\ r\in N_0$$

and

$$\theta^{r+1,\infty}(z,t;s,a)=\sum_{k=r+1}^{\infty}\frac{E_k z^k}{\left(k+a\right)^s}\exp\left(\frac{t}{k+a}\right)\quad ,\ r\in N_0$$

Which satisfy the following decomposition formula :

$$\theta^{(0,r)}\left(z,t;s,a\right)+\theta^{(r+1,\infty)}\left(z,t;s,a\right)=\theta\left(z,t;s,a\right)\qquad (1.16)$$

The integral representation formula for these generating functions are defined as follows (Srivastava [5], [6]):

$$\theta\left(z,\omega;s,a\right)=\frac{1}{\Gamma s}\int_0^{\infty}t^{s-1}e^{-at}\ {}_p\psi^*_q\left[\begin{matrix}(\lambda_1,\rho_1),...(\lambda_p,\rho_p)\\(\mu_1,\sigma_1),...(\mu_q,\sigma_q)\end{matrix};ze^{-t}\right]{}_0F_1\left(-;s;\omega t\right)dt\qquad (1.17)$$

where $\left\{\min R\left(a\right),R\left(s\right)\right\}>0$

II. RESULTS REQUIRED

The following results are required here [3, pp 181-184] :

For $f(t)=(\eta-\xi)+\rho(t-\xi)+\sigma(\eta-t)$ we have ,

$$\int_{\xi}^{\eta}\frac{\left(t-\xi\right)^{\upsilon}\left(\eta-t\right)^{\mu-1}}{\left[f\left(t\right)\right]^{\upsilon+\mu+1}}\,{}_2F_1\left[\begin{matrix}\zeta,b;\\ \mu\,;\end{matrix}\frac{\left(1+\sigma\right)\left(\eta-t\right)}{f\left(t\right)}\right]dt$$
$$=\frac{\left(\eta-\xi\right)^{-1}\left(1+\rho\right)^{-\upsilon-1}\left(1+\sigma\right)^{\mu}\Gamma(\mu)\Gamma(\upsilon+1)\Gamma(\upsilon+\mu-\zeta-b+1)}{\Gamma(\upsilon+\mu-\zeta+1)\Gamma(\upsilon+\mu-b+1)}\qquad (1.18)$$

$\text{Re}(\upsilon)>-1,\text{Re}(\mu)>0,\text{Re}(\upsilon+\mu-b+1)>0;$

$$\int_{\xi}^{\eta}\frac{\left(t-\xi\right)^{\mu}\left(\eta-t\right)^{\mu}}{\left[f\left(t\right)\right]^{2\mu+2}}\,{}_2F_1\left[\begin{matrix}\zeta,\ b;\\ \frac{1}{2}\left(\zeta+b+1\right);\end{matrix}\frac{\left(1+\sigma\right)\left(\eta-t\right)}{f\left(t\right)}\right]dt$$

$$=\frac{\pi\Gamma\left(\mu+1\right)\Gamma\left(\frac{\zeta+b+1}{2}\right)\Gamma\left(\mu+\frac{3-\zeta-b}{2}\right)}{2^{2\mu+1}\left(\eta-\xi\right)\left[\left(1+\sigma\right)\left(1+\rho\right)\right]^{\mu+1}\Gamma\left(\frac{\left(\xi+1\right)}{2}\right)\Gamma\left(\frac{\left(b+1\right)}{2}\right)}\times\frac{1}{\Gamma\left(\mu+\frac{3-\zeta}{2}\right)\Gamma\left(\mu+\frac{3-b}{2}\right)}$$

$\text{Re}(\mu)>-1,\text{Re}(3-\zeta-b+2\mu)>0;$

(1.19)

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$$\int_{\xi}^{\eta}\frac{(t-\xi)^{\mu-\upsilon}(\eta-t)^{\mu-1}}{[f(t)]^{2\mu-\upsilon+1}}\,{}_2F_1\left[\begin{matrix}\zeta,1-\xi;\\ \upsilon\ ;\end{matrix}\frac{(1+\sigma)(\eta-t)}{f(t)}\right]dt$$

$$=\frac{\pi\,\Gamma(\upsilon)\Gamma(\mu)\Gamma(\mu-\upsilon+1)}{2^{2\mu-1}(\eta-\xi)(1+\rho)^{1+\mu-\upsilon}(1+\sigma)^{\mu}\Gamma\left(\frac{1-\upsilon-\zeta}{2}\right)\Gamma\left(\frac{\upsilon+\zeta}{2}\right)}\times\frac{1}{\Gamma\left(\mu+\frac{\zeta-\upsilon+1}{2}\right)\Gamma\left(\mu+\frac{2-\zeta-\upsilon}{2}\right)}$$

(1.20)

$\mathrm{Re}(\mu)>0;\mathrm{Re}(\mu-\upsilon+1)>0;$

We have established the following results involving functions related to Hurwtiz-Lerch Zeta functions.

2.Main Results

For $f(t)=(\eta-\xi)+\rho(t-\xi)+\sigma(\eta-t)$, $h(t)=(t-\xi)^{\gamma}[f(t)]^{-\gamma}$,
$v(t)=(t-\xi)^{\gamma}(\eta-t)^{\gamma}[f(t)]^{-2\gamma}$

and for the sequence of coefficient $\{E_k\};k\in N_0$ the following main results are established here.

where $\eta\neq\xi,\min[R\{\mu-\upsilon\},R(\mu)]>0;\gamma>0$

Result-1

$$\int_{\xi}^{\eta}\frac{(t-\xi)^{\upsilon}(\eta-t)^{\mu-1}}{[f(t)]^{\upsilon+\mu+1}}\,{}_2F_1\left[\begin{matrix}\zeta,b\ ;\\ \mu\ ;\end{matrix}\frac{(1+\sigma)(\eta-t)}{f(t)}\right]\theta(z,\omega h(t),s,a)dt$$

$$=\frac{(\eta-\xi)^{-1}(1+\rho)^{-\upsilon-1}(1+\sigma)^{\mu}\,\Gamma\mu\Gamma(\upsilon+1)\Gamma(\upsilon+\mu-\zeta-b+1)}{\Gamma(\upsilon+\mu-\zeta+1)\Gamma(\upsilon+\mu-b+1)}$$

$$\sum_{k=0}^{\infty}\frac{E_k z^k}{(a+k)^s}\,{}_2\psi_2^{*}\left[\begin{matrix}(\upsilon+1,\gamma),(\upsilon+\mu-b+1,\gamma)\ ;\\ (\upsilon+\mu-\zeta+1,\gamma),(\upsilon+\mu-b+1,\gamma);\end{matrix}\frac{\omega}{(a+k)(1+\rho)}\right]$$

where $\eta\neq\xi,\min\{R(\mu),R(\upsilon)\}>0;\gamma>0$ (2.1)

Result-2

$$\int_{\xi}^{\eta}\frac{(t-\xi)^{\mu}(\eta-t)^{\mu}}{[f(t)]^{2\mu+2}}\,{}_2F_1\left[\begin{matrix}\zeta,\ b\quad ;\\ \frac{1}{2}(\zeta+b+1);\end{matrix}\frac{(1+\sigma)(\eta-t)}{f(t)}\right]\theta(z,\omega v(t),s,a)dt$$

$$=\frac{\pi\,\Gamma\mu\Gamma\left(\frac{(\zeta+b+1)}{2}\right)\Gamma\left(\mu+\frac{3-\zeta-b}{2}\right)}{2^{2\mu}(\eta-\xi)(1+\sigma)^{\mu+1}(1+\rho)^{\mu+1}\Gamma\left(\frac{\zeta+1}{2}\right)\Gamma\left(\frac{b+1}{2}\right)\Gamma\left(\mu+\frac{3-\zeta}{2}\right)\Gamma\left(\mu+\frac{3-b}{2}\right)}$$

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$$\sum_{k=0}^{\infty}\frac{E_k z^k}{(a+k)^s}\,{}_2\psi_2^*\left[\begin{matrix}(\mu,\gamma),\left(\mu+\frac{3-\zeta-b}{2},\gamma\right) & ; & \\ \left(\mu+\frac{3-\zeta}{2},\gamma\right),\left(\mu+\frac{3-b}{2},\gamma\right) & ; & \frac{\omega}{4^\gamma(a+k)(1+\sigma)^\gamma(1+\rho)^\gamma}\end{matrix}\right]$$

where $\eta\neq\xi$ $\mathrm{R}(\mu)>0$;

(2.2)

Result-3

$$\int_\xi^\eta \frac{(t-\xi)^{\mu-\upsilon}(\eta-t)^{\mu-1}}{[f(t)]^{2\mu-\upsilon+1}}\,{}_2F_1\left[\begin{matrix}\zeta,1-\zeta & ; & (1+\sigma)(\eta-t)\\ \upsilon & ; & f(t)\end{matrix}\right]\theta(z,\omega v(t),s,a)dt$$

$$=\frac{\pi\Gamma\upsilon\Gamma\mu\Gamma(\mu+\upsilon+1)}{4^{\mu-1}(\eta-\xi)(1+\rho)^{1+\mu-\upsilon}(1+\sigma)^\mu\Gamma\left(\frac{1-\upsilon-\zeta}{2}\right)\Gamma\left(\frac{\upsilon+\zeta}{2}\right)\Gamma\left(\mu+\frac{\zeta-\upsilon+1}{2}\right)\Gamma\left(\mu+\frac{2-\zeta-\upsilon}{2}\right)}$$

$$\sum_{k=0}^{\infty}\frac{E_k z^k}{(a+k)^s}\,{}_2\psi_2^*\left[\begin{matrix}(\mu,\gamma),(\mu-\upsilon+1,\gamma) & ; & \\ \left(\mu+\frac{\zeta-\upsilon+1}{2},\gamma\right),\left(\mu+\frac{2-\zeta-\upsilon}{2},\gamma\right) & ; & \frac{\omega}{4^\gamma(1+\rho)^\gamma(1+\sigma)^\gamma(a+k)}\end{matrix}\right]$$

(2.3)

where $\eta\neq\xi,\min\{R(\mu-\upsilon),R(\mu)\}>0,\gamma>0$

OUTLINES OF PROOFS

Proof of (2.1):

To prove the result in (2.1) first we denote its LHS by I_1, i.e.

$$I_1=\int_\xi^\eta \frac{(t-\xi)^{\upsilon}(\eta-t)^{\mu-1}}{[f(t)]^{\upsilon+\mu+1}}\,{}_2F_1\left[\begin{matrix}\zeta,b & ; & (1+\sigma)(\eta-t)\\ \mu & ; & f(t)\end{matrix}\right]\theta(z,\omega(t-\xi)^\gamma[f(t)]^{-\gamma};s,a)dt$$

Now on using the definition of $\theta(z,t;s,a)$ given in (1.15) and using the exponential series $e^x=\sum_{n=0}^{\infty}\frac{x^n}{n!}$ and then on changing the order of summation and integration we have

$$I_1=\sum_{n,k=0}^{\infty}\frac{E_k z^k(\omega)^n(\lambda)_n}{(a+k)^{s+n}n!}\int_\xi^\eta \frac{(t-\xi)^{\upsilon+\gamma n}(\eta-t)^{\mu+n\gamma-1}}{[f(t)]^{\upsilon+\mu+1+2\gamma n}}\,{}_2F_1\left[\begin{matrix}\zeta, & b; & (1+\sigma)(\eta-t)\\ & \mu; & f(t)\end{matrix}\right]dt$$

Now evaluating the inner integral with the help the of (1.18) then using the relation $\Gamma(a+n)=(a)_n\Gamma a$ there in and interpretate the n- series in view of (1.2) we at once arrive at the desired result in (2.1).

To prove the results (2.2) and (2.3), following the similar lines as to prove the result (2.1) and using (1.19) for the result (2.2) and (1.20) for the result (2.3) therein

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III. PARTICULAR CASES

1. If in results (2.1),(2.2) and (2.3), we take $\rho=0,\sigma=0$ we obtain the known results [4,pp 6-7,eqns.(2.4),(2.5),(2.6)]:
1. If we assume $p=1,\rho_1=1,\lambda_1=1,q=0$ in the results (2.1), (2.2) and (2.3) then we obtained the results involving $\psi(z,t;s,a)$

REFERENCES

[1]. Erdelyi A, Mangus W, Oberhettinger F, and Tricomi FG ; Higher Transcendetnal functions, Volume I. McGraw Hill Book company, New York 1953.

[2]. Erdelyi A, Mangus W, Oberhettinger F, and Tricomi FG ; Tables of integral transforms Volume II, Mc Graw Hill Book company, New York, 1954.

[3] Jaimini B B ;Investigations in multiple Mellin Barnes Type contour Integrals and transform calculus Ph.D. thesis, University of Rajasthan, Jaipur (1995)

[4] Jaimini B B. and Somani R P ; On certain class of Euler type integrals involving extended and multiparameter Hurwitz Lerch Zeta functions. South East Assian J. Math. Math Sc. Vol.12 No.1, 1-10 (2016) .

[5]. Srivastava H M ; Generating relations and other results associated with some families of the extended Huzwitz lerch Zeta function. Springer plus, 2(67), (2013).

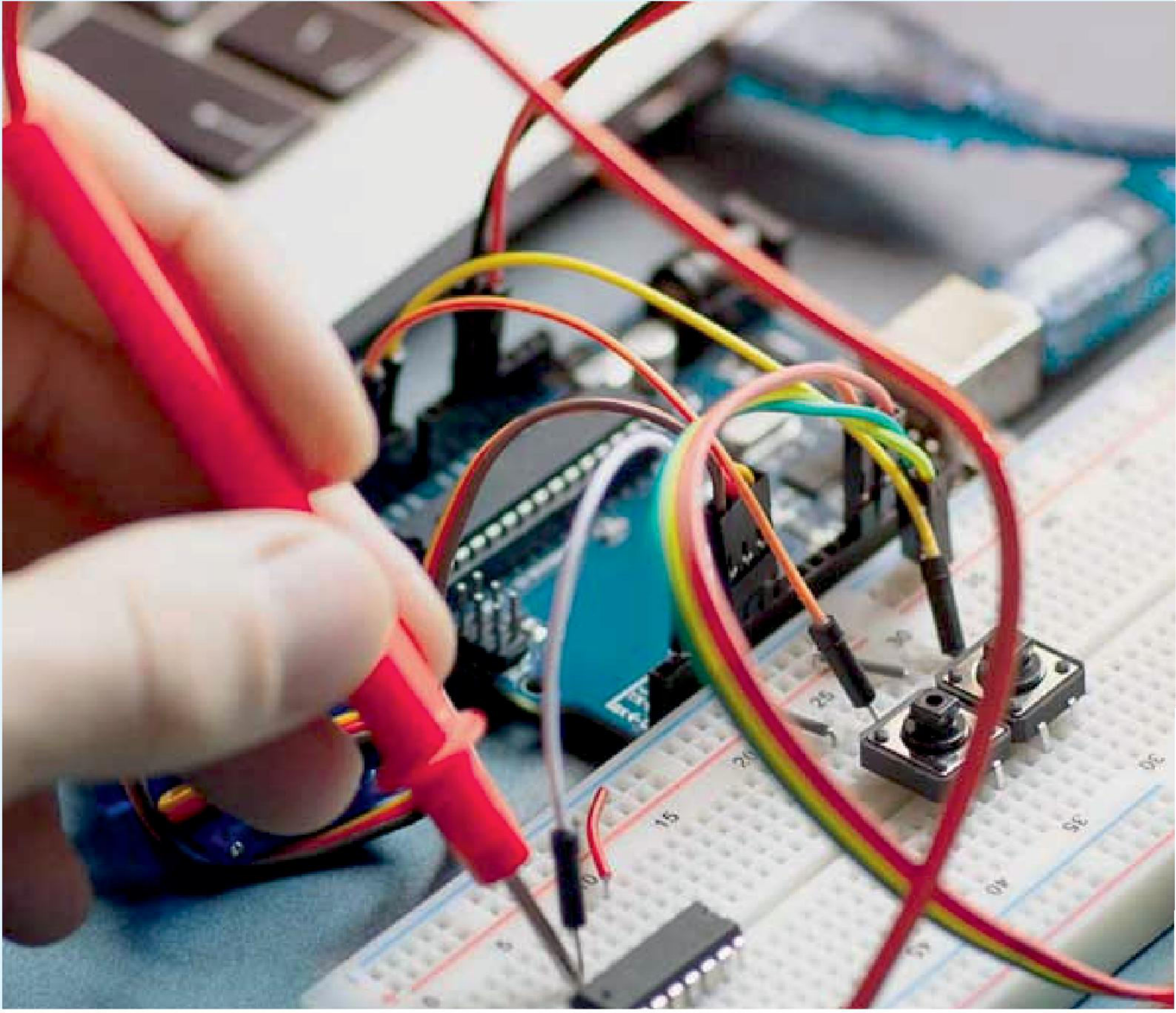
[6] Srivasatava H M ;Some properties and results involving the zeta and associated functions. Functional Analysis, Approximation and computation 7(2) : 89-133, (2015).

[7] Garg M, Jain K and Kalla S.L.;A further study of general Hurwitz lerch Zeta function, Algebras groups Geom, 25:311-319, (2008).

[8] Bin Saad M.G.; Sums and partial sums of double power series associated with the generalized zeta function and their N-fractional calculus, Math. J. Okayama Univ. 49:37-529, (2007).

[9] Lin S D and Srivasatava H M ; Some families of the Hurwitz-lerch Zeta function and associated fractional derivative and other integral representation. Appl.Maths Comput, 154:725-733,(2004).

[10] Goyal S P; and Laddha R K; On the generalized zeta function and the generalized Lambert function. Ganita Sandesh, 11:99-108,(1997)



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