International Journal of Innovative Technology and Exploring Engineering (IJITEE)
ISSN: 2278-3075 (Online), Volume-9 Issue-1, November 2019

Connections between Aboodh Transform and Some Effective Integral Transforms

Renu Chaudhary, Swarg Deep Sharma, Nigam Kumar, Sudhanshu Aggarwal

***Abstract:** Integral transforms are the most useful techniques of the mathematics which are used to finding the solution of heat transfer problems, mixing problems, electrical networks, bending of beams, signal processing problems, which generally appears in the various disciplines of engineering and sciences. In this research paper, connections between Aboodh transform and some effective integral transforms (Laplace transform, Kamal transform, Elzaki transform, Sumudu transform, Mahgoub transform, Mohand transform and Sawi transform) are discussed and integral transforms of some typical functions are given in table form in application section to signify the fruitfulness of connections between Aboodh transform and some effective mention integral transforms.*

***Keywords:** Laplace transform; Kamal transform; Elzaki transform; Sumudu transform; Mahgoub transform; Mohand transform; Sawi transform; Aboodh transform.*

***AMS Subject Classification 2010:** 44A15, 44A10, 44A05.*

I. INTRODUCTION

In recent years, integral transforms have become an essential working tool of every applied scientist and engineers. Integral transforms have been used in obtaining the solution to problems governed by ordinary and partial differential equations and special types of integral equations. The basic aim of the integral transforms is to transform a given problem into one that is easier to solve. The most common use of integral transforms is finding the solution of initial value problems. However, there are many other situations for which the integral transforms are also useful, such as in the evaluation of certain integrals and in the solution of certain differential equations, partial differential equations and integral equations. Aggarwal and Chaudhary [1] studied Mohand and Laplace transforms comparatively and solved system of differential equations using these transforms. Recently many researchers [2-6, 8] applied integral transforms namely Kamal transform, Elzaki transform, Sumudu transform, Mahgoub transform, Mohand transform and Aboodh transform for finding the value of improper integrals whose integrand contains error function.

Revised Manuscript Received on November 30, 2019.

* Correspondence Author

Renu Chaudhary*, Assistant Professor, Department of Applied Science & Humanities, I.T.S. Engineering College, Greater Noida, U.P., India. Email: rcrenuchaudhary@gmail.com

Swarg Deep Sharma, Assistant Professor, Department of Mathematics, Nand Lal Singh College Jaitpur Daudpur Constituent of Jai Prakash University Chhapra, Bihar, India. Email: gdeep.sharma@gmail.com

Nigam Kumar, Assistant Professor, Department of Applied Science & Humanities, G.L. Bajaj Institute of Technology & Management, Greater Noida, U.P., India. Email: nigam6244@gmail.com

Sudhanshu Aggarwal Assistant Professor, Department of Mathematics, National P.G. College, Barhalganj, Gorakhpur, U.P., India. Email: sudhanshu30187@gmail.com

Mahgoub [7] defined a new integral transform “Sawi transform” in his paper. Singh and Aggarwal [9] used Sawi transform and solved the problems of growth and decay. Aggarwal and Gupta [10] defined the dualities between Mohand transform and some useful integral transforms. Aggarwal and Gupta [11] gave the duality relations between some useful integral transforms and Sawi transform. Chauhan et al. [12] discussed the dualities between Laplace-Carson transform and some useful integral transforms. Recently Aggarwal et al. [13] established dualities relations between Elzaki transform and some useful integral transforms. Aggarwal et al. [14] gave the application of Laplace transform for solving population growth and decay problems.

The main object of this research paper is to define the connections between Aboodh transform and some effective integral transforms (Laplace transform, Kamal transform, Elzaki transform, Sumudu transform, Mahgoub transform, Mohand transform and Sawi transform).

II. LAPLACE TRANSFORM

The Laplace transform of the function $Z(\gamma), \gamma \geq 0$ is given by [1, 14]

$$L\{Z(\gamma)\} = \int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma = B(\epsilon) \quad (1)$$

III. KAMAL TRANSFORM

Kamal transform of the function $Z(\gamma), \gamma \geq 0$ is given by [2]

$$K\{Z(\gamma)\} = \int_0^\infty Z(\gamma)e^{\frac{-\gamma}{\epsilon}}d\gamma = C(\epsilon), \quad (2)$$
$$0 < k_1 \leq \epsilon \leq k_2$$

IV. ELZAKI TRANSFORM

Elzaki transform of the function $Z(\gamma), \gamma \geq 0$ is given by [3]

$$E\{Z(\gamma)\} = \epsilon\int_0^\infty Z(\gamma)e^{-\frac{\gamma}{\epsilon}}d\gamma = D(\epsilon), \quad (3)$$
$$0 < k_1 \leq \epsilon \leq k_2$$

V. SUMUDU TRANSFORM

Sumudu transform of the function $Z(\gamma), \gamma \geq 0$ is given by [4]

$$S\{Z(\gamma)\} = \int_0^\infty Z(\epsilon\gamma)e^{-\gamma}d\gamma = F(\epsilon), \quad (4)$$
$$0 < k_1 \leq \epsilon \leq k_2$$

VI. MAHGOUB TRANSFORM

Mahgoub (Laplace-Carson) transform of the function $Z(\gamma), \gamma \geq 0$ is given by [5]

$$M_*\{Z(\gamma)\} = \epsilon\int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma = G(\epsilon), \quad (5)$$
$$0 < k_1 \leq \epsilon \leq k_2$$

VII. MOHAND TRANSFORM

Mohand transform of the function $Z(\gamma), \gamma \geq 0$ is given by [1, 6]

$$M\{Z(\gamma)\} = \epsilon^2 \int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma = H(\epsilon), \quad (6)$$
$$0 < k_1 \leq \epsilon \leq k_2$$

VIII. SAWI TRANSFORM

Sawi transform of the function $Z(\gamma), \gamma \geq 0$ is given by [7, 9]

$$S^*\{Z(\gamma)\} = \frac{1}{\epsilon^2}\int_0^\infty Z(\gamma)e^{\frac{-\gamma}{\epsilon}}d\gamma = I(\epsilon), \quad (7)$$
$$0 < k_1 \leq \epsilon \leq k_2$$

IX. ABOODH TRANSFORM

Aboodh transform of the function $Z(\gamma), \gamma \geq 0$ is given by [8]

$$A\{Z(\gamma)\} = \frac{1}{\epsilon}\int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma = J(\epsilon), \quad (8)$$
$$0 < k_1 \leq \epsilon \leq k_2$$

X. CONNECTIONS BETWEEN ABOODH TRANSFORM AND SOME EFFECTIVE INTEGRAL TRANSFORMS

In this section, connections between Aboodh transform and some effective integral transforms (Laplace transform, Kamal transform, Elzaki transform, Sumudu transform, Mahgoub transform, Mohand transform and Sawi transform) are given.

A. Connection between Aboodh – Laplace transforms

If $A\{Z(\gamma)\} = J(\epsilon)$ and $L\{Z(\gamma)\} = B(\epsilon)$ then

$$J(\epsilon) = \frac{1}{\epsilon}B(\epsilon) \quad (9)$$

and $B(\epsilon) = \epsilon J(\epsilon)$ (10)

Proof: From (8),

$$J(\epsilon) = \frac{1}{\epsilon}\int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma$$

Now, using (1) in above Equation, we obtain

$$J(\epsilon) = \frac{1}{\epsilon}B(\epsilon).$$

To drive (10), we use (1)

$$B(\epsilon) = \int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma$$
$$\Rightarrow B(\epsilon) = \epsilon\left[\frac{1}{\epsilon}\int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma\right] \quad (11)$$

It is immediately concluded using (8) in (11),

$$B(\epsilon) = \epsilon J(\epsilon).$$

B. Connection between Aboodh – Kamal transforms

If $A\{Z(\gamma)\} = J(\epsilon)$ and $K\{Z(\gamma)\} = C(\epsilon)$ then

$$J(\epsilon) = \frac{1}{\epsilon}C\left(\frac{1}{\epsilon}\right) \quad (12)$$

and $C(\epsilon) = \frac{1}{\epsilon}J\left(\frac{1}{\epsilon}\right)$ (13)

Proof: Using (8) follows

$$J(\epsilon) = \frac{1}{\epsilon}\int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma \quad (14)$$

Now, using (2) in above equation, we obtain

$$J(\epsilon) = \frac{1}{\epsilon}C\left(\frac{1}{\epsilon}\right).$$

To drive (13), we use (2)

$$C(\epsilon) = \int_0^\infty Z(\gamma)e^{-\frac{\gamma}{\epsilon}}d\gamma$$
$$\Rightarrow C(\epsilon) = \frac{1}{\epsilon}\left[\epsilon\int_0^\infty Z(\gamma)e^{-\frac{\gamma}{\epsilon}}d\gamma\right]$$

It is immediately concluded using (8) in above equation,

$$C(\epsilon) = \frac{1}{\epsilon}J\left(\frac{1}{\epsilon}\right).$$

C. Connection between Aboodh – Elzaki transforms

If $A\{Z(\gamma)\} = J(\epsilon)$ and $E\{Z(\gamma)\} = D(\epsilon)$ then

$$J(\epsilon) = D\left(\frac{1}{\epsilon}\right) \quad (15)$$

and $D(\epsilon) = J\left(\frac{1}{\epsilon}\right)$ (16)

Proof: It is immediately concluded from (8)

$$J(\epsilon) = \frac{1}{\epsilon}\int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma$$

Now, using (3) in above Equation, we have

$$J(\epsilon) = D\left(\frac{1}{\epsilon}\right).$$

To drive (16), we use (3)

$$D(\epsilon) = \epsilon\int_0^\infty Z(\gamma)e^{-\frac{\gamma}{\epsilon}}d\gamma$$

It is immediately concluded using (8) in above equation,

$$D(\epsilon) = J\left(\frac{1}{\epsilon}\right).$$

D. Connection between Aboodh – Sumudu transforms

If $A\{Z(\gamma)\} = J(\epsilon)$and $S\{Z(\gamma)\} = F(\epsilon)$ then

$$J(\epsilon) = \frac{1}{\epsilon^2}F\left(\frac{1}{\epsilon}\right) \quad (17)$$

and $F(\epsilon) = \frac{1}{\epsilon^2}J\left(\frac{1}{\epsilon}\right)$ (18)

Proof: From (8), we have

$$J(\epsilon) = \frac{1}{\epsilon}\int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma$$

Put $\epsilon\gamma = u \Rightarrow d\gamma = \frac{du}{\epsilon}$ in above equation, we have

$$J(\epsilon) = \frac{1}{\epsilon}\int_0^\infty Z\left(\frac{u}{\epsilon}\right)e^{-u}\frac{du}{\epsilon}$$
$$\Rightarrow J(\epsilon) = \frac{1}{\epsilon^2}\int_0^\infty Z\left(\frac{u}{\epsilon}\right)e^{-u}du$$

Now, using (4) in above equation, we have

$$J(\epsilon) = \frac{1}{\epsilon^2}F\left(\frac{1}{\epsilon}\right).$$

To drive (18), we use (4)

$$F(\epsilon) = \int_0^\infty Z(\epsilon\gamma)e^{-\gamma}d\gamma$$

Put $\epsilon\gamma = u \Rightarrow d\gamma = \frac{du}{\epsilon}$ in above equation, we have

$$F(\epsilon) = \int_0^\infty Z(u)e^{-\frac{u}{\epsilon}}\frac{du}{\epsilon}$$
$$\Rightarrow F(\epsilon) = \frac{1}{\epsilon}\int_0^\infty Z(u)e^{-\frac{u}{\epsilon}}du$$
$$\Rightarrow F(\epsilon) = \frac{1}{\epsilon^2}\left[\epsilon\int_0^\infty Z(u)e^{-\frac{u}{\epsilon}}du\right]$$

It is immediately concluded using (8) in above equation,

$$F(\epsilon) = \frac{1}{\epsilon^2}J\left(\frac{1}{\epsilon}\right).$$

E. Connection between Aboodh – Mahgoub transforms

If $A\{Z(\gamma)\} = J(\epsilon)$ and $M_*\{Z(\gamma)\} = G(\epsilon)$ then

$$J(\epsilon) = \frac{1}{\epsilon^2}G(\epsilon) \quad (19)$$

and $G(\epsilon) = \epsilon^2 J(\epsilon)$ (20)

Proof: From (8), we have

$$J(\epsilon) = \frac{1}{\epsilon}\int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma$$

$$\Rightarrow J(\epsilon) = \frac{1}{\epsilon^2}\left[\epsilon \int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma\right]$$

Now, using (5) in above equation, we have

$$J(\epsilon) = \frac{1}{\epsilon^2}G(\epsilon).$$

To drive (20), we use (5)

$$G(\epsilon) = \epsilon \int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma$$

$$G(\epsilon) = \epsilon^2\left[\frac{1}{\epsilon}\int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma\right]$$

It is immediately concluded using (8) in above equation,

$$G(\epsilon) = \epsilon^2 J(\epsilon).$$

F. Connection between Aboodh – Mohand transforms

If $A\{Z(\gamma)\} = J(\epsilon)$ and $M\{Z(\gamma)\} = H(\epsilon)$ then

$J(\epsilon) = \frac{1}{\epsilon^3}H(\epsilon)$ (21)

and $H(\epsilon) = \epsilon^3 J(\epsilon)$ (22)

Proof: From (8**),** we have

$$J(\epsilon) = \frac{1}{\epsilon}\int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma$$

$$\Rightarrow J(\epsilon) = \frac{1}{\epsilon^3}\left[\epsilon^2 \int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma\right]$$

Now, using (6) in above equation, we have

$$J(\epsilon) = \frac{1}{\epsilon^3}H(\epsilon)\ .$$

To drive (22), we use (6)

$$H(\epsilon) = \epsilon^2 \int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma$$

$$\Rightarrow H(\epsilon) = \epsilon^3\left[\frac{1}{\epsilon}\int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma\right]$$

It is immediately concluded using (8) in above equation,

$$H(\epsilon) = \epsilon^3 J(\epsilon).$$

G. Connection between Aboodh – Sawi transforms

If $A\{Z(\gamma)\} = J(\epsilon)$ and $S^*\{Z(\gamma)\} = I(\epsilon)$ then

$J(\epsilon) = \frac{1}{\epsilon^3} I\left(\frac{1}{\epsilon}\right)$ (23)

and $I(\epsilon) = \frac{1}{\epsilon^3} J\left(\frac{1}{\epsilon}\right)$ (24)

Proof: Using (8) follows

$$J(\epsilon) = \frac{1}{\epsilon}\int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma$$

$$\Rightarrow J(\epsilon) = \frac{1}{\epsilon^3}\left[\epsilon^2 \int_0^\infty Z(\gamma)e^{-\epsilon\gamma}d\gamma\right]$$

Now, using (7) in above equation, we obtain

$$J(\epsilon) = \frac{1}{\epsilon^3} I\left(\frac{1}{\epsilon}\right).$$

To drive (24), we use (7)

$$I(\epsilon) = \frac{1}{\epsilon^2}\int_0^\infty Z(\gamma)e^{-\frac{\gamma}{\epsilon}}d\gamma$$

$$\Rightarrow I(\epsilon) = \frac{1}{\epsilon^3}\left[\epsilon \int_0^\infty Z(\gamma)e^{-\frac{\gamma}{\epsilon}}d\gamma\right]$$

Now, using (8) in above equation, we obtain

$$I(\epsilon) = \frac{1}{\epsilon^3} J\left(\frac{1}{\epsilon}\right).$$

XI. APPLICATIONS

This section contains seven tables from Table-I to Table-VII. These tables give the Laplace transform, Kamal transform, Elzaki transform, Sumudu transform, Mahgoub transform, Mohand transform and Sawi transform of some typical functions with the help of mention connections between Aboodh transform and some effective integral transforms.

Table-I: Some typical functions with their Laplace transform

S.N.	$Z(\gamma)$	$A\{Z(\gamma)\} = J(\epsilon)$	$L\{Z(\gamma)\} = B(\epsilon)$
1.	1	$\frac{1}{\epsilon^2}$	$\frac{1}{\epsilon}$
2.	γ	$\frac{1}{\epsilon^3}$	$\frac{1}{\epsilon^2}$
3.	γ^2	$\frac{2!}{\epsilon^4}$	$\frac{2!}{\epsilon^3}$
4.	γ^n, $n \in N$	$\frac{n!}{\epsilon^{n+2}}$	$\frac{n!}{\epsilon^{n+1}}$
5.	γ^n, $n > -1$	$\frac{\Gamma(n+1)}{\epsilon^{n+2}}$	$\frac{\Gamma(n+1)}{\epsilon^{n+1}}$
6.	$e^{a\gamma}$	$\frac{1}{\epsilon(\epsilon-a)}$	$\frac{1}{(\epsilon-a)}$
7.	$sina\gamma$	$\frac{a}{\epsilon(\epsilon^2+a^2)}$	$\frac{a}{(\epsilon^2+a^2)}$
8.	$cosa\gamma$	$\frac{1}{(\epsilon^2+a^2)}$	$\frac{\epsilon}{(\epsilon^2+a^2)}$
9.	$sinha\gamma$	$\frac{a}{\epsilon(\epsilon^2-a^2)}$	$\frac{a}{(\epsilon^2-a^2)}$
10.	$cosha\gamma$	$\frac{1}{(\epsilon^2-a^2)}$	$\frac{\epsilon}{(\epsilon^2-a^2)}$

Table-II: Some typical functions with their Kamal transform

S.N.	$Z(\gamma)$	$A\{Z(\gamma)\} = J(\epsilon)$	$K\{Z(\gamma)\} = C(\epsilon)$
1.	1	$\frac{1}{\epsilon^2}$	ϵ
2.	γ	$\frac{1}{\epsilon^3}$	ϵ^2
3.	γ^2	$\frac{2!}{\epsilon^4}$	$2!\,\epsilon^3$
4.	γ^n, $n \in N$	$\frac{n!}{\epsilon^{n+2}}$	$n!\,\epsilon^{n+1}$
5.	γ^n, $n > -1$	$\frac{\Gamma(n+1)}{\epsilon^{n+2}}$	$\Gamma(n+1)\epsilon^{n+1}$
6.	$e^{a\gamma}$	$\frac{1}{\epsilon(\epsilon-a)}$	$\frac{\epsilon}{(1-a\epsilon)}$
7.	$sina\gamma$	$\frac{a}{\epsilon(\epsilon^2+a^2)}$	$\frac{a\epsilon^2}{(1+a^2\epsilon^2)}$
8.	$cosa\gamma$	$\frac{1}{(\epsilon^2+a^2)}$	$\frac{\epsilon}{(1+a^2\epsilon^2)}$
9.	$sinha\gamma$	$\frac{a}{\epsilon(\epsilon^2-a^2)}$	$\frac{a\epsilon^2}{(1-a^2\epsilon^2)}$
10.	$cosha\gamma$	$\frac{1}{(\epsilon^2-a^2)}$	$\frac{\epsilon}{(1-a^2\epsilon^2)}$

Table-III: Some typical functions with their Elzaki transform

S.N.	$Z(\gamma)$	$A\{Z(\gamma)\}=J(\epsilon)$	$E\{Z(\gamma)\}=D(\epsilon)$
1.	1	$\frac{1}{\epsilon^2}$	ϵ^2
2.	γ	$\frac{1}{\epsilon^3}$	ϵ^3
3.	γ^2	$\frac{2!}{\epsilon^4}$	$2!\,\epsilon^4$
4.	$\gamma^n, n\in N$	$\frac{n!}{\epsilon^{n+2}}$	$n!\,\epsilon^{n+2}$
5.	$\gamma^n, n>-1$	$\frac{\Gamma(n+1)}{\epsilon^{n+2}}$	$\Gamma(n+1)\epsilon^{n+2}$
6.	$e^{a\gamma}$	$\frac{1}{\epsilon(\epsilon-a)}$	$\frac{\epsilon^2}{(1-a\epsilon)}$
7.	$sina\gamma$	$\frac{a}{\epsilon(\epsilon^2+a^2)}$	$\frac{a\epsilon^3}{(1+a^2\epsilon^2)}$
8.	$cosa\gamma$	$\frac{1}{(\epsilon^2+a^2)}$	$\frac{\epsilon^2}{(1+a^2\epsilon^2)}$
9.	$sinha\gamma$	$\frac{a}{\epsilon(\epsilon^2-a^2)}$	$\frac{a\epsilon^3}{(1-a^2\epsilon^2)}$
10.	$cosha\gamma$	$\frac{1}{(\epsilon^2-a^2)}$	$\frac{\epsilon^2}{(1-a^2\epsilon^2)}$

Table-IV: Some typical functions with their Sumudu transform

S.N.	$Z(\gamma)$	$A\{Z(\gamma)\}=J(\epsilon)$	$S\{Z(\gamma)\}=F(\epsilon)$
1.	1	$\frac{1}{\epsilon^2}$	1
2.	γ	$\frac{1}{\epsilon^3}$	ϵ
3.	γ^2	$\frac{2!}{\epsilon^4}$	$2!\,\epsilon^2$
4.	$\gamma^n, n\in N$	$\frac{n!}{\epsilon^{n+2}}$	$n!\,\epsilon^n$
5.	γ^n, $n>-1$	$\frac{\Gamma(n+1)}{\epsilon^{n+2}}$	$\Gamma(n+1)\epsilon^n$
6.	$e^{a\gamma}$	$\frac{1}{\epsilon(\epsilon-a)}$	$\frac{1}{(1-a\epsilon)}$
7.	$sina\gamma$	$\frac{a}{\epsilon(\epsilon^2+a^2)}$	$\frac{a\epsilon}{(1+a^2\epsilon^2)}$
8.	$cosa\gamma$	$\frac{1}{(\epsilon^2+a^2)}$	$\frac{1}{(1+a^2\epsilon^2)}$
9.	$sinha\gamma$	$\frac{a}{\epsilon(\epsilon^2-a^2)}$	$\frac{a\epsilon}{(1-a^2\epsilon^2)}$
10.	$cosha\gamma$	$\frac{1}{(\epsilon^2-a^2)}$	$\frac{1}{(1-a^2\epsilon^2)}$

Table-V: Some typical functions with their Mahgoub (Laplace – Carson) transform

S.N.	$Z(\gamma)$	$A\{Z(\gamma)\}=J(\epsilon)$	$M_*\{Z(\gamma)\}=G(\epsilon)$
1.	1	$\frac{1}{\epsilon^2}$	1
2.	γ	$\frac{1}{\epsilon^3}$	$\frac{1}{\epsilon}$
3.	γ^2	$\frac{2!}{\epsilon^4}$	$\frac{2!}{\epsilon^2}$
4.	$\gamma^n, n\in N$	$\frac{n!}{\epsilon^{n+2}}$	$\frac{n!}{\epsilon^n}$
5.	$\gamma^n, n>-1$	$\frac{\Gamma(n+1)}{\epsilon^{n+2}}$	$\frac{\Gamma(n+1)}{\epsilon^n}$
6.	$e^{a\gamma}$	$\frac{1}{\epsilon(\epsilon-a)}$	$\frac{\epsilon}{(\epsilon-a)}$
7.	$sina\gamma$	$\frac{a}{\epsilon(\epsilon^2+a^2)}$	$\frac{a\epsilon}{(\epsilon^2+a^2)}$
8.	$cosa\gamma$	$\frac{1}{(\epsilon^2+a^2)}$	$\frac{\epsilon^2}{(\epsilon^2+a^2)}$
9.	$sinha\gamma$	$\frac{a}{\epsilon(\epsilon^2-a^2)}$	$\frac{a\epsilon}{(\epsilon^2-a^2)}$
10.	$cosha\gamma$	$\frac{1}{(\epsilon^2-a^2)}$	$\frac{\epsilon^2}{(\epsilon^2-a^2)}$

Table-VI: Some typical functions with their Mohand transform

S.N.	$Z(\gamma)$	$A\{Z(\gamma)\}=J(\epsilon)$	$M\{Z(\gamma)\}=H(\epsilon)$
1.	1	$\frac{1}{\epsilon^2}$	ϵ
2.	γ	$\frac{1}{\epsilon^3}$	1
3.	γ^2	$\frac{2!}{\epsilon^4}$	$\frac{2!}{\epsilon}$
4.	$\gamma^n, n\in N$	$\frac{n!}{\epsilon^{n+2}}$	$\frac{n!}{\epsilon^{n-1}}$
5.	$\gamma^n, n>-1$	$\frac{\Gamma(n+1)}{\epsilon^{n+2}}$	$\frac{\Gamma(n+1)}{\epsilon^{n-1}}$
6.	$e^{a\gamma}$	$\frac{1}{\epsilon(\epsilon-a)}$	$\frac{\epsilon^2}{(\epsilon-a)}$
7.	$sina\gamma$	$\frac{a}{\epsilon(\epsilon^2+a^2)}$	$\frac{a\epsilon^2}{(\epsilon^2+a^2)}$
8.	$cosa\gamma$	$\frac{1}{(\epsilon^2+a^2)}$	$\frac{\epsilon^3}{(\epsilon^2+a^2)}$
9.	$sinha\gamma$	$\frac{a}{\epsilon(\epsilon^2-a^2)}$	$\frac{a\epsilon^2}{(\epsilon^2-a^2)}$

10.	$cosha\gamma$	$\frac{1}{(\epsilon^2 - a^2)}$	$\frac{\epsilon^3}{(\epsilon^2 - a^2)}$

Table-VII: Some typical functions with their Sawi transform

S.N.	$Z(\gamma)$	$A\{Z(\gamma)\} = J(\epsilon)$	$S^*\{Z(\gamma)\} = I(\epsilon)$
1.	1	$\frac{1}{\epsilon^2}$	$\frac{1}{\epsilon}$
2.	γ	$\frac{1}{\epsilon^3}$	1
3.	γ^2	$\frac{2!}{\epsilon^4}$	$2!\,\epsilon$
4.	$\gamma^n, n \in N$	$\frac{n!}{\epsilon^{n+2}}$	$n!\,\epsilon^{n-1}$
5.	$\gamma^n, n > -1$	$\frac{\Gamma(n+1)}{\epsilon^{n+2}}$	$\Gamma(n+1)\epsilon^{n-1}$
6.	$e^{a\gamma}$	$\frac{1}{\epsilon(\epsilon - a)}$	$\frac{1}{\epsilon(1 - a\epsilon)}$
7.	$sina\gamma$	$\frac{a}{\epsilon(\epsilon^2 + a^2)}$	$\frac{a}{(1 + a^2\epsilon^2)}$
8.	$cosa\gamma$	$\frac{1}{(\epsilon^2 + a^2)}$	$\frac{1}{\epsilon(1 + a^2\epsilon^2)}$
9.	$sinha\gamma$	$\frac{a}{\epsilon(\epsilon^2 - a^2)}$	$\frac{a}{(1 - a^2\epsilon^2)}$
10.	$cosha\gamma$	$\frac{1}{(\epsilon^2 - a^2)}$	$\frac{1}{\epsilon(1 - a^2\epsilon^2)}$

XII. CONCLUSIONS

In this research paper, authors successfully discussed the connections between Aboodh transform and some effective integral transforms (Laplace transform, Kamal transform, Elzaki transform, Sumudu transform, Mahgoub transform, Mohand transform and Sawi transform). Integral transforms of some typical functions are given in table form in application section to signify the fruitfulness of connections between Aboodh transform and some effective mention integral transforms. Results of this research paper show that strong connections exist between Aboodh transform and mention effective integral transforms. In modern era, many typical problems of future such as neutron flow, residential segregation, mechanical vibrations and growth of tumor can be easily handle by applying suitable integral transforms.

REFERENCES

1. Aggarwal, S. and Chaudhary, R., A comparative study of Mohand and Laplace transforms, Journal of Emerging Technologies and Innovative Research, Vol. 6, No. 2, Feb. 2019, pp. 230-240.
2. Aggarwal, S. and Singh, G.P., Kamal transform of error function, Journal of Applied Science and Computations, Vol. 6, No. 5, May 2019, pp. 2223-2235.
3. Aggarwal, S., Gupta, A.R. and Kumar, A., Elzaki transform of error function, Global Journal of Engineering Science and Researches, Vol. 6, No. 5, May 2019, pp. 412-422.
4. Aggarwal, S. and Sharma, S.D., Sumudu transform of error function, Journal of Applied Science and Computations, Vol. 6, No. 6, June 2019, pp. 1222-1231.
5. Aggarwal, S., Gupta, A.R., Sharma, S.D., Chauhan, R. and Sharma, N., Mahgoub transform (Laplace-Carson transform) of error function, International Journal of Latest Technology in Engineering, Management & Applied Science, Vol. 8, No. 4, April 2019, pp. 92-98.
6. Aggarwal, S., Gupta, A.R. and Kumar, D., Mohand transform of error function, International Journal of Research in Advent Technology, Vol. 7, No. 5, May 2019, pp. 224-231.
7. Mahgoub, Mohand M. Abdelrahim, The new integral transform "Sawi Transform", Advances in Theoretical and Applied Mathematics, Vol. 14, No. 1, 2019, pp. 81-87.
8. Aggarwal, S. and Singh, G.P., Aboodh transform of error function, Universal Review, Vol.10, No. 6, June 2019, pp. 137-150.
9. Singh, G.P. and Aggarwal, S., Sawi transform for population growth and decay problems, International Journal of Latest Technology in Engineering, Management & Applied Science, Vol. 8, No. 8, August 2019, pp. 157-162.
10. Aggarwal, S. and Gupta, A.R., Dualities between Mohand transform and some useful integral transforms, International Journal of Recent Technology and Engineering, Vol.8, No. 3, September 2019, pp. 843-847.
11. Aggarwal, S. and Gupta, A.R., Dualities between some useful integral transforms and Sawi transform, International Journal of Recent Technology and Engineering, Vol.8, No. 3, September 2019, pp. 5978-5982.
12. Chauhan, R., Kumar, N. and Aggarwal, S., Dualities between Laplace-Carson transform and some useful integral transforms, International Journal of Innovative Technology and Exploring Engineering, Vol.8, No. 12, October 2019, pp. 1654-1659.
13. Aggarwal, S., Bhatnagar, K. and Dua, A., Dualities between Elzaki transform and some useful integral transforms, International Journal of Innovative Technology and Exploring Engineering, Vol.8, No. 12, October 2019, pp. 4312-4318.
14. Aggarwal, S., Gupta, A.R., Singh, D.P., Asthana, N. and Kumar, N., Application of Laplace transform for solving population growth and decay problems, International Journal of Latest Technology in Engineering, Management & Applied Science, Vol. 7, No. 9, September 2018, pp. 141-145.

AUTHORS PROFILE

Dr. Renu Chaudhary is working as Assistant Professor in the Department of Mathematics at I.T.S. Engineering College, Greater Noida. She has more than 13 years of teaching experience various Engineering Colleges affiliated to A.KT.U. She has published many research papers in reputed journals. She has also participated in various workshops. Her fields of interest include Integral Transform Methods and Operation Research.

Swarg Deep Sharma is working as Assistant Professor in the Department of Mathematics at Nand Lal Singh College Jaitpur Daudpur Constituent of Jai Prakash University Chhapra, Bihar. He has also qualified CSIR NET examination (June-2007) in Mathematical Sciences. He has published many research papers in National and International Journals. His fields of interest include Integral Transform Methods and Integral Equations.

Dr. Nigam Kumar has received his Ph.D. degree from C.C.S. University, Meerut in 2016. He is working as an Assistant Professor in G.L. Bajaj Institute of Technology & Management, Greater Noida since 2013 as a responsible faculty member in the Department of Applied Science & Humanities in Mthematics. He has published many research papers in National and International Journals. His fields of interest include Topological Spaces, Integral Transform Methods and Integral Equations.

Dr. Sudhanshu Aggarwal has received his Ph.D. degree from C.C.S. University, Meerut in 2019. He has also qualified CSIR NET examination (June-2010, June-2012, June-2013, June-2014 and June-2015) in Mathematical Sciences. He is working as an Assistant Professor in National P.G. College Barhalganj, Gorakhpur. He is equipped with an extraordinary caliber and appreciable academic potency. His fields of interest include Integral Transform Methods, Differential and Partial Differential Equations, Integral Equations, Vibration of Plates, Theory of Elasticity and Number Theory. He has published many research papers in national and international journals.