**CPE223 – Signals and Systems**



**Lab # 11**

**To Reproduce the Properties of Laplace Transform Using MATLAB Functions**

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| **Name** | Muhammad Aizaz Arshad |
| **Registration Number** | 088 |
| **Class** | FA18-BCE-A |
| **Instructor’s Name** | Umair Shafique Khan |

**OBJECTIVE:**

* Verify the convolution property for Laplace transforms in MATLAB.

**REQUIRED EQUIPMENT:**

**Software:**

* **MATLAB**

**METHODOLOGY:**

The properties of Laplace Transform used only for Continuous Time Signals ae verified. A simple signal can easily be converted to Laplace but a signal having shifting, scaling, convolution etc. in it, wouldn’t be converted simply. It would be converted by using the properties.

There are different properties for all operations like Time Scaling and Frequency Scaling Property, Time Shifting and Frequency Shifting Property, Time and Frequency Differentiation, Convolution, Linearity Property and many more. By applying these property, one can easily find a transform.

To find the convolution between the two-signal given in frequency domain can be calculated by multiplying the signals in frequency domain, as with reference to the property of convolution of Laplace transform, we know that convolution in time domain is equal to the multiplication of the signals in frequency domain.

**CONCLUSION:**

In this Lab, properties of Laplace Transform discussed which is only applicable on Continuous Time Signals. We studied about the linearity, time shifting, complex frequency shifting, time scaling, differentiation in s-domain, integration in the complex frequency. Convolution in time domain and frequency domain using Laplace transform properties.

**IN LAB TASKS:**

**Question 1:**

%inlab task1 lab 11

syms t s

x=5.\*exp(-t).\*heaviside(t);

h=t.\*exp(-t).\*heaviside(t);

X=laplace(x,s);

H=laplace(h,s);

L=X.\*H;

display('x(t)\*h(t)')

Answer=ilaplace(L,t)

subplot(2,2,1)

ezplot(abs(Answer),t)

title('LHS')

% t1=1:0.5:7; % (roll#)/10=70/10=7

% x1=5.\*exp(-t1).\*heaviside(t1);

% h1=t1.\*exp(-t1).\*heaviside(t1);

% RHS=conv(x1,h1)

RHS=x.\*h

subplot(2,2,2)

ezplot(abs(RHS),t)

title('RHS')

