

FEEDBACK AND CONTROL SYSTEMS

LABORATORY ACTIVITY #4

DIFFERENTIAL EQUATIONS and LAPLACE TRANSFORM

I. Learning Outcomes:

At the end of the laboratory activity, the students should be able to:

1. Use MATLAB in solving differential equations.
2. Use MATLAB in solving Laplace transform.
3. Use MATLAB in solving inverse Laplace transform.

II. Laboratory Exercises:

1. Perform the ff. Differential Equation using Matlab:

a.

$$\frac{d^2y}{dx^2} + 4\frac{dy}{dx} - 10y = e^x$$

b.

$$\frac{dy}{dx} = 7y^2x^3$$
$$y(2) = 3.$$

2. Find the Laplace transform of $f(t) = te^{-5t}$.
3. Using your own defined Laplace equation, perform the Inverse Laplace in Matlab.
4. Find the Partial Fraction Equivalent using Matlab for the following expressions:

a. $\frac{7x-23}{(x-2)(x-5)}$

b. $\frac{5s}{(s-1)^3}$