

Experiment No. 3

Title: Visualization of response of system described by transfer function.

Objectives:

1. To learn how to write transfer function of a system in SIMULINK.
2. To learn how to generate an impulse signal from two step signals.
3. To visualize impulse, step and ramp responses for the systems in SIMULINK and MATLAB.

SIMULINK:

1. Visualize an impulse signal on scope using two step signals in SIMULINK. (Hint: use SIMULINK blocks Step, Sum and Scope).
2. Visualize impulse, step and ramp responses on scope for the following systems described by transfer functions.

$$\begin{aligned}\text{i) } G(s) &= \frac{1}{s} \\ \text{ii) } G(s) &= \frac{1}{s+1} \\ \text{iii) } G(s) &= \frac{s+4}{s^2+3.5s+6}\end{aligned}$$

3. Visualize and compare the step response of following systems on same scope.

$$\begin{aligned}\text{i) } G(s) &= \frac{1}{4s+1} \quad \text{and} \quad H(s) = \frac{1}{2s+1} \\ \text{ii) } G(s) &= \frac{1}{2s+1} \quad \text{and} \quad H(s) = \frac{3}{2s+1}\end{aligned}$$

MATLAB:

4. Write a MATLAB program to visualize impulse and step responses on graph for the systems described in Q.2. ((Hint: use MATLAB functions `impz` and `step`)).
5. List and explain new MATLAB functions used to perform tasks mentioned in Q.4.

Conclusion: (Hint: write a brief note of tasks performed in this experiment)