

Experiment No. 5

Title: State-space representation of a system.

Objectives:

1. To learn state-space representation of a system from its transfer function in MATLAB.
2. To generate transfer function from state-space representation of a system in MATLAB.
3. Observe the step response of a system described by state-space representation in SIMULINK.

MATLAB:

1. Write a MATLAB program to generate the state-space representation of a system described by transfer function, $G(s) = \frac{1}{5s^2 + 0.35s + 0.5}$. (Hint: use MATLAB function `tf2ss`).
2. Write a MATLAB program to generate the transfer function for a system with state-space representation, $A = \begin{bmatrix} -5 & 1 \\ -6 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$, $c = [2 \ 1]$, $D = 0$. (Hint: use MATLAB functions `ss2tf` and `printsys`).

SIMULINK:

3. Design the block diagram in SIMULINK to visualize the step response of the system described by state-space representation in Q.2. (Hint: use SIMULINK blocks `Step`, `state-space` and `Scope`)

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