EE5351: CONTROL SYSTEMS DESIGN

COMPUTER ASSIGNMENT 02

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DATE : 17/01/2024

Q5)

i. Consider the system shown in Figure Q2. Assume that

```
%%
sys1 = tf([0 0 0 1],[1 8 32 0]);
rlocus(sys1);

%%
sys2 = tf([0 0 1],[1 2 0]);
rlocus(sys2);

%%
%Question 05 - Part 1
%(i)
g1 = tf([0 0 1],[1 0.3 2]);
g2 = tf([0 0.4],[2 1]);

k1 = 0.7;
k2 = 0.5;
k3 = -1;
k4 = 0.4;
k5 = 2;

%inner positive feedback
gs1 = series(k3,g2);
gpf = feedback(gs1,k2,+1);

%inner negative feedback
gs2 = series(gpf,k4);
gnf1 = feedback(g1,gs2,-1);

%overall transfer function
gs3 = series(gnf1,k1);
h1 = tf([k5 0],[0 1]);
gnf2 = feedback(gs3,h1,-1);

%(ii)
step(gnf2);
title('Unit Step Response');
grid;
```

OUTPUT:

transferFunc = $$\frac{1.4s + 0.84}{2s^3 + 4.6s^2 + 6.04s + 2}$$

Unit-step response of the system.

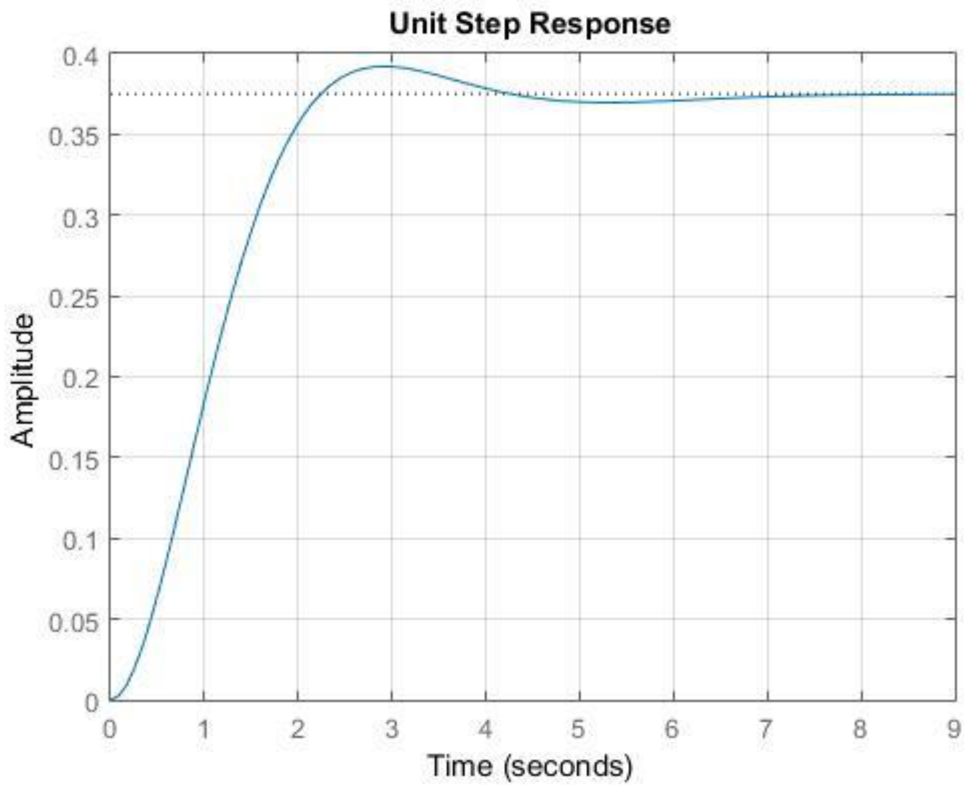

FIGURE 1:UNIT STEP RESPONSE OF THE SYSTEM

ii.

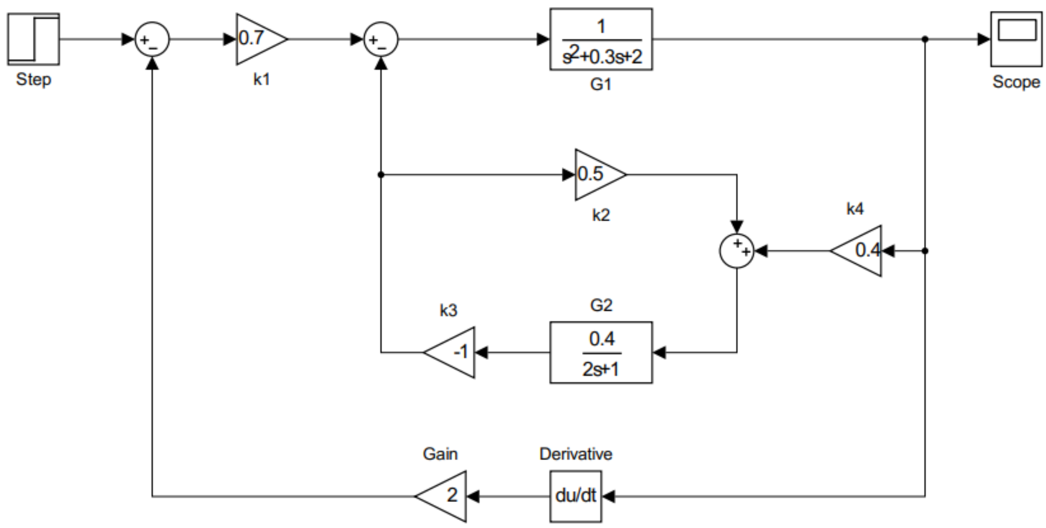

FIGURE 2:UNIT STEP RESPONSE OF THE SYSTEM

OUTPUT:

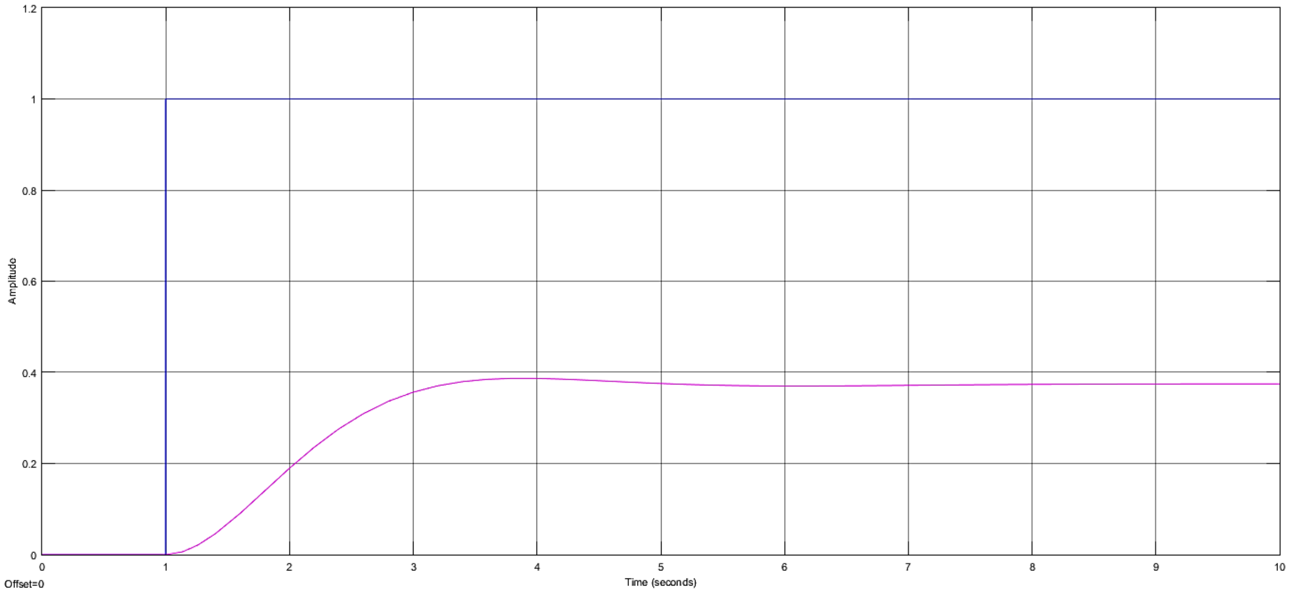

FIGURE 3:UNIT-STEP RESPONSE USING SIMULINK

Q6.

```
%Defining state space model matrices
A = [-10 -50 0;0.2 -0.05 0;0 1 0];
B = [1000; 0; 0];
C = [0 1 0];
D = 0;
%Defining state space system
sys = ss(A, B, C, D);
%Converting state space model into transfer function
G = tf(sys)
```

OUTPUT:

```
G =

        200
  --------------------
  s^2 + 10.05 s + 10.5

Continuous-time transfer function.
```