MECH-3221 Control Theory

Homework 3

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July 11, 2022

PART A:

%%%Homework 3 Control Theory

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%Part A

%%%SSR Model

%%Values A that are multiplied by X in the input eqn

A = [-2.7 -2.2 ; -0.8 -3.5];

%%Values B that are multiplied by U in the input eqn

B= [ -4;3.1];

%%Values C that are multiplied by X in the output eqn

C=[-3.9 3.6];

%%Values D that multiplied by U in the output eqn

D=0;

%Time range of 0s to 6s with a step of 0.001s

t= 0:0.001:6;

%%%Vector with equal row/columns with a magnitude of 1.9

u=1.9\*(ones(size(t)));

%%%Initial States of x1 & x2 with a matrix form of both

x1=0.4;

x2=0.9;

x=[x1,x2];

%%Creation of the Continuous time space model

sys=ss(A,B,C,D);

%%function of the simulated time response

[y,t]=lsim(sys,u,t,x);

%graphing of the function above from the variable of t,y with aesthetics

%like a grid, title and axis names

plot(t,y);

grid;

title('Output vs Time for the Dynamic Response')

xlabel('time (sec)');

ylabel('output (y)');



PART B:



Graphical user interface, text, application, email

Description automatically generated

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%Part B

%%Plot the vector from Simulink

plot(tout,OutputvectorSSR);

%Graph Aesthetics with title, grid, and axis labels

title('Simulink SSR Output for the Dynamic Response');

grid on;

xlabel('Time (sec)');

ylabel('Output (y)');

