Lab Session 03

Exercise:

Question 1:

Obtain the state space representation for the system shown below. Solve the resulting state equations using MATLAB *ode45* function (write complete script). Plot the position $x_a(t)$ and velocity $v_a(t)$ for Mass M_1 and position $x_b(t)$ and velocity $v_b(t)$ for Mass M_2 of the system with respect to time for $t = 0$ to 400 sec considering the following cases and write in your words about what you observed by looking at different plots. (Attach plot under each case).

[*Use separate A4 sheets for plots and attach it with this document*]

Case 1:

$M_2 = M_1 = 750$

$B_1 = B_2 = 20$

$K_1 = K_2 = 15$

$B_3 = 30$

$f = 300$

Case 2:

Change the value of M_1 from 50 to 650 with a step size of 200 and record your observation. Attach all the plots while changing values of M_1. Keep other parameters to be same as in *Case 1*.

Case 3:

Change the value of M_2 from 50 to 650 with a step size of 200 and record your observation. Attach all the plots while changing values of M_2. Keep other parameters to be same as in *Case 1*.

Case 4:

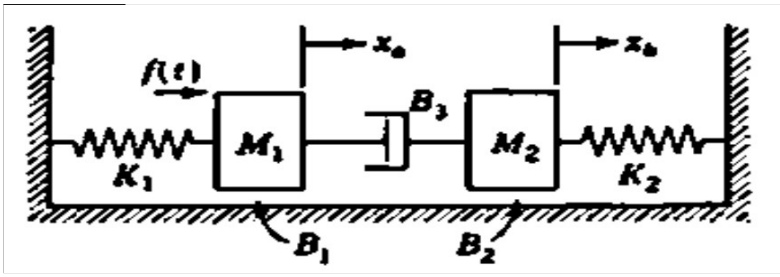
Change the value of B_1 from 5 to 20 with a step size of 5 and record your observation. Attach all the plots while changing values of B_1. Keep other parameters to be same as in *Case 1*.

Case 5:

Change the value of B_2 from 5 to 20 with a step size of 5 and record your observation. Attach all the plots while changing values of B_2. Keep other parameters to be same as in *Case 1*.

Case 6:

Change the value of B_3 from 10 to 30 with a step size of 10 and record your observation. Attach all the plots while changing values of B_3. Keep other parameters to be same as in *Case 1*.



Write your answers below this line

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