% For constant tourque 5Nm

clc

clear

TR = [0 5]; % time RANGE

X0 = [0;0;0;0];%initial conditions

[t,z] = ode45(@func1, TR, X0);%calling thr ide solver to solve by function

%storing given array as vectors

theta1 = z(:, 1);

AngVel1 = z(:, 2);

theta2 = z(:, 3);

AngVel2 = z(:, 4);

%plotting the angular displacements and velocities

acc1 = diff(AngVel1);

acc2= diff(AngVel2);

plot(t,theta1,t,AngVel1,t,[0;acc1],t,theta2,t,AngVel2,t,[0;acc2]);

xlabel('time')

legend('Angular Displacement 1','Angular Velocity 1','Angulara acceleration 1','Angular Displacement 2','Angular Velocity 2','Angulara acceleration 2')

ylabel('position & Velocity')

title("m-file")

%function containing the differentialequations

function dx = func1(~, x)

% Values of Coefficients

J1=1; J2=10; D1=0.9; D2=0.02; k=3;T=5;

% State Equations

dx(1) = x(2);

dx(3) = x(4);

dx(2) = (T-D1\*x(2)-k\*x(1)+k\*x(3))/J1;

dx(4) = (-k\*x(3)-D2\*x(4)+k\*x(1))/J2;

dx = dx';

end







