

# ME370: ADAMS LAB

Department of Mechanical Engineering,  
IIT Bombay

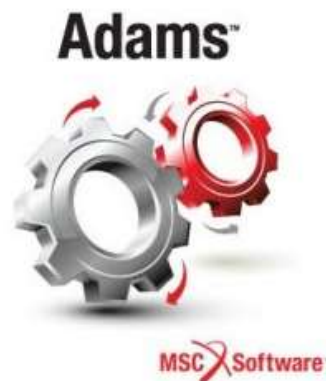


## Session 8 Report

**Group / Section:** A8

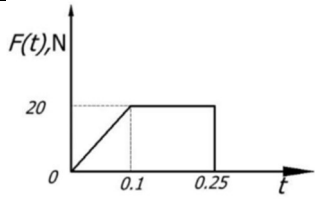
**Name:** Ameya Halarnkar

**Roll Number:** 200020023



**Date:** March 27, 2023

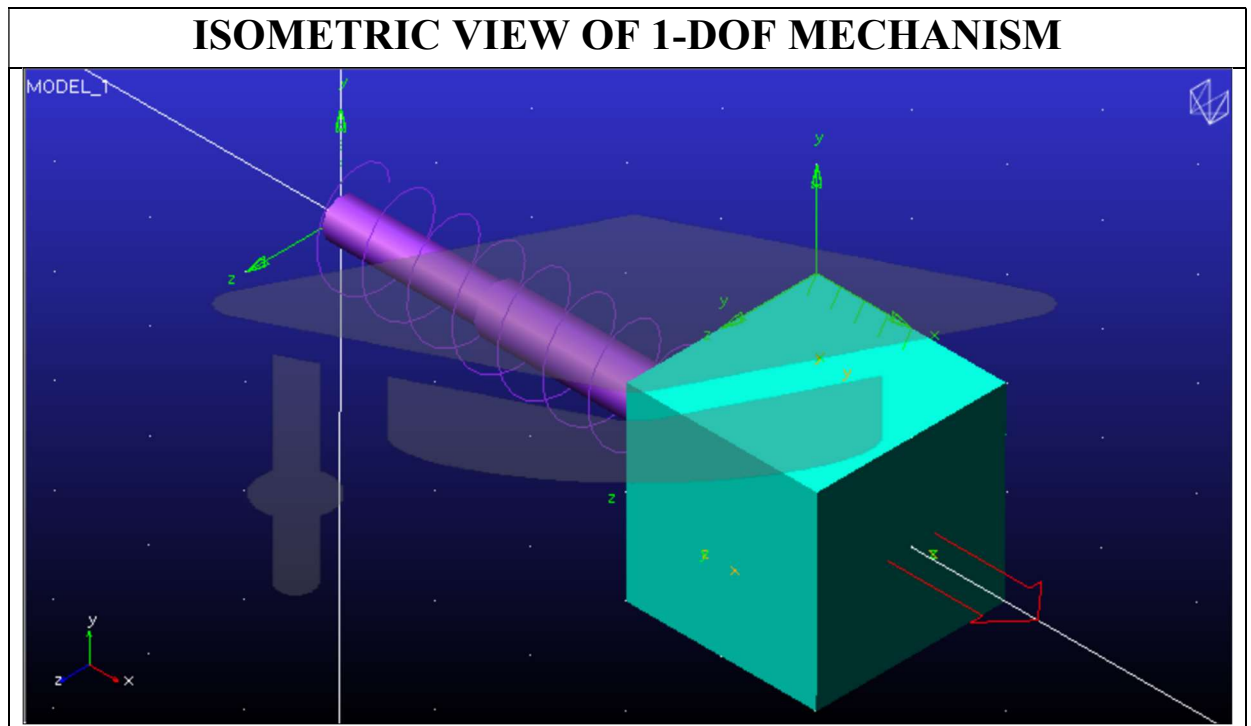
## Given Information

Information for Q1					
Equation	A	B	$m_1$	$m_2$	
$2\ddot{x} + Ax = F(t)$	3	3	5	1	

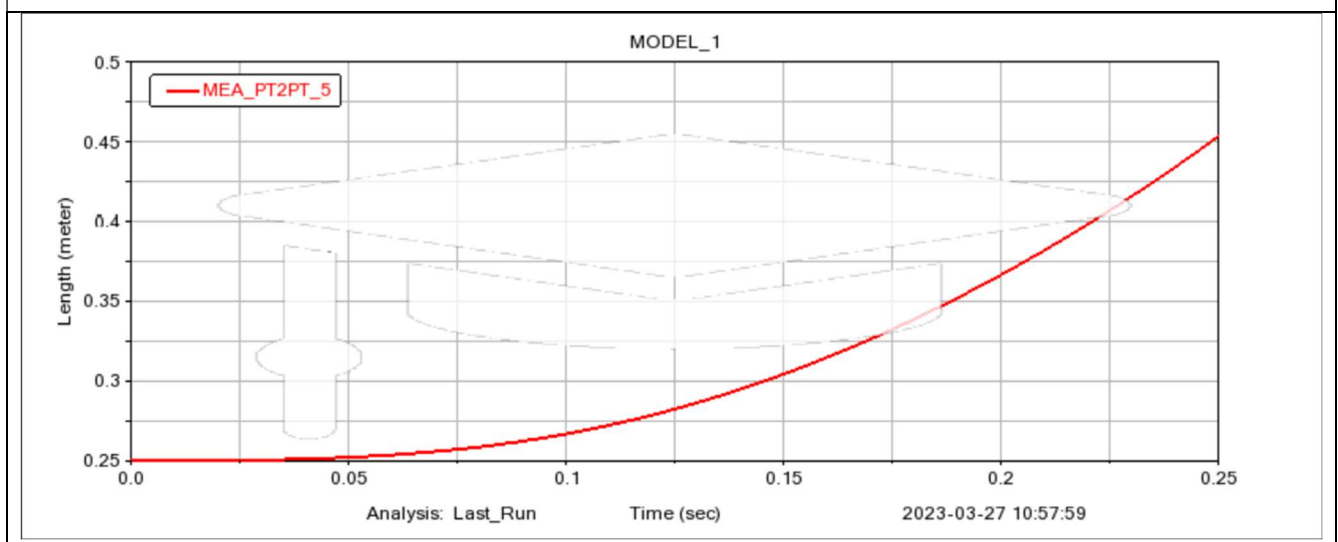
Information for Q2									
Given Equation	$\begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix} \begin{bmatrix} \ddot{x}_1 \\ \ddot{x}_2 \end{bmatrix} + \begin{bmatrix} 4 & -1 \\ -1 & 2 \end{bmatrix} \begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} + \begin{bmatrix} 5 & -2 \\ -2 & 3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \end{bmatrix} \cos Bt$								
Theoretical 2-DOF State Space	$\begin{bmatrix} m_1 & 0 \\ 0 & m_2 \end{bmatrix} \begin{bmatrix} \ddot{x}_1 \\ \ddot{x}_2 \end{bmatrix} + \begin{bmatrix} -c_1 - c_2 & c_2 \\ c_2 & -c_3 - c_2 \end{bmatrix} \begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} + \begin{bmatrix} -k_1 - k_2 & k_2 \\ k_2 & -k_3 - k_2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} F_1 \\ F_2 \end{bmatrix}$								
Initial Conditions	$x_1(0) = 0.2$		$\dot{x}_1(0) = 1$		$x_2(0) = 0$		$\dot{x}_2(0) = 0$		
Parameters	$c_1$	$c_2$	$c_3$	$k_1$	$k_2$	$k_3$	$m_1$	$m_2$	$B$
Values	-3	-1	-1	-3	-2	-1	1	2	3
Forces	$f_1(t) = \cos(3t)$				$f_2(t) = 2\cos(3t)$				

Information for Q3										
Parameters	A	B	$m_1$	$m_2$	$k_1$	$k_2$	$k_3$	$c_1$	$c_2$	$c_3$
Values	3	3	5	1	2	3	0	0	0	0
Initial Conditions	$x_1(0) = 0$			$\dot{x}_1(0) = 0$			$x_2(0) = 1$		$\dot{x}_2(0) = 0$	

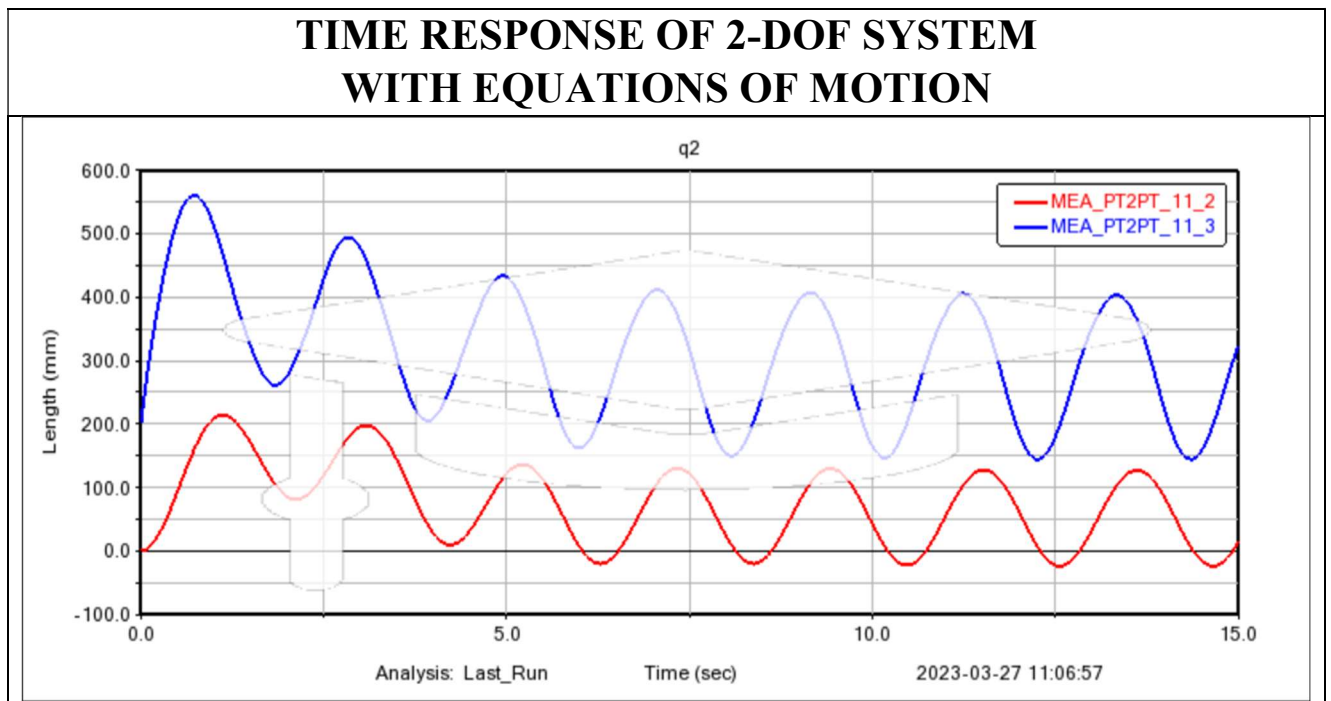
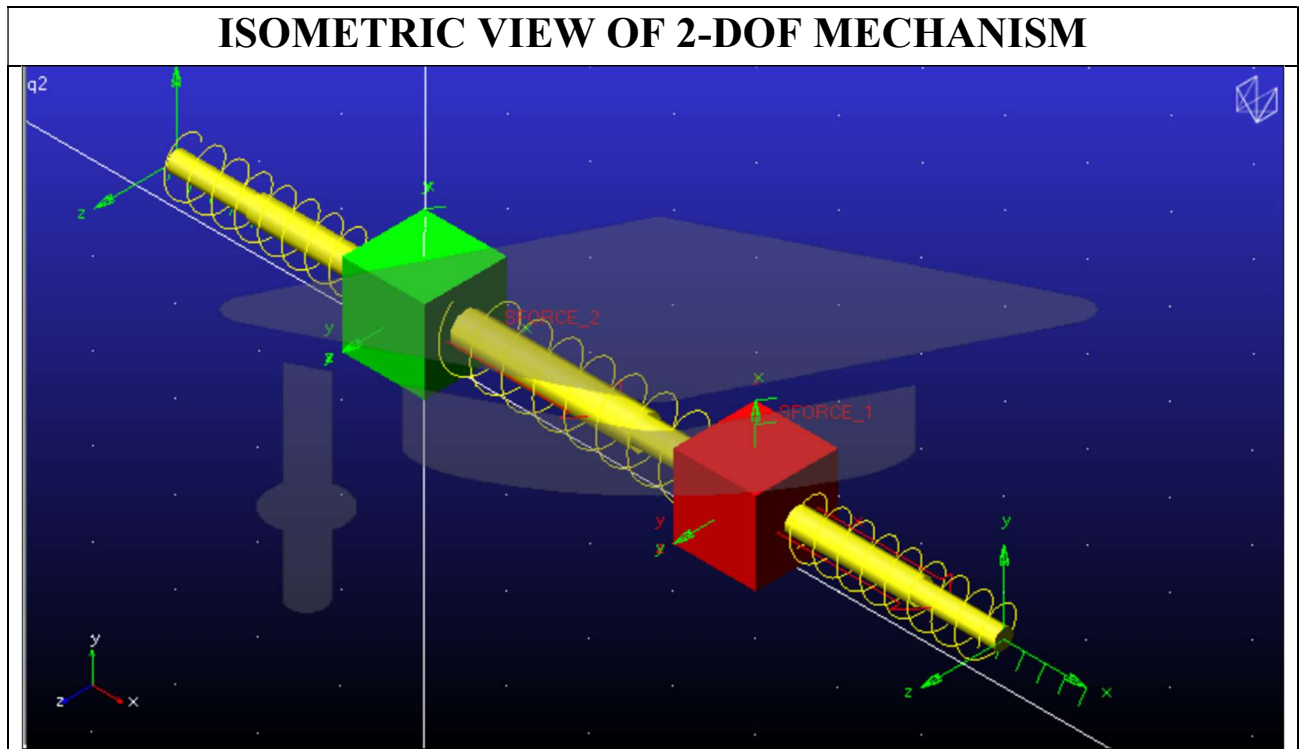
## Question 1 (1-DOF Mechanism)



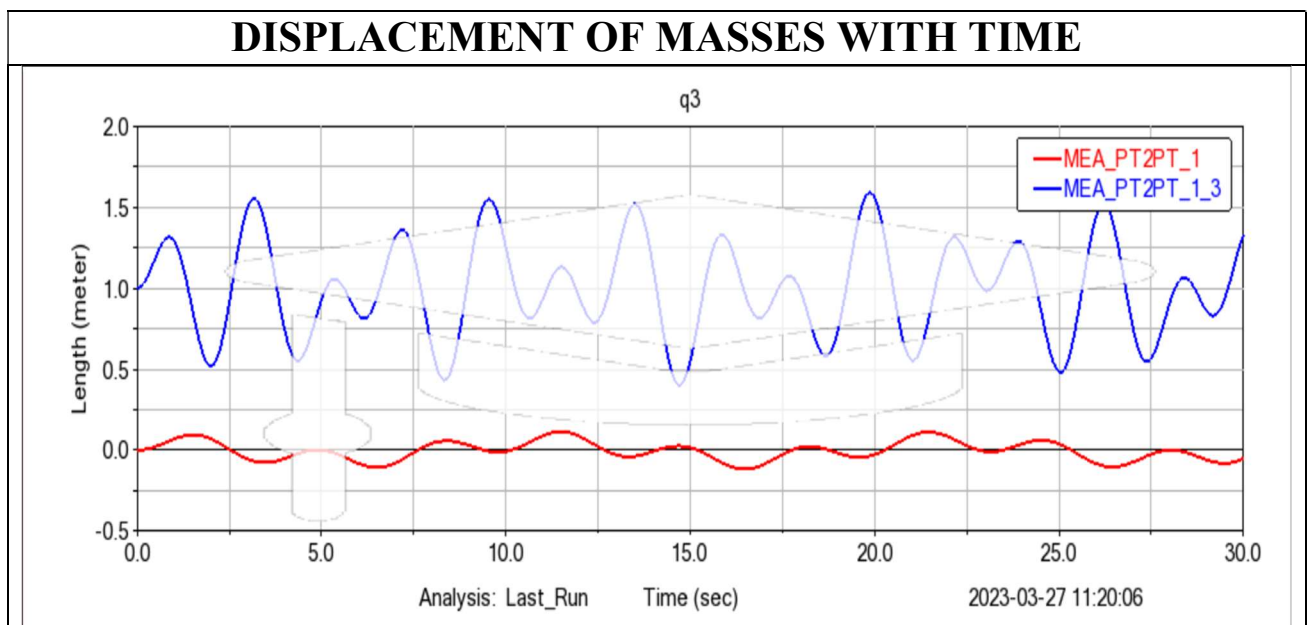
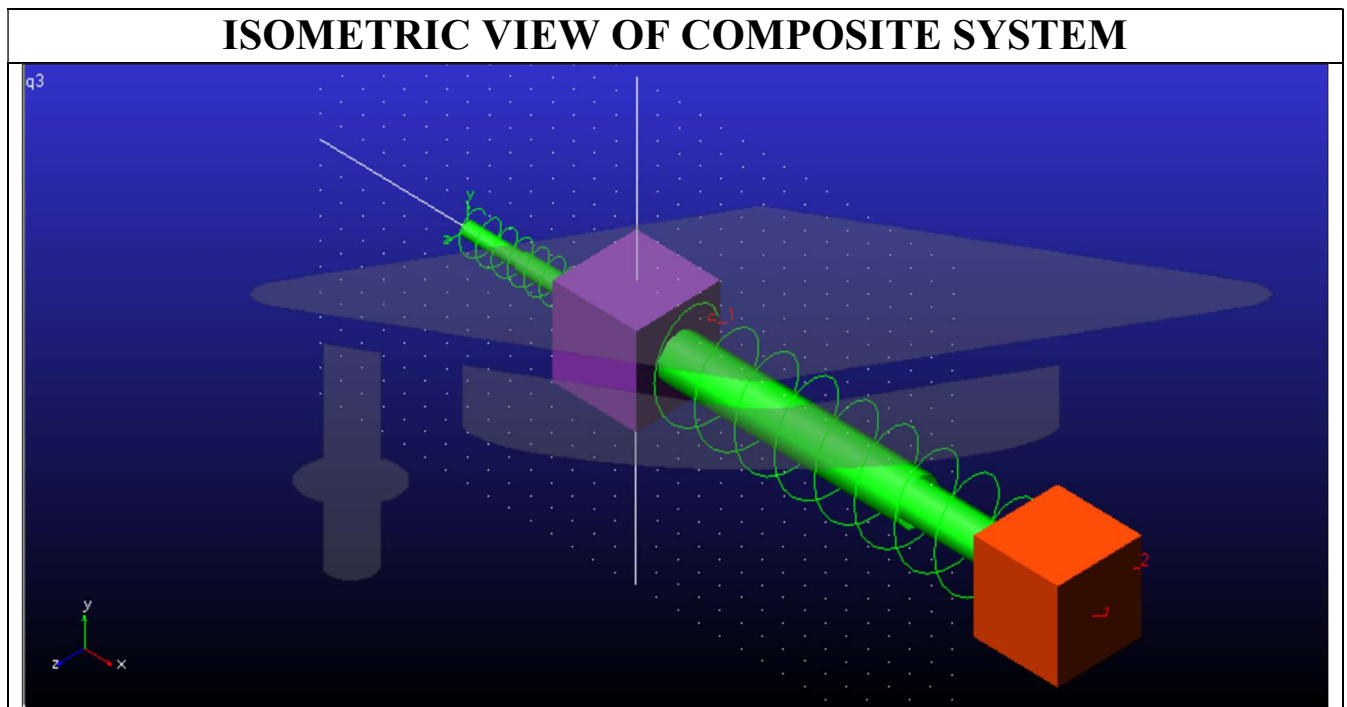
### DISPLACEMENT OF CENTRE OF MASS FROM $t=0$ TO $t=0.25$



## Question 2 (2-DOF Mechanism)



### Question 3 (Composite Spring Mass System)



—X—X—X—X—X—X—X—X—**END**—X—X—X—X—X—X—X—X—