MECH3200 PA: ECP210 Rectilinear Plant

Turn ON the controller after the PC is completed its reboot process

Open the ECP Dynamic Executive (3.2 bit) 5.6

Run as Administrator

Working files located at: C:\Program Files (x86)\ECP Systems\Dyn

(PD) File > Load Settings > (choose) Default.cfg

(PD) Utility > Download Personality File > (choose) m210di8.pmc

Observe: Disturbance Status' cell is available on the screen

SECTION 1: UNFORCED RESPONSES AND FUNDAMENTAL PROPERTIES OF NATURAL MODES

(PD) Command > Input Shape > (tick) Step > (click) Setup

Load: 0 N

Dwell time: 2000 msec

Reps: 1

(PD) Setup > Setup Driving Function > (tick) Force (Torque)

(soft reset) > (click) Disable Driving Function > (click) Enable Driving Function

(PD) Data > Setup Data Acquisition >

Sample Period: 1

Selected items: Drive Input, Encoder 1 Position

(PD) Plotting > Setup Plot >

Left Axis: Encoder 1 Position

Right Axis: (none)

(PD) Utility > (click) Zero Position

(PD) Command > Execute > (displace mass 1 approx. 20 mm) > (click) Run > (release mass 1)

Observe: mass 1 is oscillated, and wait until it stops

Result:

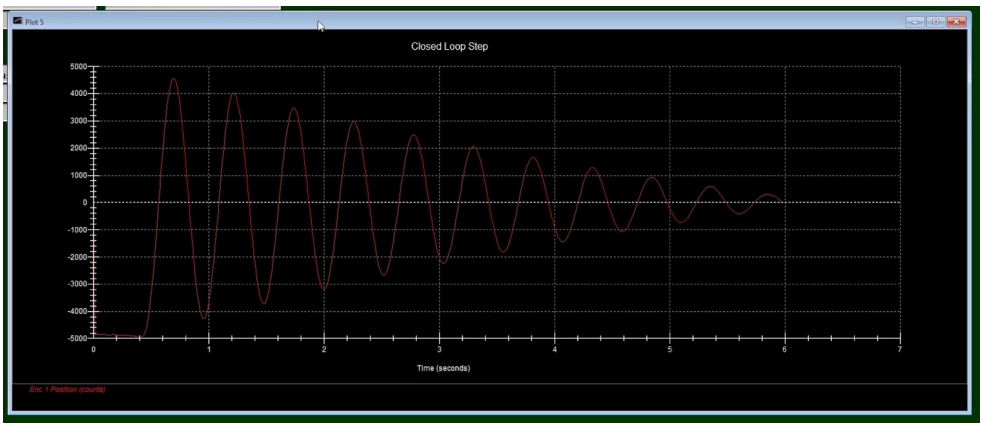

Figure 1. A typical step response is shown from the result

SECTION 2: DRIVEN RESPONSE: IMPULSE & STEP INPUTS

(PD) Command > Input Shape > (click) Impulse > (click) Setup

Step size: 20 N

Pulse width: 25ms

Rep: 2

Dwell time: 2000 msec

(PD) Setup > Setup Driving Function > (click) Force

(soft reset) > (click) Disable Driving Function > (click) Enable Driving Function

(PD) Data > Setup Data Acquisition >

Sample Period: 1

Selected items: Drive Input, Encoder 1 Position, Encoder 2 Position

(PD) Utility > (click) Zero Position

(PD) Command > Execute > (click) Run

Observe: motor pushes mass 1 and mass 2 that then oscillated in two different amplitudes

(PD) Plotting > Plot Data >

Left Axis: Encoder 1 and Encoder 2 position

Right Axis: (none)

Result:

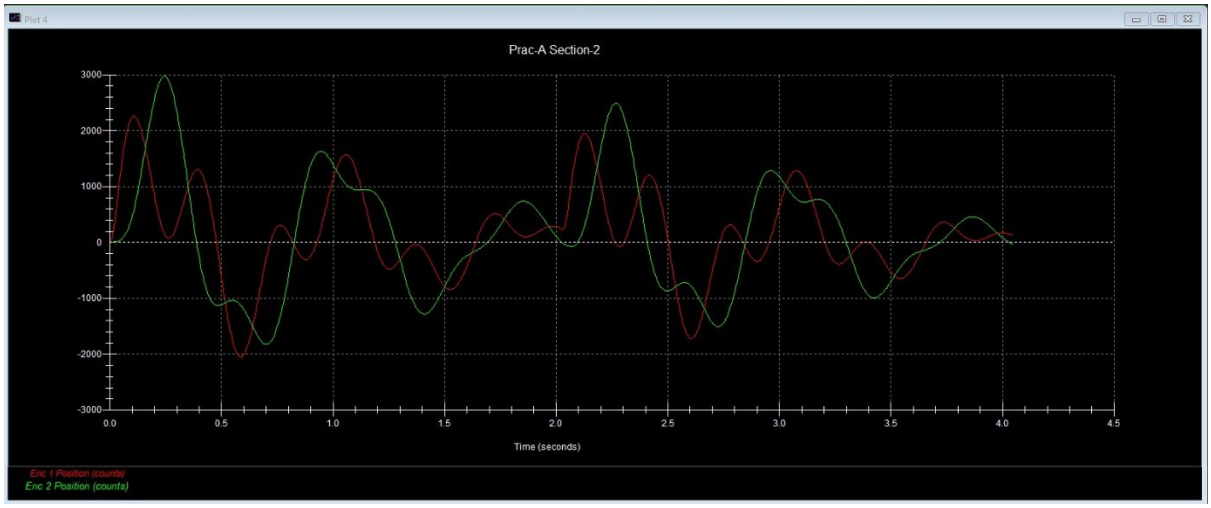

Figure 2. Two type oscillations of two different masses

PG-1: Section 1 (fix-spring-mass-1), PG-2: Section 2 (fix-spring-1-mass-1-spring-2-mass-2), PG-3: Section 3 (as Sect-2)

SECTION 3: DRIVEN RESPONSE: HARMONIC INPUT

(PD) Setup > Setup Driving Function > (click) Force + Spring + Dumper > (click) Setup

K = 400

c = 0

(soft reset) > (click) Disable Driving Function > (click) Enable Driving Function

(PD) Command > Input Shape > (click) Sine Sweep > (click) Setup

Tick: Logarithmic sweep

Amplitude: 1.2 N

Start Freq: 0.8 Hz

End Freq: 10 Hz

Sweep time: 120 sec

(PD) Data > Setup Data Acquisition >

Sample Period: 2

Selected items: Drive Input, Encoder 1 Position, Encoder 2 Position

(PD) Utility > (click) Zero Position

(PD) Command > Execute > (click) Run

NOTE: *Be aware that one or both masses may hit limit switches that disables the motor*

Result:

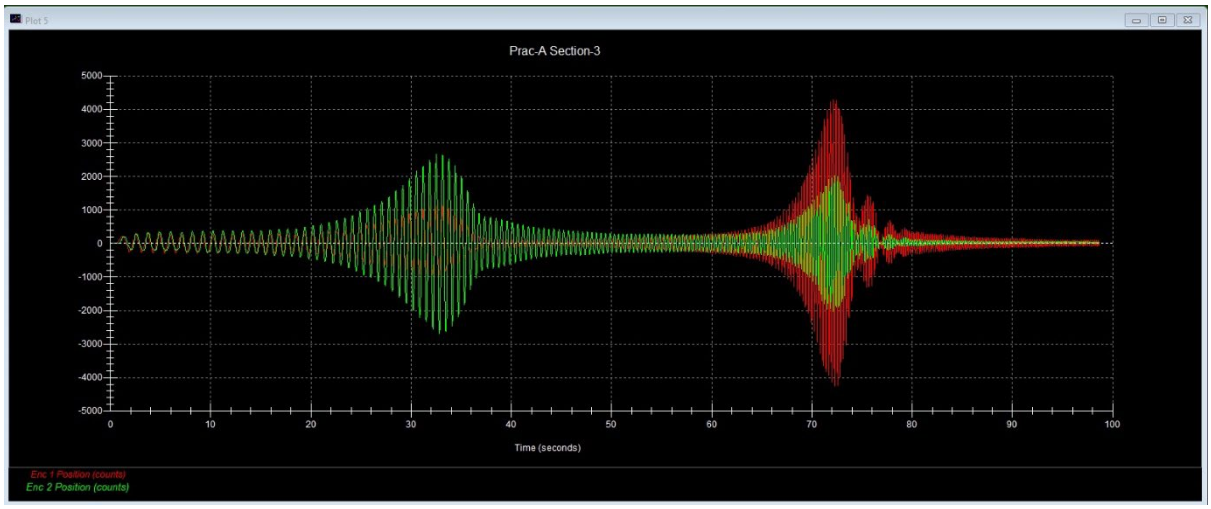

Figure 3. Mass-1 & Mass-2 oscillated in logarithm sweep to reach its steady state phase

This file is located at: G:\mats-lab\TEACHING AND LEARNING\Semester2\MECH2210 mechanical & space dynamics

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