EN40 Dynamics and Vibrations

Spring 2019
Organization

- Course Web: Google ‘Dynamics and Vibrations’ (see also Brown Canvas)

- Lectures: 9-10:20am, Tu, Th, B&H 166. Required. Lectures will present new material. Main intro to class tomorrow

- Sections 9, 10, 11, 1, 2 MW. You can attend any section you like; attendance is optional. Review confusing topics; additional examples; HW help

- FIRST TWO SECTIONS (today and Mon) WILL COVER NEW TOPICS IN MATLAB (not covered in lectures)

- More details on class to follow tomorrow.
MATLAB: one of several commercial software packages that help with calculations (data processing; math; some design packages built in; simple programming)

In EN40 we will use it for (i) data processing and plotting; (ii) algebra (Live Scripts); (iii) To solve differential equations that are two difficult to solve by hand (iv) Data acquisition for projects.
Matlab skills you will need for EN40

- Using ‘Live Scripts’ for plotting, calculus and algebra.
- Basic programming with ‘m’ files
  - Vectors/matrices
  - Loops
  - Conditional statements
  - Functions
  - Using ode45 to solve ODEs
First Homework is posted
Topics from MATLAB tutorial
Due (through canvas) Fri Feb 1.

Homework

2019 Assignments
1. Matlab Assignment Due Friday Feb 1 Before starting this assignment please work through the Matlab Tutorial

General Homework Policies:
- Homework will be assigned on Thursdays and will be due by noon the following Friday. If you forget to upload or drop off a homework and it’s a few hours late that’s usually not a problem; just hand it in anyway. As long as a homework is submitted before we send packets to graders, (or for electronic submissions, before the graders have started grading) we will always grade it. But we only guarantee to grade work that is submitted by the noon deadline.
- Submitting Homework: You can use either of the following methods to submit homework:
  - Upload a pdf file to canvas (you can upload a scanned pdf - see below for suggested scanner apps) or
  - Both: (i) Go to Canvas, and use the Text submission option to tell us that you are submitting a hard copy, and (ii) Place a paper copy in the boxes provided on the 7th floor of Barus-Holley building, North side, opposite Stephanie Gesualdi’s workstation. (HW #1 is submitted on Canvas)
Goal for Sections (Jan 23, Jan 27, Jan 30)

Worked examples on the following topics:

- Vectors/matrices
- Loops
- Conditional statements
- Functions
- Solving ODEs using ‘Live Scripts’
- Using ode45 to solve ODEs
1. Using a loop, create a vector called \( x \) that contains 401 equally spaced points, starting at -10 and ending at +10

2. Using the solution to problem 1, plot a graph of \( y = \sin(5 \, x) + \sin(5.5 \, x) \) for \(-10 < x < 10\)

3. Plot a graph of \( w(v) = \begin{cases} \cos(v) & \text{if } \cos(v) \geq \sin(v) \\ \sin(v) & \text{if } \cos(v) \leq \sin(v) \end{cases} \) for \( 0 \leq v \leq 4\pi \)