

## ME 4501 - Vibrations and Control Laboratory

### Lab 1: MATLAB Practice

Instructor: Dr. Ayse TEKES

**Due: Before the class ends. (Section 3: Monday 3:15 pm and Wednesday: 6:15 pm)**

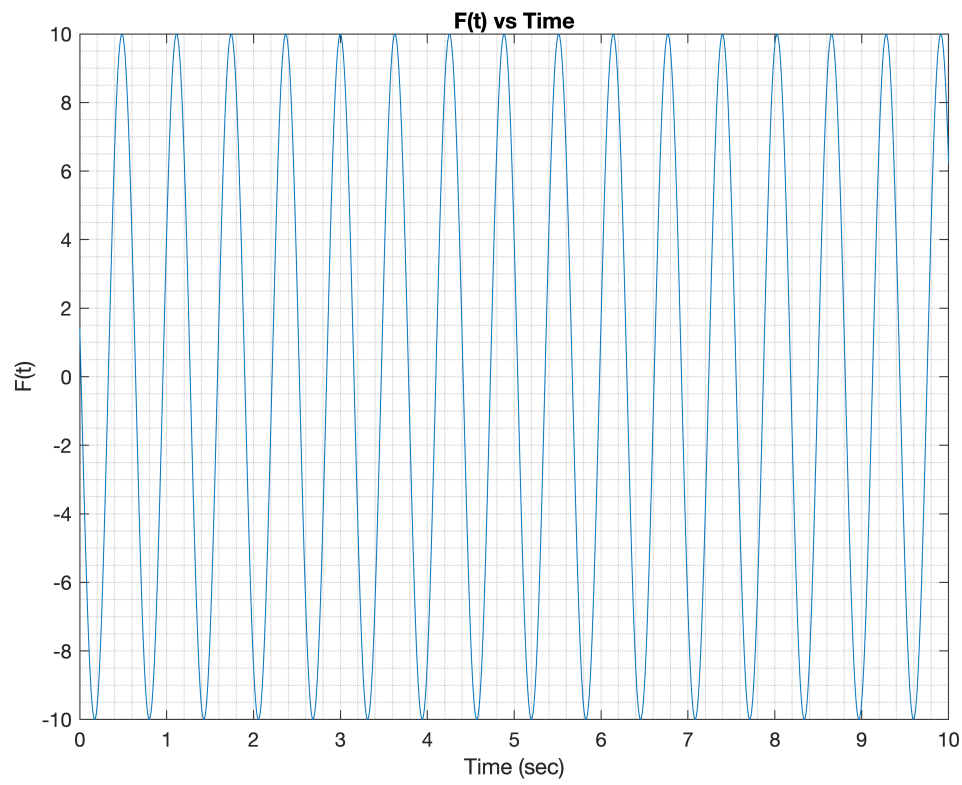
I will be grading your lab report during the class.

**Please do the following in the given order:**

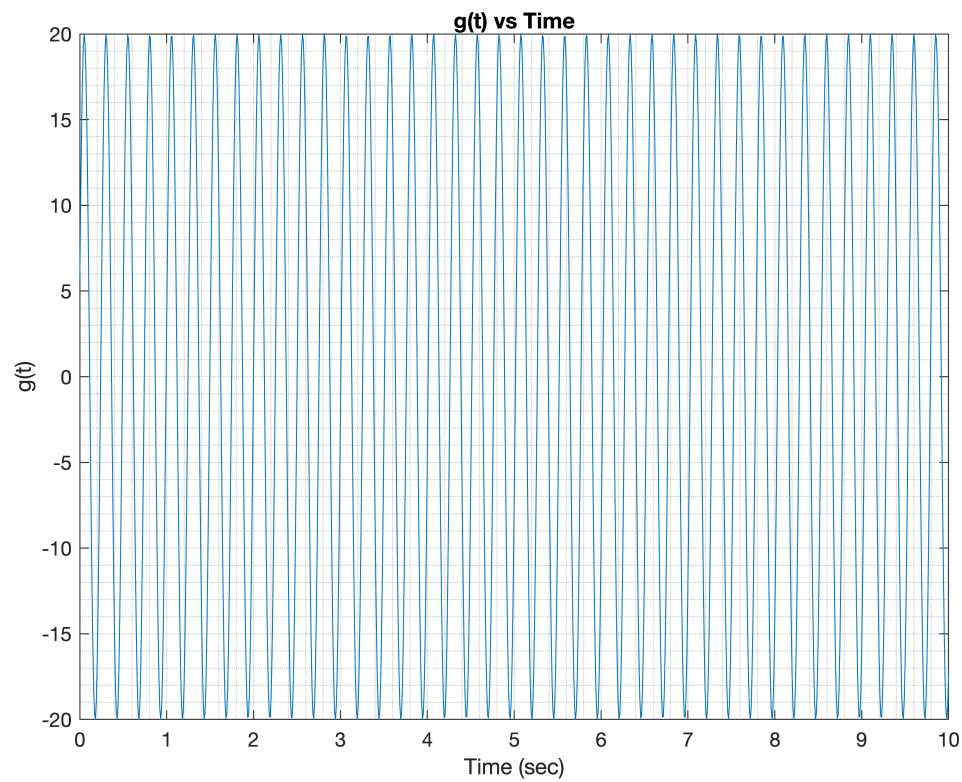
1. Complete the following training from [MathWorks](#): MATLAB Onramp and Simulink Onramp before the class starts.
2. Watch the recorded videos titled [Introduction to MATLAB](#) and [Downloading Data in MATLAB](#) before the class starts.
3. Generate the following functions in MATLAB live editor by inserting your code below. Simply go to Insert and then select Code. You might also want to refer to this [link](#) for more help

$f(t) = A\sin(w_1t + 3)$ ,  $g(t) = B\cos(w_2t + 5)$ , where  $w_1$ ,  $w_2$ ,  $A$ , and  $B$  are the values of your selection, and  $t$  is the time changing from 0 to 100 second. You might need to adjust your time if 100 seconds is too long or short. Plot  $f(t)$  and  $g(t)$  versus time and copy paste your graphs below.

```
w1=10; w2=25; A=10; B=20;  
t=linspace(0,10,1000);  
f=A*sin(w1*t+3);  
g=B*cos(w2*t+5);  
figure(1); plot(t,f); xlabel('Time (sec)'); ylabel('F(t)'); title('F(t) vs Time'); gri
```

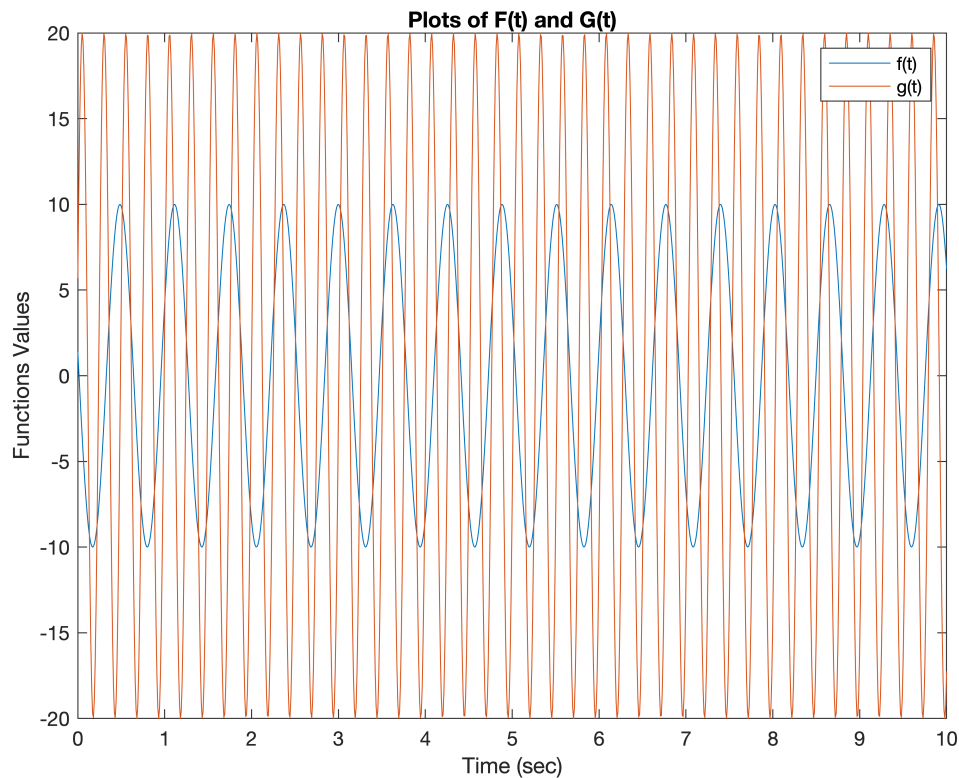


```
figure(2); plot(t,g);xlabel('Time (sec)'); ylabel('g(t)'); title('g(t) vs Time'); grid
```



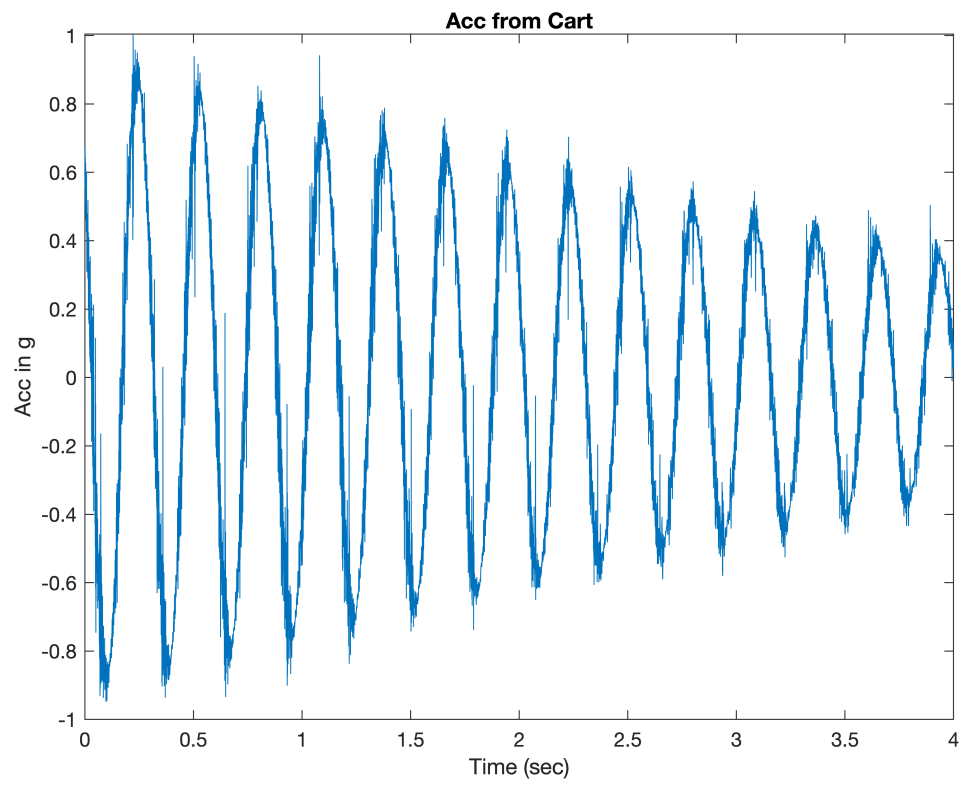
4. Plot  $f(t)$  and  $g(t)$  versus time in the same graph using *hold on* command. Please insert your command below.

```
figure(3); plot(t,f);hold on;plot(t,g);xlabel('Time (sec)');ylabel('Functions Values')  
legend('f(t)', 'g(t)')
```

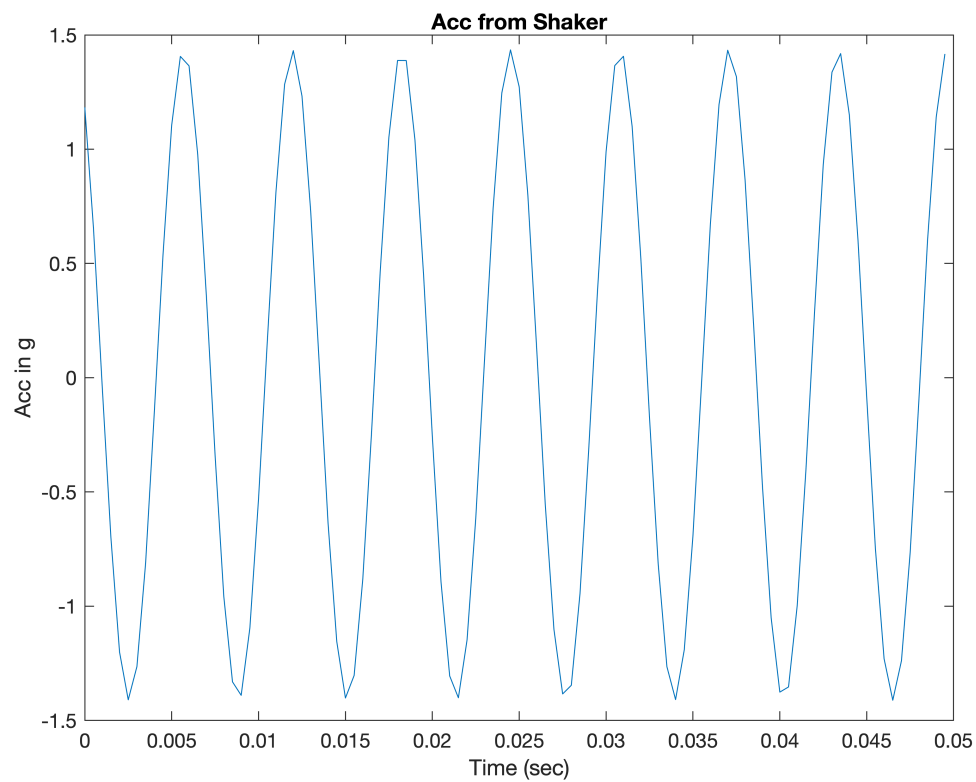


5. Download the shared sample acceleration data in the workspace. The data is recorded from a vibrational system using two types of accelerometers (uni-axial and tri-axial). Each acceleration data has two columns: time and acceleration. Time is in seconds and acceleration is in g ( $\text{m/s}^2$ ). Insert your command below to plot the acceleration vs time graph using one of the shared data. Refer to the video provided in Step 2 for help.

```
figure(4); plot(time1,acc1); xlabel('Time (sec)'); ylabel('Acc in g'); title('Acc from
```



```
figure(5); plot(time2(1:100),acc2(1:100)); xlabel('Time (sec)'); ylabel('Acc in g'); t
```



```
y=1/2*t(end)
```

```
y = 5
```