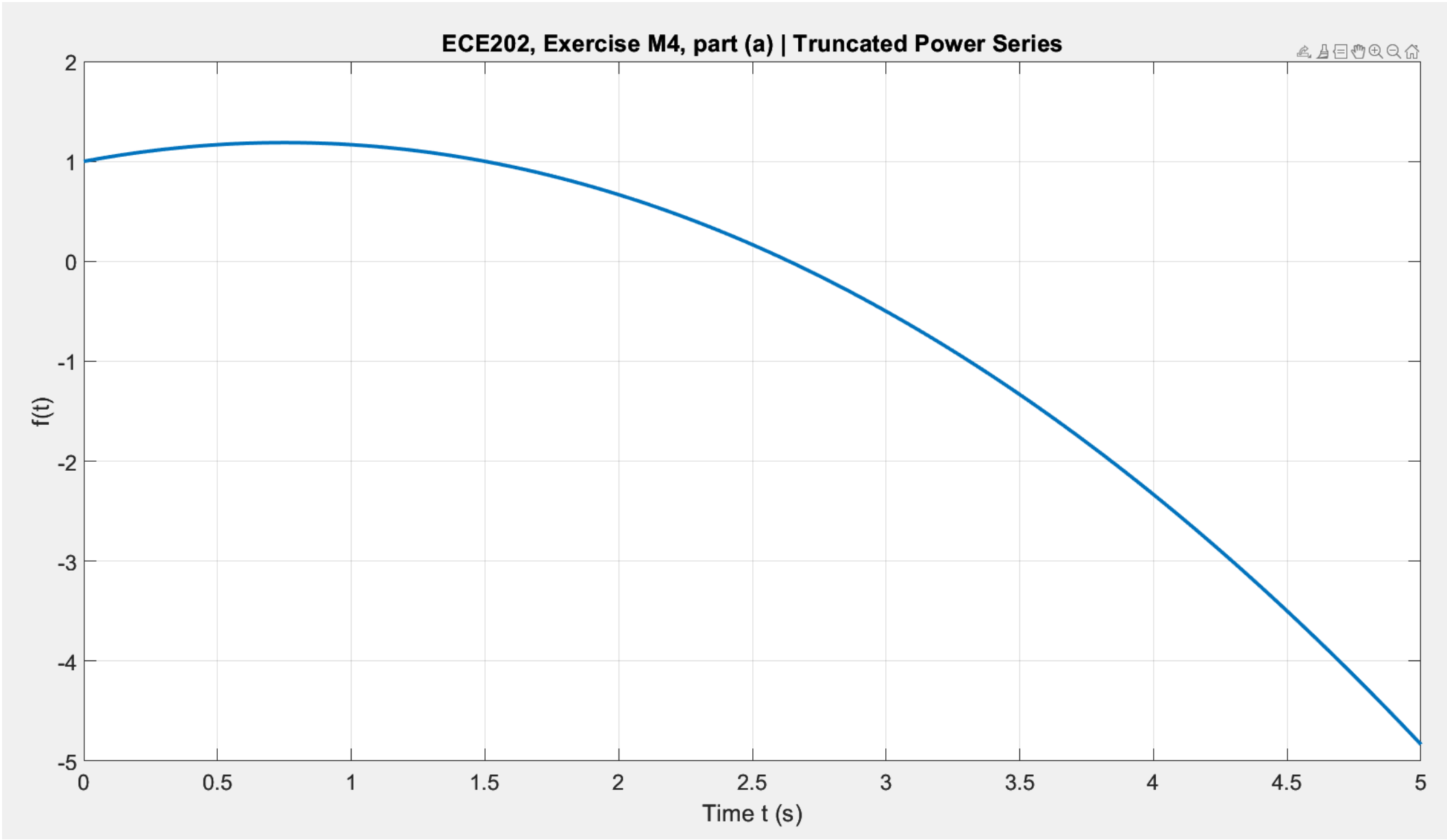
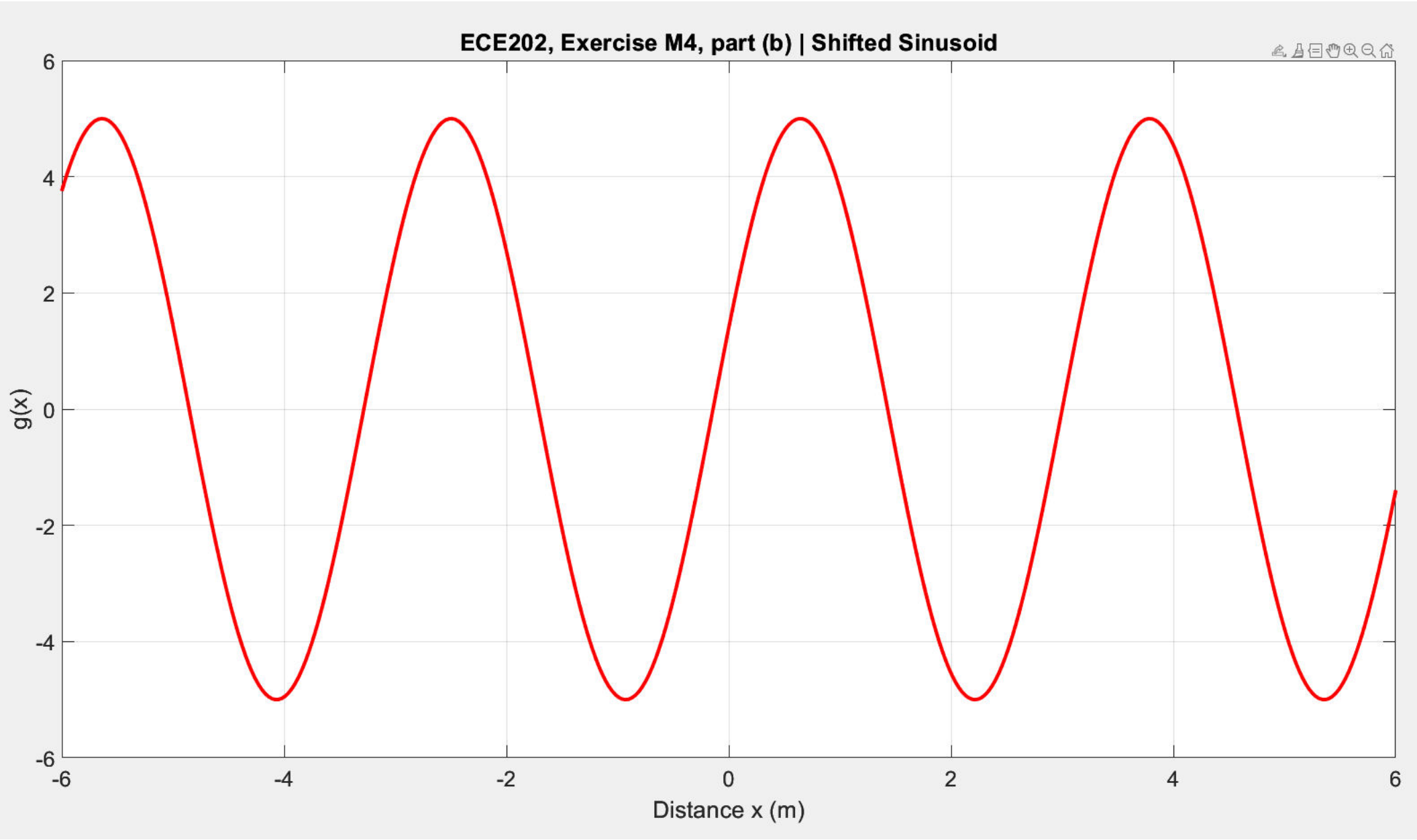
```
%{
Aidan Chin M4 part A 9/27/23
ECE 202 MATLAB Exercise M4
The goal of this code is to graph a truncated power series
%}

% *** Prepare workspace ***
clear % clear variables to remove chance of error
clf % clear figures to make the graph window clear

% *** Givens ***
tmin = 0; %minimum time in seconds
tmax = 5; %maximum time in seconds
N = 400; % number of steps to be made between min and max
t = linspace(tmin,tmax,1+N); %create array of numbers between tmin and tmax

% *** Calculation ***
f = 1 + t./2 - (t.^2)/3; %array filled by applying formula to each point in
% array t this is the chosen truncated power series formula

% *** Graphing ***
plot(t,f,'LineWidth',3); % initialize plot of array and applied formula values
title('ECE  202, Exercise M4, part (a) | Truncated Power Series','FontSize',21);
% change title and font size of title ^
xlabel('Time t (s)','FontSize',21) % change x axis label and font size
ylabel('f(t)','FontSize',21) % change y axis label and font size
set(gca, 'FontSize', 18); % change the axis values font size
grid on % enable the grid on the graph
```

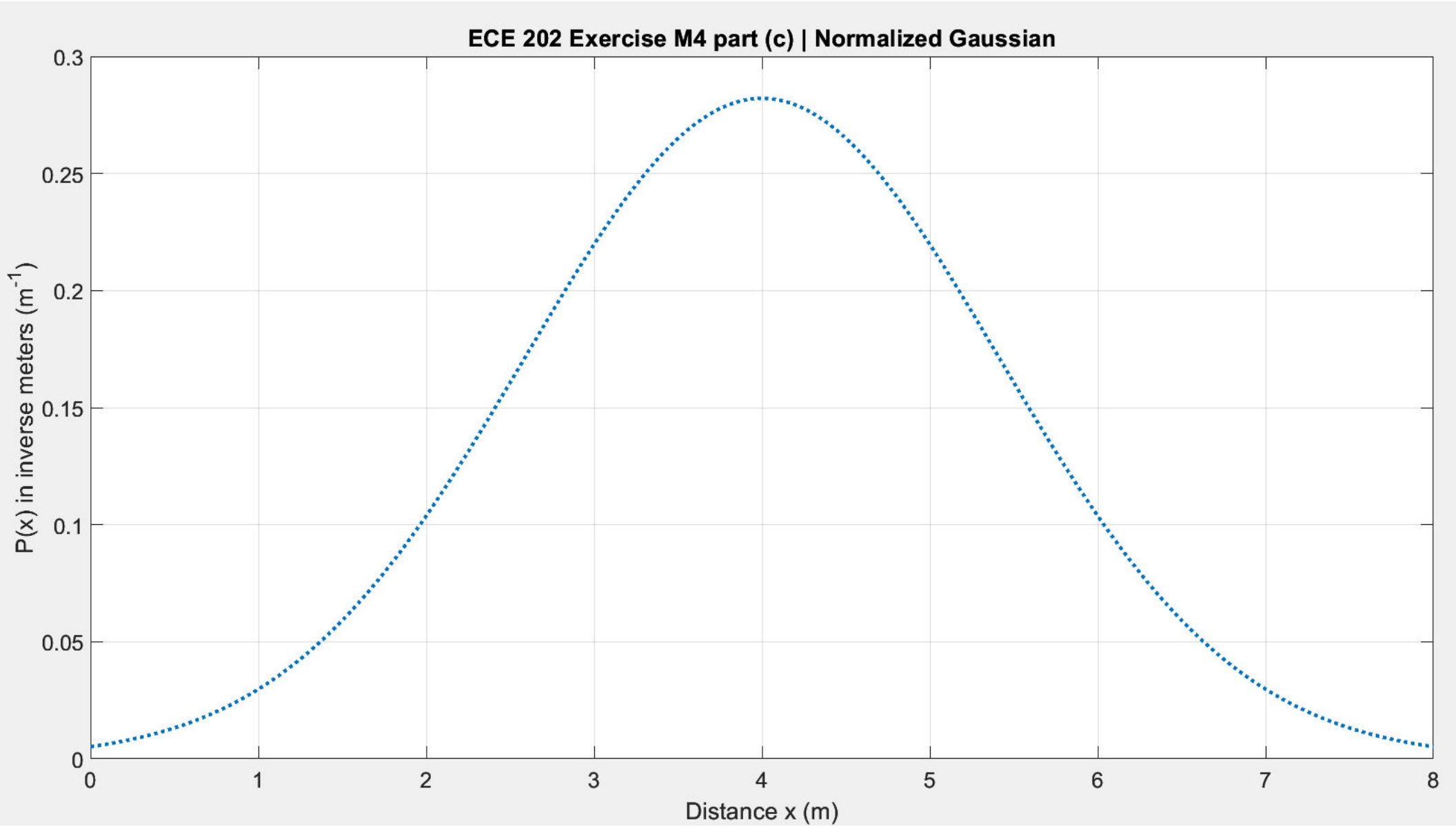

ECE202, Exercise M4, part (a) | Truncated Power Series
f(t)
Time t (s)
2
1
0
-1
-2
-3
-4
-5
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5

```
%{
Aidan Chin M4 part B 9/27/23
ECE 202 MATLAB Exercise M4
The goal of this code is to graph a Shifted Sinusoid
%}

% *** Prepare workspace ***
clear % clear variables to remove chance of error
clf % clear figures to make the graph window clear

% *** Givens ***
xmin = -6; % minimum distance in meters
xmax = 6; % maximum distance in meters
N = 400;  % number of steps to be made between min and max
x = linspace(xmin,xmax,1+N); %create array of numbers between xmin and xmax

% *** Calculation ***
g = 5 * sin(2 * (x-3)); %array filled with points applied from formula to
% each point in array x this is the chosen Shifted Sunusoid formula

% *** Graphing ***
plot(x,g,'red','LineWidth',3) % initialize plot of array and applied formula values
ylim([xmin,xmax]) %set a predetermined window limits for y axis
title('ECE  202, Exercise M4, part (b) | Shifted Sinusoid','FontSize',21)
% change title and font size of title ^
xlabel('Distance x (m)','FontSize',21)% change x axis label and font size
ylabel('g(x)','FontSize',21)% change y axis label and font size
set(gca, 'FontSize', 18) % change the axis values font size
grid on % enable the grid on the graph
```

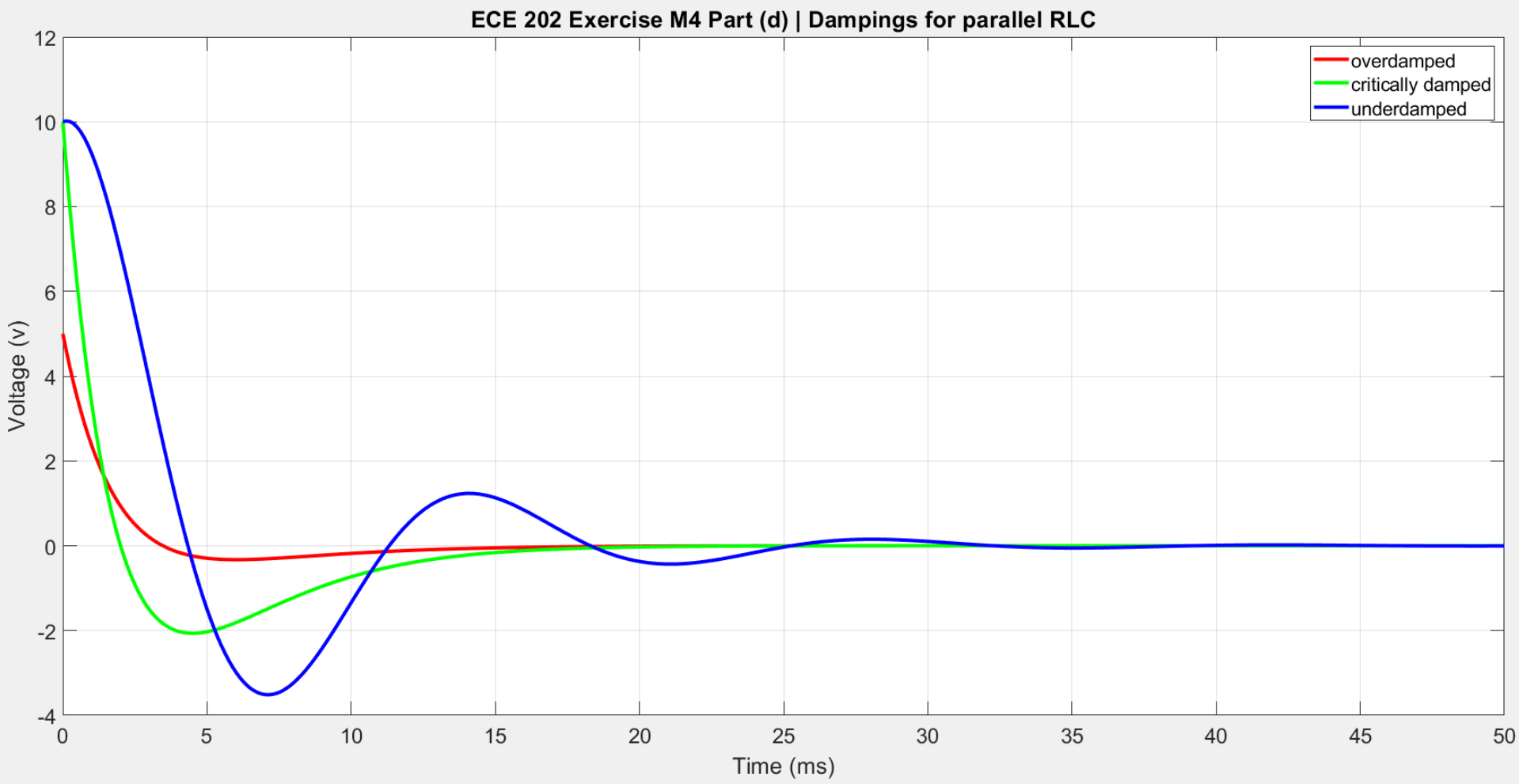

ECE202, Exercise M4, part (b) | Shifted Sinusoid
6
4
2
0
-2
-4
-6
g(x)
-6
-4
-2
0
2
4
6
Distance x (m)

```
%{
Aidan Chin M4 part C 9/27/23
ECE 202 MATLAB Exercise M4
The goal of this code is to graph a Normalized Gaussian
%}

% *** Prepare workspace ***
clear % clear variables to remove chance of error
clf % clear figures to make the graph window clear

% *** Givens ***
xmin = 0; %minimum distance in meters
xmax = 8; %maxiumum distance in meters
N = 400; % number of steps to be made between min and max
x=linspace(xmin,xmax,1+N);%create array of numbers between xmin and xmax

% *** Calculation ***
P = 1/(2*sqrt(pi)) * exp(-(x-4).^2/4); %array filled with points from applying
% formula to each point in array x this is the chosen Normalized Gaussian formula

% *** Graphing ***
plot(x,P,':','LineWidth',3) % initialize plot of array and applied formula values
title('ECE 202 Exercise M4 part (c) | Normalized Gaussian', 'FontSize',24)
% change title and font size of title ^
ylabel('P(x) in inverse meters (m^{-1})','FontSize',21)% change y axis label
                                                       % and font size
xlabel('Distance x (m)','FontSize',21) % change x axis label and font size
set(gca, 'FontSize', 18) % change the axis values font size
grid on % enable the grid on the graph

% *** Checks ***
%the area under a gaussian curve should be close to 1
%integrating the graph should yeild close to one, checking the distance
%from one should return almost zero value
CheckP = 1 - trapz(x,P) %should be about 0
```

```
>> M4C

CheckP =

    0.0047

>>
```


ECE 202 Exercise M4 part (c) | Normalized Gaussian
P(x) in inverse meters (m-1)
Distance x (m)
0
0.05
0.1
0.15
0.2
0.25
0.3
0
1
2
3
4
5
6
7
8

```
%{
Aidan Chin M4 part D 9/27/23
ECE 202 MATLAB Exercise M4
The goal of this code is to graph Three dampings for parallel RLC
%}

% *** Prepare workspace ***
clear % clear variables to remove chance of error
clf % clear figures to make the graph window clear

% *** Givens ***
tmsmin = 0; % minimum time in seconds
tmsmax = .05; % maximum time in seconds
N = 400; % number of steps to be made between min and max
tms = linspace(tmsmin,tmsmax,1+N);%create array of numbers between tmsmin
                                                        % and tmsmax
% *** Calculations ***
v1 = 10*exp(-500.*tms)-5*exp(-300.*tms);
v2 = 10*exp(-400.*tms)-5000.*tms.*exp(-400.*tms);
v3 = 10*exp(-150.*tms).*cos(450.*tms)+4.*exp(-150.*tms).*sin(450.*tms);
%v1, v2, v3 are arrays filled with the respective formula to each point in array
% tms, these are the chosen Damping for Parallel RLC formulas
tmsA = tms.*1000; % convert the seconds in tms to miliseconds in tmsA to make
%easier to read axis values

% *** Graphing ***
plot(nexttile,tmsA, v1,'red', tmsA, v2,'green', tmsA, v3, 'blue','LineWidth',3)
 % initialize plot of array and applied formula values
title('ECE 202 Exercise M4 Part (d) | Dampings for parallel RLC','FontSize',21)
legend('overdamped','critically damped','underdamped')
ylabel('Voltage (v)','FontSize',21)% change y axis label and font size
xlabel('Time (ms)','FontSize',21) % change x axis label and font size
set(gca, 'FontSize', 18) % change the axis values font size
grid on % enable the grid on the graph
```


ECE 202 Exercise M4 Part (d) | Dampings for parallel RLC
overdamped
critically damped
underdamped
Voltage (v)
Time (ms)
12
10
8
6
4
2
0
-2
-4
0
5
10
15
20
25
30
35
40
45
50