ECE 340  Matlab Session (Codes & Plots)

x=-4
x =
    -4

y=j*2
y =
    0 + 2.0000i

z=x+y
z =
    -4.0000 + 2.0000i

plot(z,'*')
axis([-5 2 -3 3])
grid
[za,zm]=cart2pol(-4,2)
za =
    2.6779

zm =
    4.4721

zad=(180/pi)*za, % Angle of z in degrees.
zad =
    153.4349

zx=real(z)
zx =
    -4

zy=imag(z)
zy =
    2
\[ x_2, y_2 = \text{pol2cart}(\frac{\pi}{3}, 5) \]

\[ x_2 = 2.5000 \]

\[ y_2 = 4.3301 \]

\[ \exp(-5) \]

\[ \text{ans} = 0.0067 \]

\[ z_1 = [1, 2, 3, 4] \]

\[ z_1 = \begin{bmatrix} 1 & 2 & 3 & 4 \end{bmatrix} \]

\[ z_2 = [5, 6, 7, 8] \]

\[ z_2 = \begin{bmatrix} 5 & 6 & 7 & 8 \end{bmatrix} \]

\[ y_4 = z_1 \cdot z_2 \]

\[ y_4 = \begin{bmatrix} 5 & 12 & 21 & 32 \end{bmatrix} \]

\[ \text{sum}(y_4) \]

\[ \text{ans} = 70 \]

\[ T_s = 0.03, T_{\text{end}} = 8, \]

\[ T_s = 0.0300 \]

\[ T_{\text{end}} = 8 \]
time=0:Ts:Tend;
help play2
play2.m
Have Fun!
M-file to display three separate plots.
One plot is a cosine, another plot is an exponential decay,
and the third plot is a combination of the two which yields
an exponentially damped, cosine waveform.

uiopen('C:\Users\Tharp\Documents\MATLAB\340\s2013\play2.m',1)
play2
u_step=inline('t>=0','t')

u_step =

   Inline function:
   u_step(t) = t>=0

t2=-2:0.01:2;
figure
plot(t2,u_step(t2))
axis([-2 2 -0.5 1.5])
tri_it=inline('((t>=2)&(t<=4))','t')

tri_it =

   Inline function:
   tri_it(t) = (t-2).*((t>=2)&(t<=4))

figure
plot(time,tri_it(time))
num=[1,4],den=[1,6,5]

num =

   1     4

den =

   1     6     5

[r,p,k]=residue(num,den)

r =

   0.2500
   0.7500

p =
k =

[]
sys1=tf(num,den)
Transfer function:
\[ \frac{s + 4}{s^2 + 6s + 5} \]
figure
impulse(sys1)
figure
bode(sys1)
diary off

Figure 1: (Cosine Waveform)
Figure 2 (Exponential Decay)

Figure 3 (Exponentially Damped Cosine)
Figure 4 (Unit Step Waveform created from an inline function)

Figure 5 (Triangle Waveform or straight-line function over a limited region via an inline function)
Figure 6 (Impulse Response from a given Transfer Function, Second-order (2 pole & 1 zero))

Figure 7 (Bode Plot of the same second-order transfer function from Figure 6)
Code for the ‘play2.m’ M-file:

```matlab
% play2.m
% Have Fun!
% M-file to display three separate plots.
% One plot is a cosine, another plot is an exponential decay,
% and the third plot is a combination of the two which yields
% an exponentially damped, cosine waveform.
Ts=0.03;Tend=8;
time=0:Ts:Tend;
y1=cos(2*time); % Cosine waveform w/ angular frequency of 2 radians/sec.
figure(1)
plot(time,y1)
xlabel('Time (sec)')
ylabel('Output Response')
title('Cosine Waveform in ECE 340')
y2=exp(-(3/4)*time); % Exponential Decay (time constant of (4/3 seconds))
figure(2)
plot(time,y2)
title('Exponential Decay')
figure(3)
y3=y1.*y2; % Use an element-by-element product.
plot(time,y3)
title('Exponentially Damped Cosine') % Title the plot in the third window.
xlabel('Time (seconds)') % Provide a label for the x-axis.
ylabel('Response') % Label the y-axis.
```