MATLAB ASSIGNMENT-5

SIMILARITY AND ORTHOGONAL TRANSFORMATION

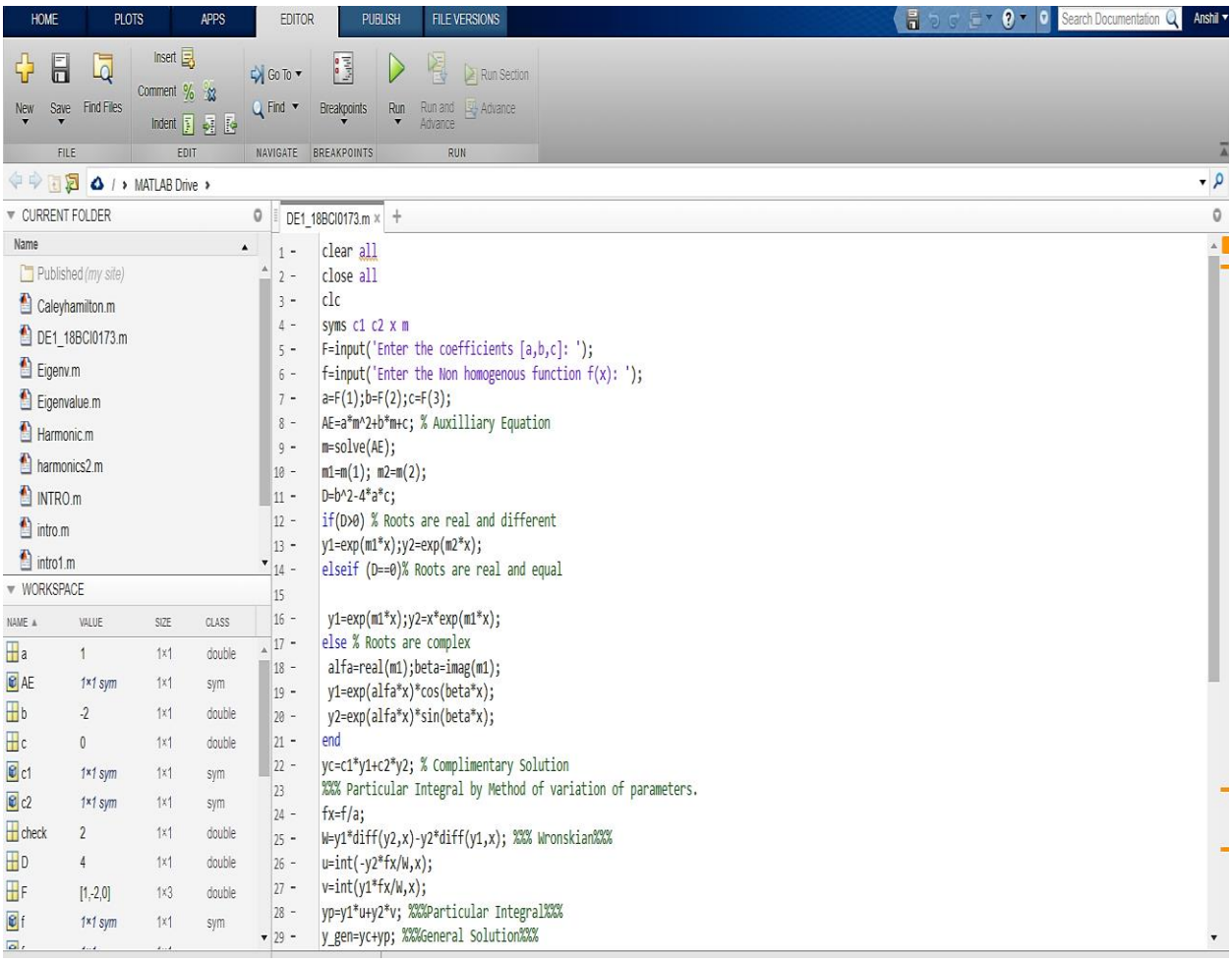
- NAME: - ANSHIL SETH
- REG NO.: - 18BCI0173
- SLOT: - L15 +L16
- SESSION: - WINTER SEMESTER 2018-2019
- FACULTY: - PROF. POORNIMA T

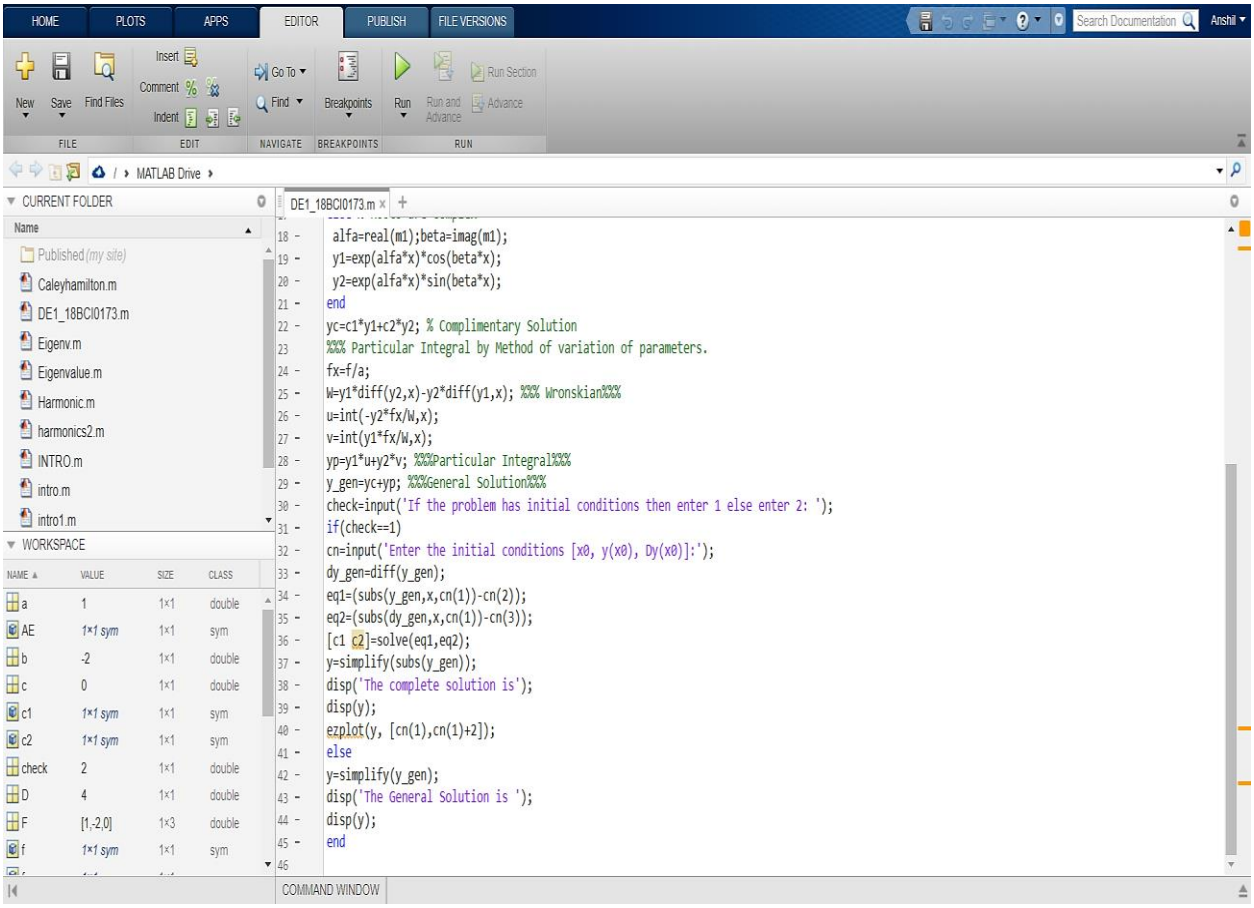
DATE: - 6th February,2019

Q1. Find the general solution of the differential equation $y'' - 2y' = e^x \sin x$.

Soln: -

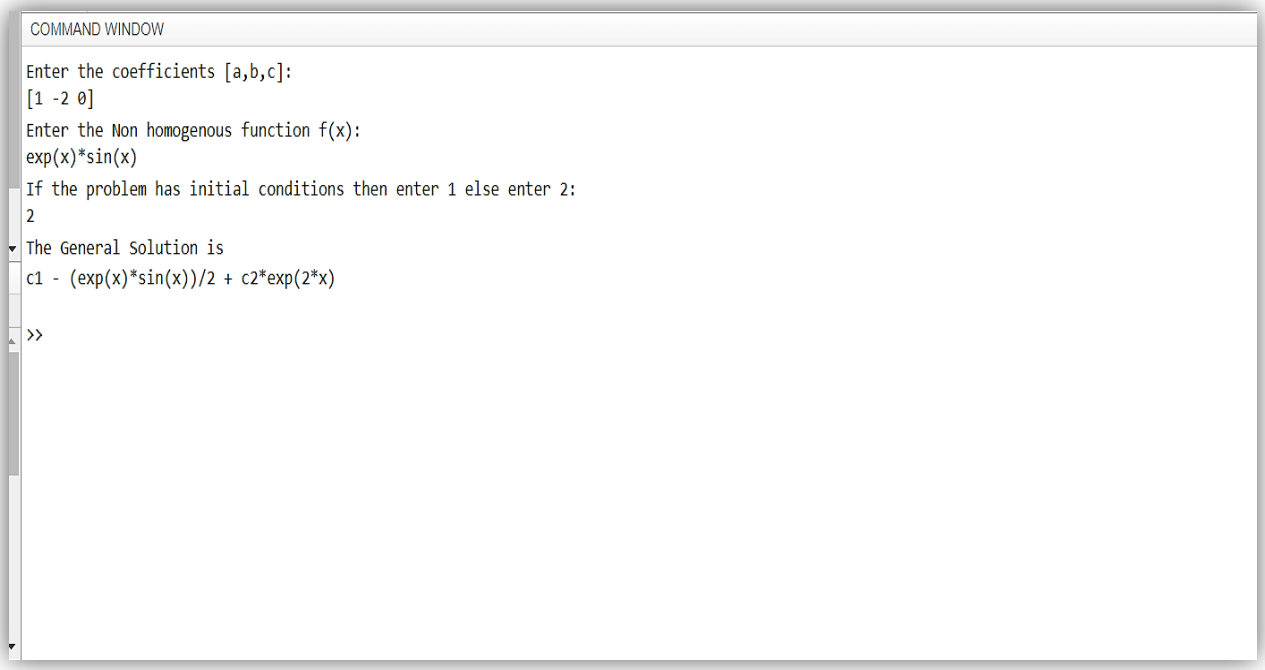
CODE: -





```
 alfa=real(m1);beta=imag(m1);
 y1=exp(alfa*x)*cos(beta*x);
 y2=exp(alfa*x)*sin(beta*x);
end
yc=c1*y1+c2*y2; % Complimentary Solution
%%% Particular Integral by Method of variation of parameters.
fx=f/a;
W=y1*diff(y2,x)-y2*diff(y1,x); %%% Wronskian%%%
u=int(-y2*fx/W,x);
v=int(y1*fx/W,x);
yp=y1*u+y2*v; %%%Particular Integral%%%
y_gen=yc+yp; %%%General Solution%%%
check=input('If the problem has initial conditions then enter 1 else enter 2: ');
if(check==1)
cn=input('Enter the initial conditions [x0, y(x0), Dy(x0)]:');
dy_gen=diff(y_gen);
eq1=(subs(y_gen,x,cn(1))-cn(2));
eq2=(subs(dy_gen,x,cn(1))-cn(3));
[c1 c2]=solve(eq1,eq2);
y=simplify(subs(y_gen));
disp('The complete solution is');
disp(y);
ezplot(y, [cn(1),cn(1)+2]);
else
y=simplify(y_gen);
disp('The General Solution is ');
disp(y);
end
```

INPUT AND OUTPUT: -



```
COMMAND WINDOW

Enter the coefficients [a,b,c]:
[1 -2 0]
Enter the Non homogenous function f(x):
exp(x)*sin(x)
If the problem has initial conditions then enter 1 else enter 2:
2
The General Solution is
c1 - (exp(x)*sin(x))/2 + c2*exp(2*x)

>>
```

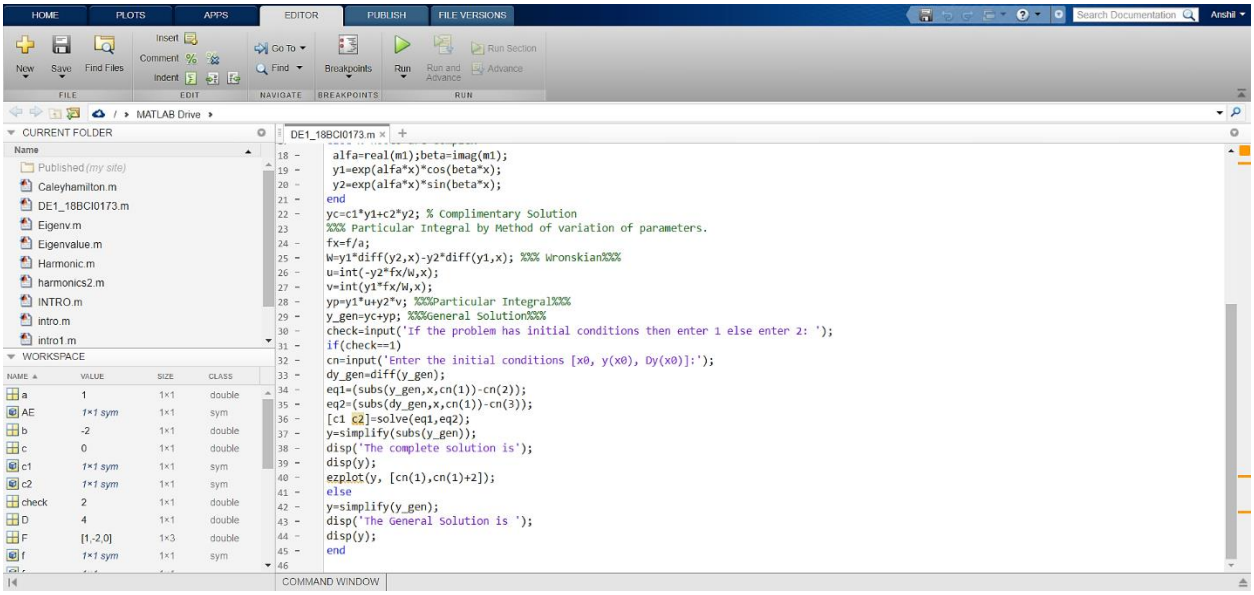
2. Solve the initial value problem

y ''+4y'+20 y=23 sin(x) – 15 cos (x). y (0) = 0 y' (0) = -1

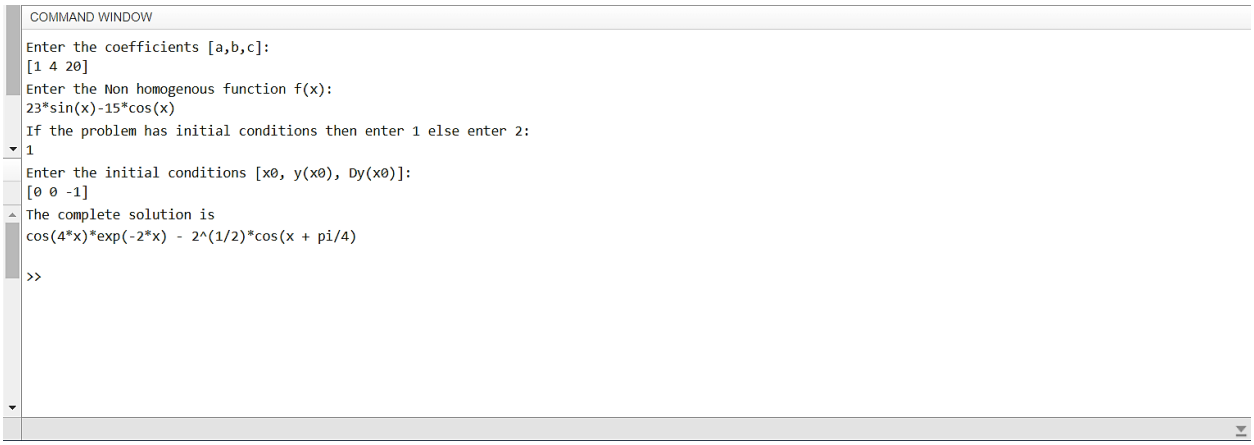
3. Find the current I(t) in an RLC circuit with R=11Ω, L=0.1 H, C=10-2 F, which is connected to a source of voltage E(t) = 100 sin400t. Assume that the current and the charge are zero when t=0.

4. A spring with mass of 2kg has damping constant 14, and a force of 6N is required to keep the spring stretched 0.5 m beyond its natural length. The spring is stretched 1m beyond its natural length and then released with zero velocity. Find the position of the mass at any time t.

CODE: -

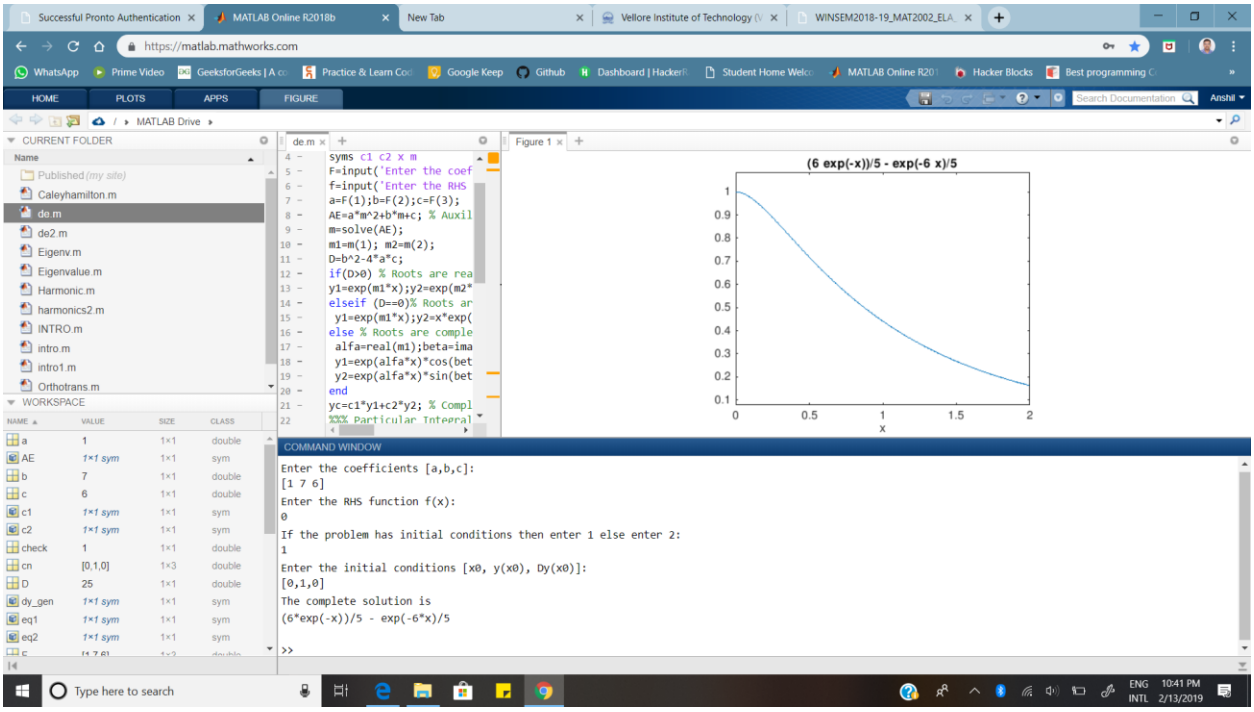


ANS 2: -

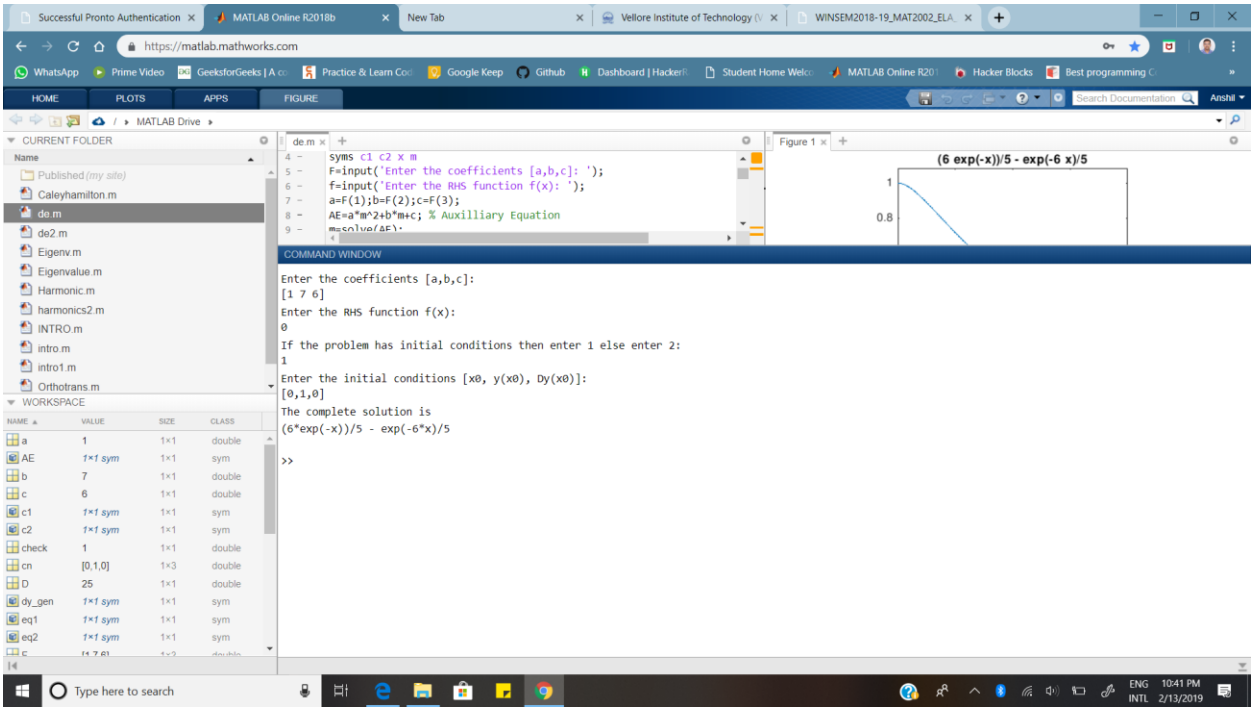


ANS 4: -

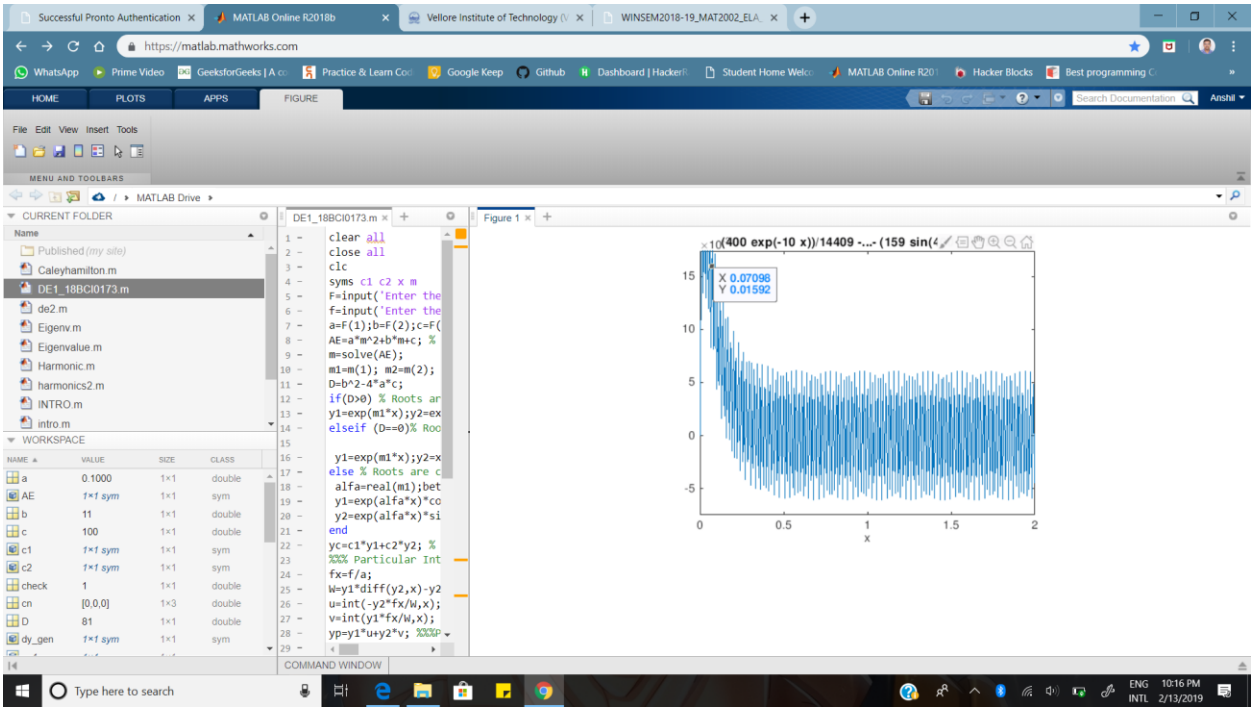
GRAPH



INPUT AND OUTPUT: -



GRAPH: -



OUTPUT AND INPUT: -