IEE EVALUATION 10 CLASS ASSIGNMENT (BATCH A TEAM 11)

TEAM MEMBERS

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Q1

- **Create MATLAB codes to implement a gain-tunable inverting amplifier which is taking the following functions as input.**
- **Sinusoidal, Square, Triangular, Constant DC**

LOGIC DIAGRAM

Inverting amplifier

A_v = GAIN

$$I_1 = \frac{V_{in} - V_A}{R_1} = \frac{V_{in} - 0}{R_1}$$

$$I_1 = \frac{V_{in}}{R_1}$$

$$I_f = \frac{V_A - V_o}{R_f} = \frac{0 - V_o}{R_f}$$

$$I_f = -\frac{V_o}{R_f}$$

$$I_1 = I_f$$

$$\frac{V_{in}}{R_1} = -\frac{V_o}{R_f}$$

$$V_o = -\left(\frac{R_f}{R_1}\right) V_{in}$$

$$A_v = -\frac{R_f}{R_1}$$

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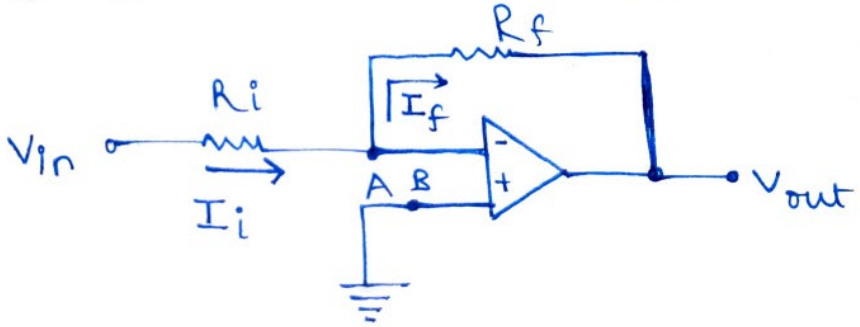
Chart

Inverting Amp (AC Source) (DC Source)

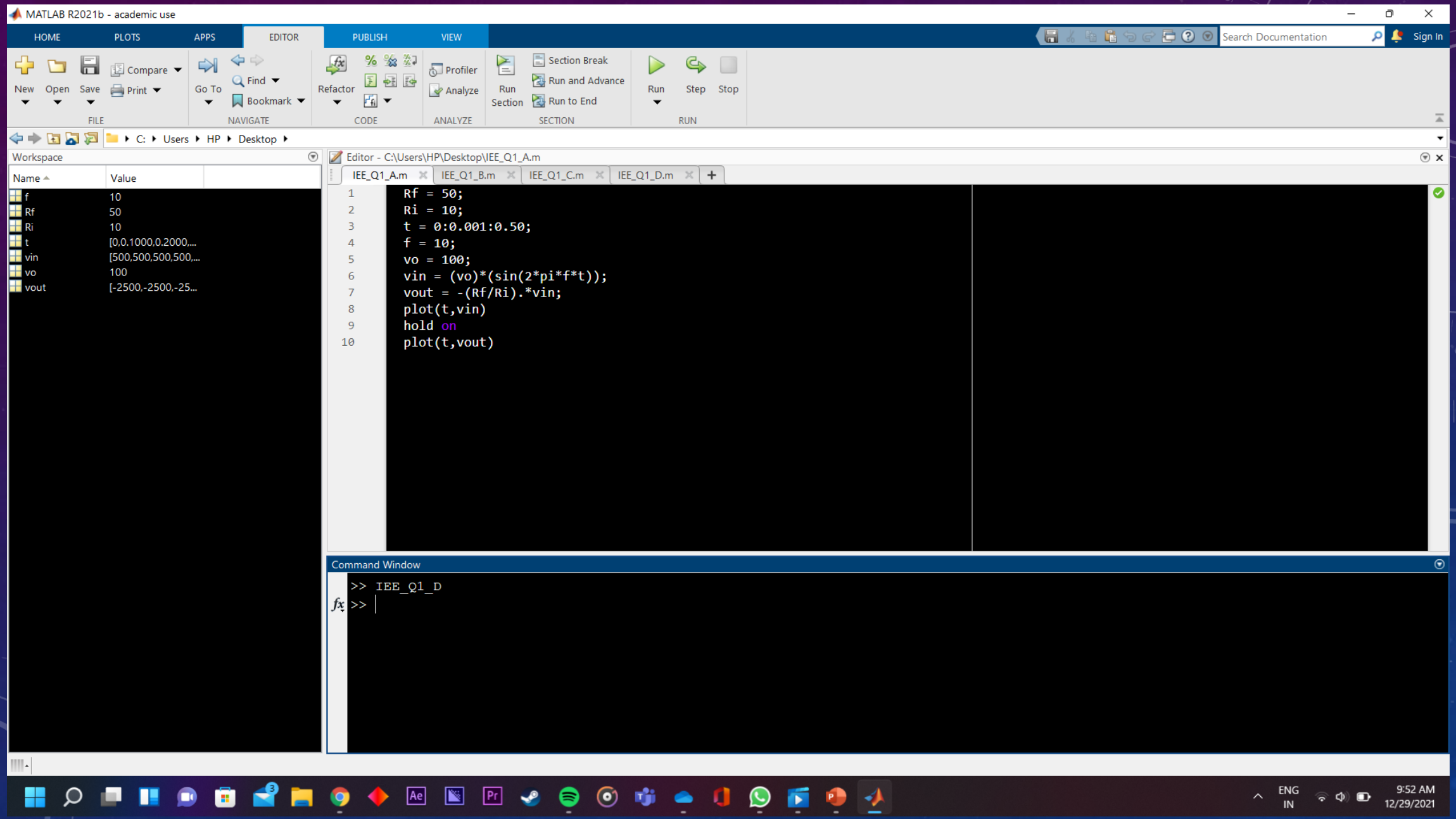


So basically input voltage source is going to be different.

for AC Source Vin

for DC Source Vin

A-MATLAB CODE



A-GRAPH

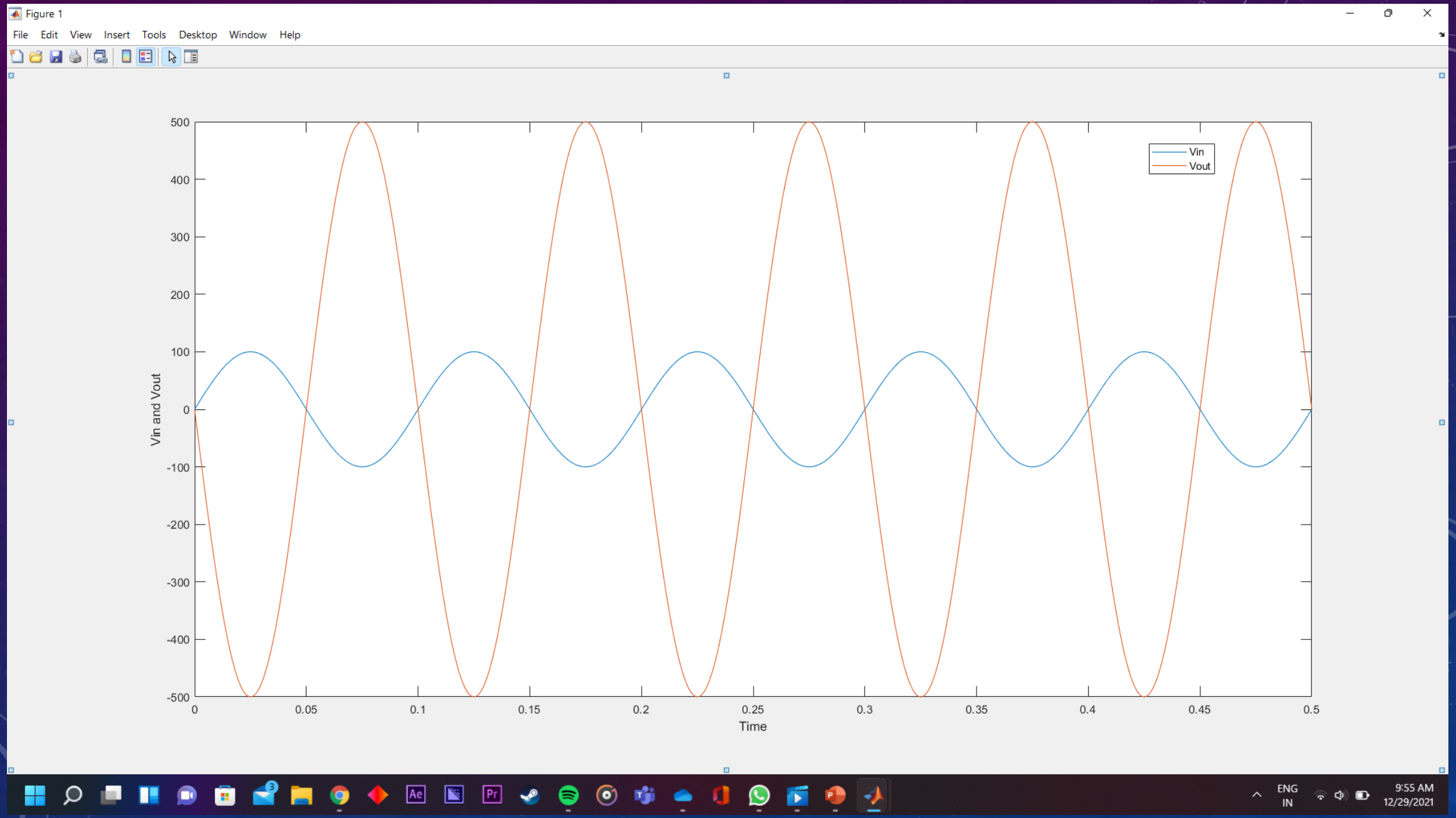
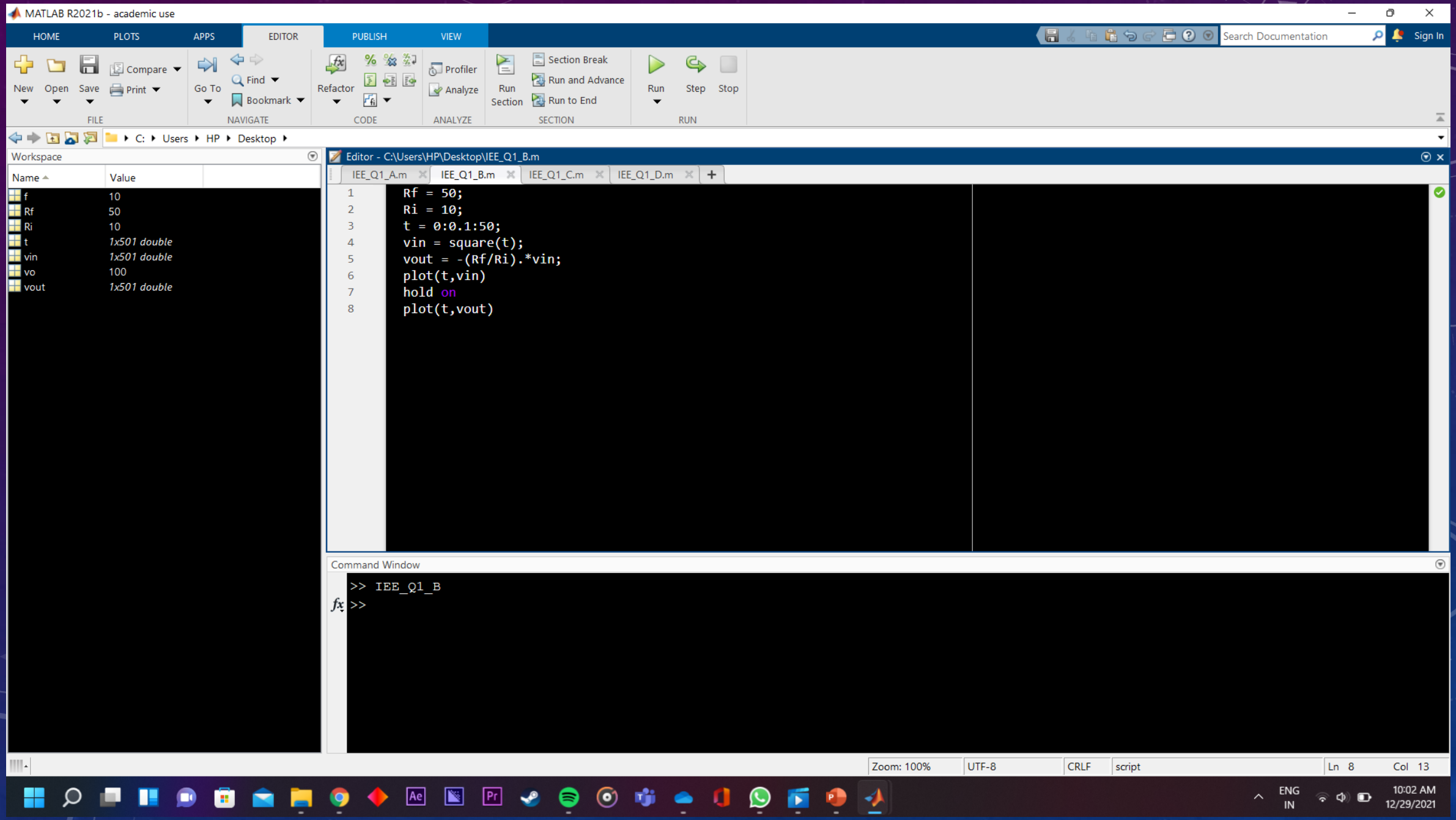


Figure 1
File Edit View Insert Tools Desktop Window Help
Vin
Vout
Vin and Vout
Time
500
400
300
200
100
0
-100
-200
-300
-400
-500
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
ENG
IN
9:55 AM
12/29/2021

B-MATLAB CODE



B-GRAPH

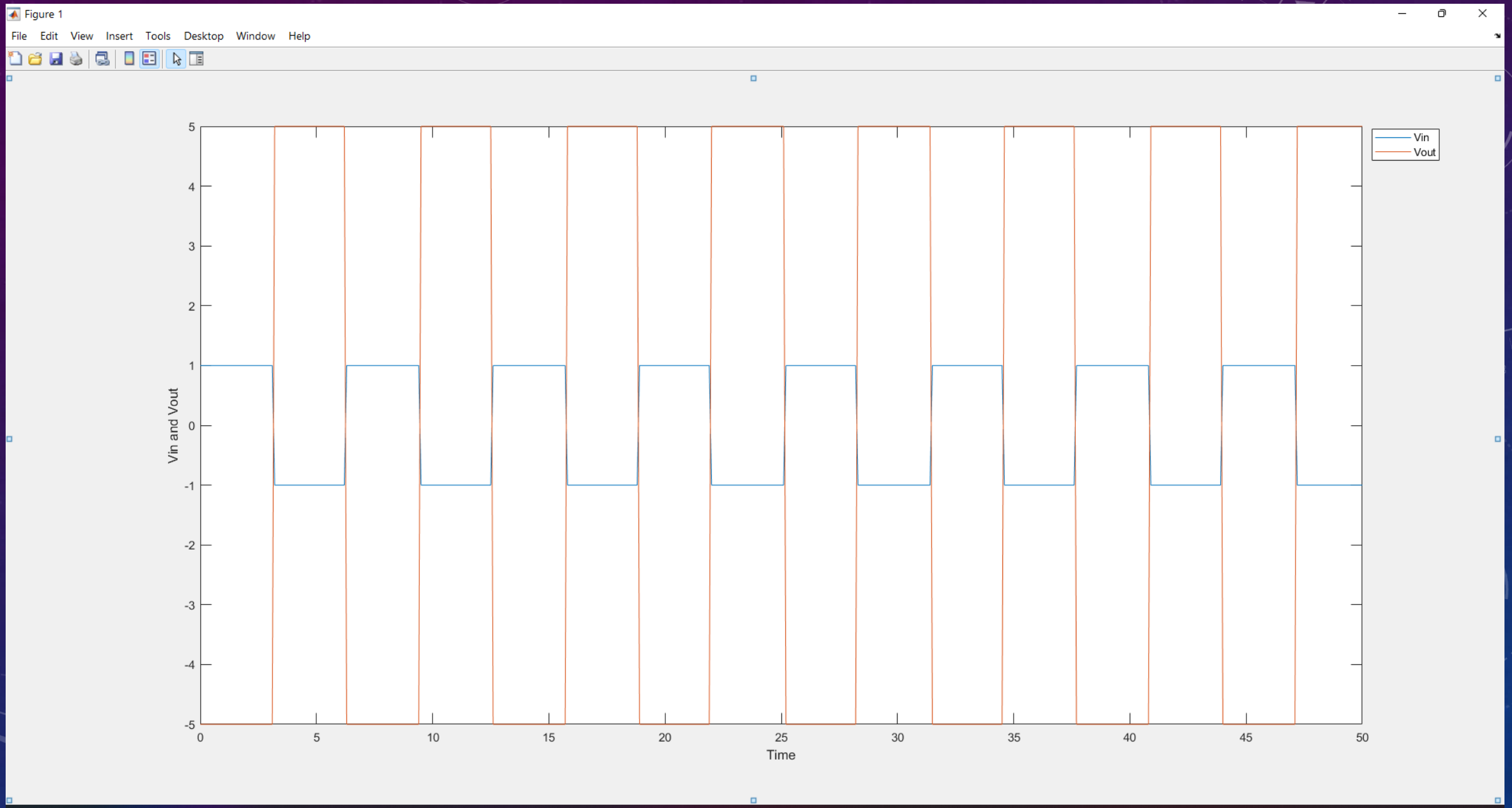
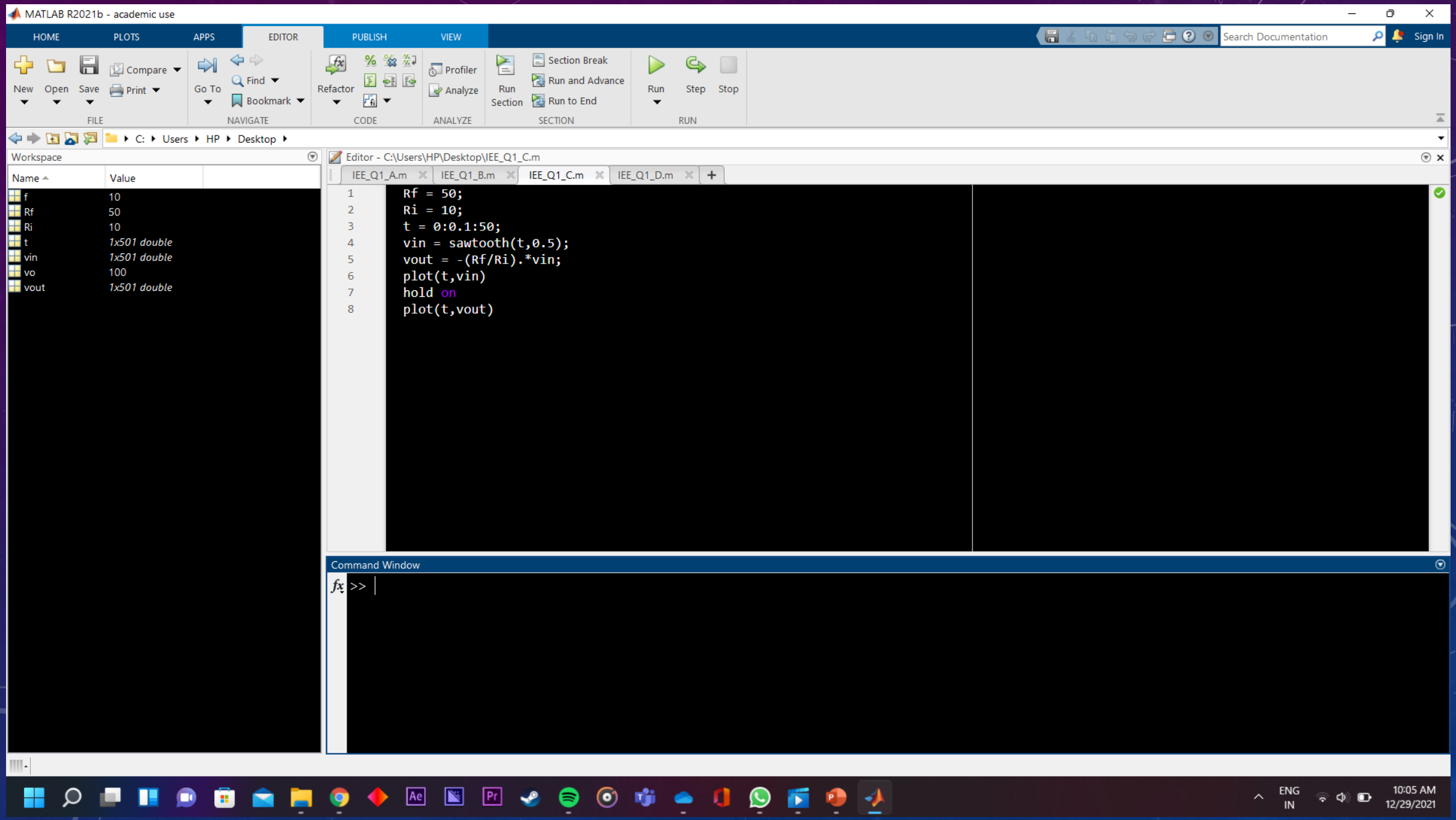


Figure 1
File Edit View Insert Tools Desktop Window Help
Vin
Vout
Vin and Vout
Time
5
4
3
2
1
0
-1
-2
-3
-4
-5
0
5
10
15
20
25
30
35
40
45
50

C-MATLAB CODE



C-GRAPH

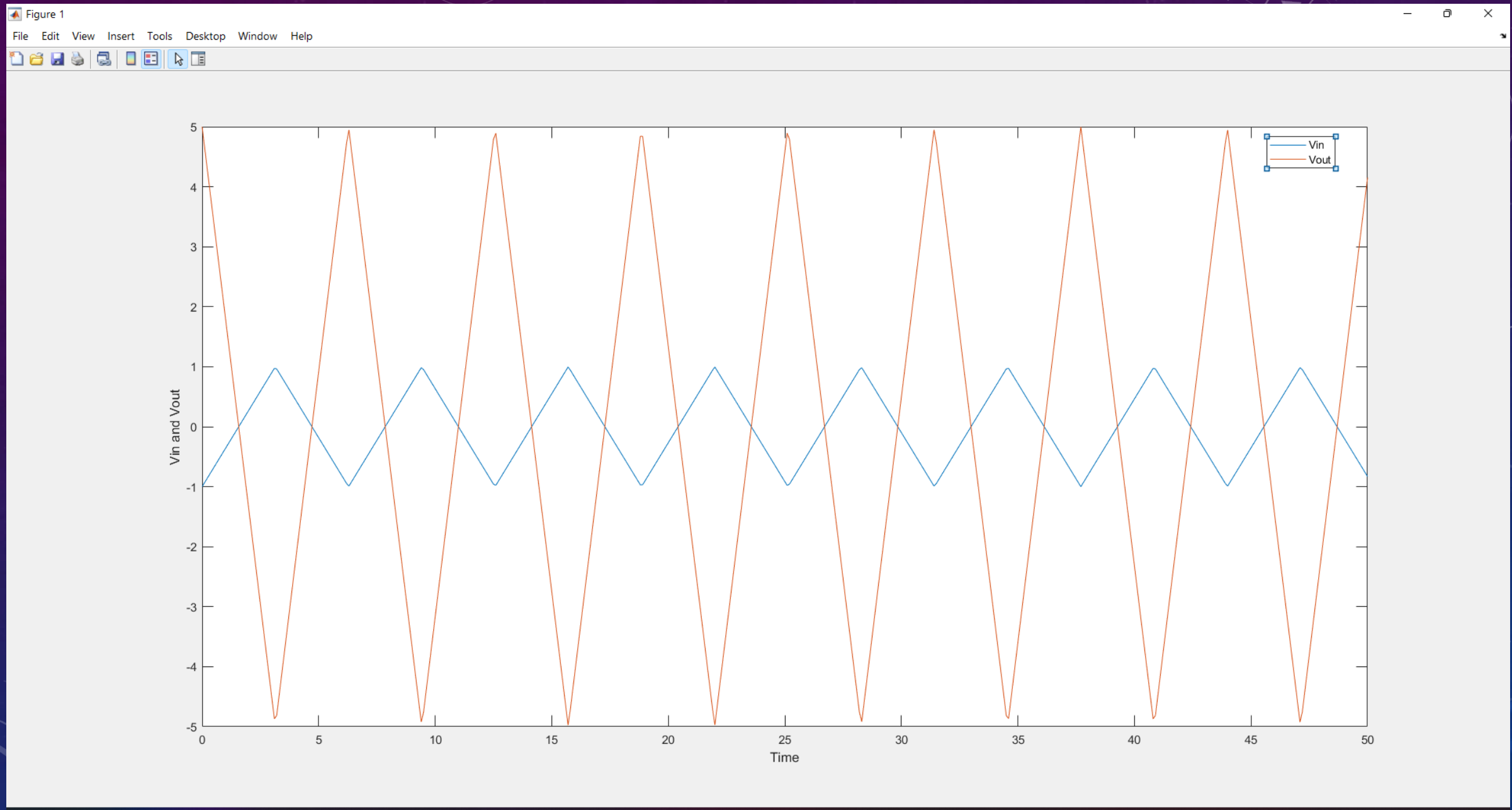
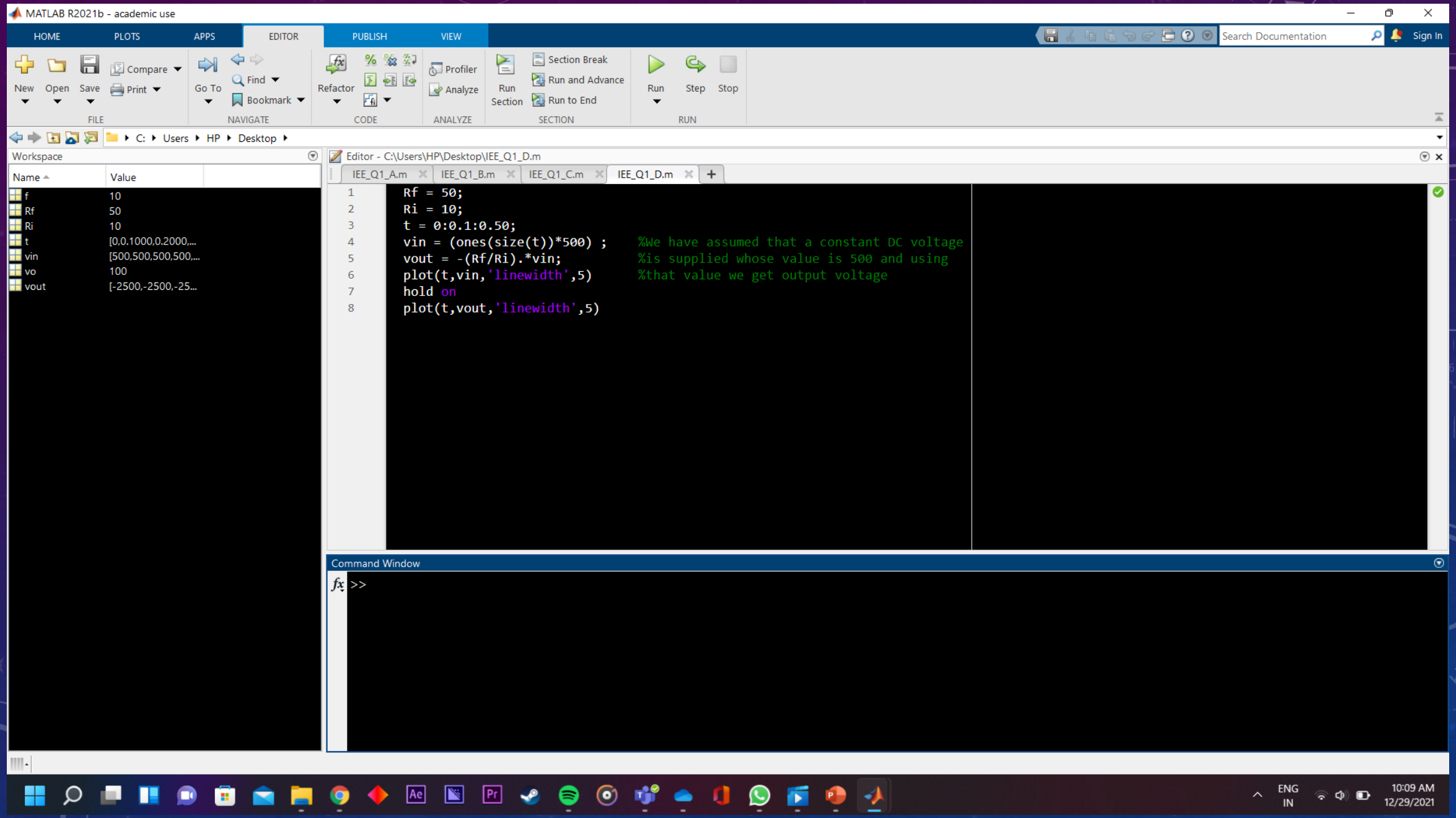


Figure 1
File Edit View Insert Tools Desktop Window Help
Vin
Vout
Vin and Vout
Time
5
4
3
2
1
0
-1
-2
-3
-4
-5
0
5
10
15
20
25
30
35
40
45
50
ENG
IN
10:04 AM
12/29/2021

D-MATLAB CODE



D-GRAPH

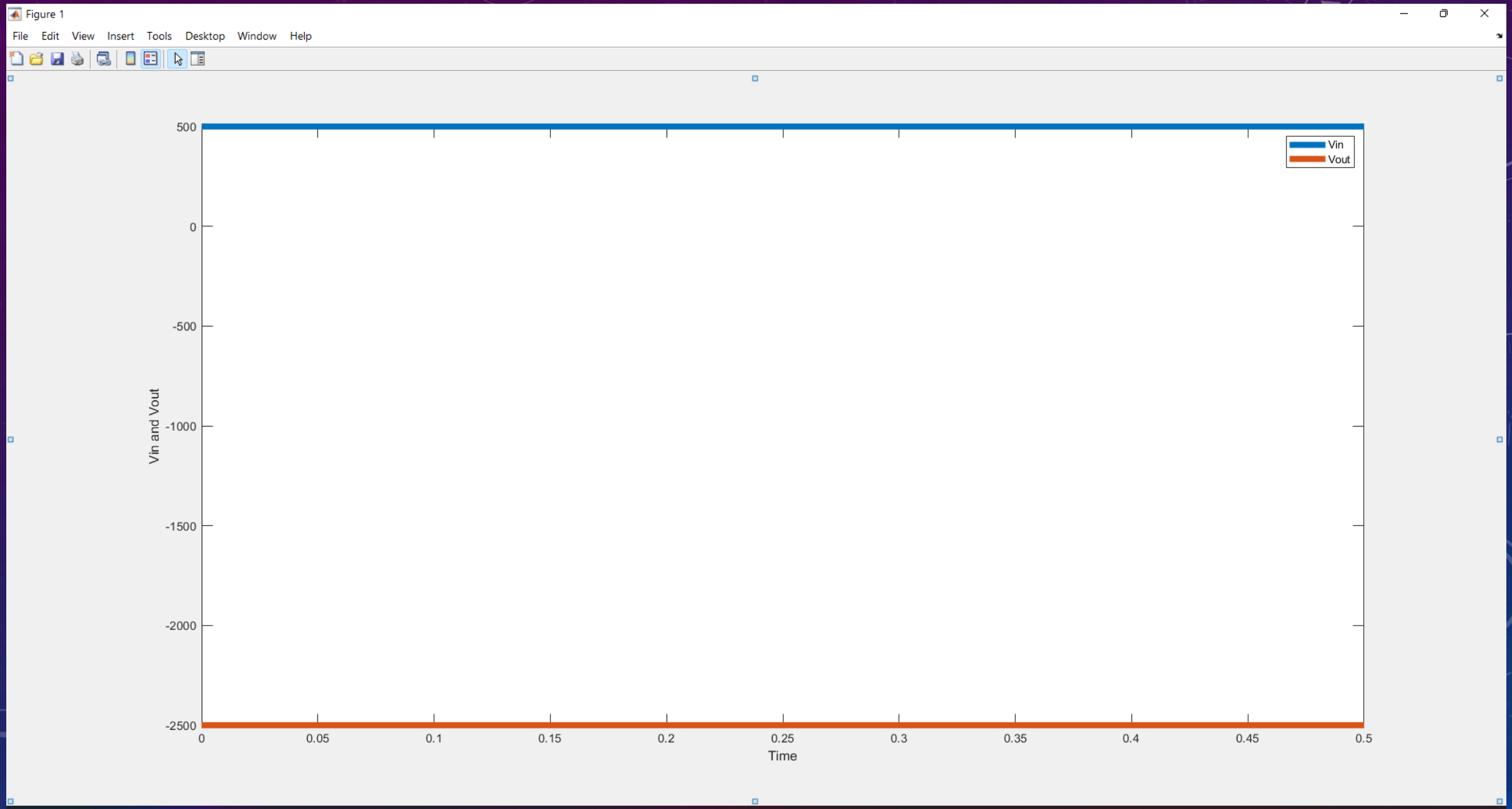
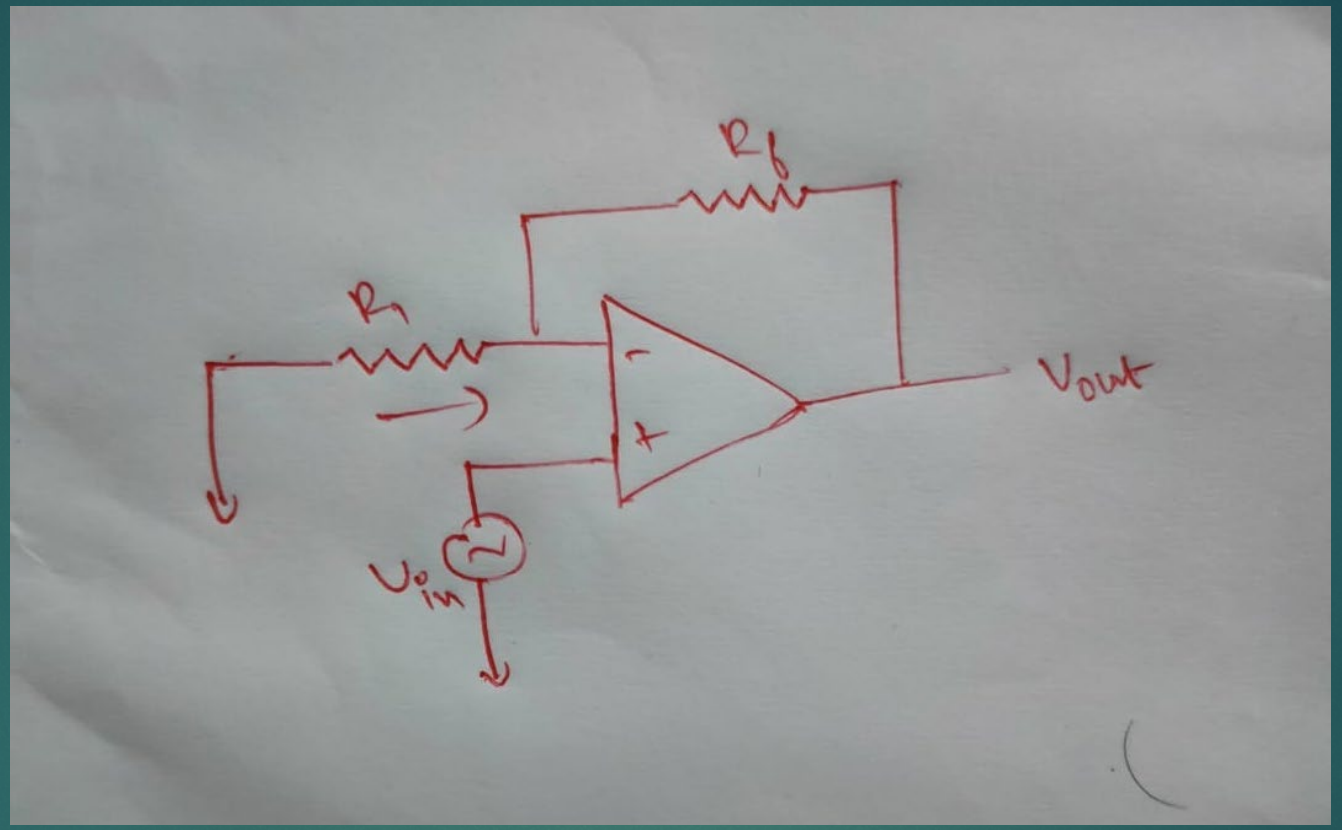


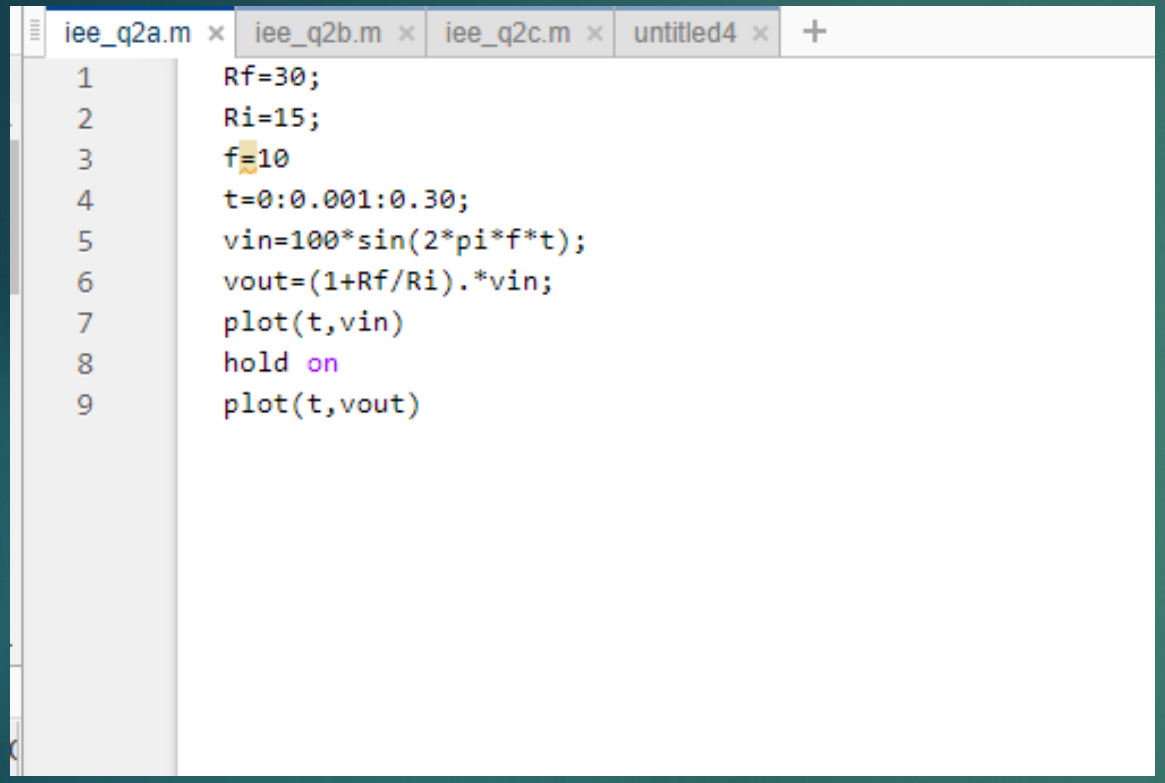
Figure 1
File Edit View Insert Tools Desktop Window Help
Vin
Vout
Vin and Vout
Time
500
0
-500
-1000
-1500
-2000
-2500
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5

Q2

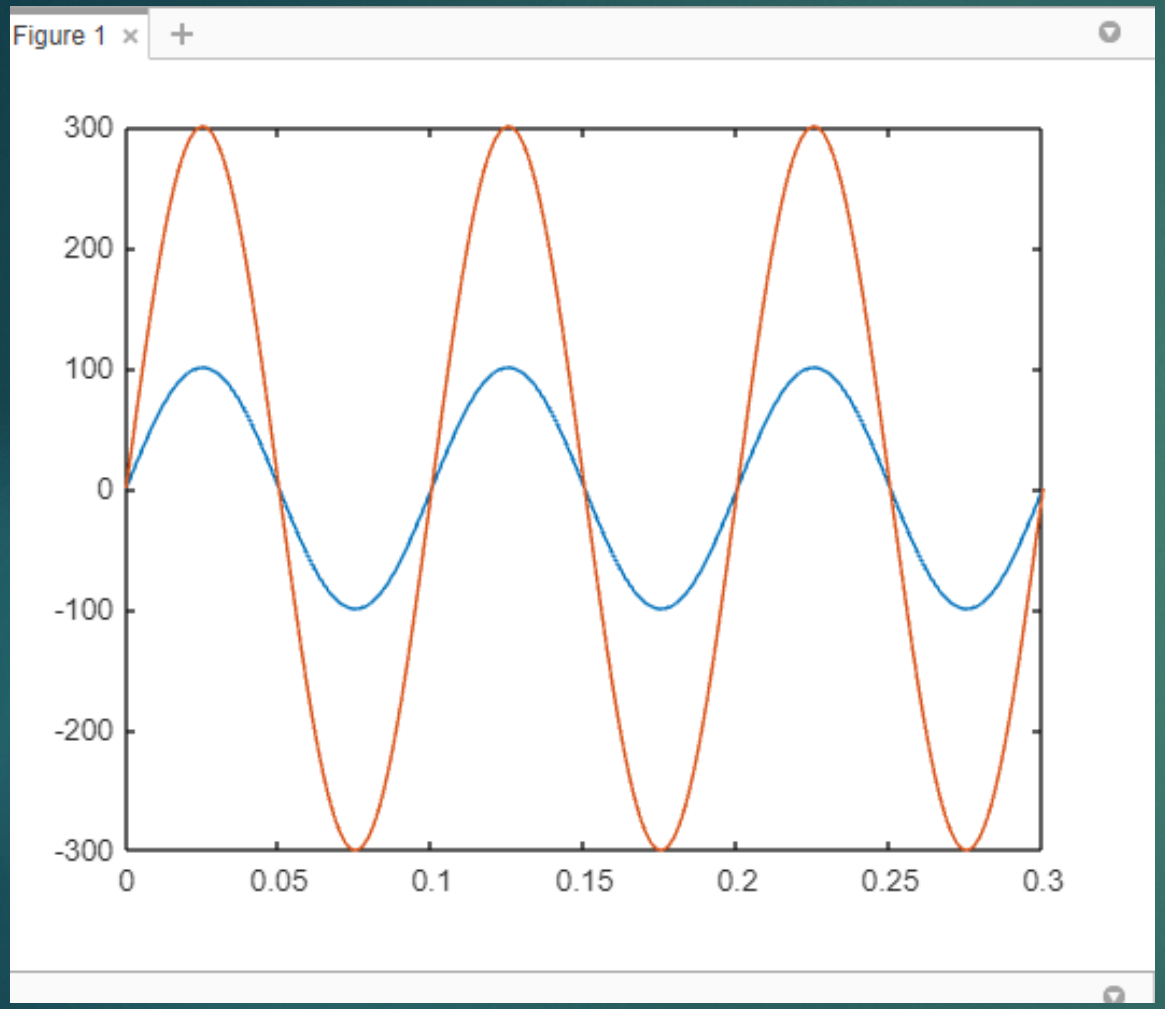
- Create MATLAB codes to implement a gain-tunable non-inverting amplifier which is taking the following functions as input.
- Sinusoidal, Square, Triangular, Constant DC

DIAGRAM





1)INPUT IS SINUSOIDAL: MATLAB CODE;

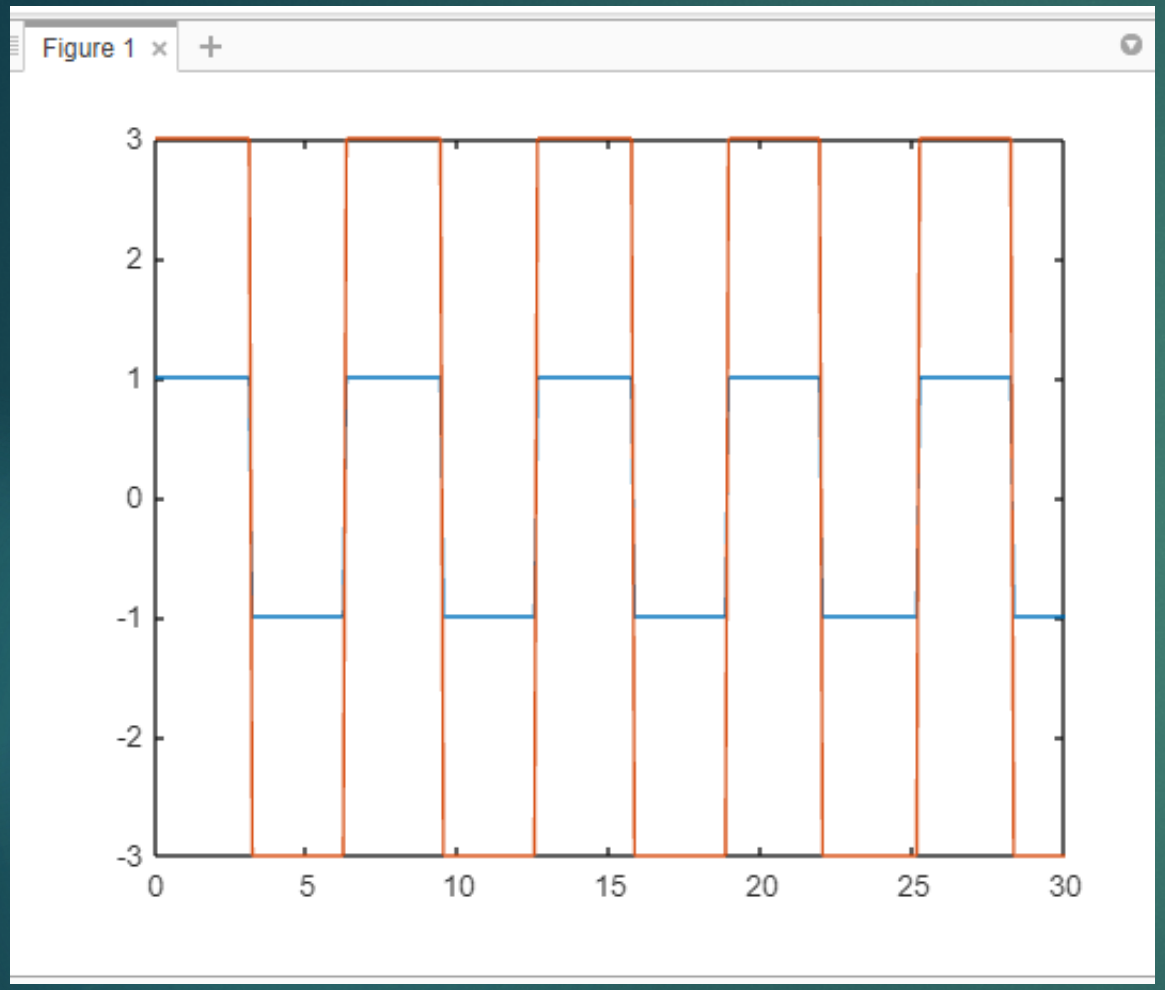


GRAPH;

iee_q2a.m | iee_q2b.m | iee_q2c.m | untitled4

```
1  Rf=30;
2  Ri=15;
3  t=0:0.1:30;
4  vin=square(t);
5  vout=(1+Rf/Ri).*vin;
6  plot(t,vin)
7  hold on
8  plot(t,vout)
```

INPUT IS SQUARE: MATLAB CODE;

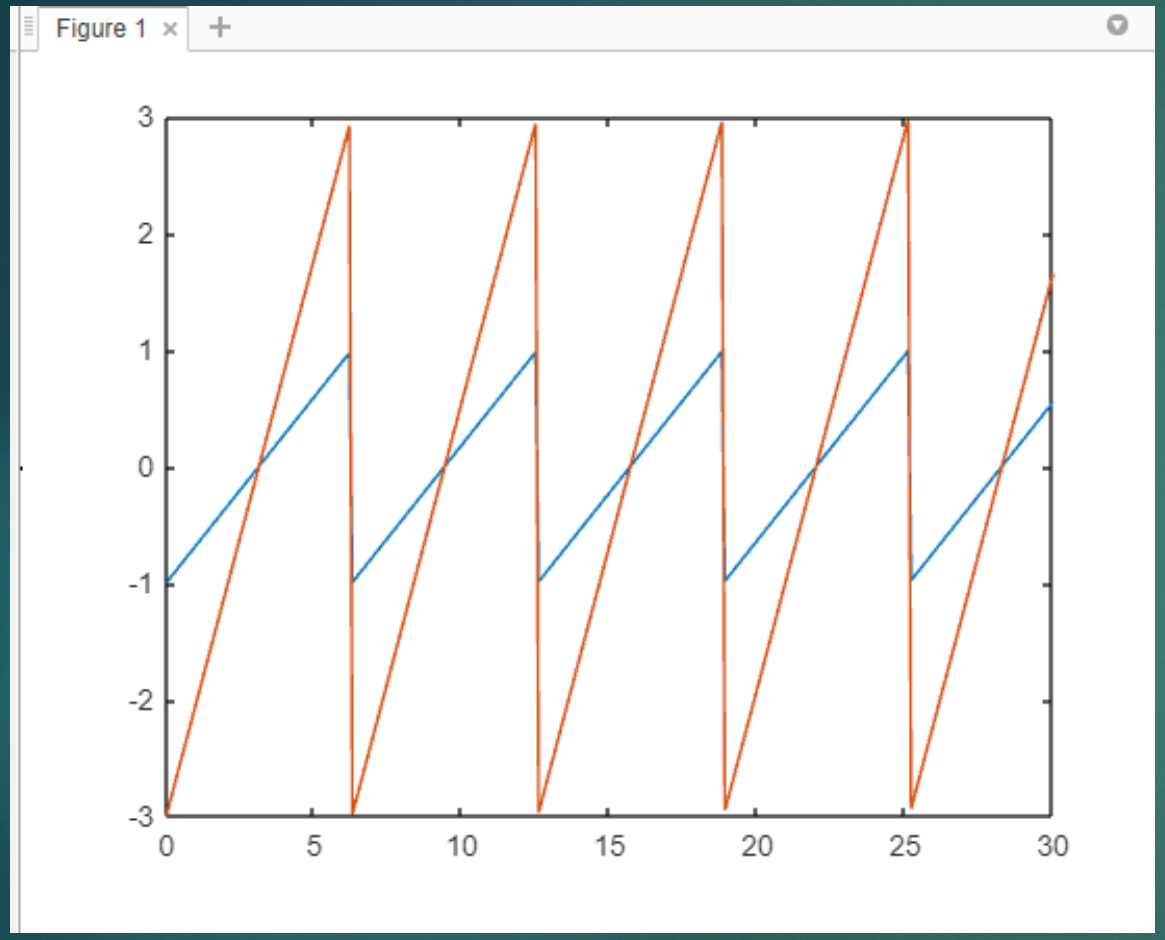


GRAPH;

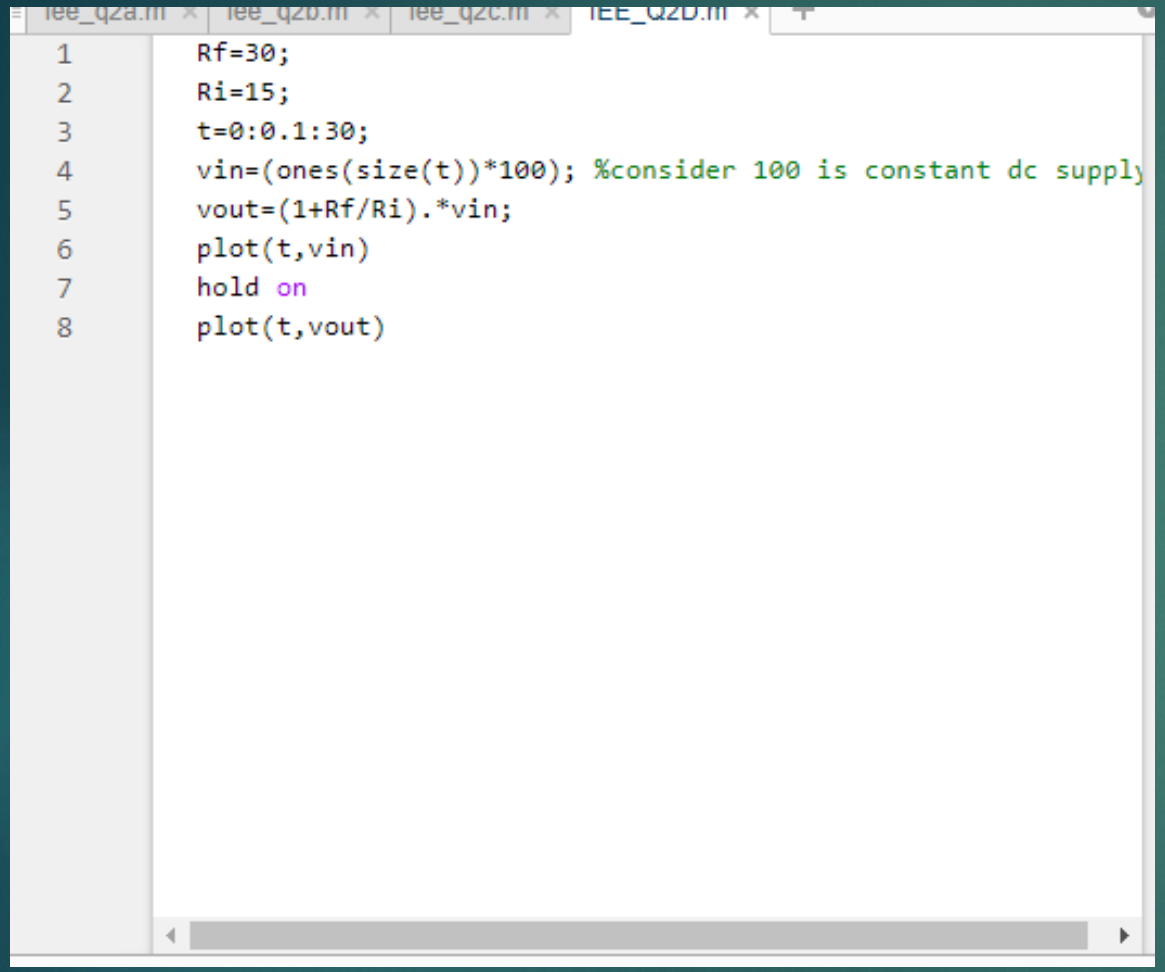
iee_q2a.m | iee_q2b.m | iee_q2c.m | untitled4

```
1  Rf=30;
2  Ri=15;
3  t=0:0.1:30;
4  vin=sawtooth(t);
5  vout=(1+Rf/Ri).*vin;
6  plot(t,vin)
7  hold on
8  plot(t,vout)
```

INPUT IS TRIANGULAR (SAWTOOTH): MATLAB CODE;



GRAPH;



INPUT IS CONSTANT DC: MATLAB CODE;

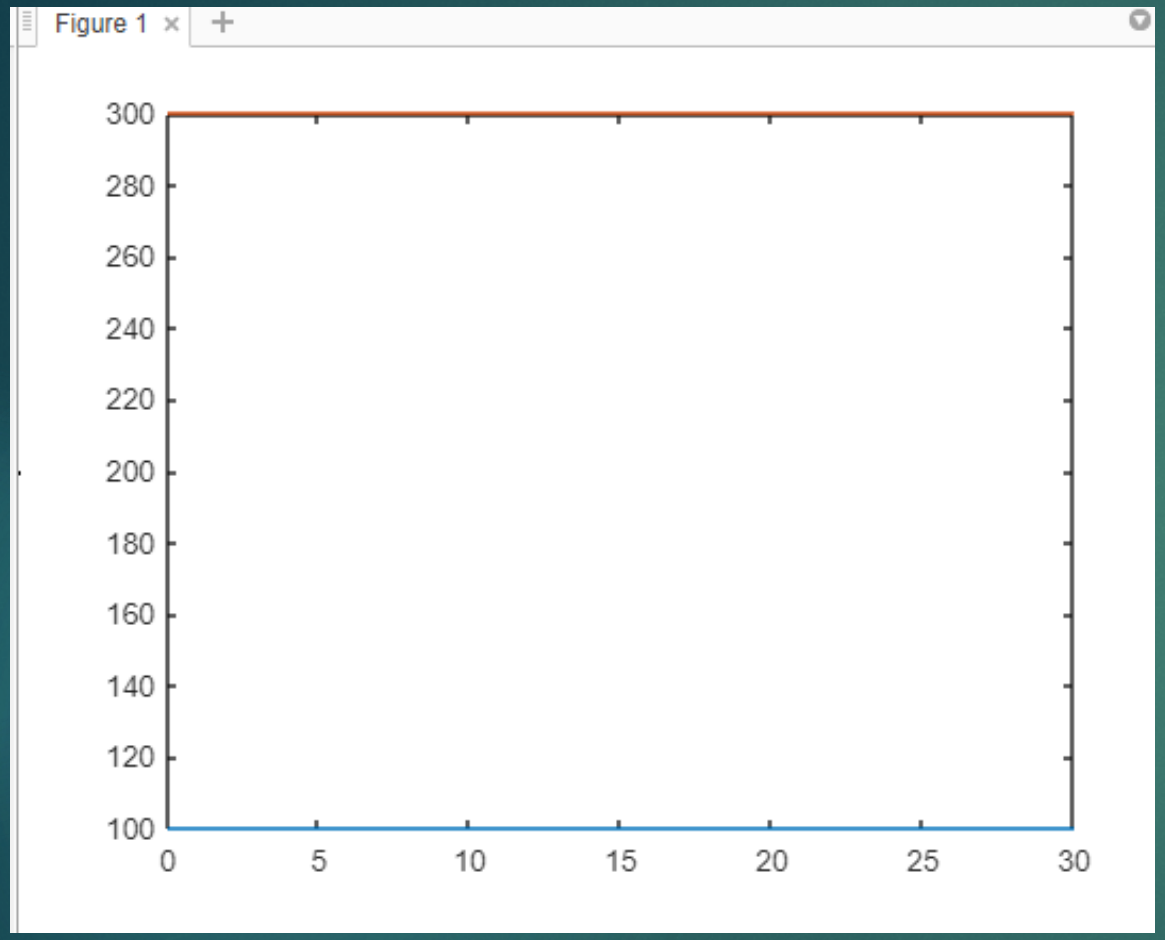


Figure 1
300
280
260
240
220
200
180
160
140
120
100
0
5
10
15
20
25
30

GRAPH;

Q3

- Create MATLAB codes to implement the OPAMP adder concept that combines 50% of the input sinusoid and 120% of the input triangular waves.

MATHLAB CODE AND OUTPUT

PUBLISH VIEW

Search Documentation

Editor - D:\que3_iee.m

+7 | IEE_E7_que3_2nd_part.m | MIS_E4_ASSIGNMENT2_que2.m | mis_E4_assignment2_que1.m | mioioioioi.m | huhuhuhhhuhhu.m | kokokokokok.m | untitled | que3_i

```
2   Ra = 40;
3   Rb = 40;
4   f = 20;
5   t = 0:0.1:25;
6   vin = 0.5*100*sin(2*pi*f*t) + 1.2*sawtooth(t,0.5);
7   vout = -(vin);
8   plot(t,vin);
9   hold on
10  plot(t,vout);
```

Command Window

```
>> que3_iee
>> que3_iee
>> que3_iee
>> que3_iee
>> que3_iee
fx >>
```

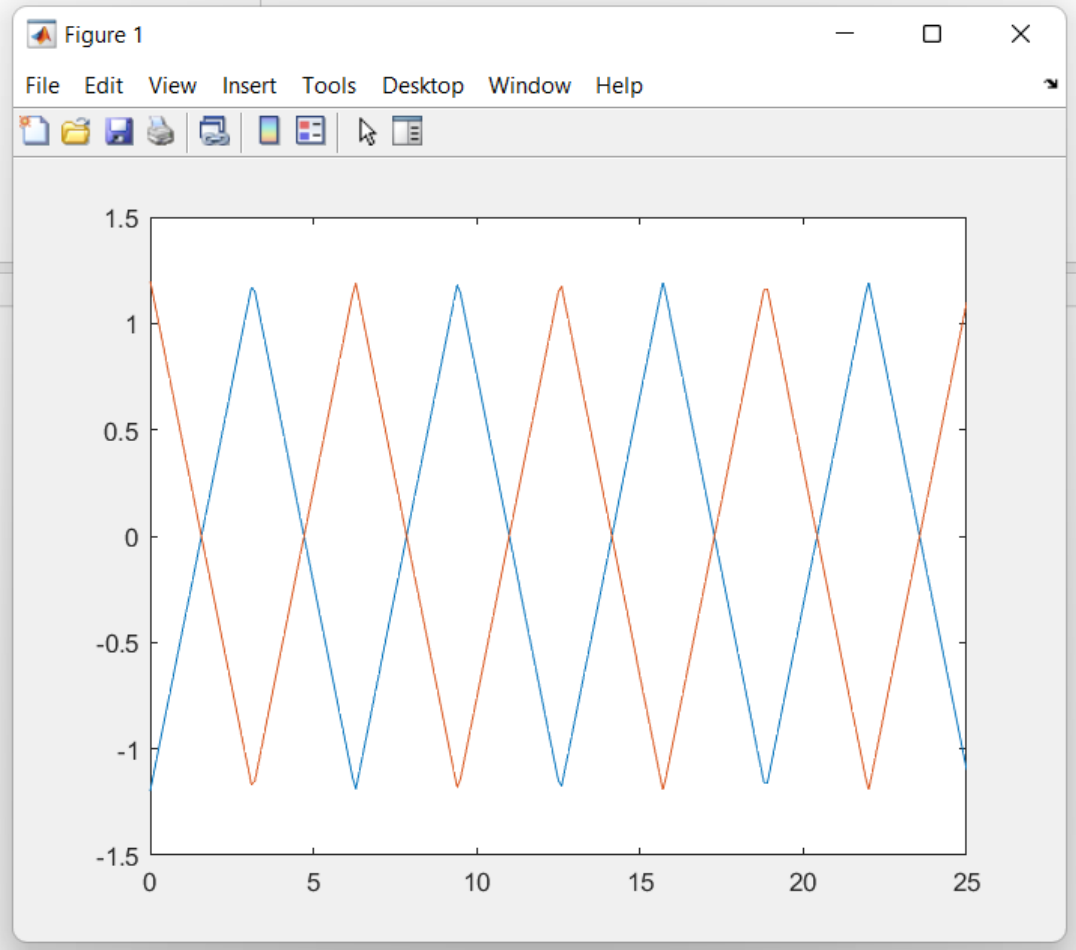


DIAGRAM: