



# Ahsanullah University of Science and Technology

**DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING**

**EEE 3110**

**Numerical Technique Laboratory**

**Report No. : 03**  
Date of Submission : 11/12/2022

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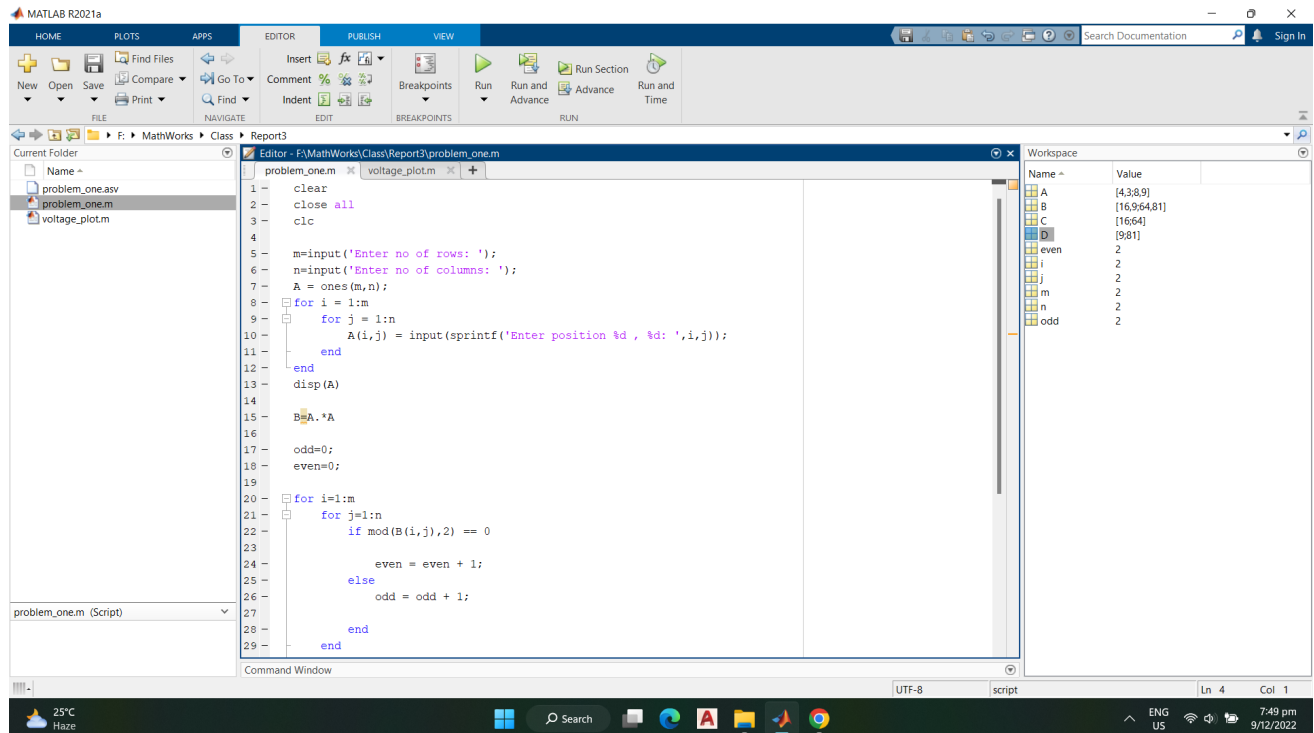
Submitted By:

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Year : 03  
Semester : 01  
Section : C(2)  
Session : Spring '22

## Problem-1:

Determine the square of every element that generates the B matrix. Display the even numbers and odd numbers in a separate matrix (C and D). Count the total number of even and odd numbers in the B matrix.

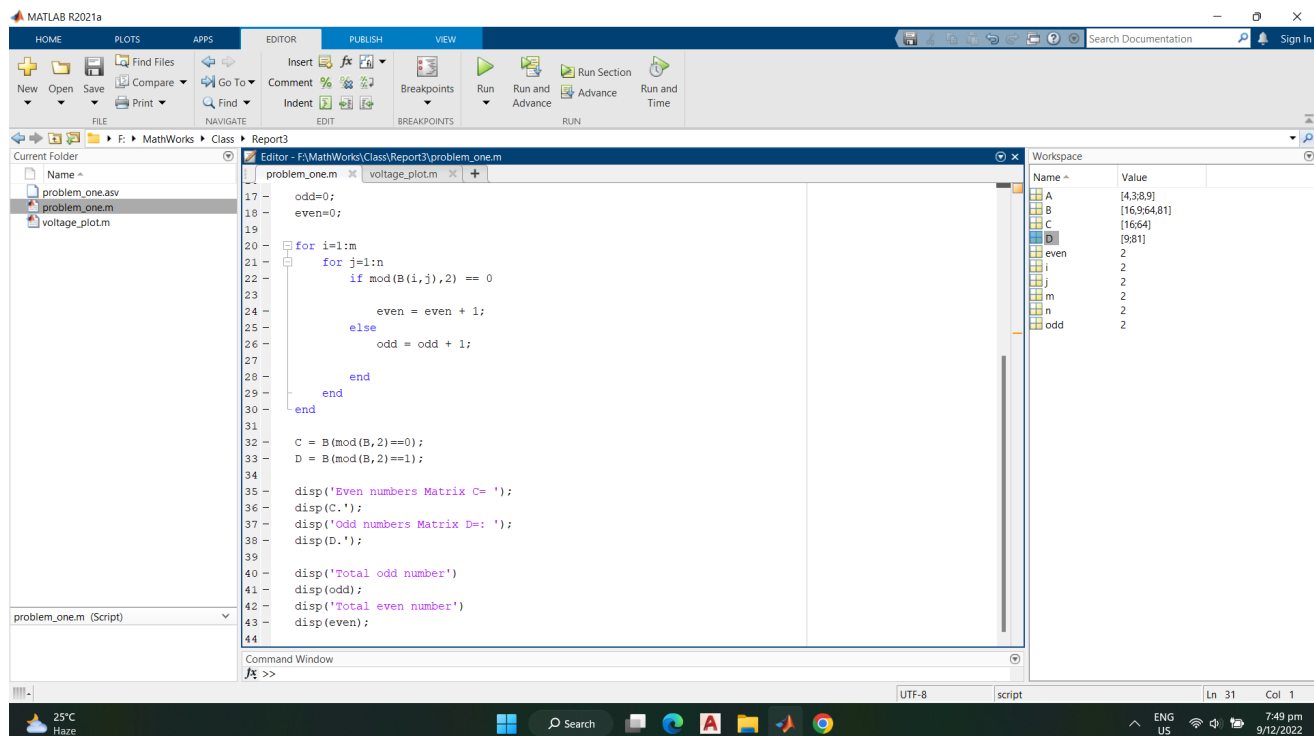


The screenshot shows the MATLAB R2021a interface with the Editor window open to the file `problem_one.m`. The script contains the following code:

```
1 clear
2 close all
3 clc
4
5 m=input('Enter no of rows: ');
6 n=input('Enter no of columns: ');
7 A = ones(m,n);
8 for i = 1:m
9     for j = 1:n
10        A(i,j) = input(sprintf('Enter position %d , %d: ',i,j));
11    end
12 end
13 disp(A)
14
15 B=A.*A
16
17 odd=0;
18 even=0;
19
20 for i=1:m
21     for j=1:n
22         if mod(B(i,j),2) == 0
23
24             even = even + 1;
25         else
26             odd = odd + 1;
27         end
28     end
29 end
```

The Workspace window on the right shows the following variables and their values:

Name	Value
A	[4,3,8,9]
B	[16,9,64,81]
C	[16,64]
D	[9,81]
even	2
i	2
j	2
m	2
n	2
odd	2



The screenshot shows the MATLAB R2021a interface with the Editor window open to the file `problem_one.m`. The script contains the following code:

```
17 odd=0;
18 even=0;
19
20 for i=1:m
21     for j=1:n
22         if mod(B(i,j),2) == 0
23
24             even = even + 1;
25         else
26             odd = odd + 1;
27         end
28     end
29 end
30
31
32 C = B(mod(B,2)==0);
33 D = B(mod(B,2)==1);
34
35 disp('Even numbers Matrix C= ');
36 disp(C);
37 disp('Odd numbers Matrix D= ');
38 disp(D);
39
40 disp('Total odd number')
41 disp(odd);
42 disp('Total even number')
43 disp(even);
44
```

The Workspace window on the right shows the following variables and their values:

Name	Value
A	[4,3,8,9]
B	[16,9,64,81]
C	[16,64]
D	[9,81]
even	2
i	2
j	2
m	2
n	2
odd	2

MATLAB R2021a

HOME PLOTS APPS EDITOR PUBLISH VIEW

File Edit Breakpoints Run Run and Advance Run Section Advance Run and Time

Current Folder: F:\MathWorks\Class\Report3

problem\_one.m voltage\_plot.m

Editor: F:\MathWorks\Class\Report3\problem\_one.m

problem\_one.m voltage\_plot.m

Command Window

```

Enter no of rows: 3
Enter no of columns: 3
Enter position 1, 1: 1
Enter position 1, 2: 2
Enter position 1, 3: 3
Enter position 2, 1: 4
Enter position 2, 2: 5
Enter position 2, 3: 6
Enter position 3, 1: 7
Enter position 3, 2: 8
Enter position 3, 3: 9
1 2 3
4 5 6
7 8 9

B =

1 4 9
16 25 36
49 64 81

Even numbers Matrix C=
16 4 64 36

Odd numbers Matrix D=:
1 49 25 9 81

Total odd number

```

Workspace

Name	Value
A	[1,2,3,4,5,6,7,8,9]
B	[1,4,9;16,25,36;49,64,81]
C	[16,4;64,36]
D	[1,49;25,9]
even	4
i	3
j	3
m	3
n	3
odd	5

problem\_one.m (Script)

25°C Haze

Search

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MATLAB R2021a

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File Edit Breakpoints Run Run and Advance Run Section Advance Run and Time

Current Folder: F:\MathWorks\Class\Report3

problem\_one.m voltage\_plot.m

Editor: F:\MathWorks\Class\Report3\problem\_one.m

problem\_one.m voltage\_plot.m

Command Window

```

Enter position 2, 2: 5
Enter position 2, 3: 6
Enter position 3, 1: 7
Enter position 3, 2: 8
Enter position 3, 3: 9
1 2 3
4 5 6
7 8 9

B =

1 4 9
16 25 36
49 64 81

Even numbers Matrix C=
16 4 64 36

Odd numbers Matrix D=:
1 49 25 9 81

Total odd number
5

Total even number
4

```

Workspace

Name	Value
A	[1,2,3,4,5,6,7,8,9]
B	[1,4,9;16,25,36;49,64,81]
C	[16,4;64,36]
D	[1,49;25,9]
even	4
i	3
j	3
m	3
n	3
odd	5

problem\_one.m (Script)

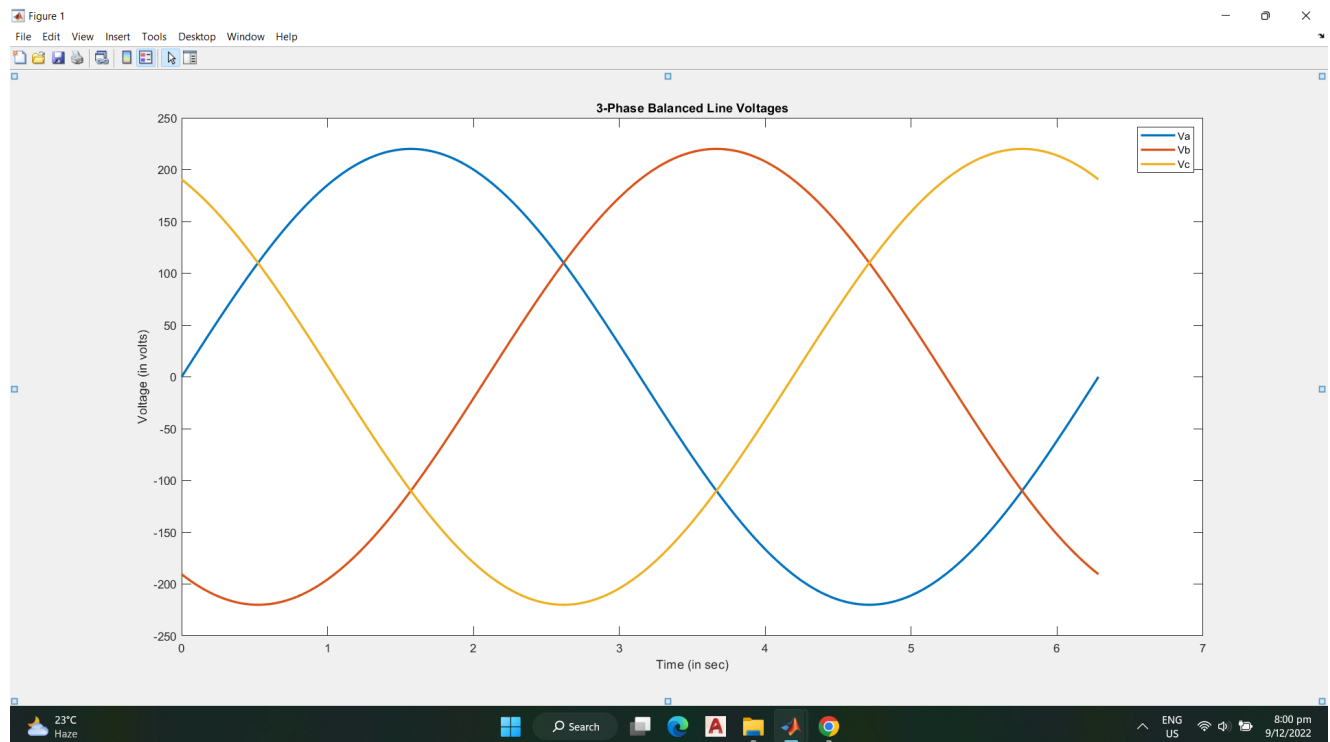
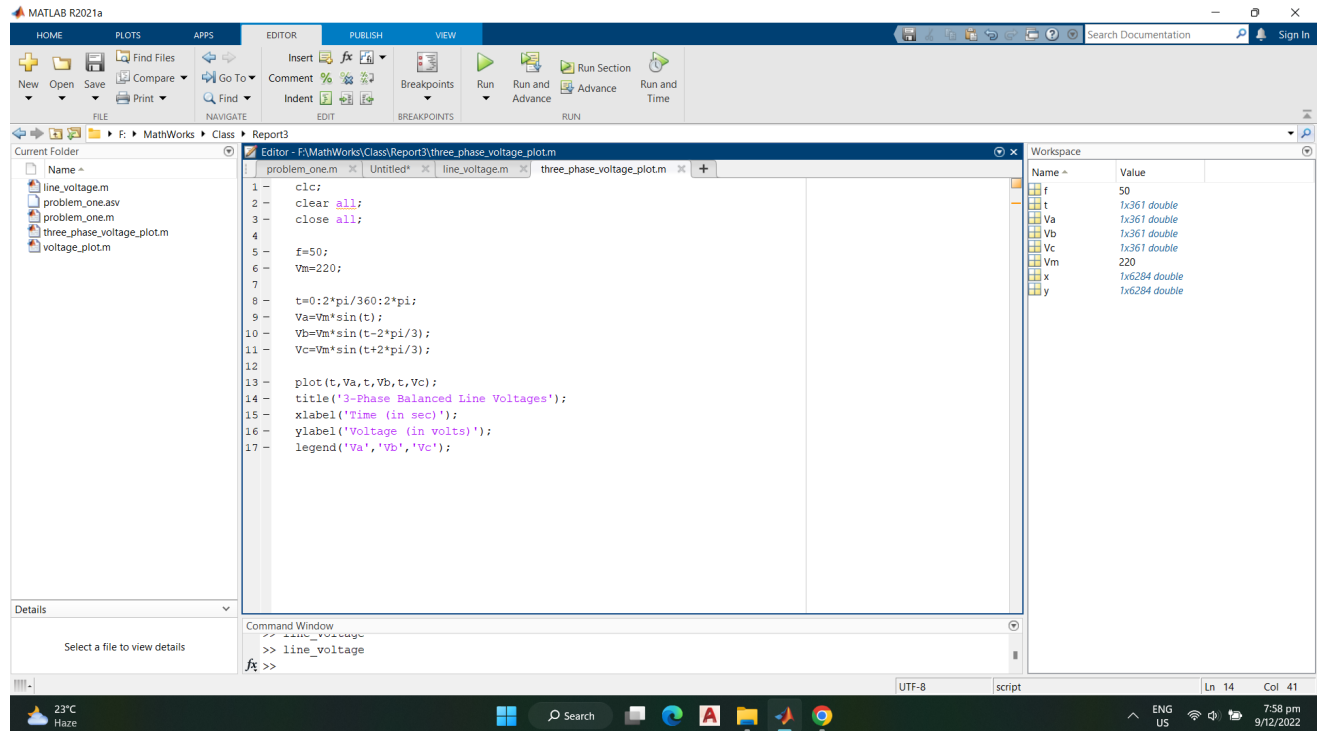
25°C Haze

Search

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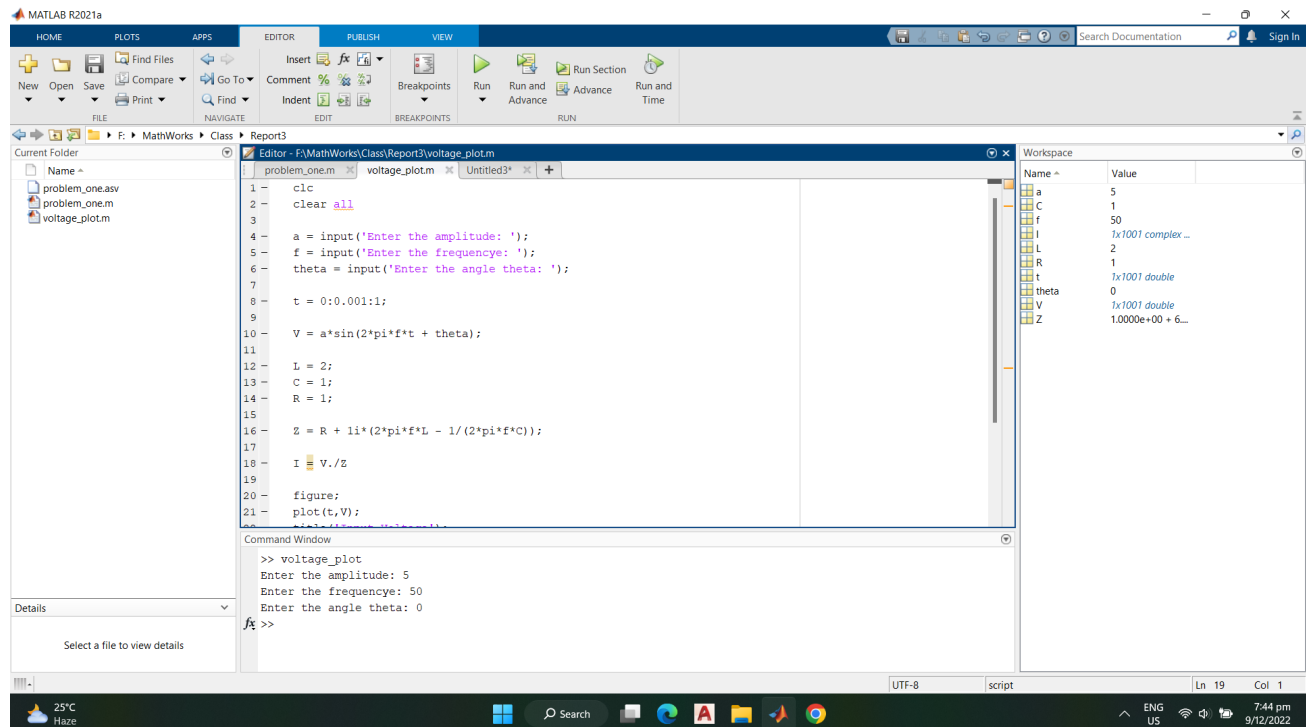
## Problem-2:

Draw the line voltages of 3 phase balanced system in same figure in matlab



### Problem-3:

Consider a simple series R-L-C. Assume we applied AC voltage.  $V = a \sin(2\pi f t + \theta)$  Take the value of  $a$ ,  $f$ ,  $\theta$  as user input. Write a MATLAB code to determine the sinusoidal input voltage and series current.



MATLAB R2021a

HOME PLOTS APPS EDITOR PUBLISH VIEW

File Edit Breakpoints Run Run and Advance Run Section Advance Run and Time

Current Folder: F:\MathWorks\Class\Report3

Editor: F:\MathWorks\Class\Report3\voltage\_plot.m

```

10 V = a*sin(2*pi*f*t + theta);
11
12 L = 2;
13 C = 1;
14 R = 1;
15
16 Z = R + 1i*(2*pi*f*L - 1/(2*pi*f*C));
17
18 I = V./Z;
19
20 figure;
21 plot(t,V);
22 title('Input Voltage');
23 xlabel('Time (s)');
24 ylabel('Voltage (V)');
25
26 figure;
27 plot(t,abs(I));
28 title('Series Current');
29 xlabel('Time (s)');
30 ylabel('Current (A)');

```

Command Window

```

>> voltage_plot
Enter the amplitude: 5
Enter the frequency: 50
Enter the angle theta: 0
fx >>

```

Workspace

Name	Value
a	5
C	1
f	50
I	1x1001 complex ...
L	2
R	1
t	1x1001 double
theta	0
V	1x1001 double
Z	1.0000e+00 + 6...

Details

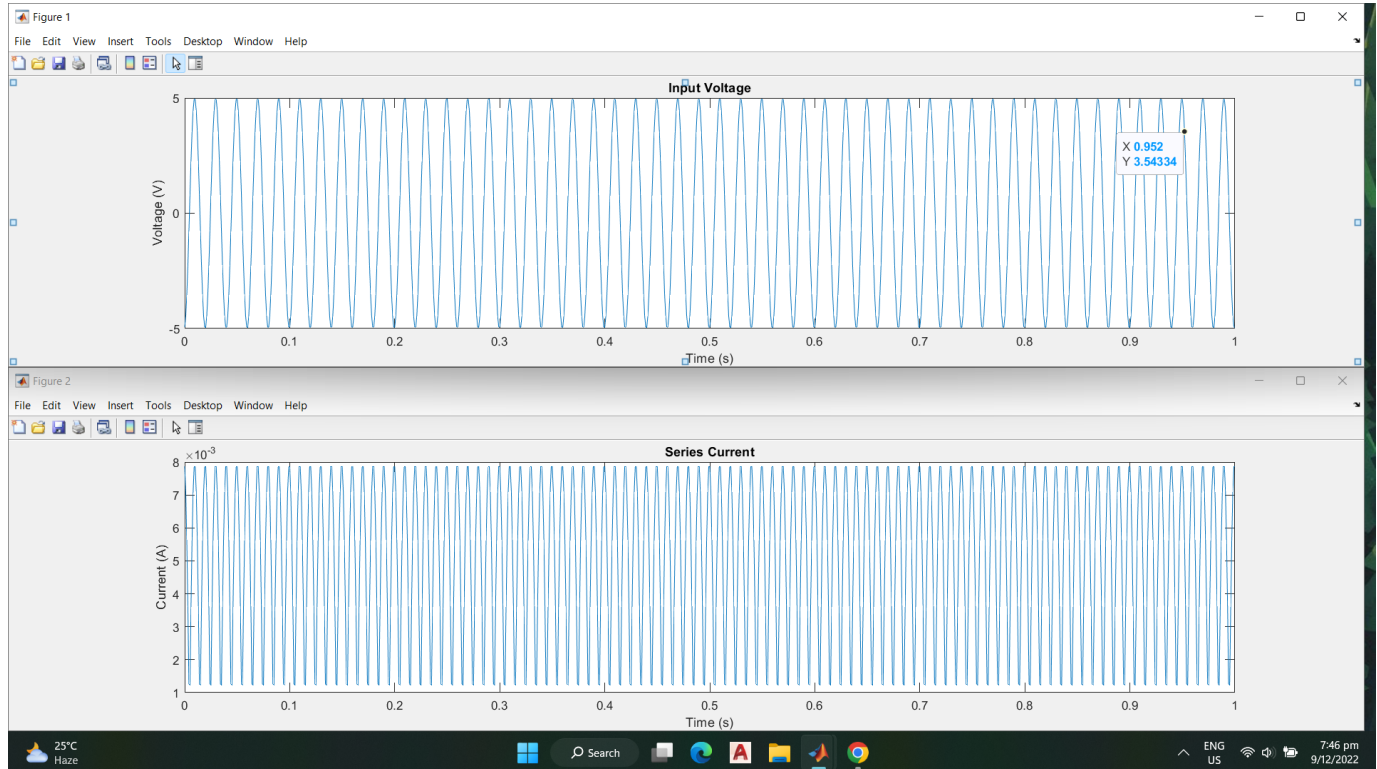
Select a file to view details

UTF-8 script Ln 25 Col 1

25°C Haze

Search

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## Problem 4:

Draw the I-V characteristics of diodes for Si and GaAs.

MATLAB R2021a

HOME PLOTS APPS EDITOR PUBLISH VIEW

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FILE NAVIGATE EDIT BREAKPOINTS RUN

Current Folder: F:\MathWorks\Class\Report3

Editor - Untitled9\*

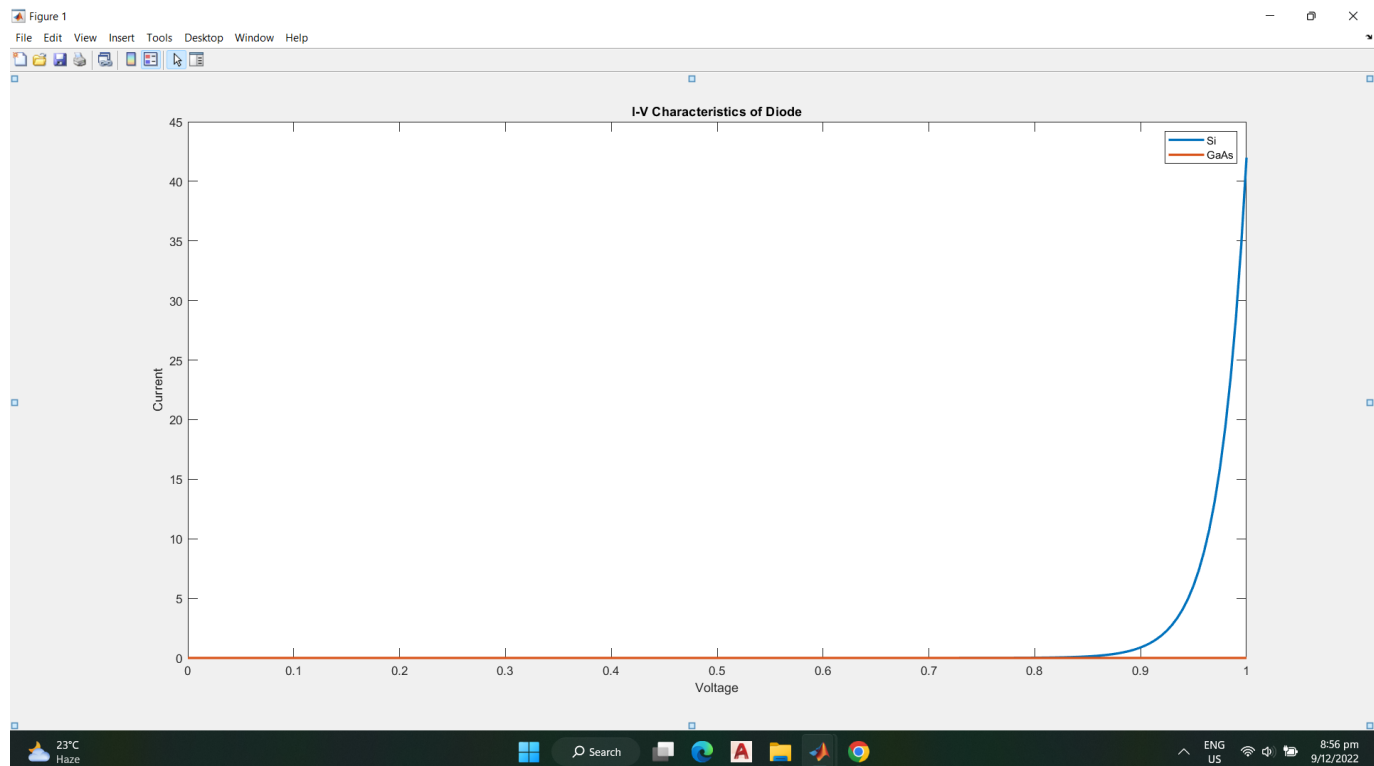
```
1 clear
2 close all
3 clc
4
5 Vd=linspace(0,1,200);
6 I0=6.9e-16;
7 n=1;
8 K=1.38e-23;
9 T=300;
10 q=1.6e-19;
11
12 Id_Si=I0*(exp(q*Vd/(n*K*T))-1);
13 plot(Vd,Id_Si)
14 hold on
15
16 Id_GaAs=I0*(exp(q*Vd/(2*K*T))-1);
17 plot(Vd,Id_GaAs)
18
19 title('I-V Characteristics of Diode')
20 xlabel('Voltage')
21 ylabel('Current')
22 legend('Si','GaAs')
```

Command Window

UTF-8 script Ln 7 Col 6

Workspace

Name	Value
I0	6.9000e-16
Id_GaAs	1x200 double
Id_Si	1x200 double
K	1.3800e-23
n	1
q	1.6000e-19
T	300
Vd	1x200 double



## Problem 5:

Write a MATLAB function that determine the summation of following series.

The screenshot shows the MATLAB R2021a interface. The Editor window displays a script named `series.m` with the following code:

```
1 clc
2 clear all
3 close all
4
5 n=input('Enter Last term n= ');
6
7 sum=series_sum(n);
8 disp(sum)
9
10
```

The Command Window shows the execution results:

```
Enter Last term n= 99
4950
```

The Workspace window shows the variables `n` and `sum` with their respective values:

Name	Value
n	99
sum	4950

The screenshot shows the MATLAB R2021a interface. The Editor window displays a function named `series_sum.m` with the following code:

```
1 function [sum] = series_sum(n)
2     sum=0;
3     for i=1:n
4         if mod(i,2)==1
5             sum=sum+(i^2);
6         else
7             sum=sum-(i^2);
8         end
9     end
10 end
11
```

The Command Window shows the execution results:

```
Enter Last term n= 99
4950
```

The Workspace window shows the variables `n` and `sum` with their respective values:

Name	Value
n	99
sum	4950



## Problem 6:

Write a program to compute the variance of an array x.

The image shows the MATLAB R2021a interface with a script editor, command window, and workspace.

**Script Editor (variance.m):**

```
1 clear all
2 close all
3 clc
4
5 x=[1:100];
6 n=length(x);
7 avg=sum(x)/n;
8
9 s=0; for i=1:100
10     s=s+(i-avg)^2
11 end
12
13 var=s/n
14
15 % P=(x-avg).^2;
16 % var=sum(P)/n
```

**Command Window:**

```
s =
    83325

var =
    833.2500
```

**Workspace:**

Name	Value
avg	50.5000
i	100
n	100
s	83325
var	833.2500 1x100 double
x	