

Shubhan Singh

2022300118

SE-Comps B/Batch C

25th April 2024

LA Lab ESE

Program No.1 :- Find the Eigen values of the following matrix.

$$A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$$

Code :-

```
clc;
A = [1 2 2; 2 1 2; 2 2 1];
printf("The Matrix A is: ");
disp(A);
a = A(1, 1) + A(2, 2) + A(3, 3);
b = A(1, 1)*A(2, 2) - A(1, 2)*A(2, 1) + A(2, 2)*A(3, 3) - A(2, 3)*A(3, 2) + A(1, 1)*A(3, 3) - A(1, 3)*A(3, 1);
m = det(A);
p = [1 -a b -m];
m = roots(p);
printf("The Eigen Values of Matrix A are:");
disp(m);
```

Output :-

```
Scilab 6.1.1 Console
The Matrix A is:
 1.  2.  2.
 2.  1.  2.
 2.  2.  1.
The Eigen Values of Matrix A are:
 5. + 0.i
-1. + 0.i
-1. + 0.i
--> |
```

Program No. 2:- Solve the given system of equations in terms of x,y,z,w using Gauss Elimination method

$$2x+3y+4z-2w=11$$

$$2x+3y-3z-w=1$$

$$7x+9y-4z+7z=21$$

$$102x-y+70z+301w=72$$

Code:-

```
clc;
A= [2 3 4 -2;2 3 -3 -1;7 9 -4 7;102 -1 70 301];
B= [11;1;21;72];
printf("The matrix A is:");
disp(A);
printf("The matrix B is:");
disp(B);
C=[A B];
printf("The matrix C is:");
disp(C);
n=4;
for i=1:n
    if C(i,i)==0
        C(i,:)=C(i,:)+C(i+1,:);
    end
    if C(i,i)~=0
        C(i,:)=C(i,+)/C(i,i);
    end
    disp(C);
    for j=i+1:n
        C(j,:)=C(j,:)-C(i,:)*C(j,i);
    end
    disp(C);
end
for i=n:-1:2
    for j=1:i-1
        C(j,:)=C(j,:)-C(i,:)*C(j,i);
    end
    disp(C);
end
printf("x=%g\n",C(1,5));
printf("y=%g\n",C(2,5));
printf("z=%g\n",C(3,5));
printf("w=%g\n",C(4,5));
```

Output :-

Scilab 6.1.1 Console

The matrix A is:

```
2.    3.    4.   -2.
2.    3.   -3.   -1.
7.    9.   -4.    7.
102.  -1.   70.  301.
```

The matrix B is:

```
11.
1.
21.
72.
```

The matrix C is:

```
2.    3.    4.   -2.   11.
2.    3.   -3.   -1.    1.
7.    9.   -4.    7.   21.
102.  -1.   70.  301.   72.
```

```
1.    1.5    2.   -1.    5.5
2.    3.   -3.   -1.    1.
7.    9.   -4.    7.   21.
102.  -1.   70.  301.   72.
```

```
1.    1.5    2.   -1.    5.5
0.    0.   -7.    1.   -10.
0.   -1.5  -18.   14.  -17.5
0.  -154. -134.  403. -489.
```

```
1.    1.5    2.   -1.    5.5
0.    1.   16.666667 -10.   18.333333
0.   -1.5  -18.   14.  -17.5
0.  -154. -134.  403. -489.
```

```
1.    1.5    2.   -1.    5.5
0.    1.   16.666667 -10.   18.333333
0.    0.    7.   -1.   10.
0.    0.  2432.6667 -1137.  2334.3333
```

```

1.   1.5   2.      -1.      5.5
0.   1.   16.666667 -10.      18.333333
0.   0.   1.      -0.1428571  1.4285714
0.   0.   2432.6667 -1137.    2334.3333

```

```

1.   1.5   2.      -1.      5.5
0.   1.   16.666667 -10.      18.333333
0.   0.   1.      -0.1428571  1.4285714
0.   0.   0.      -789.47619 -1140.9048

```

```

1.   1.5   2.      -1.      5.5
0.   1.   16.666667 -10.      18.333333
0.   0.   1.      -0.1428571  1.4285714
0.   0.   0.      1.      1.4451414

```

```

1.   1.5   2.      -1.      5.5
0.   1.   16.666667 -10.      18.333333
0.   0.   1.      -0.1428571  1.4285714
0.   0.   0.      1.      1.4451414

```

```

1.   1.5   2.      0.      6.9451414
0.   1.   16.666667 0.      32.784748
0.   0.   1.      0.      1.6350202
0.   0.   0.      1.      1.4451414

```

```

1.   1.5   0.   0.   3.675101
0.   1.   0.   0.   5.534411
0.   0.   1.   0.   1.6350202
0.   0.   0.   1.   1.4451414

```

```

1.   0.   0.   0.   -4.6265155
0.   1.   0.   0.   5.534411
0.   0.   1.   0.   1.6350202
0.   0.   0.   1.   1.4451414

```

```
x=-4.62652
```

```
y=5.53441
```

```
z=1.63502
```

```
w=1.44514
```