Bharatiya Vidya Bhavan's
Sardar Patel Institute of Technology
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous College Affiliated to University of Mumbai)

Computer Engineering Department & Information Technology Engineering Department

Academic Year: 2021-2022

Class: S.Y.B.Tech **Sem.:** 4 **Course:** Linear Algebra

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Experiment No.	4		

AIM:	To demonstrate concept of Gauss Elimination in Scilab
PROBLEMS	

CODE:	Program for finding the constitency of system of linear equation
	
	A=[2,-2,1; 6,-6,3; 12,-12,6]
	
	b=[1;3;6]
	
	[x,kerA]=linsolve(A,b)
	
	if isempty(x) then
	  printf("System of linear equation has no solution ")
	else if isempty(n)
	  printf("System of linear equation has only one solution.It is given by: ")
	  disp(x);
	  printf("The vector n is :")
	  disp(kerA)
	  else
	  printf("The system of linear equation has infinite solutions")
	  disp(x);
	  printf("The vector n is :")
	  disp(kerA)
	  end
	
	  disp(x)

disp(kerA)

```
The system of linear equation has infinite solutions
  -0.2222222
   0.2222222
  -0.1111111
The vector n is :
   0.7417223  -0.0735094
   0.5492722  -0.5038409
  -0.3849002  -0.860663
```

Gauss elimination general Code:

```
A=input("Enter the coefficents: ")

b=input("Enter the right-hand side C: ")

[m,n]=size(A)

[r,s]=size(b)

C=[A b]

for i=1:n
        if C(i,i)==0
            printf("Swapping C rows\n")
            T=C(i,i)
            C(i,:)=C(modulo(i+1,n),:)
            C(modulo(i+1,n),:)=T
            disp(C)
        end
        if C(i,i)~=1
            printf("\nDividing rows %d with %.2f",i,C(i,i))
            C(i,:)=C(i,:)/C(i,i)
        end
```

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```
        disp(C)
        for j=i+1:n
          C(j,:)=C(j,:)-C(j,i)*C(i,:)
        end
        disp(C)
end

for i=1:n
   for j=i+1:n
      C(i,:)=C(i,:)-C(i,j)*C(j,:)
   end
end
disp(C)

for i=1:n
   for j=1:n
      if i==j
         printf("X%d = %.2f\n",i,C(i,n+1))
      end
   end
end
```

OUTPUT:

```
Enter the coefficents: [2,5,7;  1,1,1;  2,1,-1]

Enter the right-hand side C: [52; 9;0]


Dividing rows 1 with 2.00
   1.    2.5    3.5    26.
   1.    1.     1.     9.
   2.    1.    -1.     0.

   1.    2.5    3.5    26.
   0.   -1.5   -2.5   -17.
   0.   -4.    -8.    -52.

Dividing rows 2 with -1.50
   1.    2.5    3.5          26.
   0.    1.     1.6666667    11.333333
   0.   -4.    -8.          -52.
```

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```
Dividing rows 3 with -1.33
   1.   2.5   3.5         26.
   0.   1.    1.6666667   11.333333
   0.   0.    1.          5.

   1.   2.5   3.5         26.
   0.   1.    1.6666667   11.333333
   0.   0.    1.          5.
Converting into lower triangle matrix

   1.   0.   0.   1.
   0.   1.   0.   3.
   0.   0.   1.   5.
X1 = 0
X2 = 3
X3 = 4
```

Example two:

```
Enter the coefficents: [3,6,8;  1,-9,2;  5,6,-3]

Enter the right-hand side C: [12; 7 ;18]


Dividing rows 1 with 3.00
   1.   2.   2.6666667   4.
   1.  -9.   2.          7.
   5.   6.  -3.          18.

   1.   2.    2.6666667   4.
   0.  -11.  -0.6666667   3.
   0.  -4.   -16.333333  -2.
```

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```
Dividing rows 2 with -11.00
   1.   2.   2.6666667   4.
   0.   1.   0.0606061  -0.2727273
   0.  -4.  -16.333333  -2.

   1.   2.   2.6666667   4.
   0.   1.   0.0606061  -0.2727273
   0.   0.  -16.090909  -3.0909091

Dividing rows 3 with -16.09
   1.   2.   2.6666667   4.
   0.   1.   0.0606061  -0.2727273
   0.   0.   1.          0.1920904

   1.   2.   2.6666667   4.
   0.   1.   0.0606061  -0.2727273
   0.   0.   1.          0.1920904
Converting into lower triangle matrix

   1.   0.   0.   4.0564972
   0.   1.   0.  -0.2843691
   0.   0.   1.   0.1920904
X1 = 4.06
X2 = -0.28
X3 = 0.19
```

CONCLUSION: Learnt about the gauss elimination and gauss Jordan elimination which converts the matrix from gauss elimination into a lower triangular matrix making it an identity matrix.