

## Report Solution of $ax=b$ with Gaussian Elimination -

### Algorithm -

```
Looping k=1, ... ,n-1
    if a[k,k]==0
        Looping row=i+1, ... ,n
            if a[row,i]!=0
                add jth row in ith row
            if no a[row,i] is non zero
                continue
    else
        Looping i=k+1, ... ,n
             $m_{(ik)} = a_{(ik)} / a_{(kk)}$ 
            Looping j=k+1, ... ,n
                 $a[i,j] = a[i,j] - m_{(ik)} * a[k,j]$ 
            b[i]=b[i]
```

### Result in 4X4 matrix -

A:

```
83.000000 86.000000 77.000000 15.000000
93.000000 35.000000 86.000000 92.000000
49.000000 21.000000 62.000000 27.000000
90.000000 59.000000 63.000000 26.000000
```

b:

```
40.000000
26.000000
72.000000
36.000000
```

Solutions of  $Ax=b$  are:

```
x1 = 0.289312
x2 = -1.346765
x3 = 1.973241
x4 = -1.342043
```

Time taken: 0.000236s

### Result in 5X5 matrix -

A:

```
83.000000 86.000000 77.000000 15.000000 93.000000
35.000000 86.000000 92.000000 49.000000 21.000000
62.000000 27.000000 90.000000 59.000000 63.000000
26.000000 40.000000 26.000000 72.000000 36.000000
11.000000 68.000000 67.000000 29.000000 82.000000
```

b:

```
30.000000
62.000000
23.000000
67.000000
35.000000
```

Solutions of  $Ax=b$  are:

$x_1 = -0.029928$

$x_2 = 0.685614$

$x_3 = -0.321175$

$x_4 = 0.746007$

$x_5 = -0.139122$

Time taken: 0.000310s

Time taken for 100X100 matrix – 0.012128s

Order of Computation -  $n^3$