Practical 5-B

Solving System of linear equation using Gauss Seidal Method

Q1 5x +2y+z=10, 3x+7y+2z=21 , x+y+9z=12

In[25]:=
```
n = 3;
a = {{5, 2, 1}, {3, 7, 2}, {1, 1, 9}};
MatrixForm[a]
x = {0, 0, 0}
y = {0, 0, 0}
b = {10, 21, 12}
For[k = 1, k ≤ 25, k++,
  For[i = 1, i ≤ n, i++,
   y[[i]] =
        (b[[i]] - Sum[a[[i, j]] * y[[j]], {j, 1, i - 1}] - Sum[a[[i, j]] * x[[j]], {j, i + 1, n}]) / a[[i, i]];
  For[m = 1, m ≤ n, m++, x[[m]] = N[y[[m]]]]
For[p = 1, p ≤ n, p++, Print["x[", p, "] = ", x[[p]]]
```

Out[27]//MatrixForm=

$$\begin{pmatrix} 5 & 2 & 1 \\ 3 & 7 & 2 \\ 1 & 1 & 9 \end{pmatrix}$$

Out[28]= {0, 0, 0}

Out[29]= {0, 0, 0}

Out[30]= {10, 21, 12}

```
x[1] = 0.864542

x[2] = 2.3506

x[3] = 0.976096
```

Q 2 17x+y+3z=5 , x+10y+2z=12 , 3x+5y+15z=11

In[33]:=
```
n = 3;
a = {{17, 1, 3}, {1, 10, 2}, {3, 5, 15}};
MatrixForm[a]
x = {0, 0, 0}
y = {0, 0, 0}
b = {5, 12, 11}
For[k = 1, k ≤ 25, k++,
  For[i = 1, i ≤ n, i++,
   y[[i]] =
        (b[[i]] - Sum[a[[i, j]] * y[[j]], {j, 1, i - 1}] - Sum[a[[i, j]] * x[[j]], {j, i + 1, n}]) / a[[i, i]];
  For [m = 1, m ≤ n, m++, x[[m]] = N[y[[m]]]]
For [ p = 1, p ≤ n, p++, Print["x[", p, "] = ", x[[p]]]
```

Out[35]//MatrixForm=

$$\begin{pmatrix} 17 & 1 & 3 \\ 1 & 10 & 2 \\ 3 & 5 & 15 \end{pmatrix}$$

Out[36]= {0, 0, 0}

Out[37]= {0, 0, 0}

Out[38]= {5, 12, 11}

```
x[1] = 0.170732
x[2] = 1.1176
x[3] = 0.326655
```