Course Code: MS424/MI310
Course title: Computer Lab

Numerical Solution of System of Linear Equations:

A. Gauss Elimination Method

The system of linear equations be like

$$a_{11}x_1 + a_{12}x_2 + \ldots\ldots\ldots a_{1n}x_n = b_1$$
$$a_{21}x_1 + a_{22}x_2 + \ldots\ldots\ldots a_{2n}x_n = b_2$$
$$\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$
$$\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$
$$a_{n1}x_1 + a_{n2}x_2 + \ldots\ldots\ldots a_{nn}x_n = b_n$$

Then *Gauss Elimination Method* may be explain as follows:

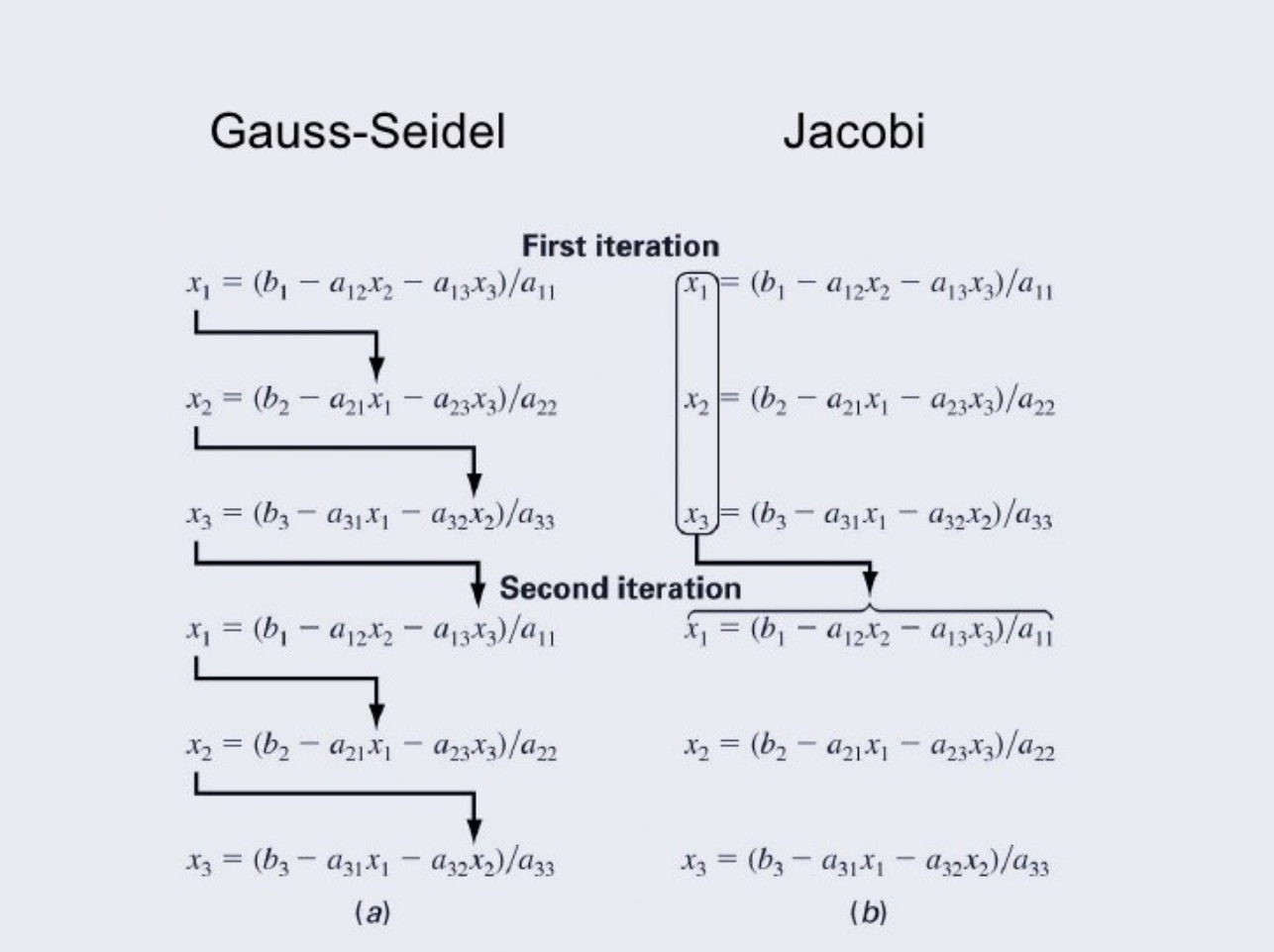
1. Declare the variables and read the order of the matrix n.
2. Take the coefficients of the linear equation as:
   Do for k=1 to n
   Do for j=1 to n+1
   Read a[k][j]
   End for j and k
3. Do for k=1 to n-1
   Do for i=k+1 to n
   Do for j=k+1 to n+1
   a[i][j] = a[i][j] – a[i][k] /a[k][k] * a[k][j]
   End for j, i and k
4. Compute x[n] = a[n][n+1]/a[n][n]
5. Do for k=n-1 to 1
   sum = 0
   Do for j=k+1 to n
   sum = sum + a[k][j] * x[j]
   End for j
   x[k] = 1/a[k][k] * (a[k][n+1] – sum)
   End for k
6. Display the result x[k]
7. Stop

B. Iterative Methods (*Gauss Seidel & Jacobi methods*)

Let a system linear equations with of 3 variable is

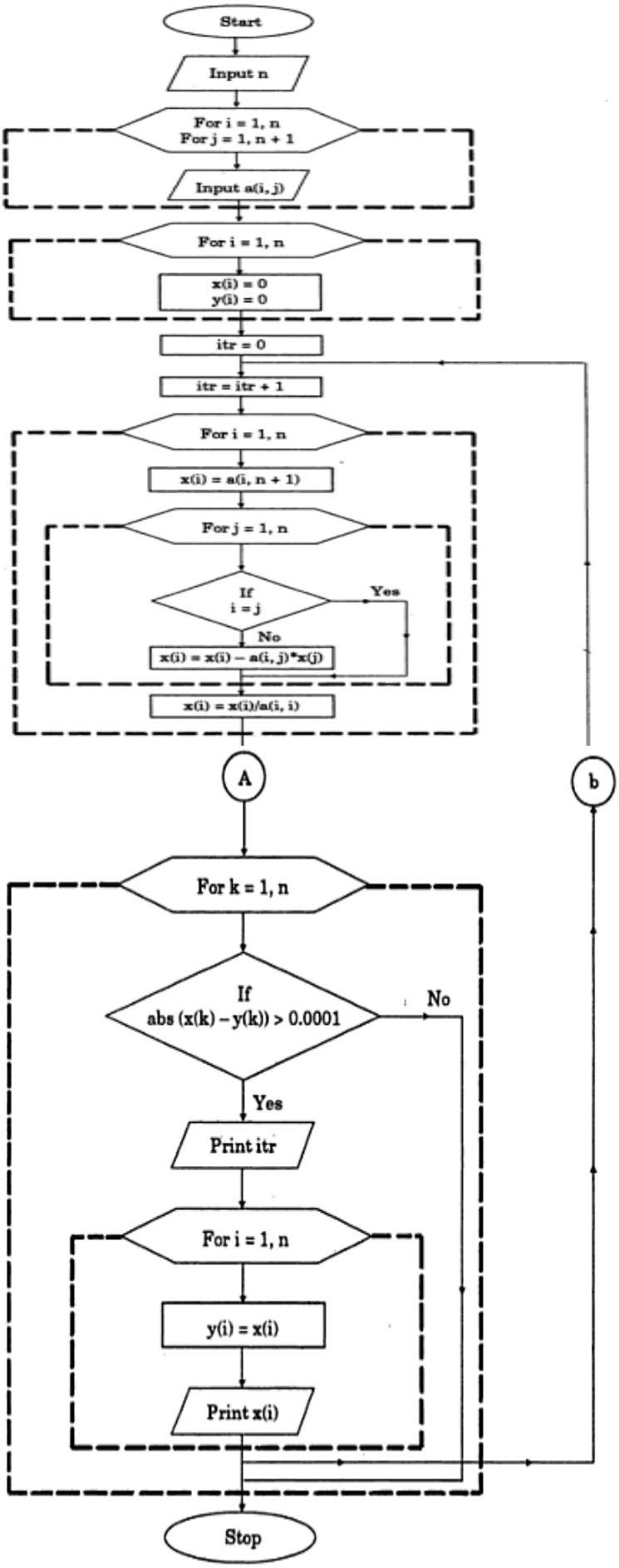
$$a_{11}x_1+a_{12}x_2+a_{13}x_3=b_1$$
$$a_{21}x_1+a_{22}x_2+a_{23}x_3=b_2$$
$$a_{31}x_1+a_{32}x_2+a_{33}x_3=b_3.$$

Then the above two methods may be explain as follows:



Students are advised to study above and make C code to execute properly. Write the details in laboratory copy and submit in the very next day of the classes resume.

Gauss-Seidel Method Flowchart:



Gauss-Jacobi Method Flowchart: