CLL:113-Tut-4(21.8.19)

Iterative Methods: Gauss Seidel, Jacobi, and SOR Gauss Seidel

Q1. Write a C program to solve N linear equations via **Gauss Seidel** and **Jacobi method.**

Q2.Upto 25 iterations draw the $\sqrt{\sum Error_i^{\,2}}$ vs k (k is the iteration number) for GS and Jacobi method for the following set of equations starting with initial guess of $x^{(0)} = [1 \;\; 2 \;\; 1]^T$.

$$\begin{bmatrix} 2 & 1 & 0 \\ 1 & 2 & 1 \\ 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}$$

The convergence of Gauss Seidel technique can be speeded up using successive over-relaxation (SOR).

Q3. Solve the matrix in Q2, with the same guess values but with SOR with w=1.5 and make a comparative study with the GS method to see the convergence with iteration. (Do things via a computer program). The solution of the given set of equations are **x** = $[3 \;\; -5 \;\; 9]^T$.