



09/02/23
Thursday

Iterative methods

a) Gauss Jacobi method
b) Gauss seidel method.

1. State a Sufficient Condition Gauss Jacobi to Converge. (or)
write a Sufficient condition Gauss Seidal meth. to Converge

Ans
The co-efficient of matrix should be diagonally dominant.

2. Solve the following system by Gauss Jacobi & Seidal method.

$$\begin{aligned} 27x + 6y - z &= 85 \\ x + y + 54z &= 110 \\ 6x + 15y + 2z &= 72 \end{aligned}$$

Soln

As the co-efficient matrix is not diagonally dominant. rewrite the Equation

$$\begin{aligned} 27x + 6y - z &= 85 \\ 6x + 15y + 2z &= 72 \\ x + y + 54z &= 110. \end{aligned}$$

① $\Rightarrow x = \frac{1}{27} (85 - 6y + z)$
② $\Rightarrow y = \frac{1}{15} (72 - 6x - 2z)$
③ $\Rightarrow z = \frac{1}{54} (110 - x - y)$



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(i) Gauss Seidel Method:

Let the initial solution be
 $x=0, y=0, z=0.$

$$x = \frac{85}{27}, \quad y = \frac{72}{15}, \quad z = \frac{110}{54}$$

Iteration	x	y	z
0	0	0	0 ✓
1	3.148 ✓	4.8 ✓	2.037
2	2.156	3.269	2.037 1.889
3	2.491	3.685	1.936
4	2.400	3.545	1.922
5	2.431	3.583	1.926
6	2.423	3.570	1.925
7	2.426	3.574	1.926
8	2.425	3.572	1.925
9	2.425	3.573	1.925
10	2.425	3.573	1.925