

DEPARTMENT OF MATHEMATICS
BIRLA INSTITUTE OF TECHNOLOGY MESRA, RANCHI
IMM5002 Numerical Method Lab, Session: (MO-19)
Lab Assignment - 08

1. Consider the linear system $Ax = B$,

$$\begin{aligned}1.19x_1 + 2.11x_2 - 100x_3 + x_4 &= 1.12 \\14.2x_1 - 0.122x_2 + 12.2x_3 - x_4 &= 3.44 \\100x_2 - 99.9x_3 + x_4 &= 2.15 \\15.3x_1 + 0.11x_2 - 13.1x_3 - x_4 &= 4.16\end{aligned}$$

Solve the above systems using Gaussian elimination without pivoting.

2. Repeat the exercise 1 using Gauss-Jordan method.
3. Decompose the matrix A in the form of $A = LU$, where, L is the unit lower triangular matrix and U is the upper triangular matrix.
4. Repeat the exercise 1 using Gaussian elimination with partial pivoting.
- 5* Now Perform the iteration by solving $Ay^{(k)} = r^{(k)}, k = 0, 1, 2, \dots$, where $r^{(k)} = B - Ax^{(k)}$, taking the initial guess as a solution of Gaussian elimination without pivoting and update the solution for next iteration by using $x^{(k+1)} = x^{(k)} + y^{(k)}$ and use the stopping criterion $\|r^{(k)}\| < 10^{-3}$.
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