Computational Numerical Methods

CS 374

Prosenjit Kundu

Solving System of Linear Equation

an xit anx xit... + am un = 5,

ani ni + anz 1/2 + - ... + ann 1/n = bn.

$$A \times 2 b$$

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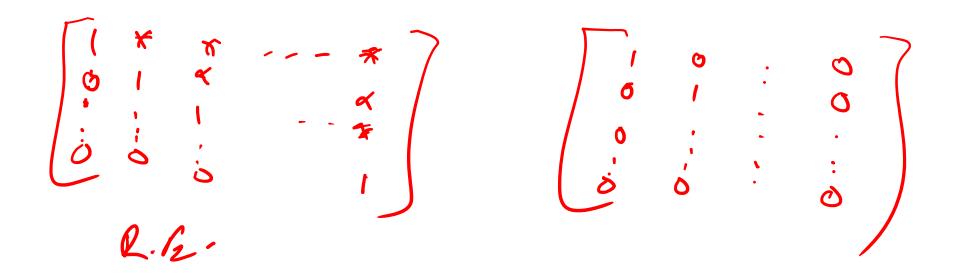
$$a_{11} \quad a_{12} - \cdots \quad a_{1m}$$

$$a_{21} \cdots \cdots \cdots \quad a_{nm}$$

$$\vdots$$

$$a_{mn} - \cdots \cdots \quad a_{mn}$$

$$b = \begin{pmatrix} b_1 \\ b_2 \\ b_n \end{pmatrix} \times 2 \begin{pmatrix} h_1 \\ h_2 \\ h_n \end{pmatrix}$$



Al haws Elimination method.

 $A_{11} X_{1} + A_{12} X_{1} + A_{13} X_{2} = 5, \quad B_{1} X \quad A_{11} X_{02}$ $A_{21} X_{1} + A_{22} X_{2} + A_{13} X_{3} = 5 \quad E_{2}$ $A_{31} X_{1} + A_{32} X_{1} + A_{33} X_{1} = 5, \quad E_{3}$ $A_{31} X_{1} + A_{32} X_{1} + A_{33} X_{1} = 5, \quad E_{3}$

E1

E2

E2 $62 - \frac{\alpha L_1}{\alpha_{11}} C_1$ $63 - \frac{\alpha S_1}{\alpha_{11}} E_1$

 $a_{11} n_{1} + q_{12} n_{1} + q_{13} n_{3} = \zeta,$ $0 + Q_{22}^{(12)} n_{1} + Q_{23}^{(2)} n_{3} = \zeta_{2}^{(2)}$ $0 + Q_{32}^{(2)} n_{1} + Q_{33}^{(2)} n_{3} = \zeta_{3}^{(2)}$

$$\begin{array}{lll}
\alpha_{11} \, n_{1} + \alpha_{11} \, n_{1} + \alpha_{13} \, n_{3} &= \zeta_{1} \\
0 & \alpha_{22} \, n_{1} + \alpha_{23} \, n_{3} &= \zeta_{1} \\
\alpha_{33} \, n_{3} &= \zeta_{3} \\
\end{array}$$

$$\begin{array}{lll}
\Xi_{3}^{(2)} - \alpha_{31} \\
\Xi_{2}^{(2)} - \alpha_{32} \\
\Xi_{2}^{(2)} - \alpha_{22} \\
\Xi_{2}^{(2)} - \alpha_{22} \\
\end{array}$$

Example

$$S u_1 + 2 u_1 + 2 u_3 = -1$$

$$2 u_1 + \frac{2}{3} u_2 + \frac{1}{3} u_3 = 1$$

$$u_1 + 2 u_2 - u_3 = 0$$

Compute wing 4 digit rounding.

$$6 \, \chi_1 + 2 \, \chi_2 + 2 \, \chi_3 = -2$$
.
$$0 + 9.0001 \, \chi_2$$

Actual Solution

$$u_1 = 2.6$$
 $u_2 = -3.8$
 $u_3 = -5$

6 11, + 27, + 243 = -2.

 $0 + 0.0001 \text{ ML} = 0.33333 \text{ M}_3 = 1.6667$ $0 + 0.0001 \text{ ML} = 0.33333 \text{ M}_3 = 1.6667$

Baen tramis me xx.

 $\begin{cases} u_3 = -5.803 \\ u_2 = 0 \\ u_1 = 1.335 \end{cases}$

Modified Gauss climinarish. With partfol pivon

Si= man } 1911, 1921), 1931]

Using the modified method solve the privious pour son

0= 2 n1 + 0.6667 n2 to.] 333 n3 = 1

0= 11 + 242 - 73 =0

Ster! (6, 4, 1) = 6

641+ 271+ 245= 12-2

0 + 0-0001 Uz - 0.3333 Uz = 1.66 \$7

0 + 1.666742 -1.3333333 = 0.33334.

man (1.6667, 0.0001) = 1.6667

 $6N_1 + UN_1 + 2N_3 = -2$ $(.6667N_2 - 1.3777N_3 = 0.337Y_3$ $0.0001 N_2 - 0.3383N_3 = 1.8667.$ (n) + L72+2.73 = -2.

0 1.6667 N - 1.3333 N = 0.333 Y

 $0 - 0.3332 \mu_3 = 1.6667$

43 - 25.003

 $y_2 = -3.801$, $y_1 = 2.602$

M3 = -5

 $n_2 = -3-6$, $n_1 = 2.6$