Subject — الموضوع الدرس

Section 3

$$\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$$

Step①: $\frac{R_1}{a_{11}} \times a_{21} - R_2 \to R_2$

$\frac{R_1}{a_{11}} \times a_{31} - R_3 \to R_3$

Step② $\frac{R_2}{a_{22}} \times a_{32} - R_3 \to R_3$

★Pit Falls for gauss elimination

① Division by zero ② large round off errors

★Solve The system using gauss elimination with Partial Pivoting:

1

$X_1 - X_2 + X_3 = 2$

$-6X_1 + X_2 - X_3 = 3$

$3X_1 + X_2 + X_3 = 4$

column 1 لعنيه

$$\left[\begin{array}{ccc|c} 1 & -1 & 1 & 2 \\ (-6) & 1 & -1 & 3 \\ 3 & 1 & 1 & 4 \end{array}\right]_{n \times n}$$

$|a_{pk}|$ → اكبر قيمة

$k \le p \le n$

a_{21} → Swith R2 with R_1 →

$$\left[\begin{array}{ccc|c} -6 & -1 & -1 & 3 \\ 1 & -1 & 1 & 2 \\ 3 & 1 & 1 & 4 \end{array}\right]$$

اكبر

$\frac{R_1}{-6} \times 1 - R_2 \to R_2$

$\frac{R_1}{-6} \times 3 - R_3 \to R_3$

$$= \left[\begin{array}{ccc|c} -6 & 1 & -1 & 3 \\ 0 & 5/6 & -5/6 & -5/2 \\ 0 & (-3/2) & -1/2 & -11/2 \end{array}\right]$$

After 1 -14 Column 2

a_{32} → largest no.

$\frac{R_2}{-3/2} \times \frac{5}{6} - R_3 \to R_3$

$$= \left[\begin{array}{ccc|c} -6 & 1 & -1 & 3 \\ 0 & -3/2 & -1/2 & -11/2 \\ 0 & 5/6 & -5/6 & -5/2 \end{array}\right]$$

$$= \left[\begin{array}{ccc|c} -6 & 1 & -1 & 3 \\ 0 & -3/2 & -1/2 & -11/2 \\ 0 & 0 & 10/9 & 50/9 \end{array}\right]$$

$\frac{10}{9} x_3 = \frac{50}{9}$

$x_3 = 5$

$x_2 = 2$

$x_1 = -1$

محمد و اميرة

$\det(A) = -6 \times -\frac{3}{2} \times \frac{10}{9} =$

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Date التاريخ

(2)

$2x+y+3z=10$

$15x+2y=5$

$x+3y+z=3$

$\rightarrow \left[\begin{array}{ccc|c} 2 & 1 & 3 & 10 \\ (15) & 2 & 0 & 5 \\ 1 & 3 & 1 & 3 \end{array}\right]$ a_{21}

$$\left[\begin{array}{ccc|c} 15 & 2 & 0 & 5 \\ 2 & 1 & 3 & 10 \\ 1 & 3 & 1 & 3 \end{array}\right] \quad \frac{R_1}{15}\times 2 - R_2 \rightarrow R_2 \quad \frac{R_1}{15}\times 1 - R_3 \rightarrow R_3$$

$$= \left[\begin{array}{ccc|c} 15 & 2 & 0 & 5 \\ 0 & -\frac{11}{15} & -3 & -\frac{28}{3} \\ 0 & (-\frac{43}{15}) & -1 & -\frac{8}{3} \end{array}\right] \xrightarrow{a_{32}} \left[\begin{array}{ccc|c} 15 & 2 & 0 & 5 \\ 0 & -\frac{43}{15} & -1 & -\frac{8}{3} \\ 0 & -\frac{11}{5} & -3 & -\frac{28}{3} \end{array}\right] \quad \frac{R_2}{-\frac{43}{15}}\times\frac{-11}{15} - R_3$$

2.8

$$= \left[\begin{array}{ccc|c} 15 & 2 & 0 & 5 \\ 0 & -\frac{43}{15} & -1 & -\frac{8}{3} \\ 0 & 0 & \frac{118}{43} & \frac{372}{43} \end{array}\right]$$

$z = \frac{186}{59}$

$y = -\frac{10}{59}$

$x = \frac{21}{59}$

Solve The System by Jacobi Method

$5x+2y=7 \rightarrow x_1 = \frac{7-2y_0}{5}$

$x-4y+2z=-2 \rightarrow y_1 = \frac{1}{4}(x_0+z_0+2)$

$y+2z=3 \rightarrow z_1 = \frac{1}{2}(3-y_0)$

$X_0 = \begin{bmatrix} 1.2 \\ 0.8 \\ 1.2 \end{bmatrix}$

iteration	x	y	z
0	1.2	0.8	1.2
1			
2			
3			
4			