

$x_2$  to diagonal brace, absolute value

## GAUSS Elimination w. Pivoting

### ① Partial Pivoting

L column ma compare garera



diagonal element  $\xrightarrow{|a_i|}$  largest

so,

①  $C_1$

L compare all 3, largest c element  
vaako row interchange garera  
R1 banaune.

&  $a_{11} \downarrow |a_i| 0$

②  $C_2$

L  $a_{12} \rightarrow 0$

NOW,

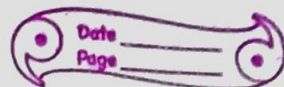
see  $a_{22}$  &  $a_{32}$  jun ~~tho~~ thulo  
xa teslai

$R_2$  ma lagne

&

$a_{22} \downarrow |a_i| 0$

↳ similarly, to make upper  $\Delta$  matrix



• **Note :**

yesma elements compare garda

-ye ko  $\rightarrow$  absolute value line



tara row interchange garda

sign ma  $\rightarrow$  no change

1 solve the following system of eqns. using partial pivoting technique

$$2x_1 + 2x_2 + x_3 = 6$$

$$4x_1 + 2x_2 + 3x_3 = 4$$

$$x_1 - x_2 + x_3 = 0$$

Soln

$[A:B] = \left[ \begin{array}{ccc|c} 2 & 2 & 1 & 6 \\ 4 & 2 & 3 & 4 \\ 1 & -1 & 1 & 0 \end{array} \right]$

Interchange

pivot element

pivot eq<sup>n</sup>

$$= \left[ \begin{array}{ccc|c} 4 & 2 & 3 & 4 \\ 2 & 2 & 1 & 6 \\ 1 & -1 & 1 & 0 \end{array} \right]$$

b: lions and d...

Applying row

$$\cdot R_2 \rightarrow R_2 - \frac{2}{4} * R_1$$

$$\cdot R_3 \rightarrow R_3 - 1 * R_1$$

$$= \left[ \begin{array}{ccc|c} 4 & \textcircled{2} & 3 & 4 \\ 0 & 1 & -1/2 & 1 \\ 0 & \boxed{-3/2} & 1/4 & -1 \end{array} \right] \begin{array}{l} \text{out} \\ \text{Interchange} \end{array}$$

absolute line  
compare grade

Interchanging  $R_2$  &  $R_3$

$$= \left[ \begin{array}{ccc|c} 4 & 2 & 3 & 4 \\ 0 & \textcircled{-3/2} & 1/4 & -1 \\ 0 & 1 & -1/2 & 1 \end{array} \right]$$

sign change hunda

Applying row operations

$$\cdot R_3 \rightarrow R_3 + \frac{2}{3} * R_2$$

$$= \left[ \begin{array}{ccc|c} 4 & 2 & 3 & 4 \\ 0 & -3/2 & 1/4 & -1 \\ 0 & 0 & -1/3 & 10/3 \end{array} \right]$$



2nd, 516, -10, 8



Now, by backward substitution

$$\frac{-1}{3} x_3 = \frac{10}{3}$$

$$\therefore x_3 = -10$$

Then,

$$\frac{-3}{2} x_2 + \frac{1}{4} (-10) = -1$$

$$\text{or, } (-3/2) x_2 = 3/2$$

$$\therefore x_2 = -1$$

Then,

$$4x_1 + 2(-1) + 3(-10) = 4$$

$$\text{or, } 4x_1 = 36$$

$$\therefore x_1 = 9$$

2. Solve the following system of eqns using partial pivoting method.

$$2x_1 + x_2 + x_3 - 2x_4 = -10$$

$$4x_1 + 2x_3 + x_4 = 8$$

$$3x_1 + 2x_2 + 2x_3 = 7$$

$$x_1 + 2x_2 + 2x_3 - x_4 = -5$$

## ① complete pivoting

↳ matrix A bata largest element ki diagonal banana.

① largest element vaki column ki banana  
↳ column interchange

② Then,  
↳ terki ahi banana at  $R_1$   
↳ row interchange

↳ variable interchange hunxa !!

↳ to be noted

③ all  $\downarrow$  ki 0

④  $R_1$  ki elements out

⑤ matrix A ma  $R_2$  &  $R_3$  ki elements compare

⑥ continue till upper A matrix