CS ASSIGNMENT

SURAJ KUMAR YADAV
20220PHY014

① Solve the follow. linear system of eqn using hauss ellimination method:

$$y + z = 2 \quad\quad ①$$
$$2x + 3z = 5 \quad\quad ②$$
$$x + y + z = 3 \quad\quad ③$$

① ⇒ ③ − ① :−

$$x + y + z = 3$$
$$y + z = 2$$
$$\boxed{x = 1}$$

Put $x = 1$ in ② :−

$$2 \times 1 + 3z = 5$$
$$3z = 3$$
$$\boxed{z = 1}$$

Put $z = 1$ in ① :−

$$y + 1 = 2$$
$$\boxed{y = 1}$$

So, the soln is $x = 1, y = 1, z = 1$

② Use hauss Elmn method with partial pivoting to solve

$$2x + 3y + z = 9$$
$$x + 2y + 3z = 6$$
$$3x + y + 2z = 8$$

$$2 \quad \begin{bmatrix} 2 & 3 & 1 & | & 9 \\ 1 & 2 & 3 & | & 6 \\ 3 & 1 & 2 & | & 8 \end{bmatrix}$$

$$R_1 \longrightarrow R_1/2$$

$$\begin{bmatrix} 1 & 3/2 & 1/2 & | & 9/2 \\ 1 & 2 & 3 & | & 6 \\ 3 & 1 & 2 & | & 8 \end{bmatrix}$$

$$R_2 \longrightarrow R_2 - R_1$$

$$\begin{bmatrix} 1 & 3/2 & 1/2 & | & 9/2 \\ 0 & 1/2 & 5/2 & | & 3/2 \\ 3 & 1 & 2 & | & 8 \end{bmatrix}$$

$$R_3 \longrightarrow R_3 - 3R_1$$

$$\begin{bmatrix} 1 & 3/2 & 1/2 & | & 9/2 \\ 0 & 1/2 & 5/2 & | & 3/2 \\ 0 & -7/2 & 1/2 & | & -11/2 \end{bmatrix}$$

$$R_2 \longrightarrow 2R_2$$

$$\begin{bmatrix} 1 & 3/2 & 1/2 & | & 9/2 \\ 0 & 1 & 5 & | & 3 \\ 0 & -7/2 & 1/2 & | & -11/2 \end{bmatrix}$$

$$R_1 \longrightarrow R_1 - \frac{3}{2}R_2$$

$$\begin{bmatrix} 1 & 0 & -7 & | & 0 \\ 0 & 1 & 5 & | & 3 \\ 0 & -7/2 & 1/2 & | & -11/2 \end{bmatrix}$$

$R_2 \rightarrow R_3 + \dfrac{7}{2} R_2$

$$\begin{bmatrix} 1 & 0 & -7 \\ 0 & 1 & 5 \\ 0 & 0 & 1 \end{bmatrix} \Bigg| \begin{matrix} 0 \\ 0 \\ 0.2778 \end{matrix}$$

$R_1 \rightarrow R_1 + 7 R_3$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 5 \\ 0 & 0 & 1 \end{bmatrix} \Bigg| \begin{matrix} 1.9444 \\ 3 \\ 0.2778 \end{matrix}$$

$R_2 \rightarrow R_2 - 5 R_3$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \Bigg| \begin{matrix} 1.9444 \\ 1.6111 \\ 0.2778 \end{matrix}$$

So, sol^n is $x = 1.9444$

$\qquad\qquad\qquad y = 1.6111$

$\qquad\qquad\qquad z = 0.2778$