

Assignment I

① Given the matrix $\begin{bmatrix} 0 & 3 & -6 & 6 & 4 & -5 \\ 3 & -7 & 8 & -5 & 8 & 9 \\ 3 & -9 & 12 & -9 & 6 & 15 \end{bmatrix}$,

discuss the forward and backward phase of the row reduction algorithm.

② Find the general solution of the systems whose augmented matrices are:

i) $\begin{bmatrix} 1 & 3 & 4 & 7 \\ 3 & 9 & 7 & 6 \end{bmatrix}$ ii) $\begin{bmatrix} 0 & 1 & -6 & 5 \\ 1 & -2 & 7 & -6 \end{bmatrix}$ (iii) $\begin{bmatrix} 3 & -4 & 2 & 0 \\ -9 & 12 & -6 & 0 \\ -6 & 8 & -4 & 0 \end{bmatrix}$

③ Determine if the system is consistent and find the soln.

i) $x_1 + 3x_3 = 2$

$x_2 - 3x_4 = 3$

$-2x_2 + 3x_3 + 2x_4 = 1$

$3x_1 + 7x_4 = -5$

ii) $x_2 - 8x_3 = 8$

$2x_1 - 3x_2 + 2x_3 = 1$

$5x_1 - 8x_2 + 7x_3 = 1$

4) Compute $(u+v)$ and $(3u-2v)$

i) $u = \begin{bmatrix} 6 \\ -1 \\ 5 \end{bmatrix}$, $v = \begin{bmatrix} -3 \\ 4 \\ 6 \end{bmatrix}$

ii) $u = \begin{bmatrix} 1 \\ -7 \\ -5 \end{bmatrix}$ & $v = \begin{bmatrix} -3 \\ 4 \\ 6 \end{bmatrix}$

⑤ Determine if b is a linear combination of the vectors formed by the columns of the matrix A .

$A = \begin{bmatrix} 1 & -4 & 2 \\ 0 & 3 & 5 \\ -2 & 8 & -4 \end{bmatrix}$, $b = \begin{bmatrix} 3 \\ -7 \\ -3 \end{bmatrix}$

⑥ Find the value of h so that vector b is in $\text{span}\{u, v\}$

$u = \begin{bmatrix} 1 \\ 4 \\ -2 \end{bmatrix}$, $v = \begin{bmatrix} -2 \\ -3 \\ 7 \end{bmatrix}$, $b = \begin{bmatrix} 4 \\ 1 \\ h \end{bmatrix}$

⑦ Solve the following and write the soln in parametric form & discuss

i) $2x_1 + 5x_2 + 6x_3 = 13$

$3x_1 + x_2 - 4x_3 = 20$

$x_1 - 3x_2 - 8x_3 = -10$

ii) $x_1 + 3x_2 - 5x_3 = 0$

$x_1 + 4x_2 - 8x_3 = 0$

$-3x_1 - 7x_2 + 9x_3 = 0$