

Submatrixes 1- Partitioned

A matrix A is partitioned into several submatrixes; denoted by

$$\begin{array}{lcl} A_{11} & A_{12} & A_{13} \dots A_{1j} \longrightarrow \text{Matrix A} \\ B_{11} & B_{12} & \dots B_{1j} \longrightarrow \text{Matrix B} \\ C_{11} & & C_{1j} \longrightarrow \text{Matrix C} \end{array}$$

Remark

The important point to note is that partitioned matrices obey the usual rules of matrix algebra.

Ex 1 - If

$$A = \left[\begin{array}{cc|cc} 5 & 3 & -1 & -2 \\ 0 & 7 & 3 & 4 \\ -2 & 1 & 0 & 5 \end{array} \right]$$

Then

$$A_{ij} ; A_{11} = \begin{bmatrix} 5 & 3 \end{bmatrix}, A_{12} = \begin{bmatrix} -1 & -2 \end{bmatrix}$$

$$A_{21} = \begin{bmatrix} 0 & 7 \\ -2 & 1 \end{bmatrix}, A_{22} = \begin{bmatrix} 3 & 4 \\ 0 & 5 \end{bmatrix}$$

$$A = \left[\begin{array}{cc} \begin{bmatrix} 5 & 3 \end{bmatrix} & \begin{bmatrix} -1 & -2 \end{bmatrix} \\ \begin{bmatrix} 0 & 7 \\ -2 & 1 \end{bmatrix} & \begin{bmatrix} 3 & 4 \\ 0 & 5 \end{bmatrix} \end{array} \right]$$

$$= \begin{bmatrix} A_{11} & A_{12} \\ A_{21} & A_{22} \end{bmatrix}$$

OR submatrix A as follows

$$A = \left[\begin{array}{ccc|c} 5 & 3 & -1 & -2 \\ 0 & 7 & 3 & 4 \\ \hline -2 & 1 & 0 & 5 \end{array} \right]$$

$$A = \left[\begin{array}{c} \begin{bmatrix} 5 \\ 0 \end{bmatrix} \\ \begin{bmatrix} 3 & -1 \\ 7 & 3 \end{bmatrix} \\ \begin{bmatrix} -2 \\ 1 & 0 \end{bmatrix} \end{array} \right] \begin{array}{c} \begin{bmatrix} -2 \\ 4 \end{bmatrix} \\ \begin{bmatrix} 5 \end{bmatrix} \end{array}$$