

CHUBUNDU OKORO-IJAGHA ALVIN

MAT 204

COMPUTER SCIENCE

18/Eng02/078

$$A = \begin{pmatrix} 1 & -3 & 6 \\ 4 & 0 & 2 \\ 8 & 5 & 1 \end{pmatrix} \quad B = \begin{pmatrix} 1 & 1 & 2 \\ 1 & -2 & 1 \\ 0 & 3 & -4 \end{pmatrix} \quad C = \begin{pmatrix} 0 & 4 & 3 \\ 6 & -7 & 1 \\ 1 & -3 & 2 \end{pmatrix}$$

i. **RANK OF A**

$$|A| = \begin{vmatrix} 1 & -3 & 6 \\ 4 & 0 & 2 \\ 8 & 5 & 1 \end{vmatrix}$$

$$|A| = 1(0 - 10) + 3(4 - 16) + 6(20 - 0)$$

$$|A| = -10 - 36 + 120 = 74 \text{ IT IS NOT EQUAL TO 0; HENCE THE RANK OF A IS 3}$$

ii. **RANK OF B TRANSPOSE**

$$|B| = \begin{vmatrix} 1 & 1 & 0 \\ 1 & -2 & 3 \\ 2 & 1 & -4 \end{vmatrix}$$

$$|B| = 1(8 + 3) - 1(-4 - 6) + 0(1 + 4)$$

$$|B| = 5 + 10 + 0 = 15 \text{ IT IS NOT EQUAL TO 0; HENCE THE RANK OF B TRANSPOSE IS 3}$$

iii. **RANK OF (A + C) TRANSPOSE**

$$|A+C| = \begin{vmatrix} 1 & 1 \\ 9 \\ 10 & -7 & 3 \end{vmatrix}$$

$$|A+C|^T = \begin{pmatrix} 1 & 10 \\ 9 & \\ 1 & -7 & 2 \end{pmatrix}$$

$$|A+C| = 1(-21 - 6) - 10(3 - 18) + 9(3 + 63)$$

$$|A+C| = -27 + 150 + 594 = 717$$

IT IS NOT EQUAL TO 0; HENCE THE RANK OF **(A + C) TRANSPOSE** IS **3**

iv. **RANK OF (B + C)**

$$|B+C| = \begin{pmatrix} 1 & 5 \\ 5 & \\ 7 & -9 & 2 \end{pmatrix}$$

$$|B+C| = 1(18 - 0) - 5(-14 - 2) + 5(0 + 9)$$

$$|B+C| = 18 + 80 + 45 = 143$$

IT IS NOT EQUAL TO 0; HENCE THE RANK OF **(B + C)** IS **3**

v. **RANK OF (A+B+C)**

$$|A+B+C| = \begin{pmatrix} 2 & 2 \\ 11 & \\ 11 & -9 & 4 \end{pmatrix}$$

$$|A+B+C| = 2(9 - 20) - 2(-11 - 36) + 11(55 + 81)$$

$$|A+B+C| = -22 + 94 + 1496 = 1568$$

IT IS NOT EQUAL TO 0; HENCE THE RANK OF  $(\mathbf{A} + \mathbf{B} + \mathbf{C})$  IS 3