20201081 9 조정현 4주차 과제

[연습문제 2.2 pp1+3]

#1) (1) $\begin{bmatrix} 5 \\ -1 \\ 4 \end{bmatrix}$ (2) $\begin{bmatrix} 1 & 2 & 1 \\ -1 & 0 & 3 \end{bmatrix}$

#2) $A^T = \begin{bmatrix} 4 & 1 & 4 & 5 \\ 2 & -1 & 2 & 2 \\ 4 & 0 & 1 & 3 \\ 6 & 3 & 1 & 6 \end{bmatrix}$

#4) 대각항 = 2, -7, 2

대각합 = $tr(A) = 2 - 7 + 2 = -7$

#6) (1) x=4, y=1, z=3 (2) y=-6, x=0, z값은 알수 없음

#8) (1) [14] (2) $\begin{bmatrix} 3 \\ 6 \\ -4 \end{bmatrix}$

(1) $A^T A = \begin{bmatrix} 1 & 2 & -3 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ -3 \end{bmatrix} = \begin{bmatrix} 1\times1 + 2\times2 + (-2)\times(-3) \end{bmatrix} = [14]$

(2) $A = \begin{bmatrix} 1 \\ 2 \\ -3 \end{bmatrix}$ $B^T = \begin{bmatrix} 2 \\ 4 \\ -1 \end{bmatrix}$

$A + B^T = \begin{bmatrix} 1+2 \\ 2+4 \\ -3-1 \end{bmatrix} = \begin{bmatrix} 3 \\ 6 \\ -4 \end{bmatrix}$

[연습문제 2.3 pp1+3]

#2) 행 사다리꼴 : 1, 3, 4, 5, 7, 8 / 기약 행 사다리꼴 : 3, 4, 7

#6) (1) $\begin{bmatrix} 1 & 1 & 0 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & 0 & 2 \\ 0 & 0 & 0 & 1 & \frac{1}{2} \end{bmatrix}$ (2) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

(1) $R_1 \times (-2) + R_2 = \begin{bmatrix} 2 & 2 & -1 & 6 & 4 \\ 0 & 0 & 3 & -2 & 5 \\ 8 & 8 & -1 & 26 & 23 \end{bmatrix}$

$R_1 \times (-4) + R_3 = \begin{bmatrix} 2 & 2 & -1 & 6 & 4 \\ 0 & 0 & 3 & -2 & 5 \\ 0 & 0 & 3 & 2 & 7 \end{bmatrix}$

$R_2 \times (-1) + R_3 = \begin{bmatrix} 2 & 2 & -1 & 6 & 4 \\ 0 & 0 & 3 & -2 & 5 \\ 0 & 0 & 0 & 4 & 2 \end{bmatrix}$

$R_2 \times \frac{1}{3} + R_1 = \begin{bmatrix} 2 & 2 & 0 & \frac{16}{3} & \frac{19}{3} \\ 0 & 0 & 3 & -2 & 5 \\ 0 & 0 & 0 & 4 & 2 \end{bmatrix}$

$R_3 \times (-\frac{4}{3}) + R_1 = \begin{bmatrix} 2 & 2 & 0 & 0 & \frac{4}{3} \\ 0 & 0 & 3 & -2 & 5 \\ 0 & 0 & 0 & 4 & 2 \end{bmatrix}$

$R_3 \times \frac{1}{2} + R_2 = \begin{bmatrix} 2 & 2 & 0 & 0 & 3 \\ 0 & 0 & 3 & 0 & 6 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$

$\therefore \begin{bmatrix} 1 & 1 & 0 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & 0 & 2 \\ 0 & 0 & 0 & 1 & \frac{1}{2} \end{bmatrix}$

(2) $R_3 \times \frac{1}{11} = \begin{bmatrix} 5 & -9 & 6 \\ 0 & 2 & 3 \\ 0 & 0 & 1 \end{bmatrix}$

$R_3 \times (-3) + R_2 = \begin{bmatrix} 5 & -9 & 6 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

$R_2 \times 9 + R_1 = \begin{bmatrix} 5 & 0 & 6 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

$R_3 \times (-6) + R_1 = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

#8) (1) 2 (2) 3

(1) $\frac{1}{3} R_1 = \begin{bmatrix} 1 & -1 & 0 \\ 0 & 5 & 5 \\ 4 & 4 & 8 \end{bmatrix}$

$R_1 \times 4 + R_3 = R_3 \times \frac{1}{5} = \begin{bmatrix} 1 & -1 & 0 \\ 0 & 1 & 1 \\ 0 & 8 & 8 \end{bmatrix}$

$R_2 \times (-8) + R_3 = R_3 = \begin{bmatrix} 1 & -1 & 0 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix}$

$R_2 + R_1 = R_1 = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix}$ ∴ 계수 = 2

(2) $R_1 + R_3 \rightarrow R_3 \times \frac{1}{10} = \begin{bmatrix} \textcircled{8} & 1 & 3 & 6 \\ 0 & \textcircled{3} & 2 & 2 \\ 0 & 0 & 0 & \textcircled{1} \end{bmatrix}$ ∴ 계수 = 3

#9) 행 사다리꼴 : $\begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 2 & 3 \\ 0 & 0 & 3 & 4 \\ 0 & 0 & 0 & 0 \end{bmatrix}$ 기약 행 사다리꼴 : $\begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & \frac{3}{2} \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$

(1) 행 사다리꼴

$R_1 \times (-2) + R_4 = \begin{bmatrix} 0 & 1 & 2 & 3 \\ 0 & 3 & 8 & 12 \\ 0 & 0 & 4 & 6 \\ 0 & 0 & 3 & 4 \end{bmatrix}$

$R_1 \times (-3) + R_2 = \begin{bmatrix} 0 & 1 & 2 & 3 \\ 0 & 0 & 2 & 3 \\ 0 & 0 & 4 & 6 \\ 0 & 0 & 3 & 4 \end{bmatrix}$

$R_2 \times (-1) + R_1 = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 2 & 3 \\ 0 & 0 & 4 & 6 \\ 0 & 0 & 3 & 4 \end{bmatrix}$

$R_2 \times (-2) + R_3 = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 2 & 3 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 3 & 4 \end{bmatrix}$

$\therefore \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 2 & 3 \\ 0 & 0 & 3 & 4 \\ 0 & 0 & 0 & 0 \end{bmatrix}$

(2) 기약 행 사다리꼴

$R_2 \times (-\frac{3}{2}) + R_3 = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 2 & 3 \\ 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 \end{bmatrix}$

$R_3 \times \frac{1}{2} + R_3 \times 2 = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & \frac{3}{2} \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$

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#11)

	1	2	3	4
1	0	1	0	1
2	1	0	1	1
3	0	1	0	1
4	1	1	1	0

인접하면 1, 인접하지 않으면 0으로 표기한다.

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	1	2	3	4
1	0	1	0	1
2	1	0	1	1
3	0	1	0	1
4	1	1	1	0