

線形代数学・3章、宿題解答

1)

$$\left[\begin{array}{ccc|c} 1 & 8 & -5 & 6 \\ 0 & -15 & 7 & -15 \\ 0 & -26 & 16 & -26 \end{array} \right] \rightarrow \left[\begin{array}{ccc|c} 1 & 8 & -5 & 6 \\ 0 & 1 & -7/15 & 1 \\ 0 & 0 & 1 & 0 \end{array} \right] \rightarrow \left[\begin{array}{ccc|c} 1 & 0 & 0 & -2 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{array} \right] \therefore \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -2 \\ 1 \\ 0 \end{bmatrix}$$

2)

$$\left[\begin{array}{cccc|c} 1 & 1 & -2 & 1 & 4 \\ 0 & 1 & 5 & -3 & 2 \end{array} \right] \rightarrow \left[\begin{array}{cccc|c} 1 & 0 & -7 & 4 & 2 \\ 0 & 1 & 5 & -3 & 2 \end{array} \right] \therefore \begin{bmatrix} x \\ y \\ z \\ u \end{bmatrix} = z \begin{bmatrix} 7 \\ -5 \\ 1 \\ 0 \end{bmatrix} + u \begin{bmatrix} -4 \\ 3 \\ 0 \\ 1 \end{bmatrix} + \begin{bmatrix} 2 \\ 2 \\ 0 \\ 0 \end{bmatrix}$$

3)

$$\left[\begin{array}{cccc|c} 1 & 3 & 1 & -8 & 3 \\ 0 & 1 & 1 & -3 & 2 \\ 0 & -1 & -1 & 3 & -9 \end{array} \right] \rightarrow \left[\begin{array}{cccc|c} 1 & 3 & 1 & -8 & 3 \\ 0 & 1 & 1 & -3 & 2 \\ 0 & 0 & 0 & 0 & -7 \end{array} \right] \begin{array}{l} \text{rank}A \neq \text{rank}[A \mid b] \\ \therefore \text{よって解なし} \end{array}$$