

$$\begin{cases} x + ky + z = 2 \\ -x - 2y + 3z = -1 \\ 3x + ky = 5 \end{cases}$$

$$\begin{bmatrix} 1 & k & 1 & 2 \\ -1 & -2 & 3 & -1 \\ 3 & k & 1 & 5 \end{bmatrix}$$

$$\begin{array}{l} L_1 \leftrightarrow L_2 \\ L_3 \rightarrow L_3 - 3L_1 \end{array} \begin{bmatrix} 1 & 2 & 3 & -1 \\ -1 & -2 & 3 & -1 \\ 3 & k & 1 & 5 \end{bmatrix} \xrightarrow{L_2 \rightarrow L_2 + L_1} \begin{bmatrix} 1 & 2 & 3 & -1 \\ 0 & 0 & 6 & 0 \\ 3 & k & 1 & 5 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 2 & 3 & -1 \\ 0 & 0 & 6 & 0 \\ 0 & k-6 & -8 & 2 \end{bmatrix}$$

$$\begin{array}{l} L_3 \rightarrow L_3 - \frac{k-6}{6}L_2 \\ L_1 \rightarrow L_1 - 2L_2 \end{array} \begin{bmatrix} 1 & 2 & 3 & -1 \\ 0 & 0 & 6 & 0 \\ 0 & k-6 & -8 & 2 \end{bmatrix}$$