

$$\vec{b} = \begin{pmatrix} 9 \\ 10 \\ -1 \end{pmatrix} \Rightarrow$$

$$x\vec{a} + y\vec{c} = \vec{b} \Leftrightarrow \begin{cases} x + 3y = 9 & \textcircled{1} \\ 2x + 2y = 10 & \textcircled{2} \\ -x + y = -1 & \textcircled{3} \end{cases}$$

$$\Leftrightarrow \begin{cases} x + 3y = 9 & \textcircled{1} \\ -4y = -8 & \textcircled{2}' = \textcircled{2} + \textcircled{1} \times (-2) \\ 4y = 8 & \textcircled{3}' = \textcircled{3} + \textcircled{1} \times 1 \end{cases}$$

$$\Leftrightarrow \begin{cases} x + 3y = 9 & \textcircled{1} \\ y = 2 & \textcircled{2}'' = \textcircled{2}' \times (-\frac{1}{4}) \\ 4y = 8 & \textcircled{3}' \end{cases}$$

$$\Leftrightarrow \begin{cases} x = 3 & \textcircled{1}' = \textcircled{1} + \textcircled{2}'' \times (-3) \\ y = 2 & \textcircled{2}'' \\ 0 = 0 & \textcircled{3}'' = \textcircled{3}' + \textcircled{2}'' \times 1 \end{cases}$$

$$\Leftrightarrow x = 3, y = 2.$$

$$2r + = 1r \times (-2), 3r + = 1r \times 1$$

$$\left( \begin{array}{cc|c} 1 & 3 & 9 \\ 2 & 2 & 10 \\ -1 & 1 & -1 \end{array} \right) \rightarrow \left( \begin{array}{cc|c} 1 & 3 & 9 \\ 0 & -4 & -8 \\ 0 & 4 & 8 \end{array} \right) \xrightarrow{2r \times = (-\frac{1}{4})} \left( \begin{array}{cc|c} 1 & 3 & 9 \\ 0 & 1 & 2 \\ 0 & 4 & 8 \end{array} \right)$$

$$\begin{array}{l} 1r + = 2r \times (-3) \\ 3r + = 2r \times (-4) \\ \hline \end{array} \rightarrow \left( \begin{array}{cc|c} 1 & 0 & 3 \\ 0 & 1 & 2 \\ 0 & 0 & 0 \end{array} \right)$$

$$\vec{r} = \begin{pmatrix} -5 \\ -11 \\ 8 \end{pmatrix} \quad \text{L2"2}$$

$$x\vec{a} + y\vec{b} = \vec{r} \Leftrightarrow \begin{cases} x + 3y = -5 & \textcircled{1} \\ 2x + 2y = -11 & \textcircled{2} \\ -x + y = 18 & \textcircled{3} \end{cases}$$

$$\Leftrightarrow \begin{cases} x + 3y = -5 & \textcircled{1} \\ -4y = -1 & \textcircled{2}' = \textcircled{2} + \textcircled{1} \times (-2) \\ 4y = 13 & \textcircled{3}' = \textcircled{3} + \textcircled{1} \times 1 \end{cases}$$

$$\Leftrightarrow \begin{cases} x + 3y = -5 & \textcircled{1} \\ y = \frac{1}{4} & \textcircled{2}'' = \textcircled{2}' \times (-\frac{1}{4}) \\ 4y = 13 & \textcircled{3}' \end{cases}$$

$$\Leftrightarrow \begin{cases} x = -\frac{23}{4} & \textcircled{1}' = \textcircled{1} + \textcircled{2}'' \times (-3) \\ y = \frac{1}{4} & \textcircled{2}'' \\ 0 = 12 & \textcircled{3}'' = \textcircled{3}' + \textcircled{2}'' \times (-4) \end{cases}$$

$\textcircled{3}'' \neq \frac{0}{0} \Rightarrow \vec{r} \notin \text{span}\{\vec{a}, \vec{b}\}$   $\alpha, \beta \in \mathbb{R}$  はず  $\vec{r} \notin \text{span}\{\vec{a}, \vec{b}\}$  のため  $x\vec{a} + y\vec{b} = \vec{r}$   $\Leftrightarrow$   
 $\frac{0}{0} \Rightarrow \vec{r} \notin \text{span}\{\vec{a}, \vec{b}\}$   $\alpha, \beta \in \mathbb{R}$  はず  $\vec{r} \notin \text{span}\{\vec{a}, \vec{b}\}$  のため