

利用高斯消元法求方程式的解

$$\begin{cases} 2x + y + z = 6 \\ x - y - z = -3 \\ 3x + y + 2z = 1 \end{cases}$$

$$\left[\begin{array}{ccc|c} 2 & 1 & 1 & 6 \\ 1 & -1 & -1 & -3 \\ 3 & 1 & 2 & 1 \end{array} \right] \begin{matrix} \downarrow \\ \\ \end{matrix}$$

$$\left[\begin{array}{ccc|c} 1+0 & -1+1 & -1+1 & -3+4 \\ 0 & 1 & 1 & 4 \\ 0+0 & 4+(-4) & 5+(-4) & 16+(-16) \end{array} \right]$$

① 化成矩陣

$$\left[\begin{array}{ccc|c} x & y & z & \\ 2 & 1 & 1 & 6 \\ 1 & -1 & -1 & -3 \\ 3 & 1 & 2 & 1 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & -1 & -1 & -3 \\ 2 & 1 & 1 & 6 \\ 3 & 1 & 2 & 1 \end{array} \right] \begin{matrix} \\ \leftarrow x-2 \\ \leftarrow x-3 \end{matrix}$$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 4 \\ 0 & 0 & 1 & 0 \end{array} \right] \begin{matrix} \\ \\ \leftarrow x-1 \end{matrix}$$

$$\left[\begin{array}{ccc|c} 1 & -1 & -1 & -3 \\ 2+(-2) & 1+2 & 1+2 & 6+6 \\ 3+(-3) & 1+3 & 2+3 & 1+9 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0+0 & 1+0 & 1+(-1) & 4+0 \\ 0 & 0 & 1 & 0 \end{array} \right]$$

② 斜線 1
其餘係數都 0

$$\left[\begin{array}{ccc|c} x & y & z & \\ 1 & 0 & 0 & x \\ 0 & 1 & 0 & y \\ 0 & 0 & 1 & z \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & -1 & -1 & -3 \\ 0 & 3 & 3 & 12 \\ 0 & 4 & 5 & 16 \end{array} \right] \times \frac{1}{3}$$

$$\left[\begin{array}{ccc|c} x & y & z & \\ 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 4 \\ 0 & 0 & 1 & 0 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & -1 & -1 & -3 \\ 0 & 1 & 1 & 4 \\ 0 & 4 & 5 & 16 \end{array} \right] \begin{matrix} \leftarrow x+1 \\ \\ \leftarrow x-4 \end{matrix}$$

$$\begin{cases} x = 1 \\ y = 4 \\ z = 0 \end{cases} \#$$