Solve the system as following $\begin{cases} x_1 - 3x_2 + x_3 - 7x_4 + 4x_5 = 0 \\ x_1 + 2x_2 - 3x_3 = 0 \\ x_2 - 4x_3 + x_5 = 0 \end{cases}$. [98 彰師大車輛 4]

[解] $\begin{bmatrix} 1 & -3 & 1 & -7 & 4 \\ 1 & 2 & -3 & 0 & 0 \\ 0 & 1 & -4 & 0 & 1 \end{bmatrix} \xrightarrow{R_{12}(-1)} \begin{bmatrix} 1 & -3 & 1 & -7 & 4 \\ 0 & 5 & -4 & 7 & -4 \\ 0 & 1 & -4 & 0 & 1 \end{bmatrix} \xrightarrow{R_{23}} \begin{bmatrix} 1 & -3 & 1 & -7 & 4 \\ 0 & 1 & -4 & 0 & 1 \\ 0 & 5 & -4 & 7 & -4 \end{bmatrix}$

$\xrightarrow{R_{23}(-5)} \begin{bmatrix} 1 & -3 & 1 & -7 & 4 \\ 0 & 1 & -4 & 0 & 1 \\ 0 & 0 & 16 & 7 & -9 \end{bmatrix}$

令 $x_5 = C_1, x_4 = C_2 \Rightarrow x_3 = \frac{9}{16}C_1 - \frac{7}{16}C_2, x_2 = \frac{5}{4}C_1 - \frac{7}{4}C_2, x_1 = -\frac{13}{16}C_1 + \frac{35}{16}C_2$

南臺科技大學
Southern Taiwan University of Science and Technology