

Exercise 1

$$\begin{aligned} \textcircled{a} \quad & \begin{pmatrix} C_1 & C_1 \\ 0 & C_1 \end{pmatrix} + \begin{pmatrix} C_2 & C_2 \\ C_2 & 0 \end{pmatrix} \\ & + \begin{pmatrix} 0 & C_3 \\ 0 & 0 \end{pmatrix} \\ & = \begin{pmatrix} C_1 + C_2 & C_1 + C_2 + C_3 \\ C_2 & C_1 \end{pmatrix} \end{aligned}$$

$$b) \begin{pmatrix} C_1 + C_2 + a & C_1 + C_2 + C_3 + b \\ C_2 + c & C_1 + a \end{pmatrix}$$

$$\left(\begin{array}{ccc|ccc} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 1 & 0 \\ 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 1 \end{array} \right)$$

$$\rightarrow \left(\begin{array}{ccc|ccc} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & -1 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 1 \end{array} \right)$$

$$\rightarrow \left(\begin{array}{ccc|ccc} 0 & 1 & 0 & 1 & 0 & 0 & -1 \\ 0 & 1 & 0 & & & & \end{array} \right)$$

