

Help file for solution of Example 4 (done in class), for Section 8.2

Find the reduced row echelon form of

$$\begin{bmatrix} 2-2i & 4 & 4 & 0 \\ -1 & -2-2i & 0 & 0 \\ -1 & 0 & -2-2i & 0 \end{bmatrix}$$

Solution

$$\begin{aligned} & \begin{bmatrix} \boxed{2-2i} & 4 & 4 & 0 \\ -1 & -2-2i & 0 & 0 \\ -1 & 0 & -2-2i & 0 \end{bmatrix} \xrightarrow{(2+2i)R_1} \begin{bmatrix} \boxed{8} & 8+8i & 8+8i & 0 \\ -1 & -2-2i & 0 & 0 \\ -1 & 0 & -2-2i & 0 \end{bmatrix} \\ & \xrightarrow{\frac{1}{8}R_1} \begin{bmatrix} \boxed{1} & 1+i & 1+i & 0 \\ -1 & -2-2i & 0 & 0 \\ -1 & 0 & -2-2i & 0 \end{bmatrix} \xrightarrow[\substack{R_2+R_1 \\ R_3+R_1}]{} \begin{bmatrix} \boxed{1} & 1+i & 1+i & 0 \\ 0 & -1-i & 1+i & 0 \\ 0 & 1+i & -1-i & 0 \end{bmatrix} \\ & \xrightarrow{R_3+R_2} \begin{bmatrix} \boxed{1} & 1+i & 1+i & 0 \\ 0 & \boxed{-1-i} & 1+i & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix} \xrightarrow{R_1+R_2} \begin{bmatrix} \boxed{1} & 0 & 2+2i & 0 \\ 0 & \boxed{-1-i} & 1+i & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix} \\ & \xrightarrow{(-1+i)R_2} \begin{bmatrix} \boxed{1} & 0 & 2+2i & 0 \\ 0 & \boxed{2} & -2 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix} \xrightarrow{\frac{1}{2}R_2} \begin{bmatrix} \boxed{1} & 0 & 2+2i & 0 \\ 0 & \boxed{1} & -1 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix} \end{aligned}$$