Example: Converting a Controllable System to CCF

Step 2: Determine desired $\mathcal{C}(\bar{A}, \bar{B})$.

We need to figure out $\bar{A}$ and $\bar{B}$.

For CCF, we must have

$$\bar{A} = \begin{pmatrix} 0 & 1 \\ -a_2 & -a_1 \end{pmatrix}, \qquad \bar{B} = \begin{pmatrix} 0 \\ 1 \end{pmatrix}.$$

We have just computed

$$\bar{A} = \begin{pmatrix} 0 & 1 \\ -15 & -8 \end{pmatrix}, \quad \bar{B} = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

Therefore, the new controllability matrix should be

$$\mathcal{C}(\bar{A}, \bar{B}) = [\bar{B} \,|\, \bar{A}\bar{B}] = \begin{pmatrix} 0 & 1 \\ 1 & -8 \end{pmatrix}$$