Example: Converting a Controllable System to CCF

Note!! The way I do this is different from the textbook.

Consider $A = \begin{pmatrix} -15 & 8 \\ -15 & 7 \end{pmatrix}$, $B = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$ (C is immaterial).

Convert to CCF if possible.

Step 1: check for controllability.

$$AB = \begin{pmatrix} -15 & 8 \\ -15 & 7 \end{pmatrix} \begin{pmatrix} 1 \\ 1 \end{pmatrix} = \begin{pmatrix} -7 \\ -8 \end{pmatrix} \implies \mathcal{C} = \begin{pmatrix} 1 & -7 \\ 1 & -8 \end{pmatrix}$$

$$\det \mathcal{C} = -1 \qquad \text{-- controllable}$$