

## Example: Converting a Controllable System to CCF

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

Step 1: check for controllability.

$$C = \begin{pmatrix} 1 & -7 \\ 1 & -8 \end{pmatrix} \quad \det C = -1 \quad - \text{controllable}$$

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

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

Step 3: Compute  $T$ .

$$T = C(\bar{A}, \bar{B}) \cdot [C(A, B)]^{-1} = \begin{pmatrix} 0 & 1 \\ 1 & -8 \end{pmatrix} \begin{pmatrix} 8 & -7 \\ 1 & -1 \end{pmatrix} = \begin{pmatrix} 1 & -1 \\ 0 & 1 \end{pmatrix}$$