Observer Pole Placement

General procedure for any *observable* system:

1. Convert to OCF: $T = \underbrace{\mathcal{O}(\bar{A}, \bar{C})^{-1}}_{\text{new}} \underbrace{[\mathcal{O}(A, C)]}_{\text{old}}$
2. Find $\bar{L}$, such that $\bar{A} - \bar{L}\bar{C}$ has desired eigenvalues.
3. Convert back to original coordinates: $L = T^{-1}\bar{L}$.

The resulting observer is

$$\dot{\hat{x}} = (A - T^{-1}\bar{L}C)\hat{x} + T^{-1}\bar{L}y$$

In fact, this procedure is not necessary because of duality between controllability and observability!!