

Dynamic Output Feedback: Does It Work?

Summarizing:

- ▶ When $y = x$, full state feedback $u = -Kx$ achieves desired pole placement.
- ▶ How do we know that $u = -K\hat{x}$ achieves similar objectives?

Here is our overall closed-loop system:

$$\begin{aligned}\dot{x} &= Ax - BK\hat{x} \\ \dot{\hat{x}} &= (A - LC - BK)\hat{x} + LCx\end{aligned}$$

We can write it in block matrix form:

$$\begin{pmatrix} \dot{x} \\ \dot{\hat{x}} \end{pmatrix} = \begin{pmatrix} A & -BK \\ LC & A - LC - BK \end{pmatrix} \begin{pmatrix} x \\ \hat{x} \end{pmatrix}$$

How do we relate this to “nominal” behavior, $A - BK$?