

# EE 105 **Feedback control systems**

Transfer functions  $\Leftrightarrow$  state space

Steven Bell

23 September 2024

# By the end of class today, you should be able to:

- Write a state-space model for a transfer function
- Use MATLAB to convert between state space and TF
- Explain why we've been bothering with both models

# From a transfer function to state space

# Block diagram view of state space

# A messier example

# Let's do this in MATLAB!

How do the coefficients in the TF relate to the coefficients in the  $A/B/C/D$  matrices?

What would these mean?

**Why does this happen?**

**Zoom out: why use both TFs and SS?**



# Formalizing "good" step responses