Welcome to EE 105!

Please find a seat and fill out a name tent with the name you go by.

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EE 105 **Feedback control systems**

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What is a control system?

A process or system ("plant")
where we can measure some output
and control some inputs
and where the measurement is used modulate the input.

About me

Assistant teaching professor in ECE

Bachelor's in
Computer Engineering

MS/PhD in
Electrical Engineering

About me

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Never took a "true" control systems course (!)

But I've taken several related courses, and built real control systems.

About you

While you're waiting:
  Introduce yourselves
   Write down as many real-world examples of control systems as you can

Logistics

- Course website: http://www.ece.tufts.edu/ee/105/

- Go read the syllabus

- Textbooks

- Weekly homework, due on Wednesdays

- Final project building something cool

- Take-home midterm and final

Office hours

- I'm in Halligan 202c
  Come say hi; I'll have cookies next week

- TA: Maziar Amiraski

Device policy

No laptops or cell phones out during class, please.

Duncan et al., 2012
Digital Devices, Distraction, and Student Performance:
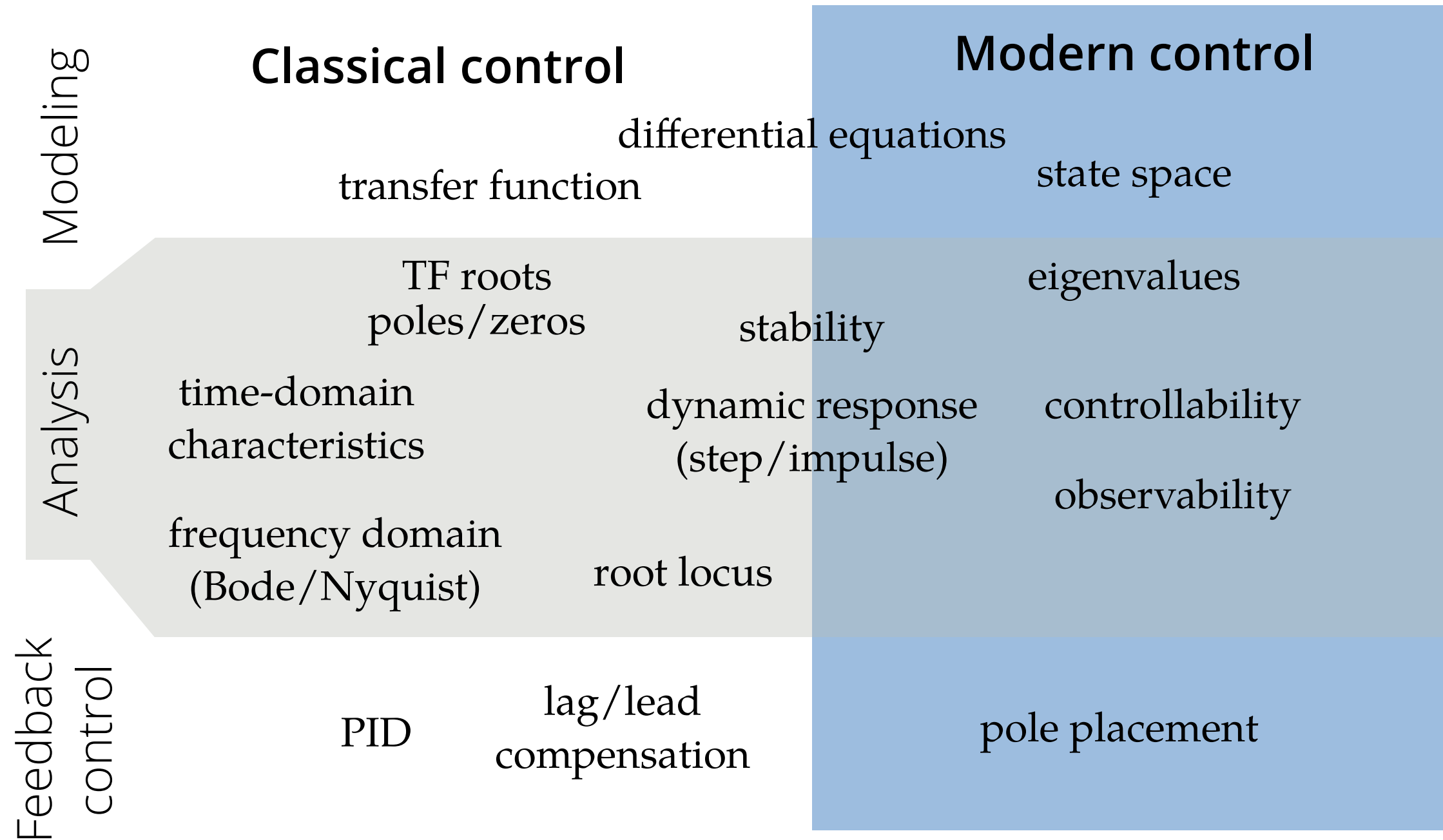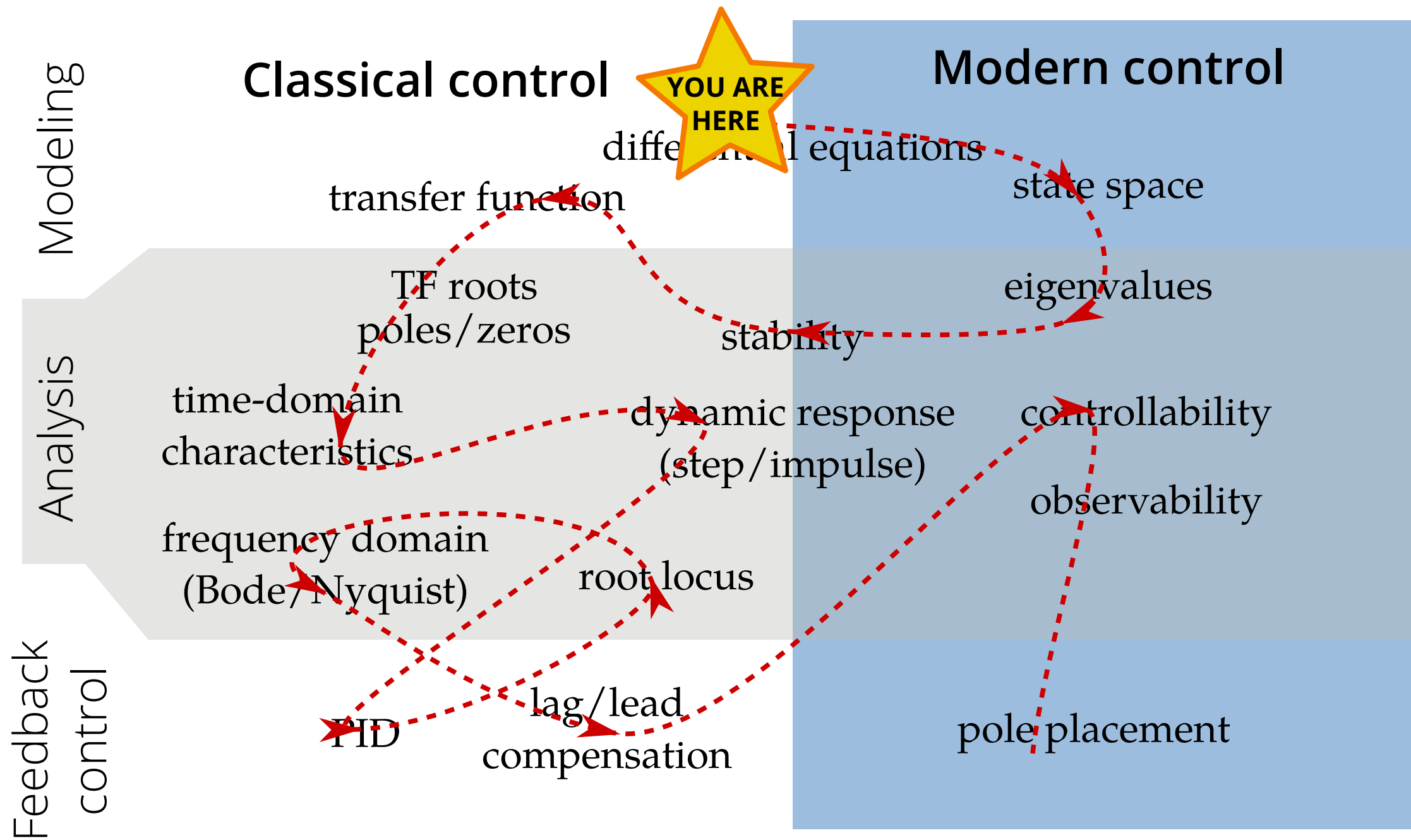*Does In-Class Cell Phone Use Reduce Learning?*
http://casa.colorado.edu/~dduncan/wp/wp-content/uploads/AER010108.pdf

Ravizza et al., 2014
Non-academic internet use in the classroom is negatively related to classroom learning
regardless of intellectual ability
https://www.sciencedirect.com/science/article/pii/S0360131514001298

Real-world control systems

Classical control   **Modern control**

Modeling

differential equations

transfer function

state space

Analysis

TF roots
poles/zeros

stability

eigenvalues

time-domain
characteristics

dynamic response
(step/impulse)

controllability

observability

frequency domain
(Bode/Nyquist)

root locus

Feedback
control

PID

lag/lead
compensation

pole placement

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

- Give examples of feedback control systems

- Describe the parameters of interest

- Define "linear system" and identify systems as linear or non-linear

- Sketch the general form of an LTI system