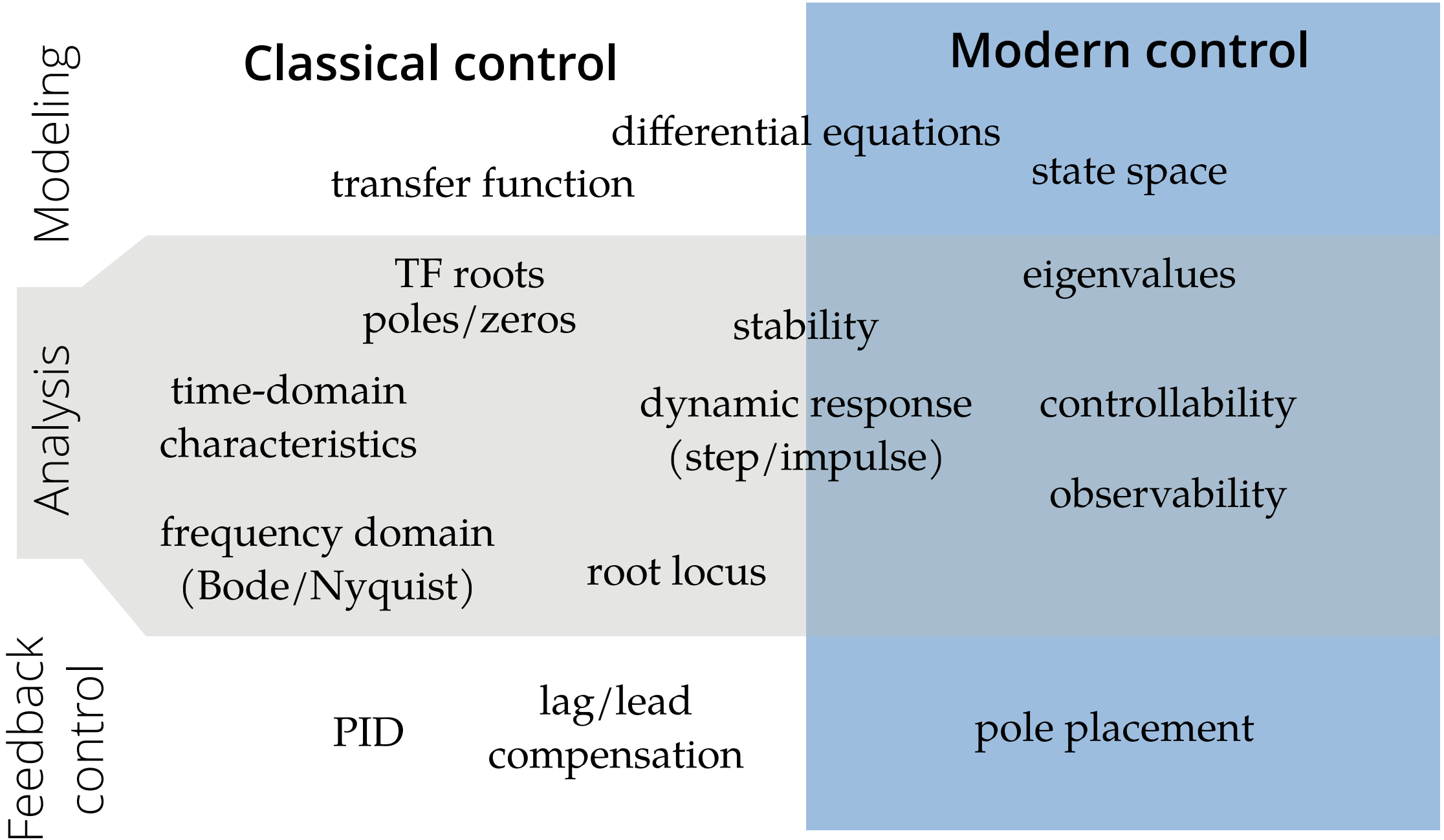
EE 105 Feedback control systems

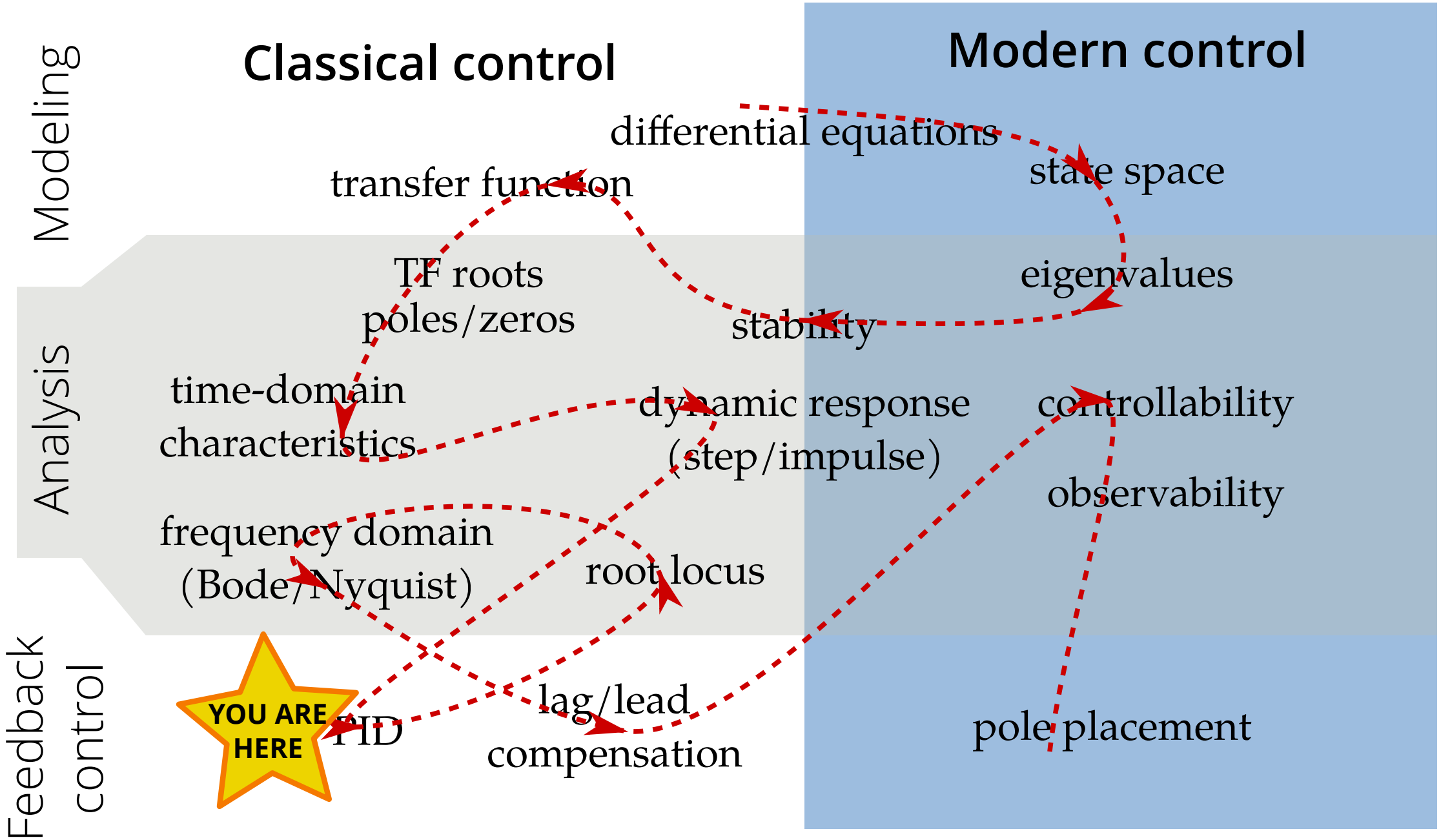
A first look at feedback (finally!)

Steven Bell

30 September 2024

Tufts UNIVERSITY


Classical control
Modern control
Modeling
Analysis
Feedback control
differential equations
transfer function
state space
TF roots
poles/zeros
eigenvalues
stability
time-domain
characteristics
dynamic response
(step/impulse)
controllability
observability
frequency domain
(Bode/Nyquist)
root locus
PID
lag/lead
compensation
pole placement

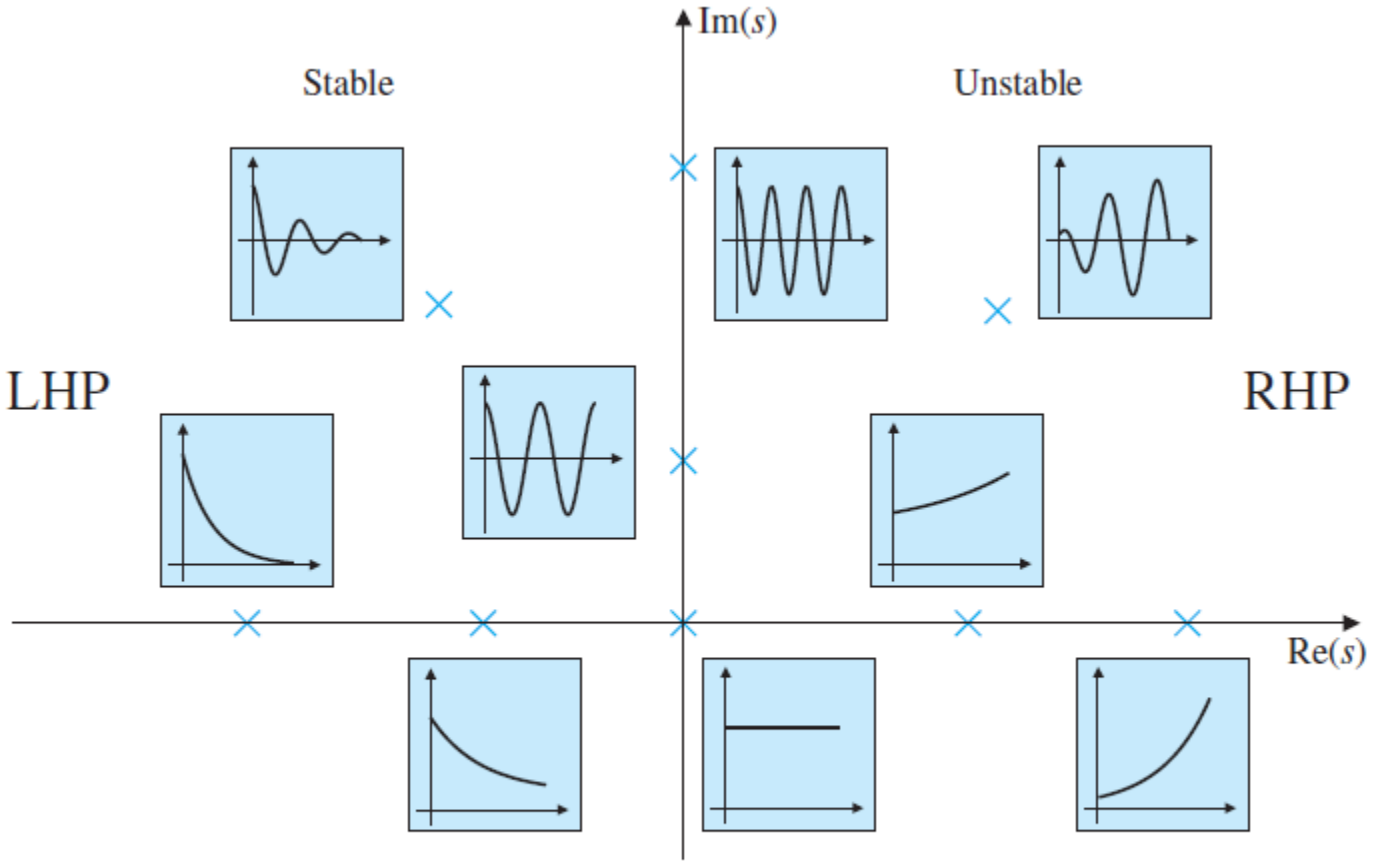

Classical control
Modern control
Modeling
Analysis
Feedback control
differential equations
state space
transfer function
TF roots
poles/zeros
eigenvalues
stability
time-domain
characteristics
dynamic response
(step/impulse)
controllability
observability
frequency domain
(Bode/Nyquist)
root locus
YOU ARE HERE
PID
lag/lead
compensation
pole placement

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

- Sketch a block diagram for a general feedback system
- Explain what proportional control does
- Explain what integral control does
- Write the TF for a system with a proportional or integral controller

Lecture 7: where are the poles?

FPE 3.16



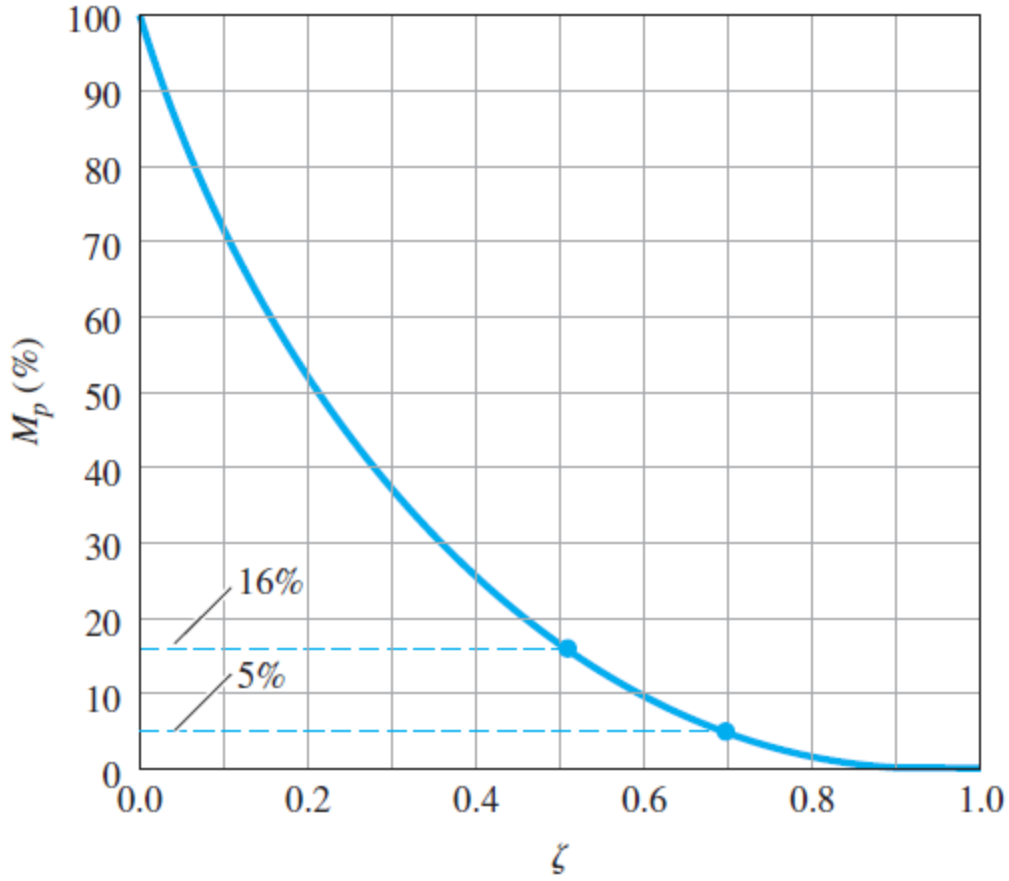
Lecture 7 catchup: rise time

This is fuzzy, but we can build some rules of thumb:

Lecture 7 catchup: overshoot

FPE 3.24

Calculus happens… and then:



Lecture 7 catchup: settling time

Feedback!