Level 1 -> Open Loop Control - Cart Problem

1.1 Speed Control with Air Drag

1.2 Position Control with Air Drag

1.3 Speed Control without Air Drag

1.4 Position Control without Air Drag

1.5 Variable Slope / Wind (impossible)

Level 2 -> Feedback Control (Solve 1.4 and 1.5 again with) - Cart Problem

2.1 P

2.2 PD + lowpass / anti kick

2.3 PI + anti windup

2.4 PID

2.5 All again with Feedforward

2.6 2.5 + with noise

Level 3 -> Minimum Phase System with Zeros

3.1 Simple case

3.2 3.1 + Settling Time Target

3.3 3.2 + Overshoot Target

Level 4 -> Stable non-Minimum Phase System

4.1 Dealing with Inverse Response

Level 5 -> Unstable System (Even RHP Poles, Stable Controller)

Level 6 -> Unstable System (Odd RHP Poles, Unstable Controller) - Inverted Pendulum

6.1 Inverted Pendulum

6.2 Inverted Pendulum on a Cart

Level 7 -> Time Delayed System

Level 8 -> Return back to all levels to examine them in frequency domain

Level X -> State Estimation

Predictor

Observer

Kalman Filter

Level 9 -> Non-linear Systems

9.1 What happened to Frequency Response?

9.2 Feedback Linearization

Level 10 ->

Level 11 ->

Level 12 ->