CS4140
Embedded Systems Laboratory

System Integration
Yaw control

Calibration (zeroing), continuous?
Filtering?
- Butterworth
Angle: P-controller + Kalman filter
Angle: cascaded P control

\[ \phi_s + p_s = K \int (\int sp + \phi - p) \]

Rate controller

Kalman Filter
Example Signal Flow (Classic Filter)
Notes on Filtering

- Classic filtering: trade-off noise vs. phase lag
- Kalman filter instead
- Sufficient resolution, especially for gyro bias (b)
- Non-zero angle bias at standstill
- Timing: angle loop is target
Example Signal Flow (Kalman Filter)
Signal Flow (Kalman Filter)

Kalman Filter

PC

P1

+ -

P2

engine mapping

QR

gyro

accel

sp

say

phi

p