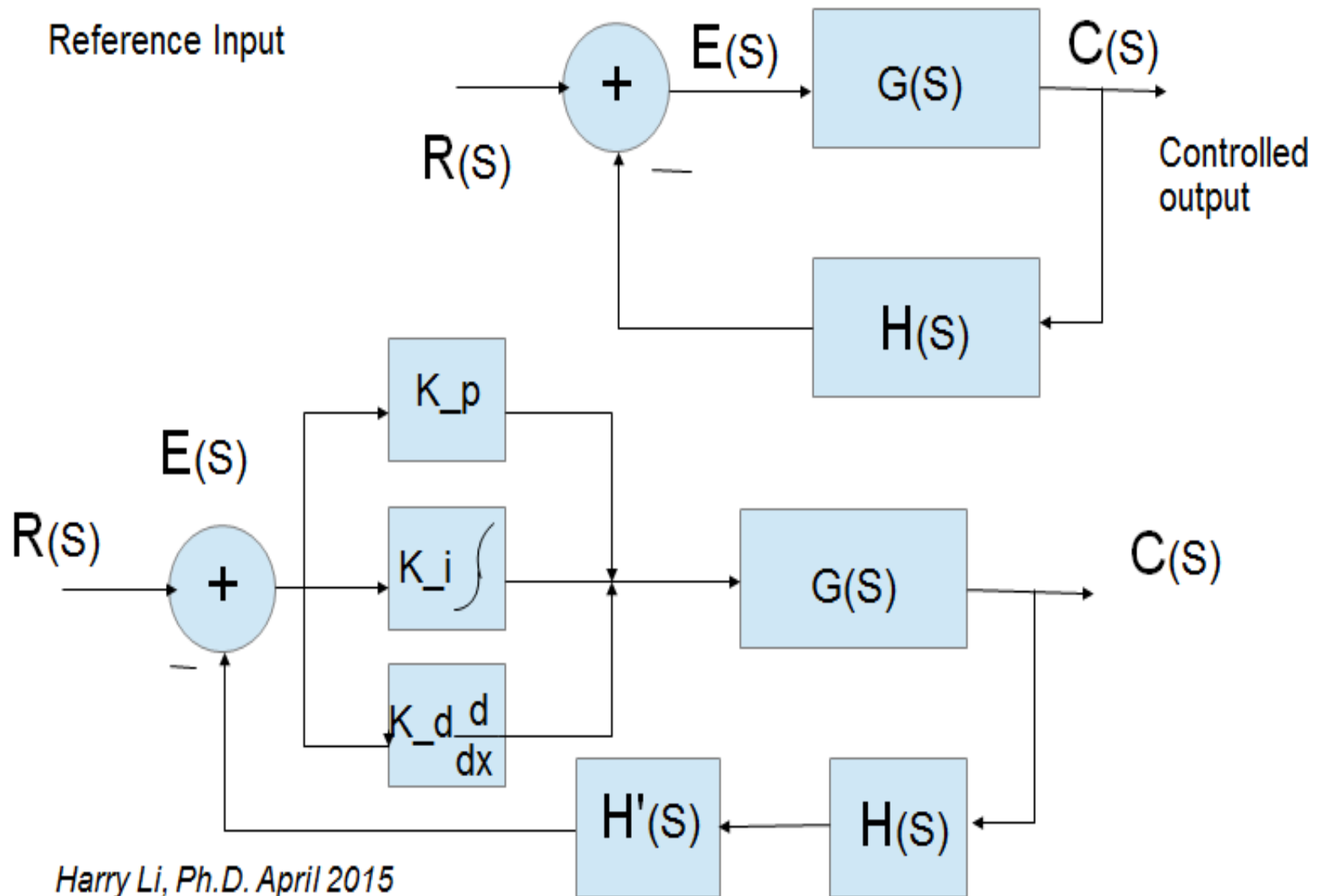
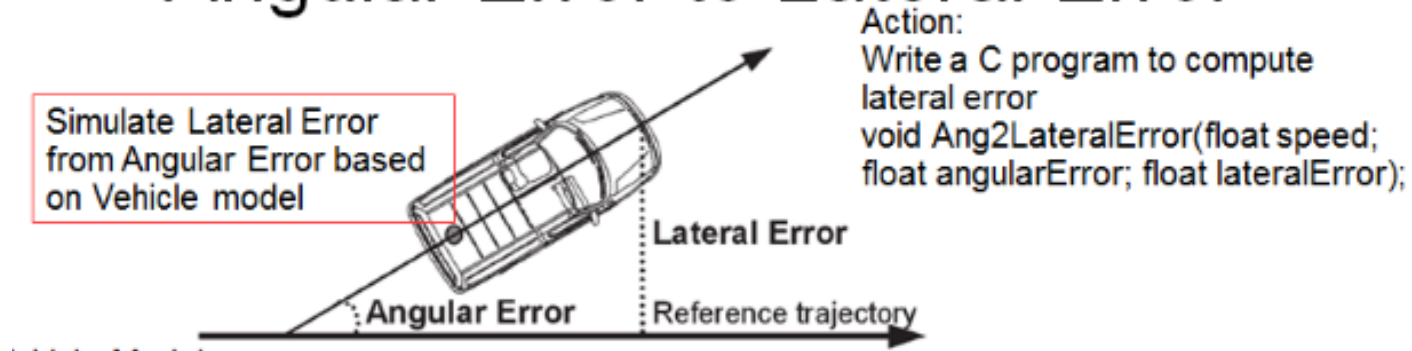


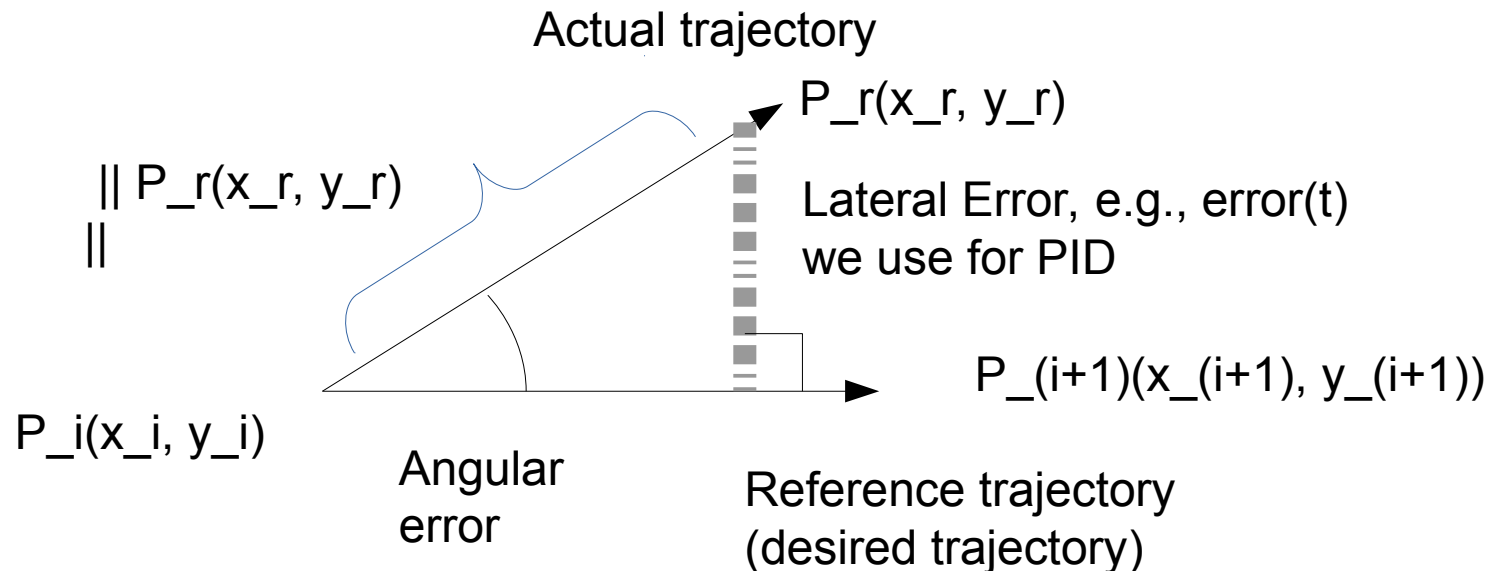
# Conventional PID Control



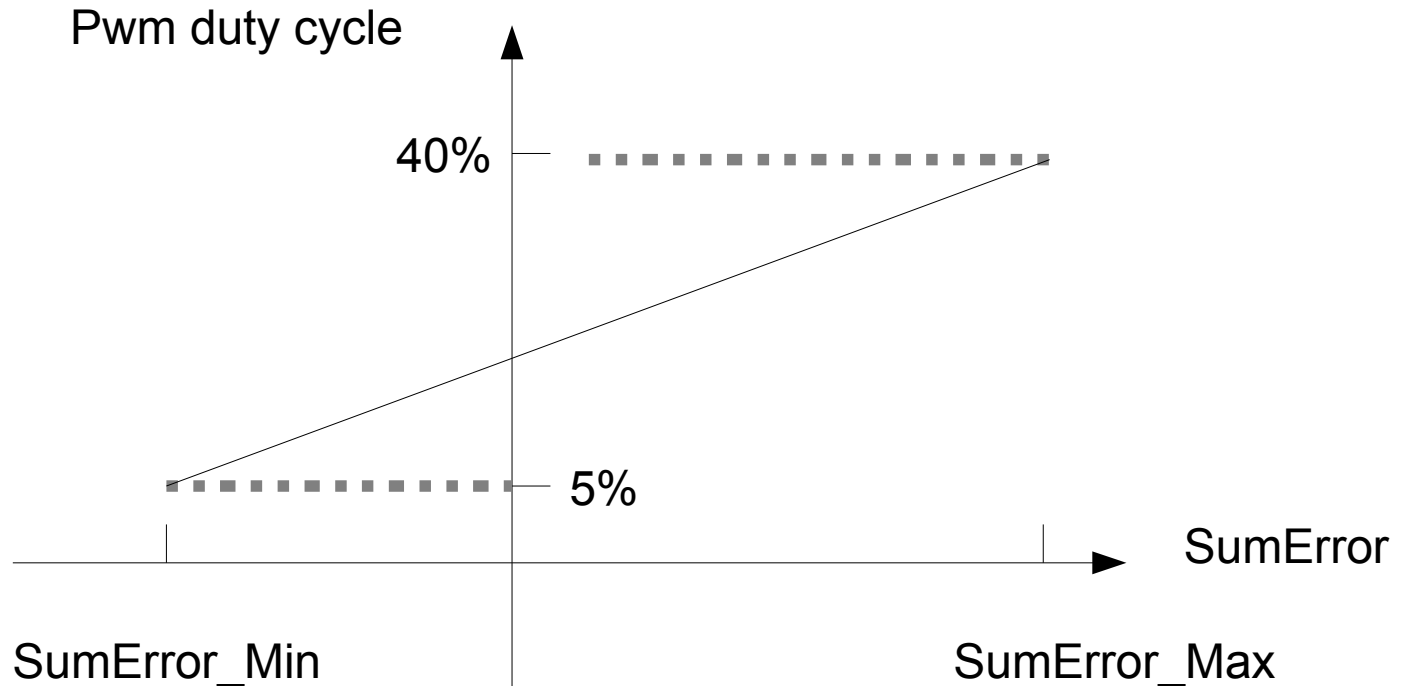
# Angular Error to Lateral Error



Displacement for actual trajectory can be computed by  $\| P_r(x_r, y_r) \|$



# Control Action Mapping to Duty Cycle



Note (2019): 1. pwm frequency is set to 2KHz and duty cycle changes from 5% to 40%; 2. set duty cycle to 15% for 5 Km/hour