

EECS192 Lecture 9

Mar. 15, 2016

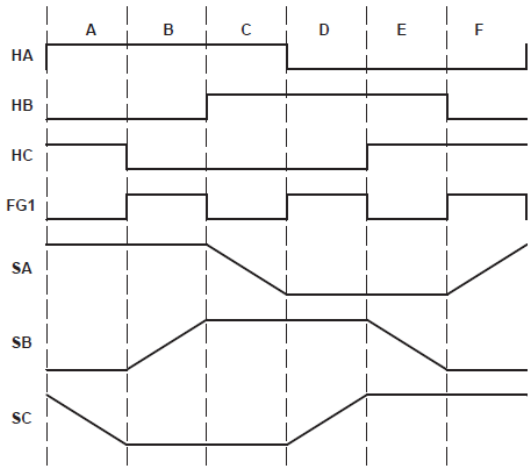
Notes:

1. Check off-
 1. 3/18 Closed loop figure 8 drop and run
 2. Setup courtyard track
2. Progress Report due Tues 4/5 in class
3. HW 2 due Fri April 1, 6 pm in bcourses
4. CalDay Sat. April 16 @ UCB, Freescale Cup at UC Davis
5. Lab share Tues 5-7 pm, all of April. Also two benches

Topics

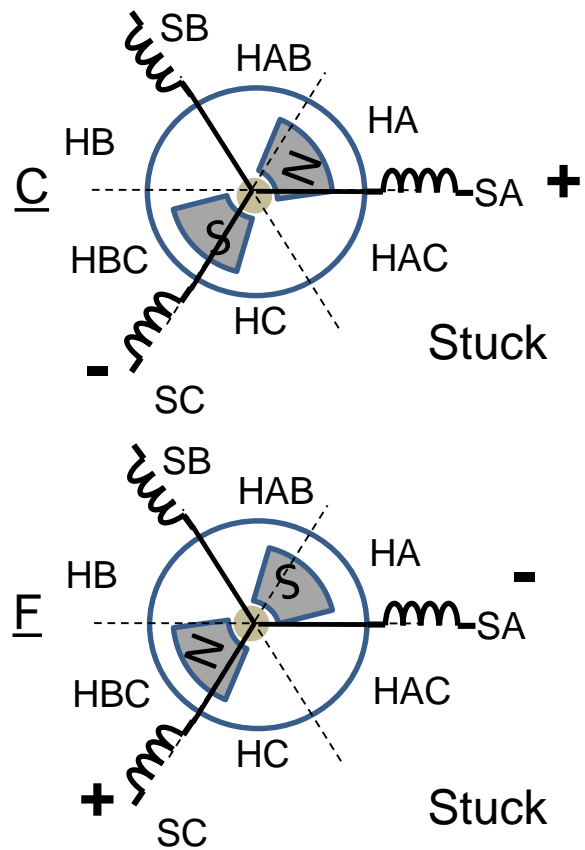
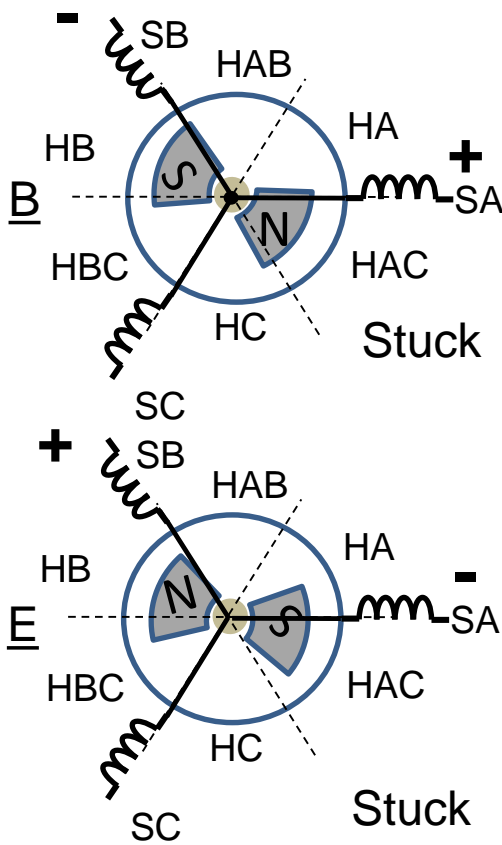
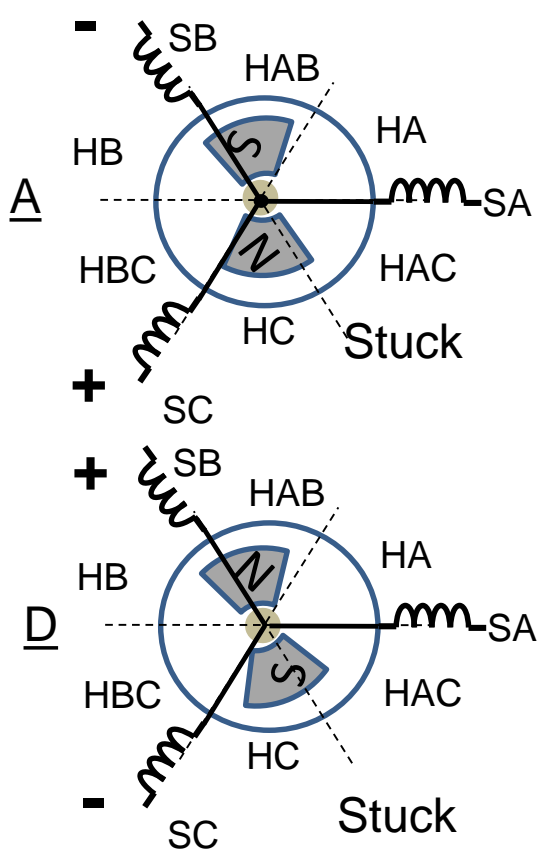
- Brushless motor(!)
- Feedback control overview: P, PI control
- Bicycle steering model
- Quiz 4
- V-rep steering simulator
- Software notes for embedded control

DIR = 1 = FOR

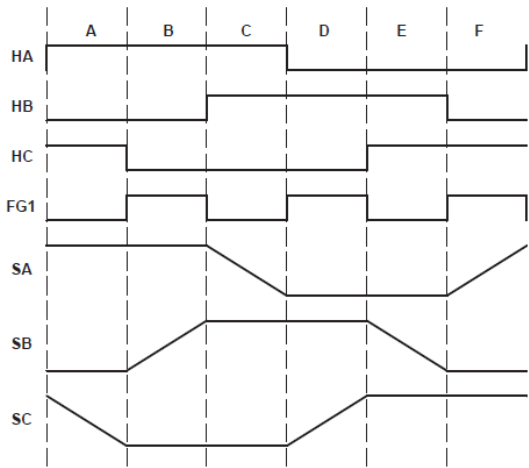


Hall Encoder	High	Low
A=HAC	A	B
B=HA	A	C
C=HAB	B	C
D=HB	B	A
E=HBC	C	A
F=HC	C	B

Hall sensor
angle skewed 60 degrees
FWD= STUCK!

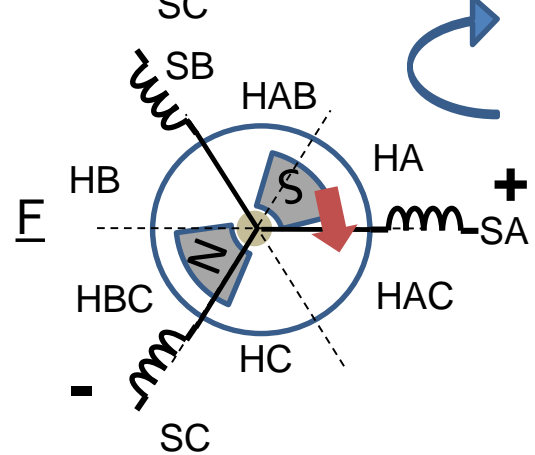
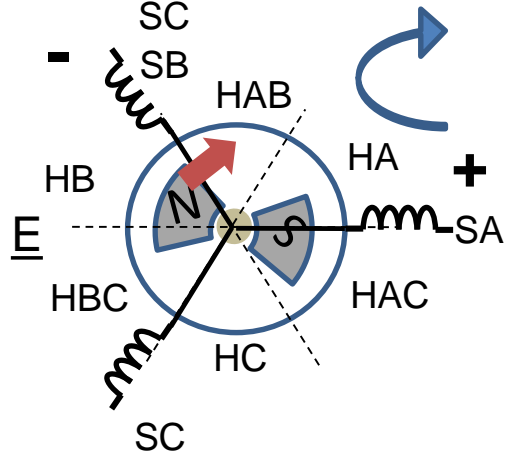
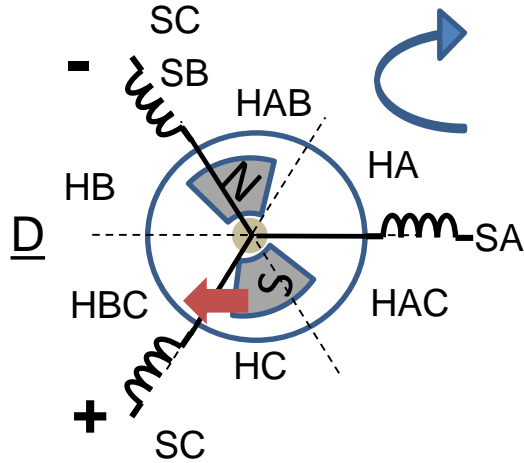
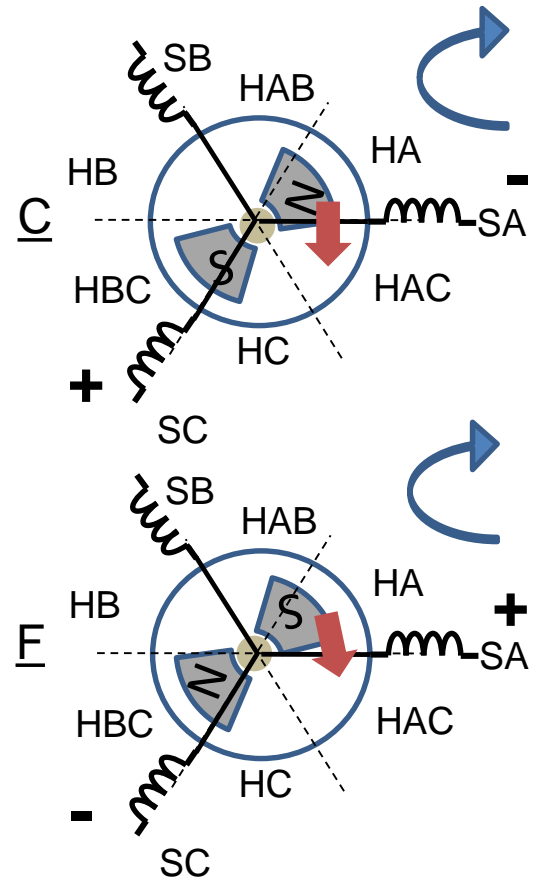
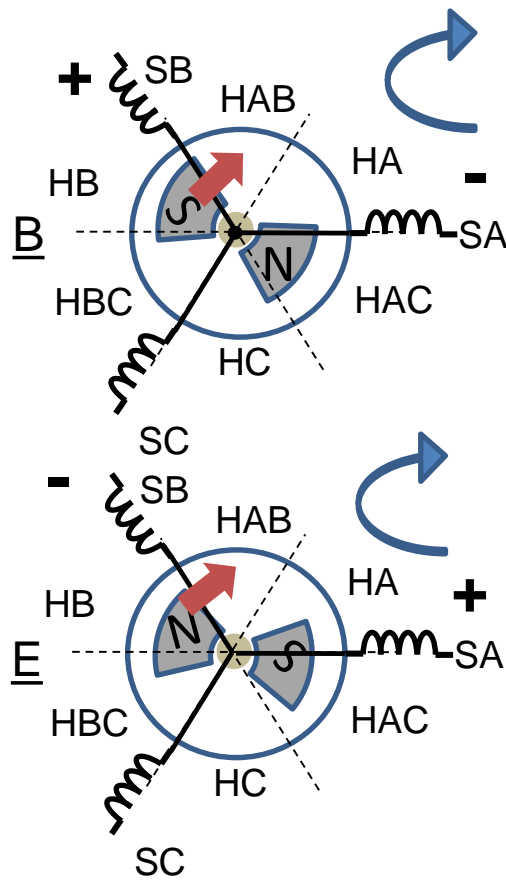
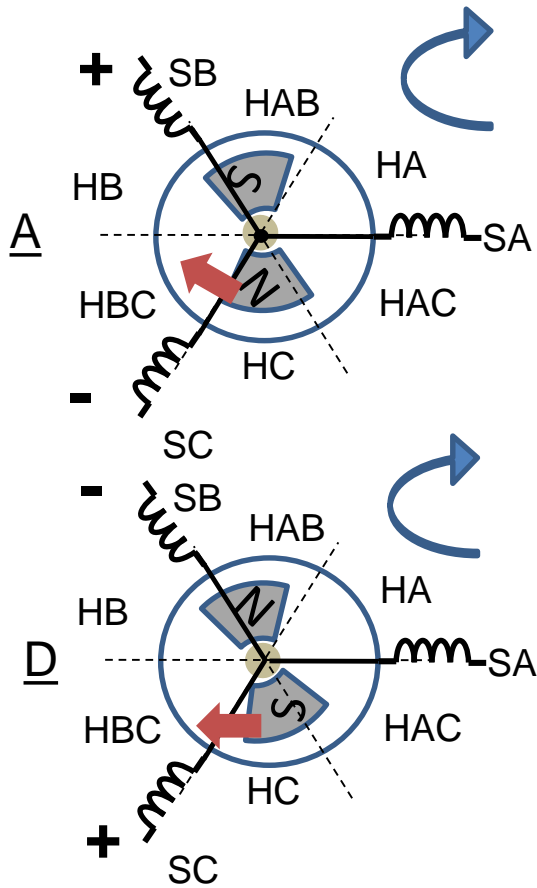


DIR = 1 = FOR

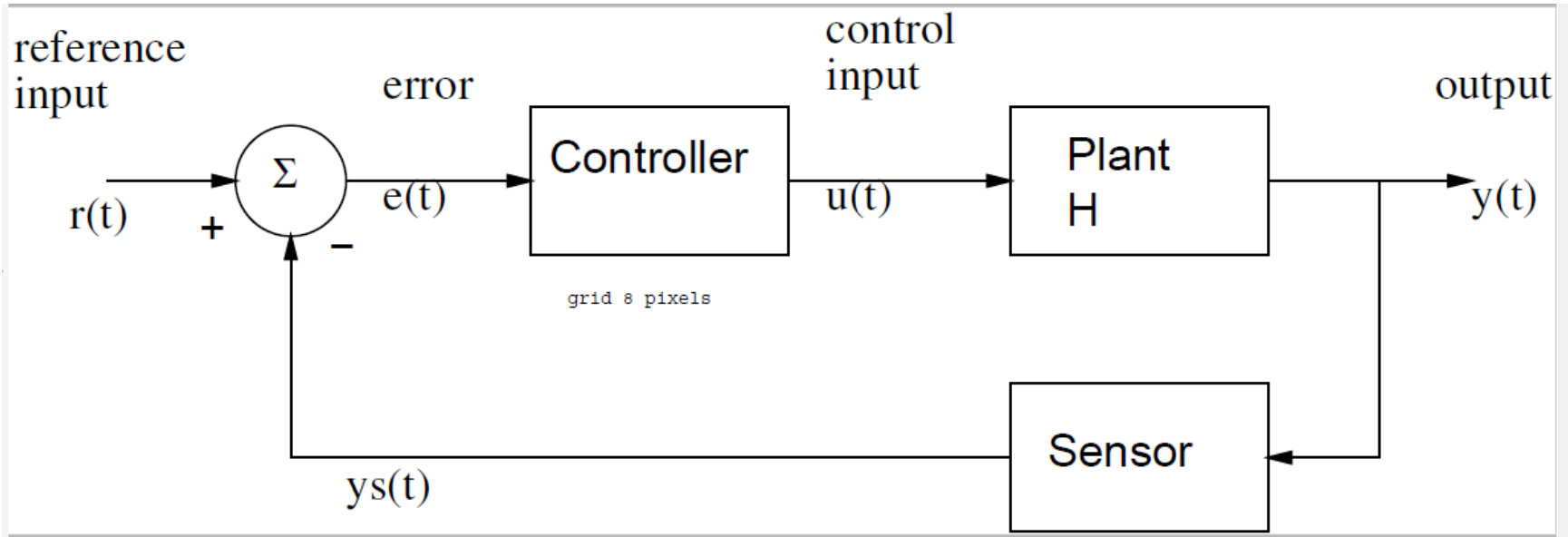


Hall Encoder	High	Low
A=HAC	B	A
B=HA	C	A
C=HAB	C	B
D=HB	A	B
E=HBC	A	C
F=HC	B	C

Hall sensor
angle skewed 60 degrees
REV: weak rotation



Control overview



On board...

Proportional control:

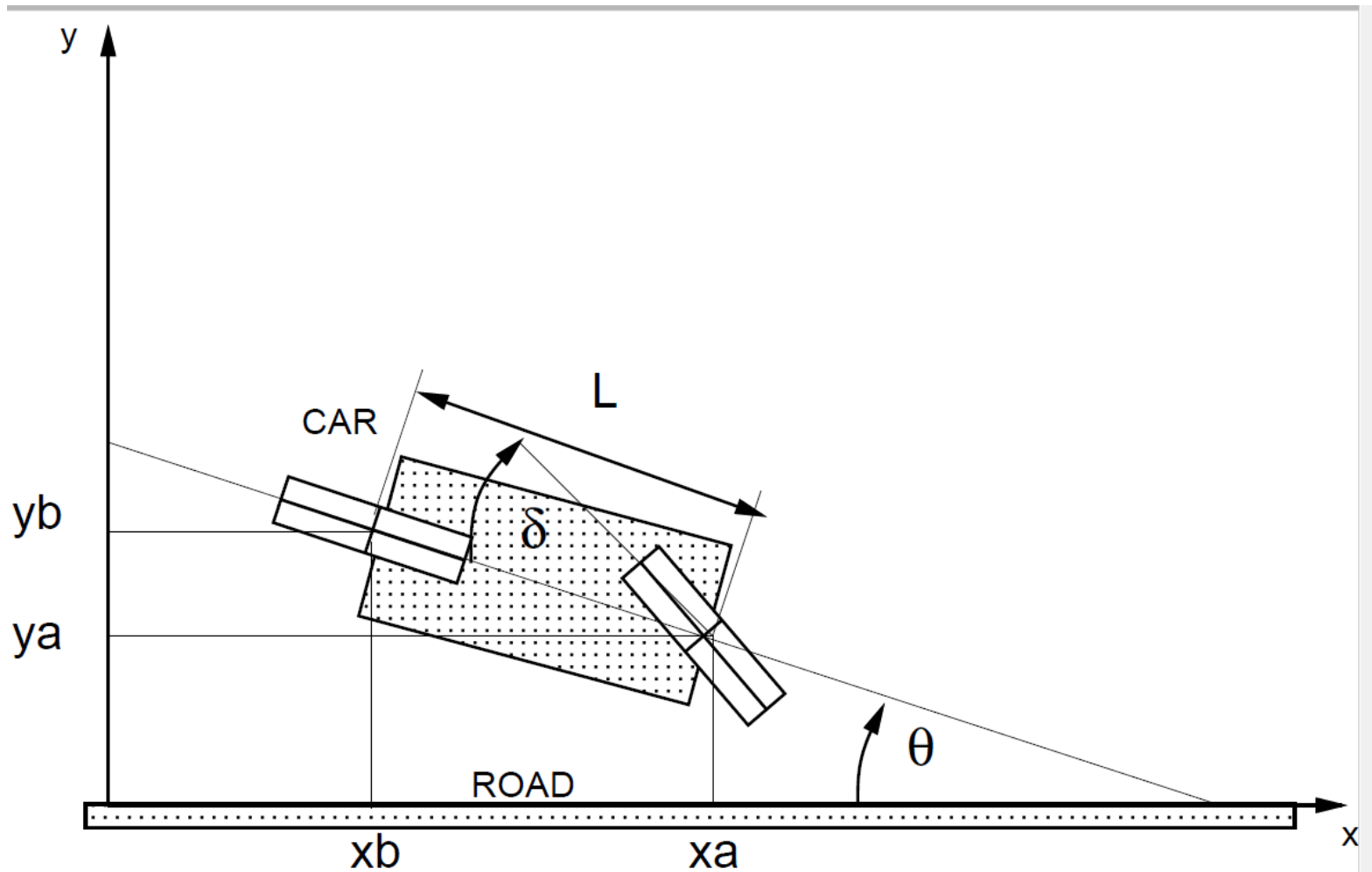
$$U = k_p * e = k_p * (r - y);$$

Proportional + integral control

$$U = k_p * e + k_i * e_sum;$$

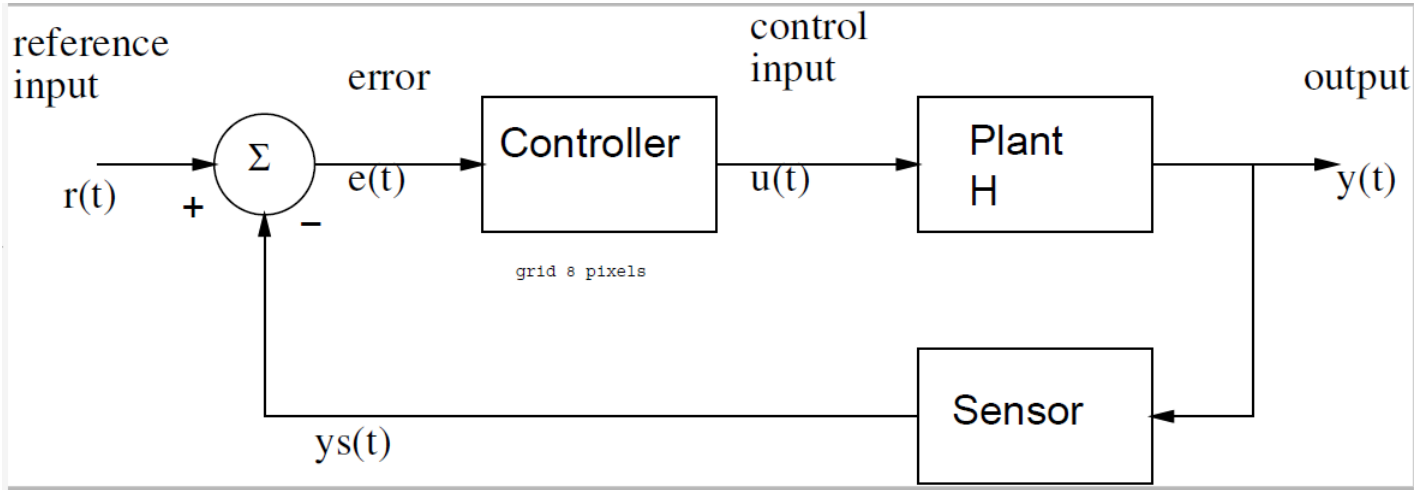
$$e_sum = e_sum + e;$$

Bicycle Steering Model



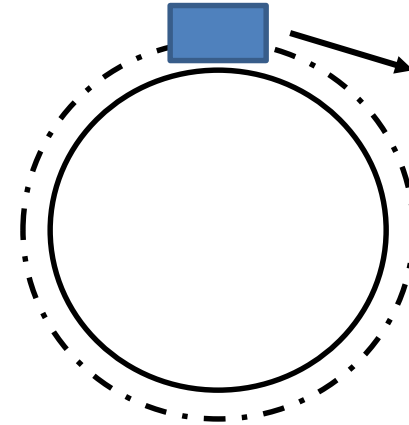
On board

Bicycle Steering Control



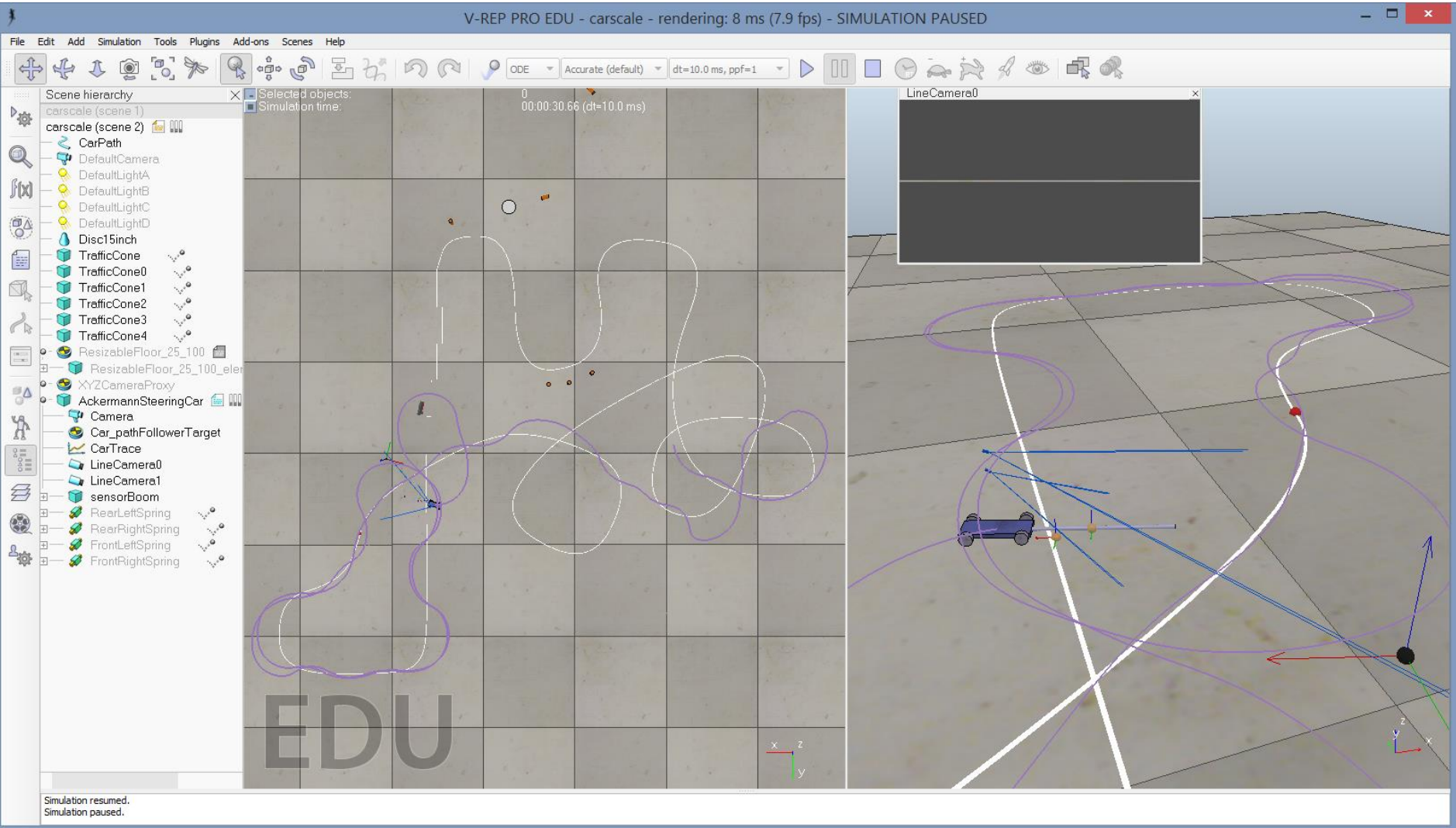
Note steady state error:
car follows larger radius

Proportional control:
 $r = 0$ (to be on straight track)
 $\delta = u = k_p * e$



On board

V-rep simulation



demo

Software Notes

