

EECS192 Lecture 9

Mar. 14, 2017

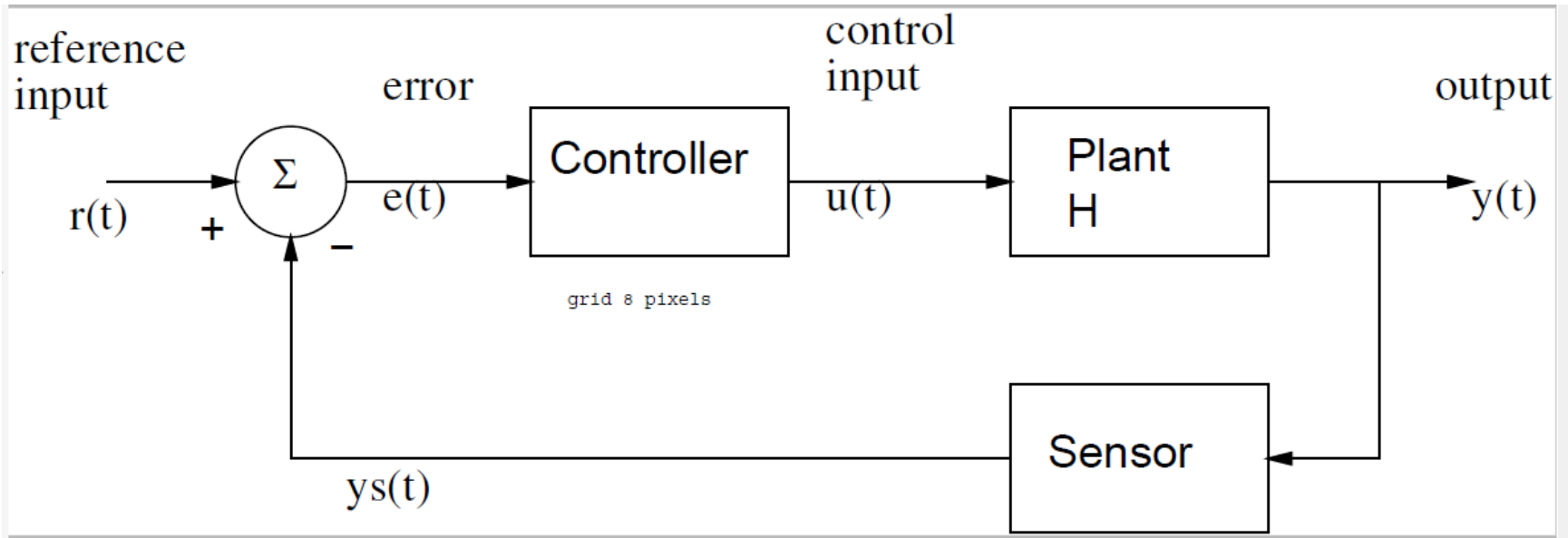
Notes:

1. Check off-
 1. 3/17 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 22 @ UCB

Topics

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

Control overview



On board...

Proportional control:

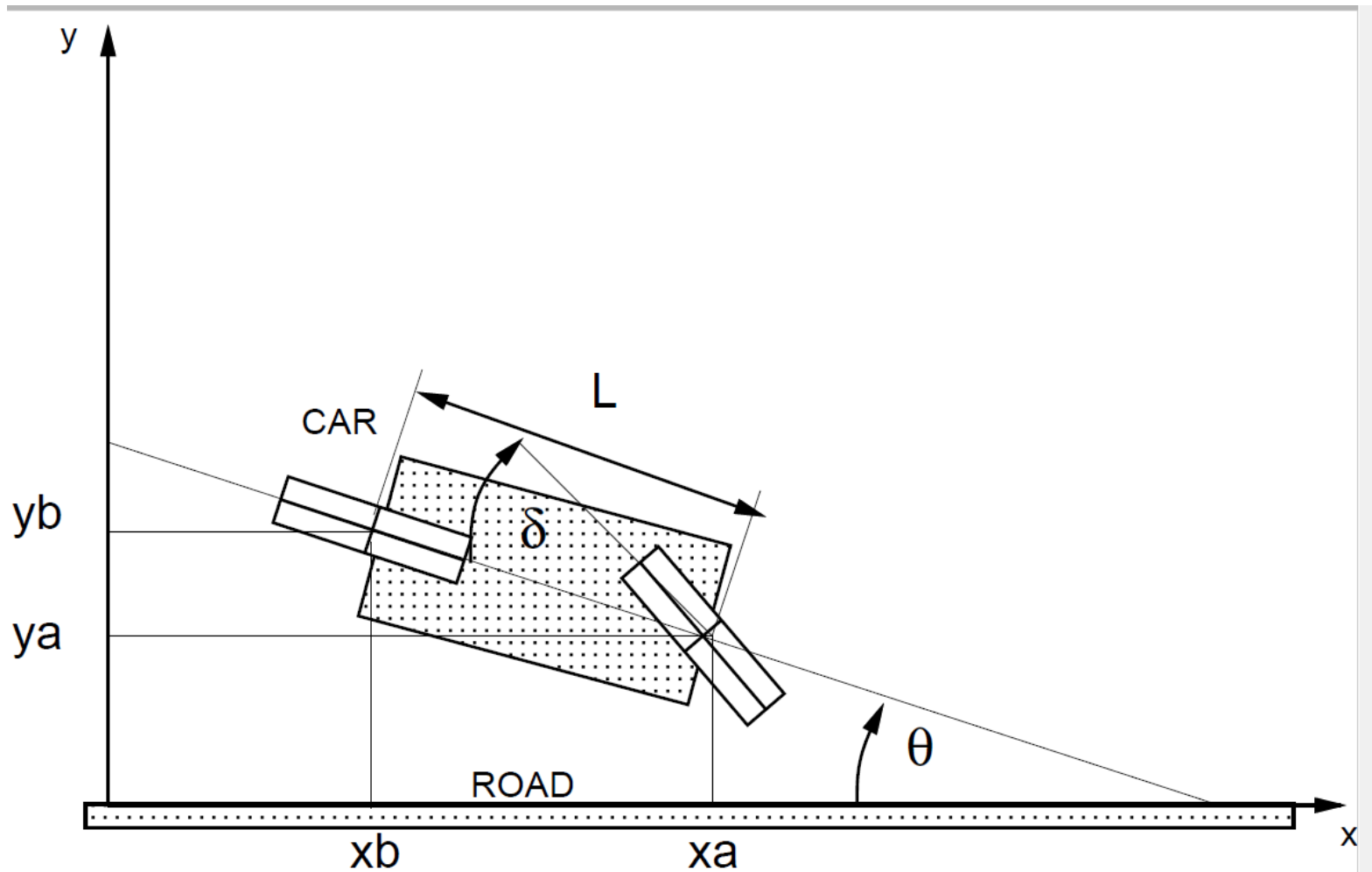
$$U = k_p * e = k_p * (r - y);$$

Proportional + integral control

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

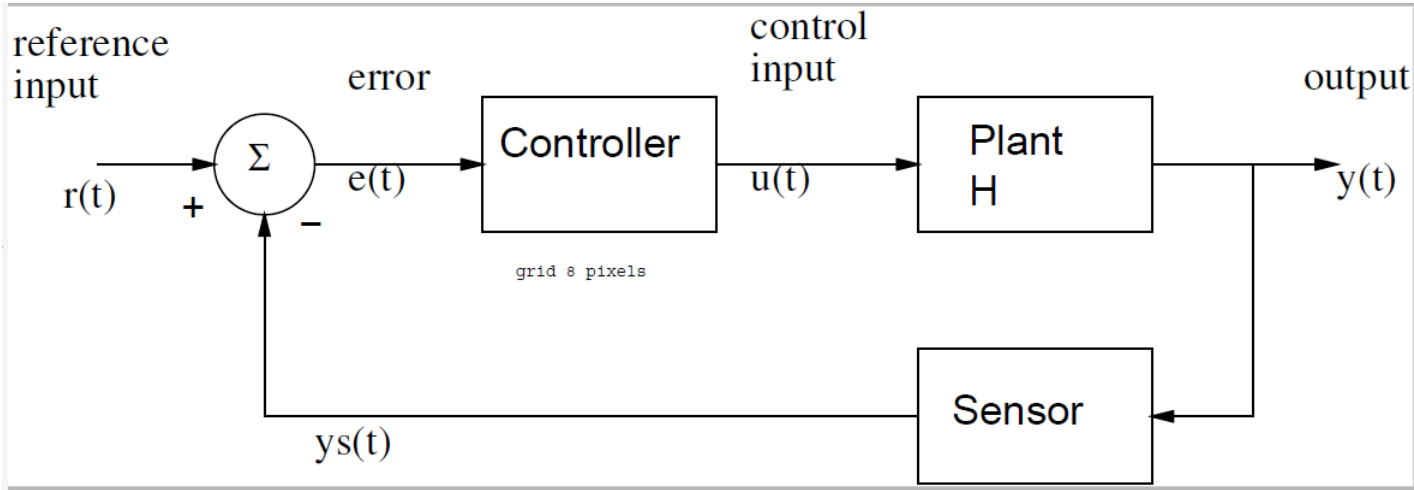
$$e_sum = e_sum + e;$$

Bicycle Steering Model



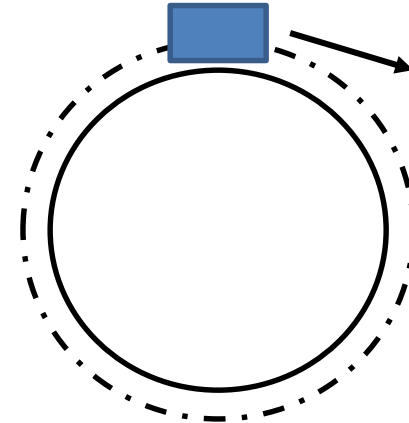
On board

Bicycle Steering Control



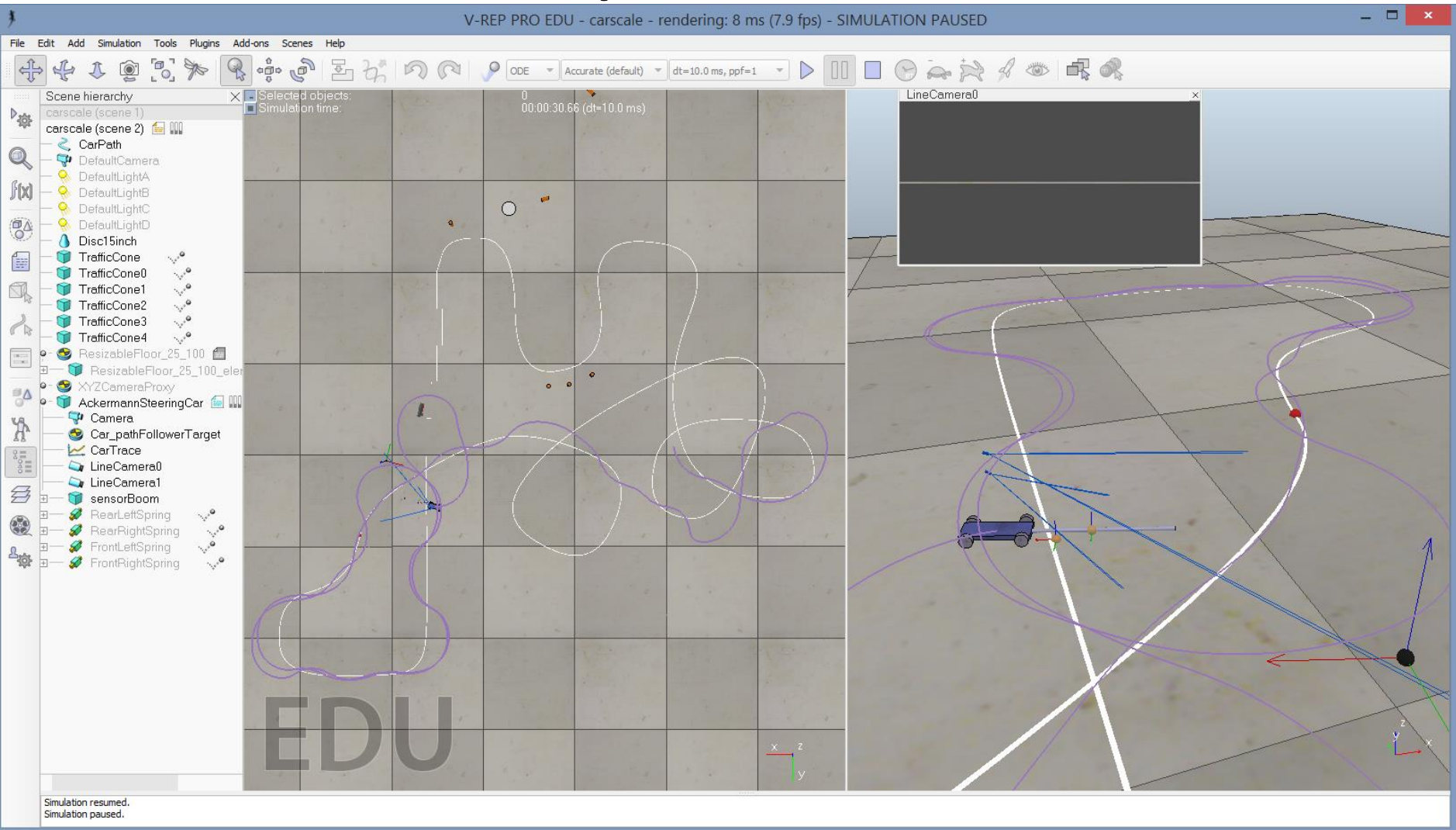
Note steady state error:
car follows larger radius

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



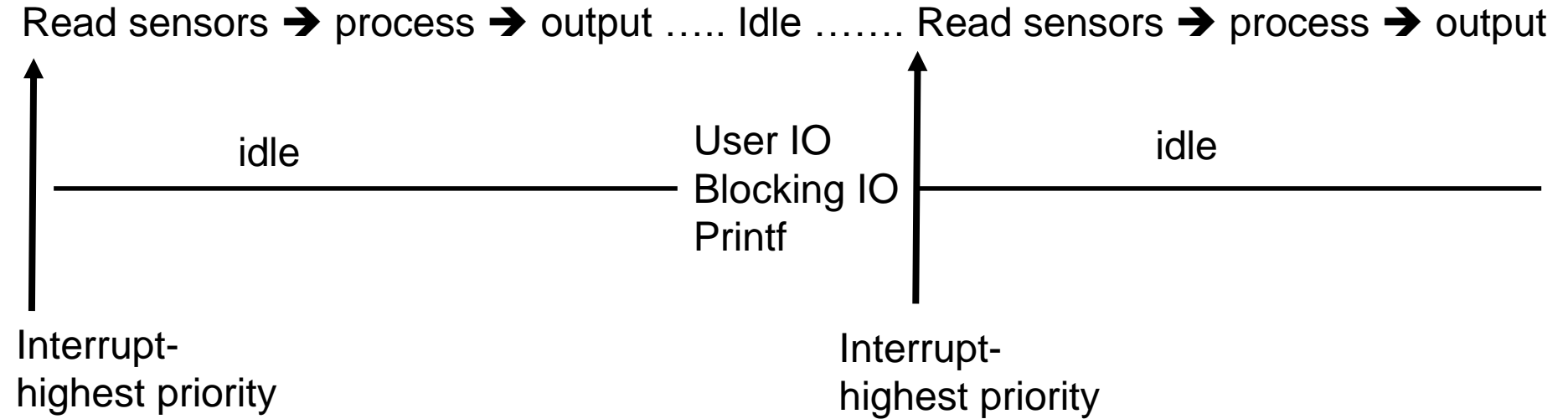
On board

V-rep simulation

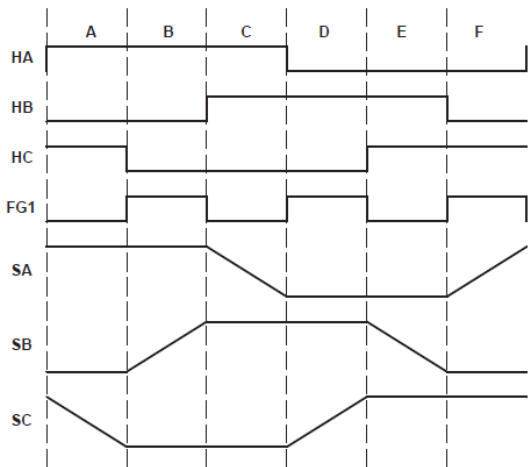


demo

Software Notes

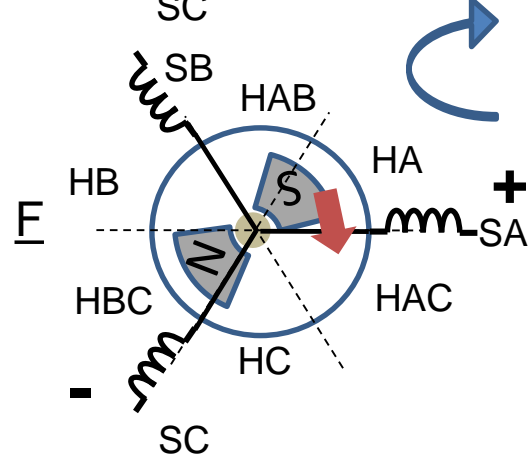
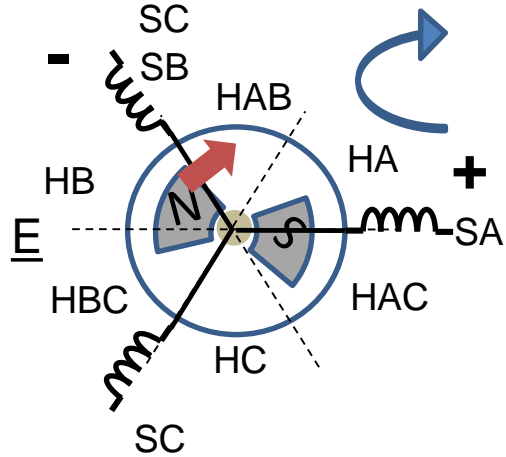
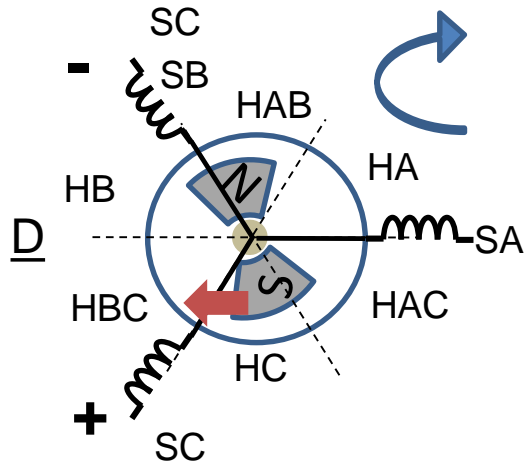
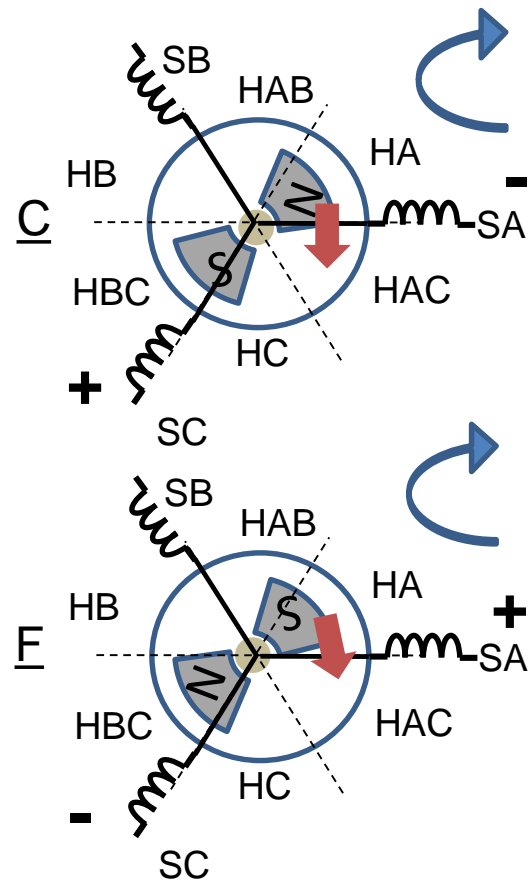
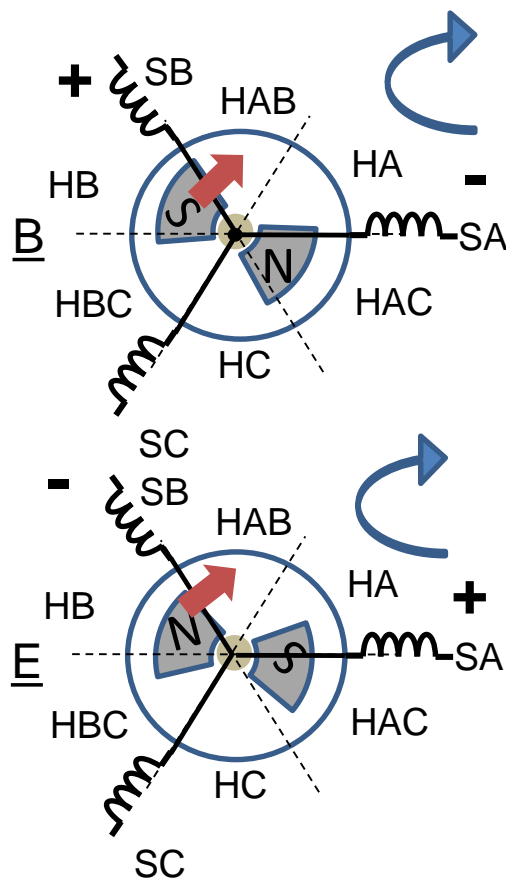
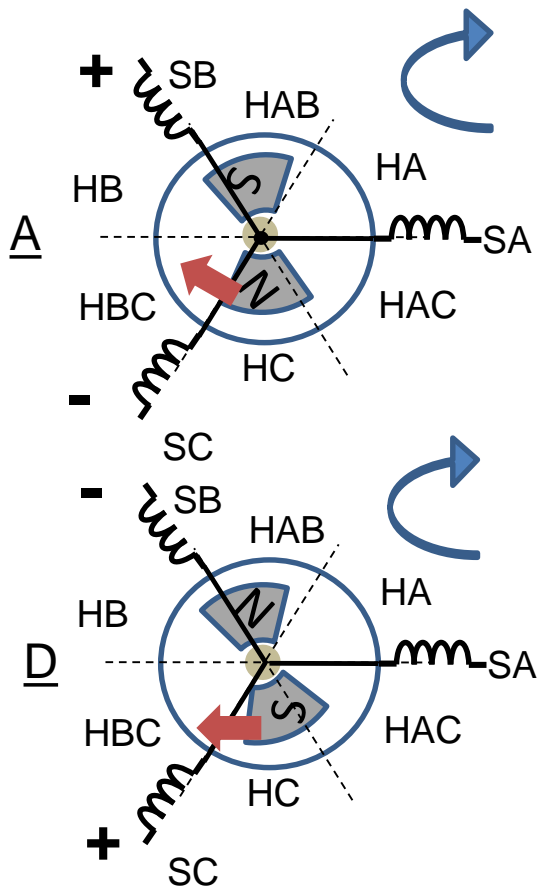


DIR = 1 = FOR

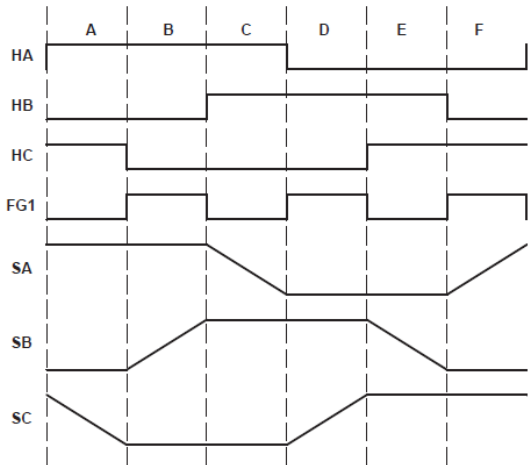


Hall Encoder	High	Low
A=HAC	B	A
B=HA	C	A
C=HAB	C	B
D=HB	A	B
E=HBC	A	C
F=HC	B	C

Hall sensor
angle skewed 60 degrees
REV: weak rotation



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!

