

ME333

Quiz 7

1. Pseudocode for a basic PID controller:

```
__ISR(timer at 1kHz) {  
    int error = get_ref() - get_sensor();  
    eint += error;  
    float u = Kp*error + Ki*eint + Kd*(error - eprevious);  
    eprevious = error;  
  
    send u to controller  
  
    interrupt_flag = 0;  
}
```

2. Integrator anti-windup sets a maximum (absolute) value for the accumulated area for integral gains. This way, if there is a sudden change in the input for the sensor after a long time of no change, the feedback loop won't take extra long to push through the integral error to correct its value.

3.

- a. The response has too much overshoot. I could increase the derivative gain K_d .
- b. The response has too much overshoot. I could decrease the proportional gain K_p to reduce the overshoot.
- c. I could increase the integral gain K_i to reduce the steady-state error.