Project 8:
Proportional-Derivative Control

Questions?

Project 7

- Due Friday @9am
- Demos by Monday

Project 7

```
int16_t compute_rotation_error(
                int16_t theta_goal, int16_t theta)
```

- Output range: -1799 … 1800

```
int16_t clip_error(int16_t error, int16_t deadband,
                                  int16_t saturation)
```

- Must be a continuous function

Project 7

- Orientation LEDs are now displaying rotation error

Project 8

Bring position and derivative control together

```
void position_derivative_control(int16_t forward_thrust,
     int16_t error, int16_t rotation_rate)
{
     int16_t thrust = Kp * error - Kv * rotation_rate;
     set_side_motor_magnitudes(forward_thrust - thrust,
          forward_thrust + thrust);
}
```

Project 8

Tuning Kp, Kv

- Use Kp from previous project and start with small Kv
- Slowly increase Kv until the craft is nearly critically damped
- If you want the craft to be even more aggressive about reaching the goal, then bump up Kp and then slowly change Kv

Notes

- The projects are building on one-another
- When we give feedback during a code review, that feedback must be incorporated into your future project implementation

Next Time

Finite State Machines for control