Robert Weischedel

CS 5780

4/17/17

Lab 8 Post Lab

1. What gain parameters did you end up using for your PI controller?
   * Describe the response of the system to speed changes

For my PI Controller I discovered that using values close to and around 10 worked the best for me. This may have been because my motor wasn’t the best. End the end I decided to use a value of 7 for my proportional gain Kp and a value of 8 for my integral gain Ki.

1. Describe what the derivative control parameter does.
   * Why it might be helpful?
   * Why it might cause problems?

The derivate control parameter purpose is to detect the rate the error develops at, and then attempts to correct the error. It can potentially cause problems due to the “twitchy” fast response time of the parameter; this phenomenon is also known as derivative kick. If you have a system that tends to have fluctuations, then the small but quick fluctuations end up being magnified leading to increased oscillations in the system. Or in others words it might up making the overall control even worse.

1. List four basic issues/problems that are often encountered in a basic PID algorithm.
   * How do you avoid or solve them?

One of the issues of a basic PID algorithm is getting consistent behavior from the PID, which also makes it difficult to calculate the integral and derivative math. We can fix this by ensuring the PID is being evaluated at a constant interval.

Another one of the issues of a PID algorithm is that it can be difficult to change tuning parameters while the system is running. We can fix this by bringing the Ki value inside the integral. Next you take the error and multiply it by the current Ki value. Thus this new value will only effect the equations moving forward, but not currently.

Another one of the issues of a PID algorithm is reset windup where the PID thinks it can do something that it can’t. This can easily be fixed by ensuring that we clamp each of terms in PID.

Another of the issues of a PID algorithm is that sometimes you don’t need the information given to you from the controller. And if you ignore the PID controller is just keeps trying to compensate for your lack of attention until when you need it again and you get a massive change in the output value. This can easily be fixed by adding code to the controller allowing us to turn off/on the controller and change the values by hand as desired.