Control Writing Document

Tuning PID controllers in a system is often tedious and can be both dangerous and difficult in many situations. With robotic arms cable of moving entire automobiles smooth and stable control is very important.

Drones, specifically quadcopters, have seen increasing use in our society. Having high maneuverability coupled with relatively inexpensive actuation, quadcopters are becoming more and more utilized. Controlling these quadcopters often requires fast and precise tuning values to accurately control the system. When controlling attitude of quadcopters, the difference between an unstable and fully controllable system is often minute.

While tuning PID controllers knowing where to start can be a huge benefit. Fortunately, MATLAB has a built in toolbox which offers PID tuning. Utilizing MATLAB’s toolbox is quite simple, but it requires a fully functional simulation of free body dynamics. While there exists extensive research in strategies for quadcopter control, there exists very little research into tuning a quadcopter based on simulation results. This paper and its associated work will address that goal.

Before addressing the nested control strategy used in this paper, a proper understanding of the dynamics governing motion must be understood and realized. Research into these dynamics and the associated assumptions can be found in the following sources: \_\_\_\_\_\_. The reader is encouraged to pay close attention to source \_\_\_ regarding

Simulations should be performed with digital control, but utilize continuous free body dynamics.

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