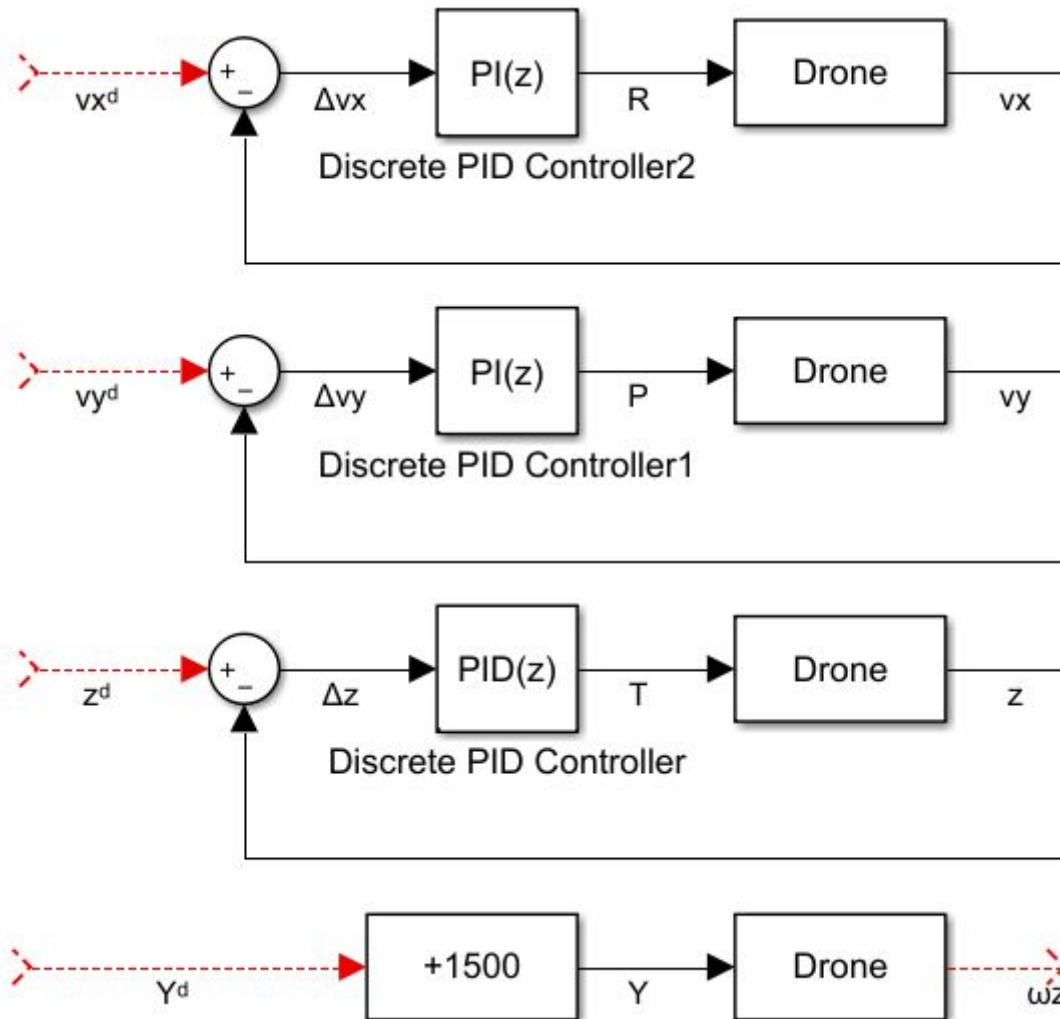# Block Diagrams of PiDrone

Velocities Control

In the X and Y axes, we have a closed-loop control with a discrete PI controller (60Hz), in which the input is the velocity error and the output is the Roll command (for X-axis) and Pitch command (for Y-axis), torque commands sent to the drone.

In the Z-axis, we have a PID controller on a closed-loop controlling the Z position. There's no user command of Z velocity, just Z position. The output of the PID controller is the Throttle force command.

For the Yaw velocity (ωZ), we don't have proper control. The user passes the desired Yaw torque, with a value between -50 and +50, and the value is adapted to the flight controller range (1000,2000).

Position Control
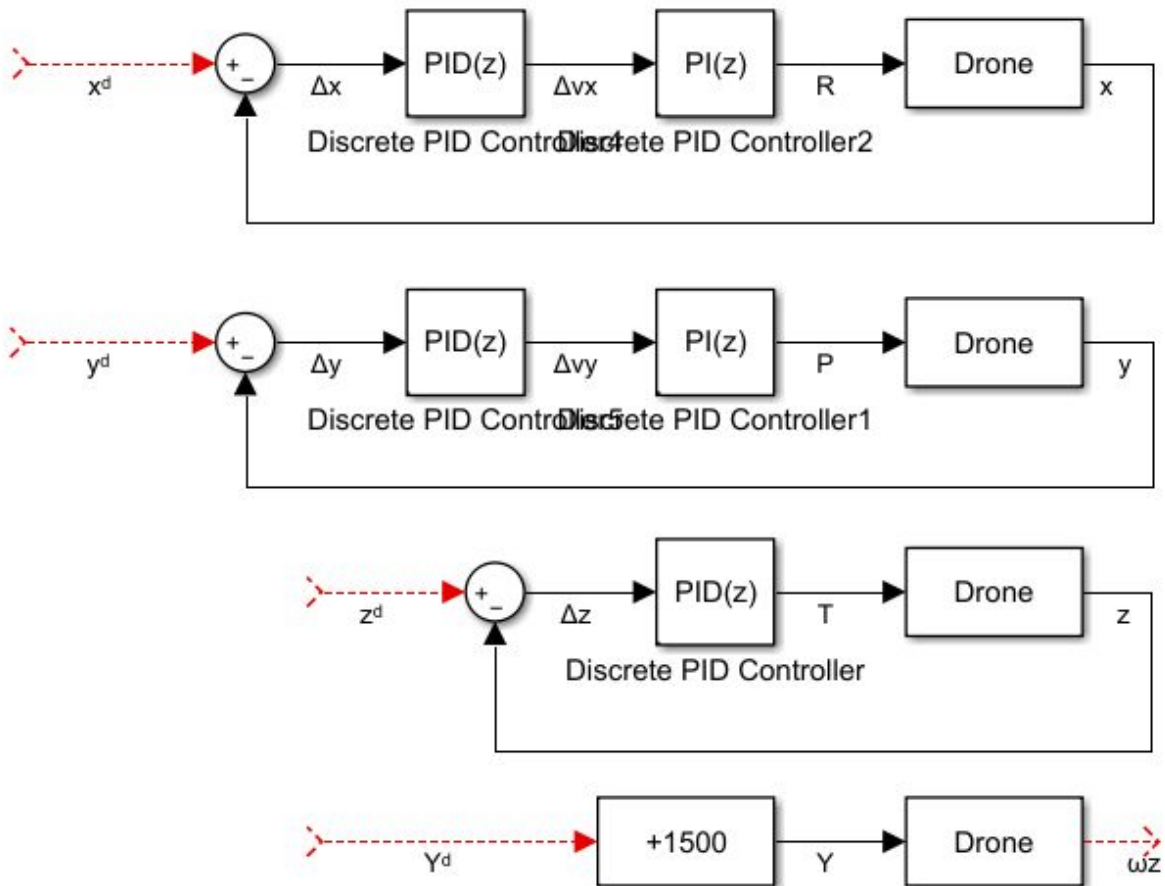
In the X and Y axes, we have the same PI controllers from the Velocity Control, but their input is now a velocity error generated by PID controllers, which have the position error as input. The linear velocities of X and Y axes are summed to the velocity error and then subtracted, so I didn't represent them.

The controls of Z and Yaw are the same from the Velocities Control.