ME 410: Quadrotor Design and Control
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Week 1 Report

This week the task was to calibrate the imu and get a steady reading of pitch and roll. The first step was setting up the **I2C** communication. In **I2C** communication there are two memory addresses to write to. For our IMU we write to **0x19** memory address for acceleration and **0x69** for gyro.

We then used the datasheet to find the corresponding range values. For acceleration **0x41** is the memory address and **0x00** provides the +- 3g range. This is found on page 30 on the datasheet. We set the gyro range to +- 1000 degrees per second by writing **0x01** to the memory address **0x0F.**

After these steps, a calibration sequence is conducted. We read the 6 values from the IMU and save into a global variable. The first three values are accelerometer readings and the last three values are gyro readings. During each calibration iteration we also save the roll and pitch angles.

Pitch = atan(imu[1], imu[0])
Roll = atan(imu[2], imu[0])

The sequence is run 1000 times and the average reading is saved as the default sequence. We subtract this for the gyro readings during reading the data.

One thing that was tricky is making sure that gyro readings for Z had the same sign as pitch. In addition, Y readings have to have the same sign as roll. This is because pitch angle is calculated from Y and X values. Therefore, the rotation is around the Z axis. Thus, velocity and pitch angle signs must match in all readings. The same relationship exists between the Y axis readings and roll. This was easy to implement in code. To achieve this consistency gyro Z readings were multiplied by -1.