

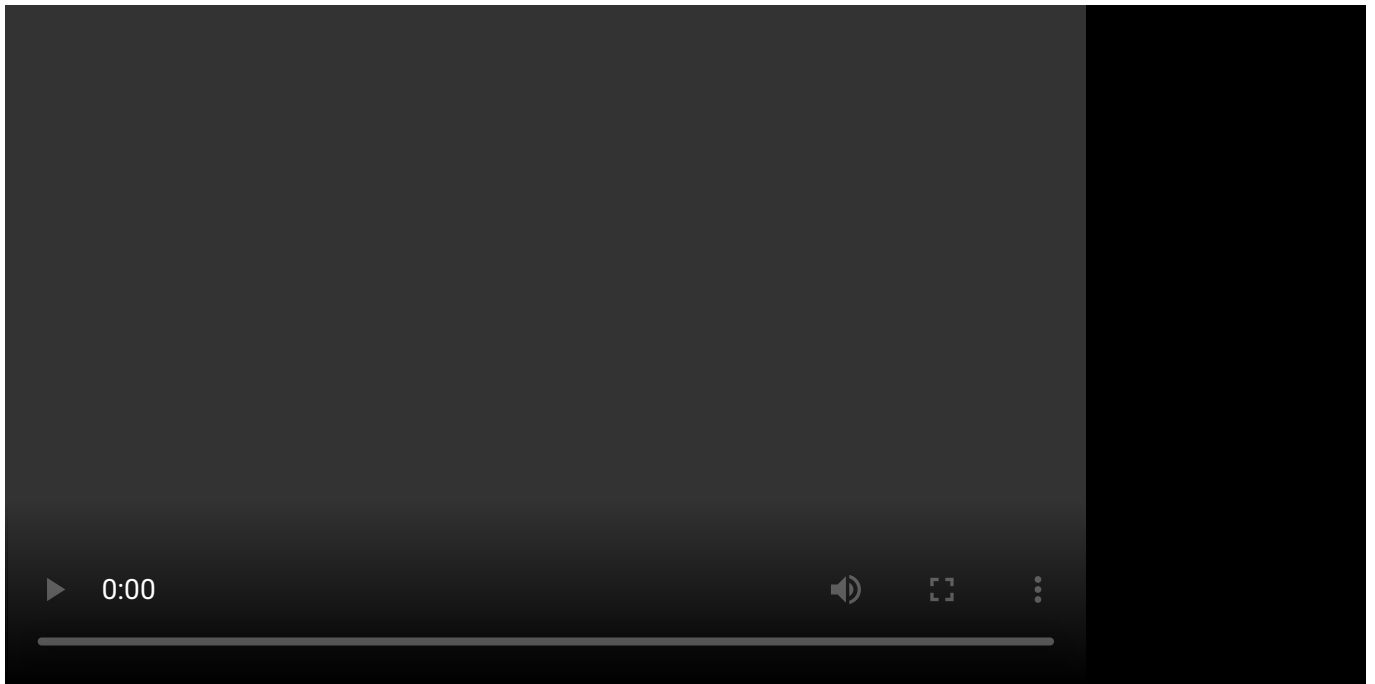
Lab Tasks

Set up the IMU

Picture of your Artemis IMU connections



Show that the IMU example code works



AD0_VAL definition discussion

The AD0_VAL represents the last bit of the i2c address of the IMU. This value is only supposed to be 0 if the ADR jumper is closed, the value is 0. The ADR jumper is not closed, so the value is 0.

Acceleration and gyroscope data discussion (pictures recommended)

Accelerometer

Image of output at $\{-90, 0, 90\}$ degrees for pitch and roll (include equations)

From class,

$$Roll_{accelerometer} = atan(a_x, a_z)$$

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$$Pitch_{accelerometer} = atan(a_y, a_z)$$

\, so using IMU.accX, IMU.accY, IMU.accZ as x y and z respectively, the pitch and roll could be calculated yielding these results.

Accelerometer accuracy discussion

Noise in the frequency spectrum analysis

Include graphs for your fourier transform

Discuss the results

Gyroscope

Include documentation for pitch, roll, and yaw with images of the results of different IMU positions

Demonstrate the accuracy and range of the complementary filter, and discuss any design choices

Sample Data

Speed of sampling discussion

Demonstrate collected and stored time-stamped IMU data in arrays

Demonstrate 5s of ToF and IMU data sent over Bluetooth

Cut the Coord

Discussion on battery distinction

Picture of your Artemis connected to the 650mAh battery

Record a Stunt

Include a video (or some videos) of you playing with the car and discuss your observations

Without Artemis

With Artemis, and plot data sent over Bluetooth