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Assignment 2 for Mobile Health and Wireless Systems

Github Link: <https://github.com/psturmfels/tilt_measurement>

**Part 1:**

I measured the angular velocity and acceleration over 5 minutes while the phone was not moving, and plotted the recorded values in each plane in a box plot, below:

A screenshot of a video game

Description automatically generatedA screenshot of a social media post

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Direction** | **Mean of Angular Velocity** | **Standard Deviation of Angular Velocity** | **Mean of Acceleration** | **Standard Deviation of Acceleration** |
| x | -0.012881 | 0.001041 | 0.002524 | 0.002873 |
| y | 0.024203 | 0.000846 | -0.000348 | 0.003575 |
| z | -0.021752 | 0.001315 | -1.0004805 | 0.004191 |

We use the mean the x and y planes to correct the recorded values from here on out.

**Part 2:**

We plot the x and y tilt of the device when held still for 5 minutes using the gyroscope only (blue), the accelerometer only (orange), and using a linear combination of the two (green) with a beta of 0.98. Using only the accelerometer is unbiased but very noisy. Using only the gyroscope has very little noise, but incurs bias. Using a combination of both provides the best results.

A screenshot of a cell phone

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