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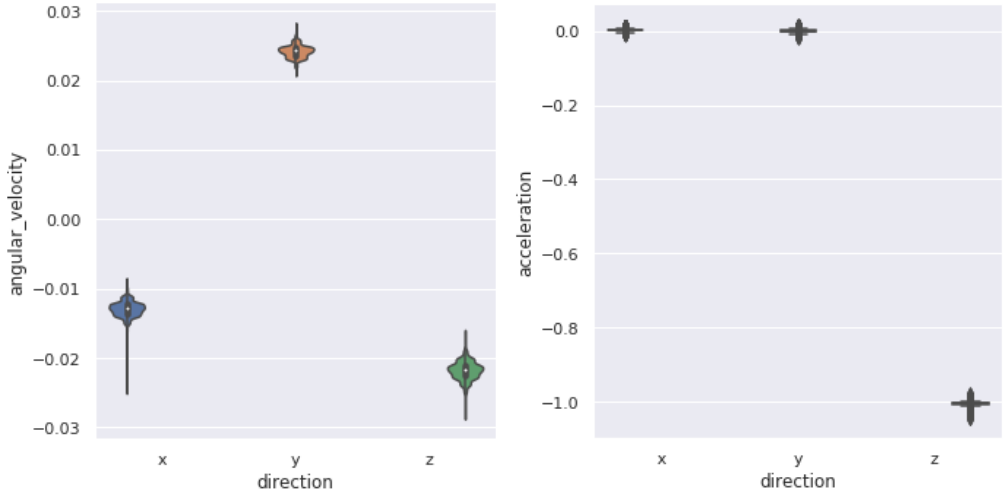
Assignment 2 for Mobile Health and Wireless Systems

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:



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.