About:

For my summer research at the NYUAD Biomechanics Laboratory, I was tasked to build a proof-of-concept prototype of to measure plant stalk flexural rigidity. To measure the angular position of the prototype, a significant value for the flexural rigidity calculation, I used an inertial measurement unit (IMU) with Kalman filter to obtain an accurate angular data.

Device

I used the LSM9DS0 6 degrees of freedom IMU from sparkfun and an Arduino Pro 3.3V to measure the acceleration and gyration of the device. To find the angular data of the device I could not rely solely on the accelerometer value, due to its slow response rate, or on the gyroscope value, due to its tendency to drift. To fuse the two values together, I used the stochastic estimation Kalman filter.

To fuse the accelerometer and gyroscope value, I