Inertial Sensor Presentation

4/20

Fisher Price Platinum Edition Cradle n' Swing

- Metronome alternative.
- Only suitable metronome: expensive and 3 weeks to ship

- Not perfectly stable in off axes
- Takes time to speed up
- Exact speeds, measurements not known

- Test: Is the ending position same as starting position?

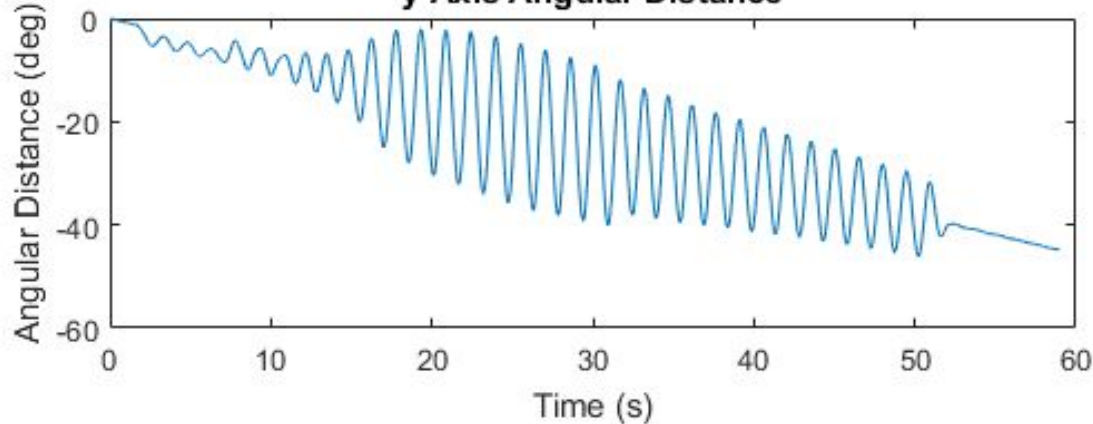## Stationary Testing for Offset Velocity

- Sensor: 01623D
- Test: sensor placed on undisturbed surface for 60 seconds.

- Velocity is low pass filtered for noise
- Average velocities in x,y,z are treated as constant offsets

- Mean_x: -1.2012 deg/s
- Mean_y: -0.7176 deg/s
- Mean_z: 0.8495 deg/s

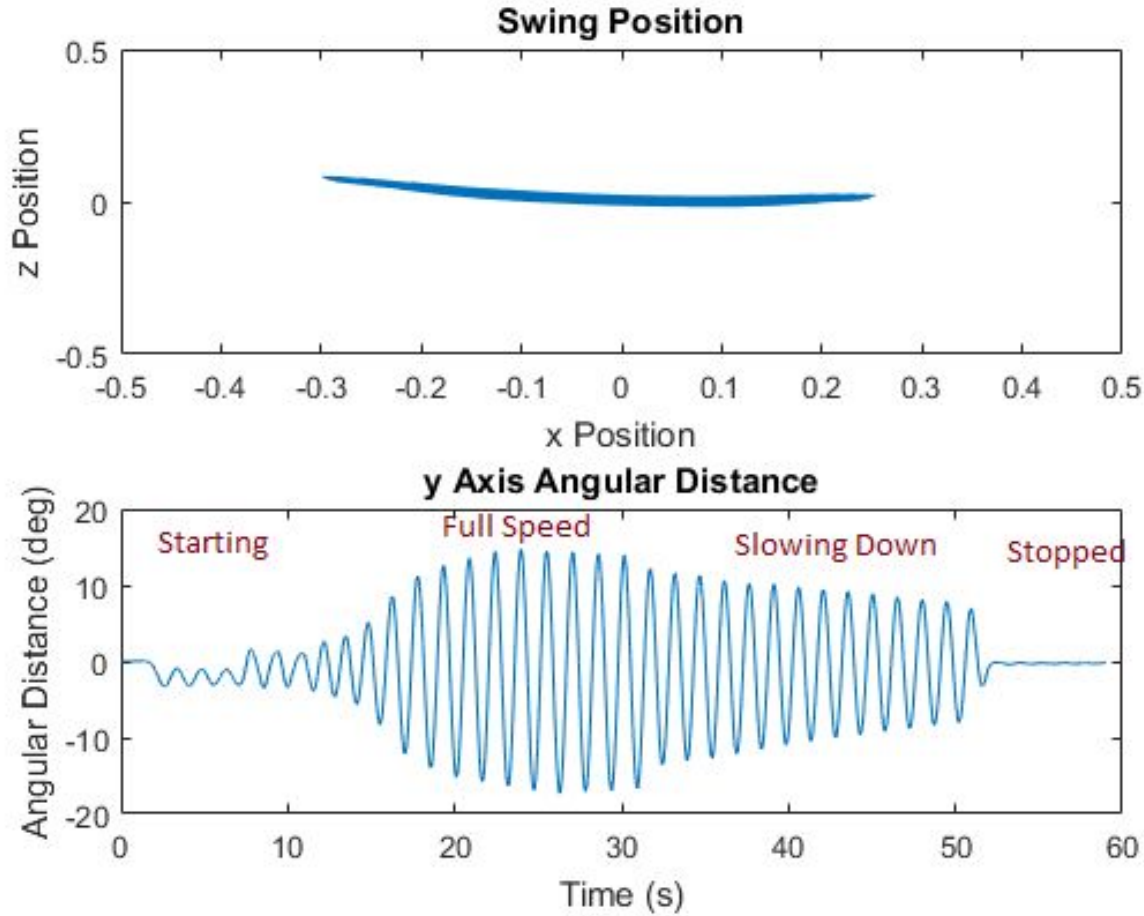3-D Linear Position based on Relative Angular Velocity
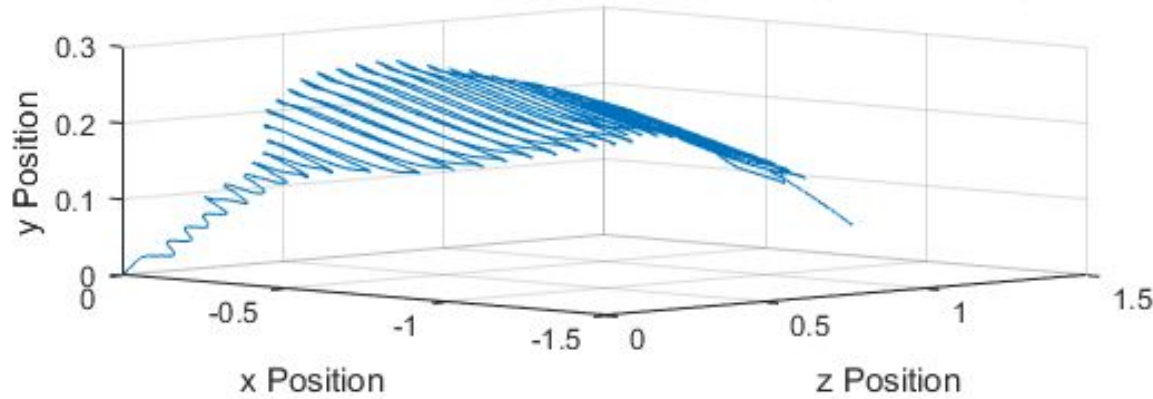
y Axis Angular Distance

Results (without correction)

- Sensor taped to seat of swing, swing powered on

- 15 seconds until desired speed achieved (level 4/6)
- 15 seconds run time at desired speed
- 20 seconds slowing down after power off
- Stopped by hand at 52 second mark

Swing Position

y Axis Angular Distance

Results (Drift Corrected)

- Offset velocities from stationary test subtracted from swing test.
- Swing motion is now apparent.

- **Most importantly**, Y position starts at zero, and ends at zero with correction.

Where to go from here?

- Work with Kevin's calibration to ensure that one initial calibration reliably reports offset velocity for an extended period of time

- Enclosure for sensors with Altium .STEP files. Need to discuss new harness design ideas (one wide compression belt)

- Further work converting to quaternion format, using accelerometers and Kinect to enhance gyroscope accuracy