

HW1

CCE-661

1. Google Earth image is in attached to end of file.
2. The purpose of the figure 8s was to warm up the INS. Once warmed up, the system will output more consistent data.
- 3.

	Mean (deg)	StDev (deg)
Roll	-86.0954	5.8764
Pitch	-0.4960	2.7271
Heading	234.7959	86.3384

The roll value does not make sense to me. I would think that the roll value would be approximately 0 during flight like pitch is because the UAS spends most of its time roughly horizontal.

During flight, the roll and pitch don't change much because the plane is staying in roughly the same position (assuming not a lot of highly dynamic maneuvers). This flight pattern results in small standard deviations for roll and pitch.

The standard deviation for heading is much larger. Each leg of each figure eight results in almost a full circle. This is 360 degrees of change. Additionally, the system wraps values when they go beyond 360 or below 0. Because of the large travel range and wrapping affect, the standard deviation of the heading is much larger compared to the roll and pitch.

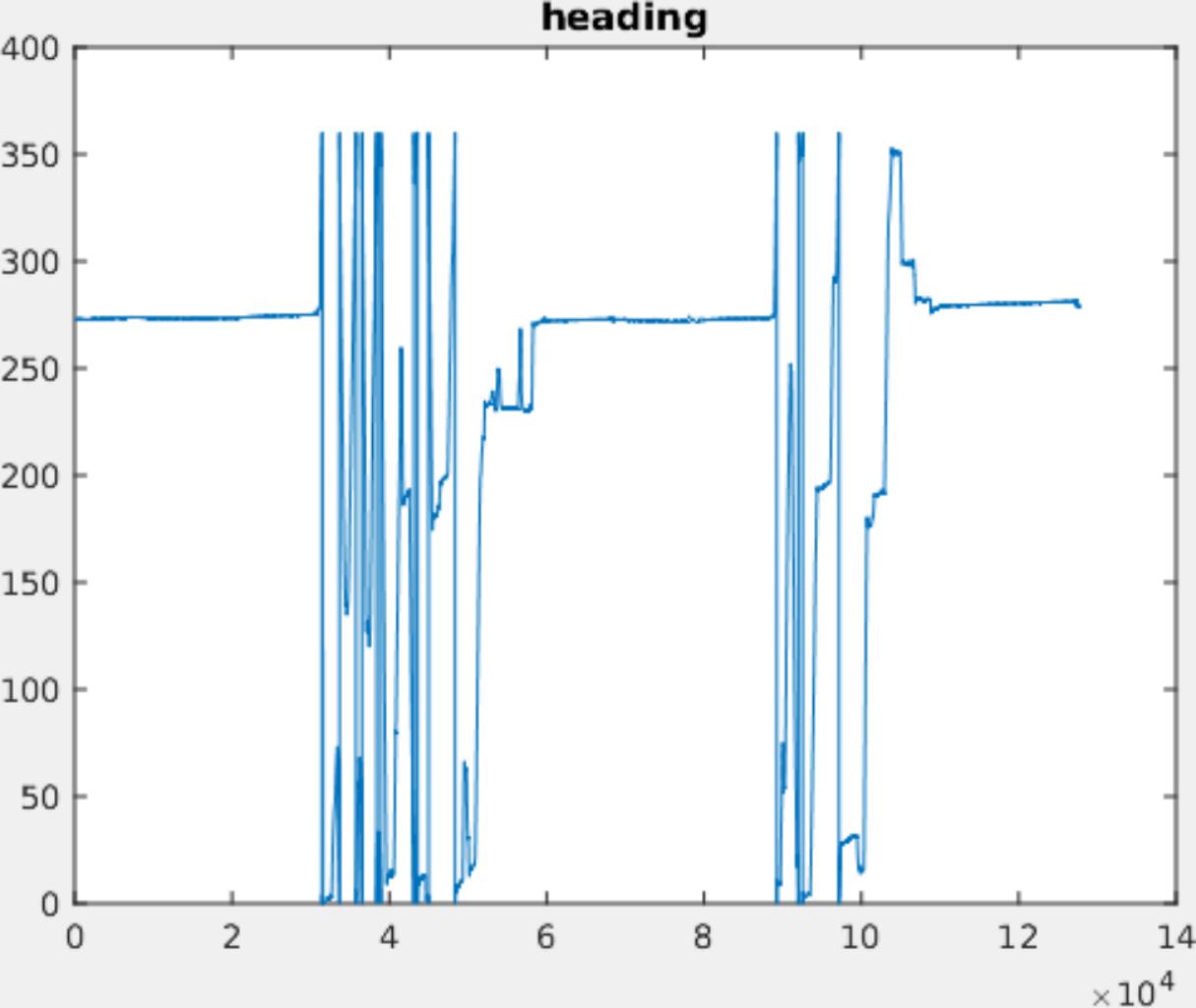
4. Mean 3D Speed: 2.431 m/s
Yes, this value makes sense. The UAS seemed to be moving at the same speed as jogging which is about 2.2 m/s. The UAS is around that speed.
5. Attached to end of file.
6. In sections where there is a lot of movement by the UAS like when it is turning or changing elevation seem to cause increased uncertainty. The changing vibration or dynamics caused by the motors may make the system harder to predict during those maneuvers.
7. Heading has the largest error. This consistent with the manufacturer's specifications from the first lecture.

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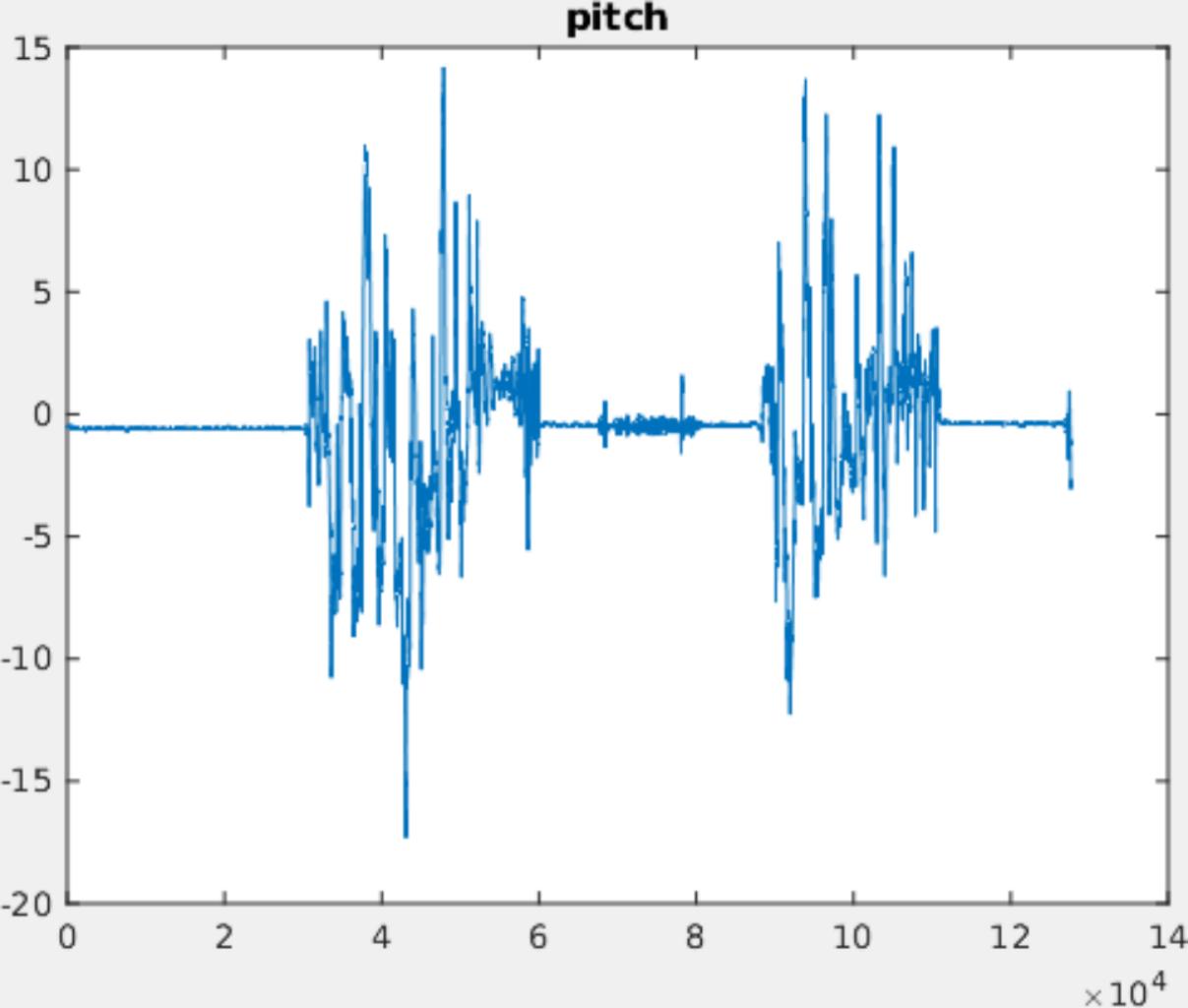
Drone flight from the first day of class



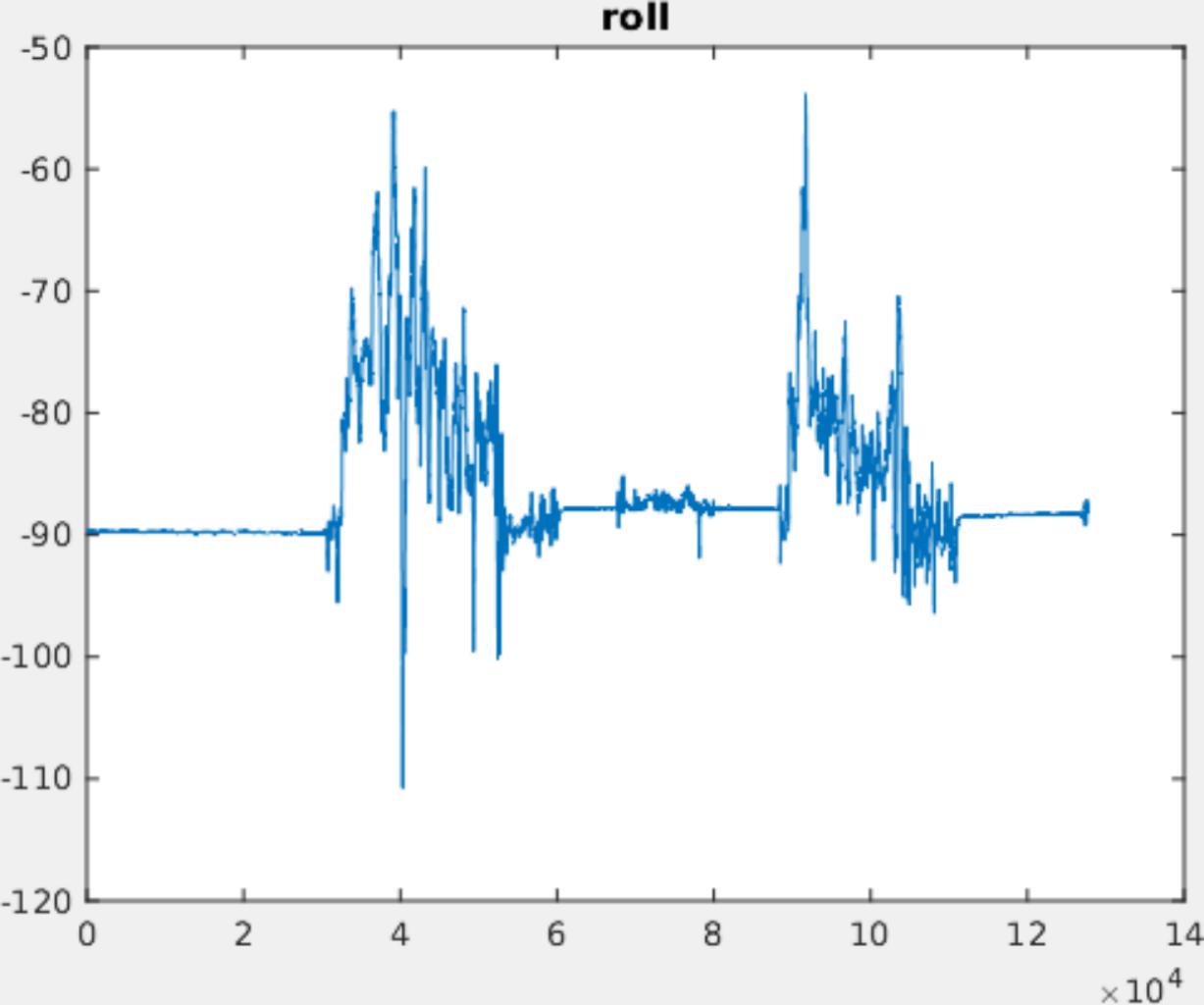
heading

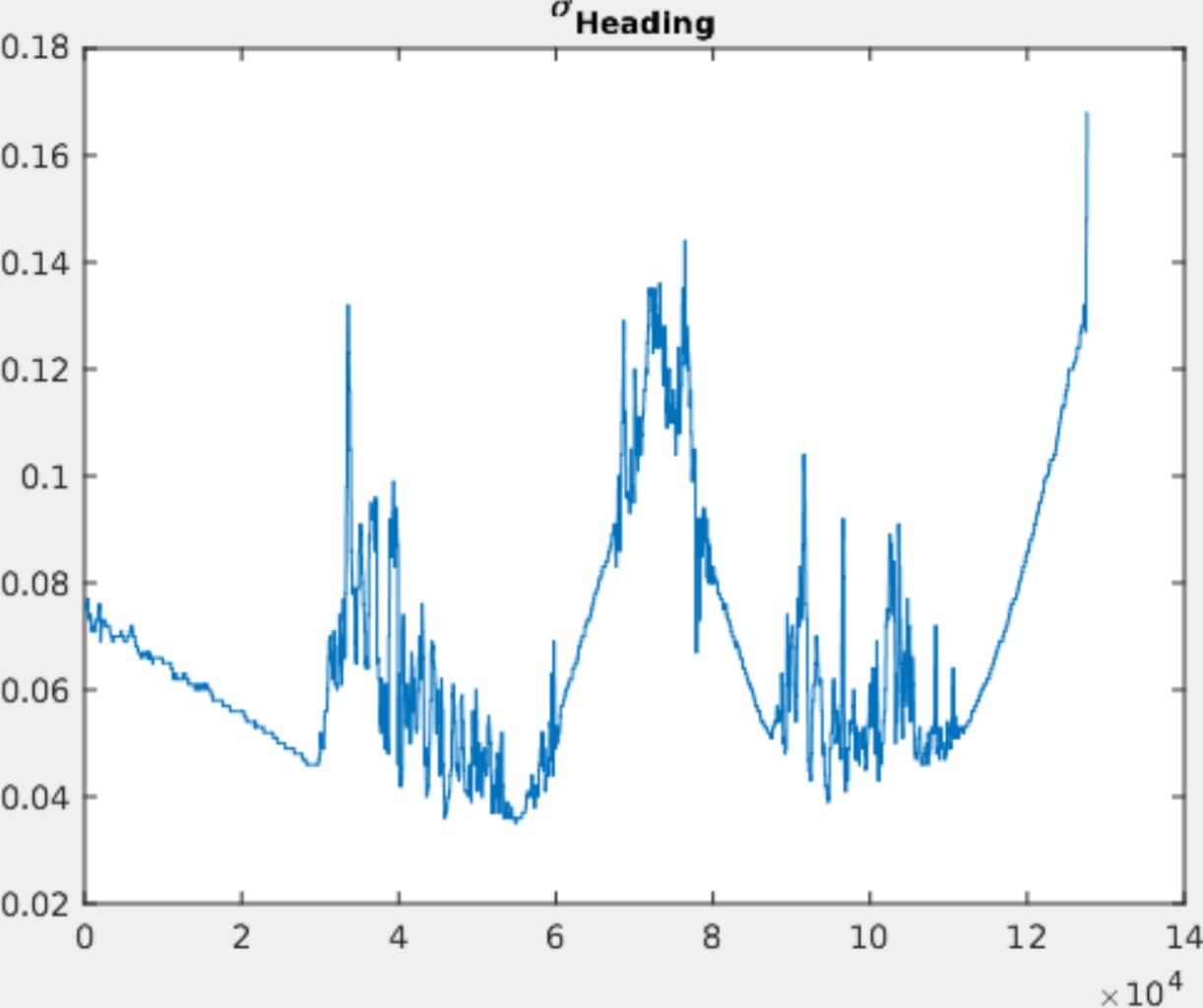


pitch

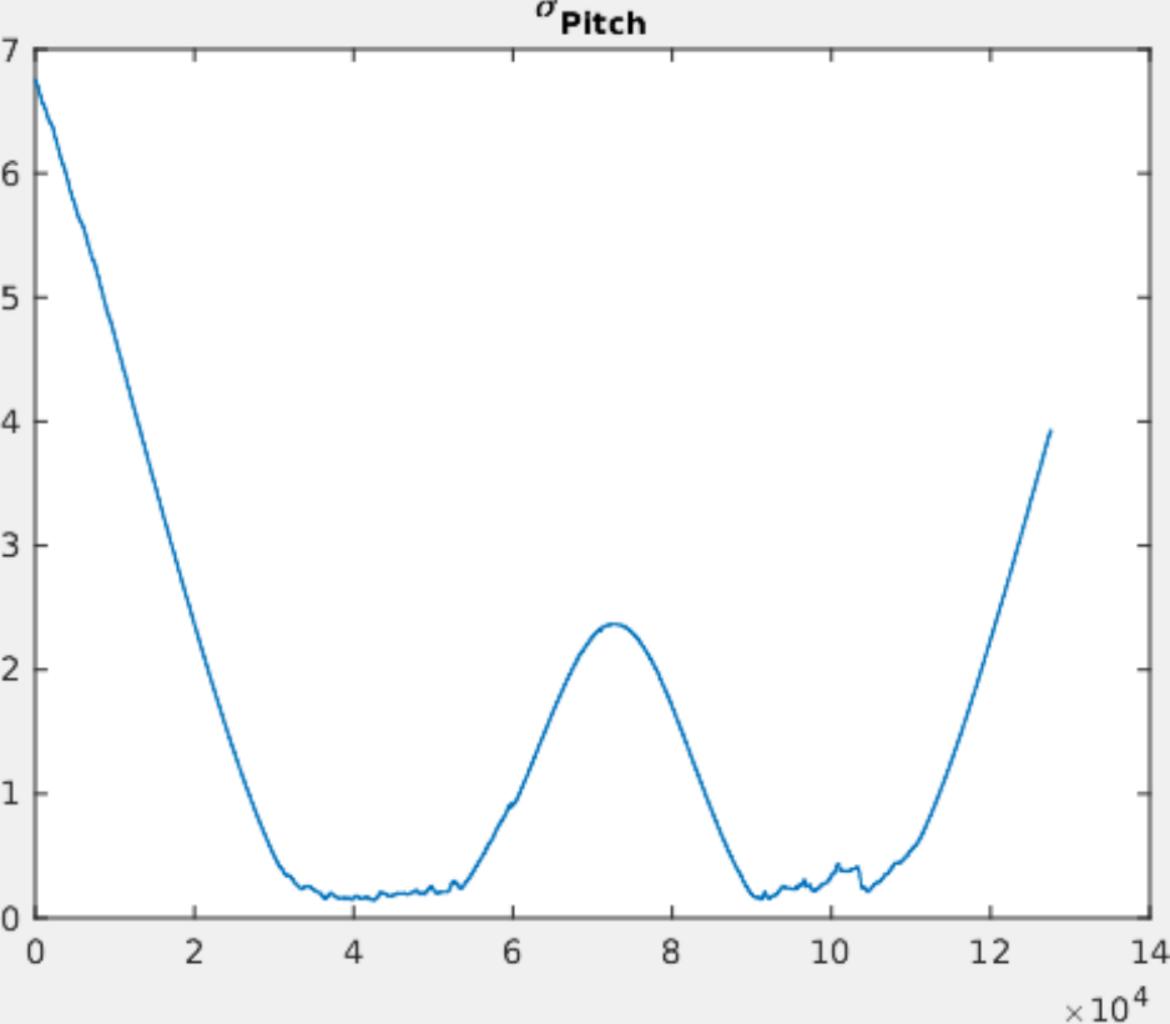


roll





σ Pitch



σ_{Roll} 