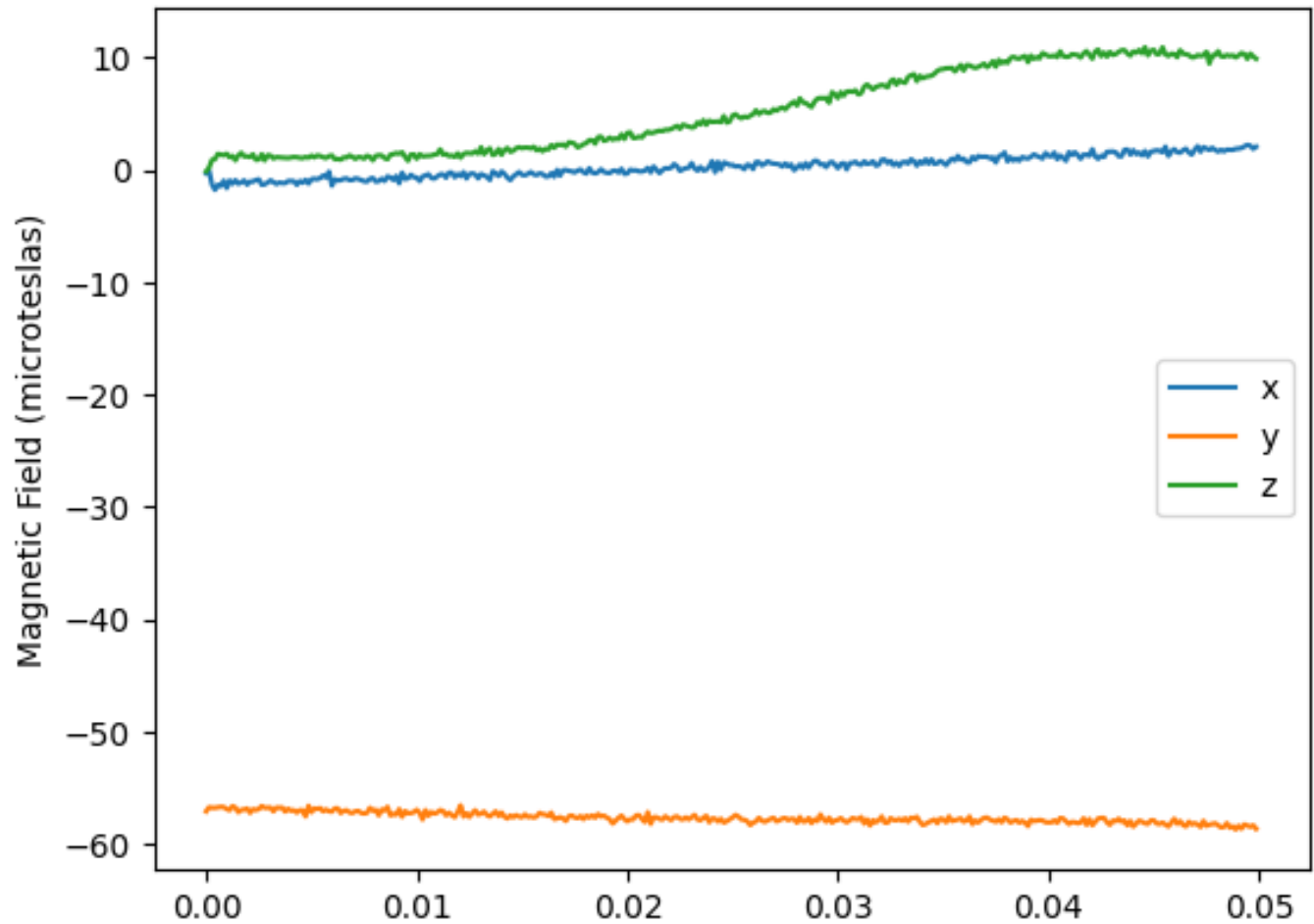
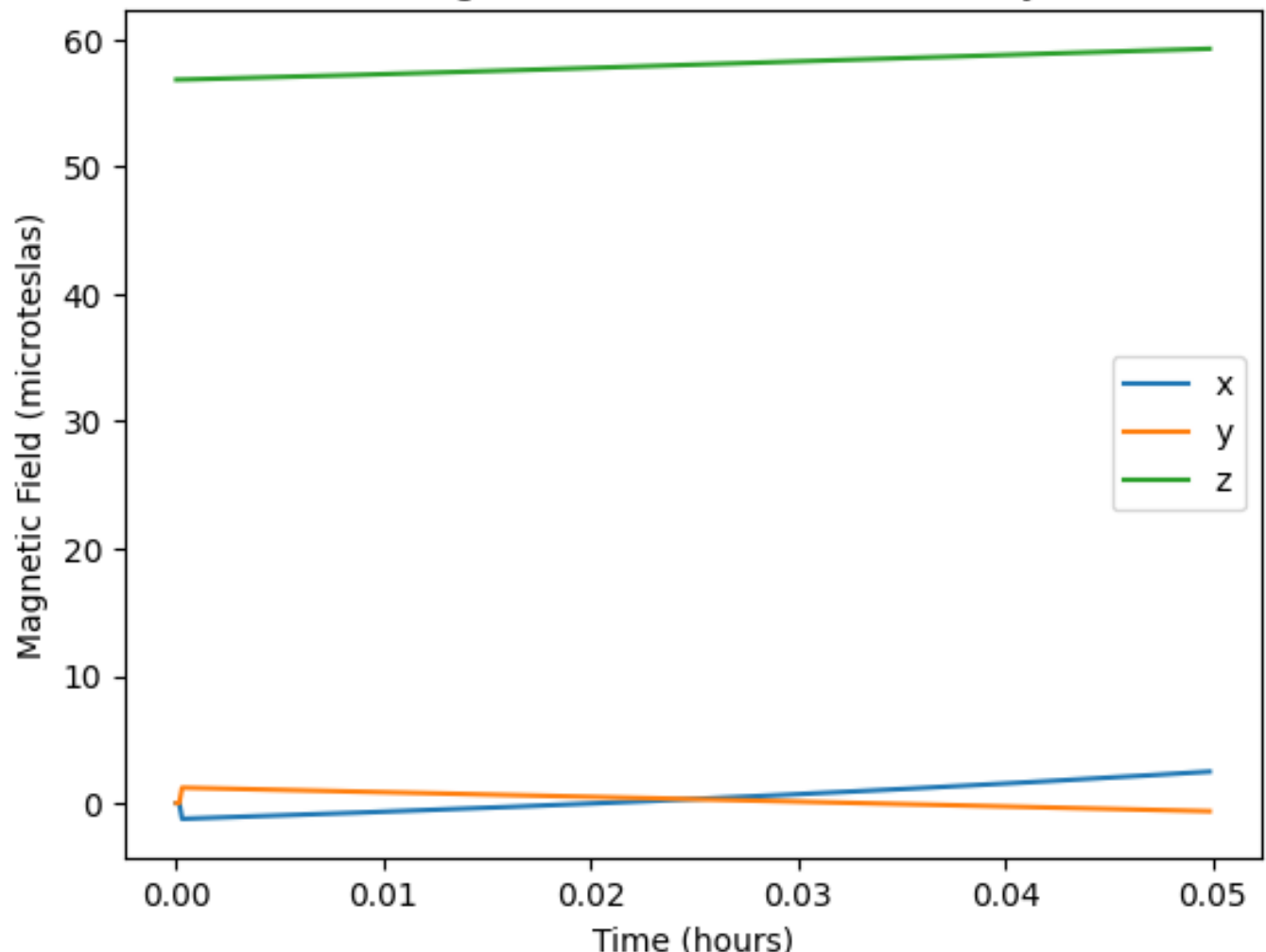


# Detumbling Simulation Report

## Magnetometer Data (Body Frame)

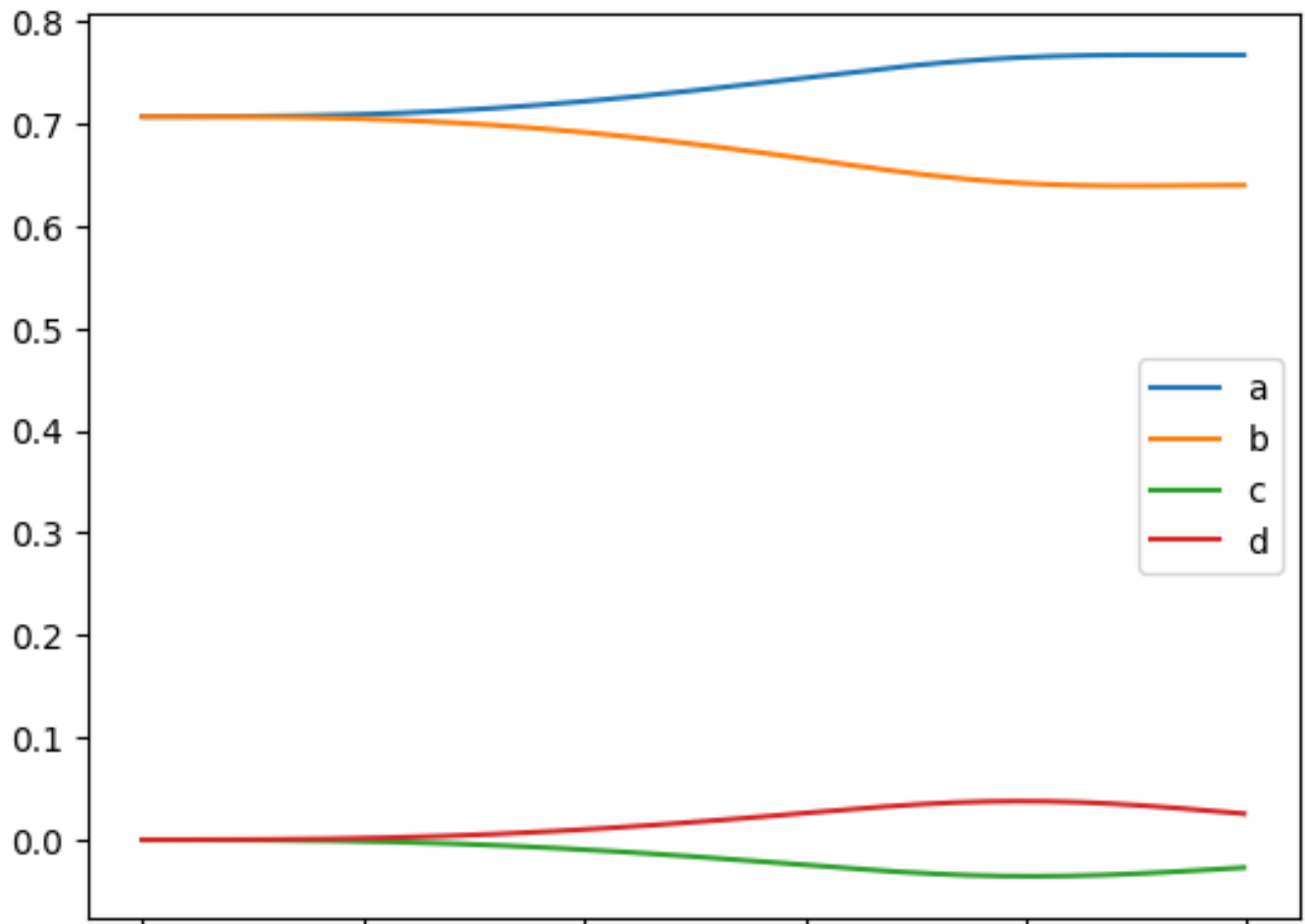


## Earth's Magnetic Field (ECI frame from PySOL)

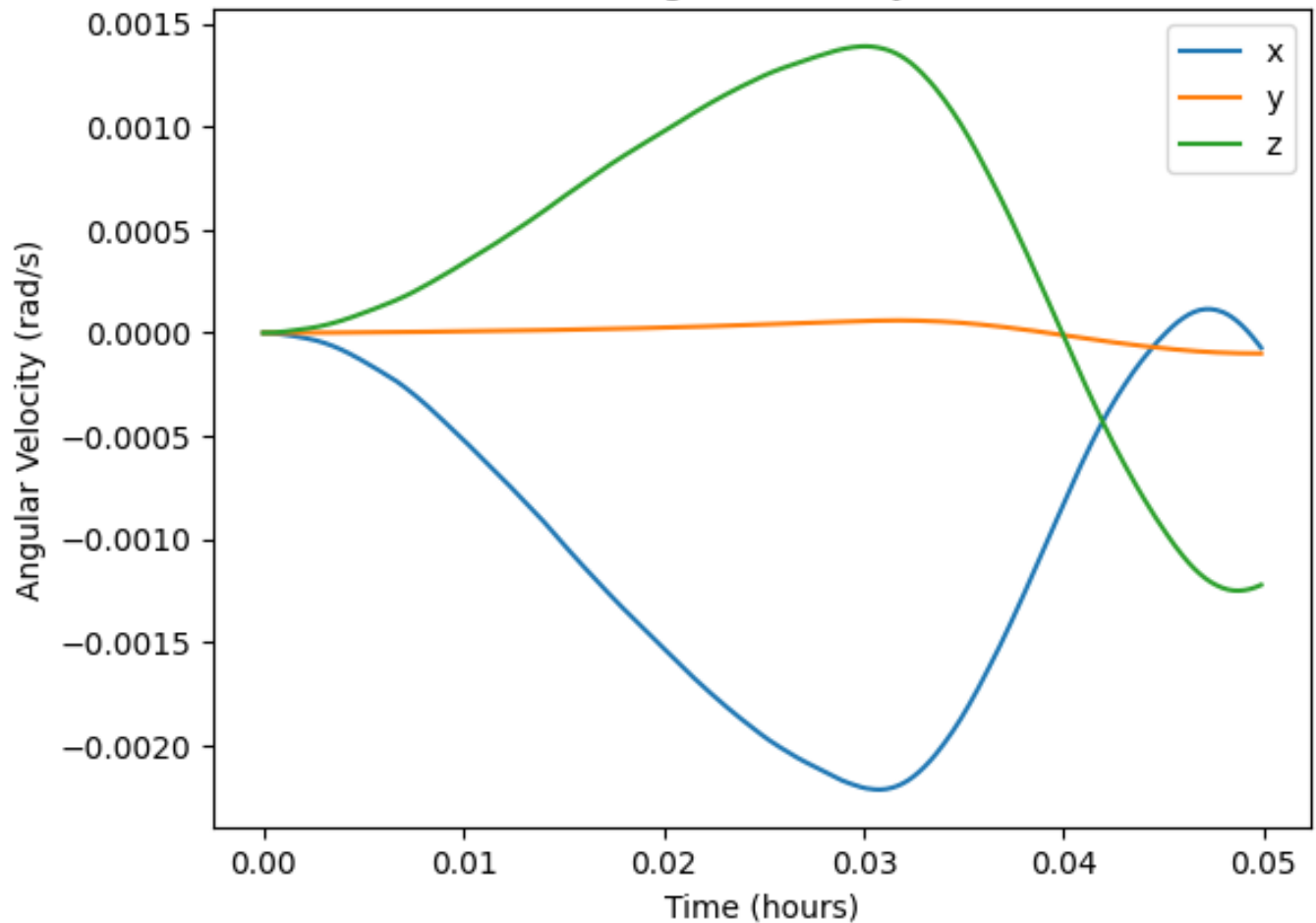


## Orientation and Angular Velocity

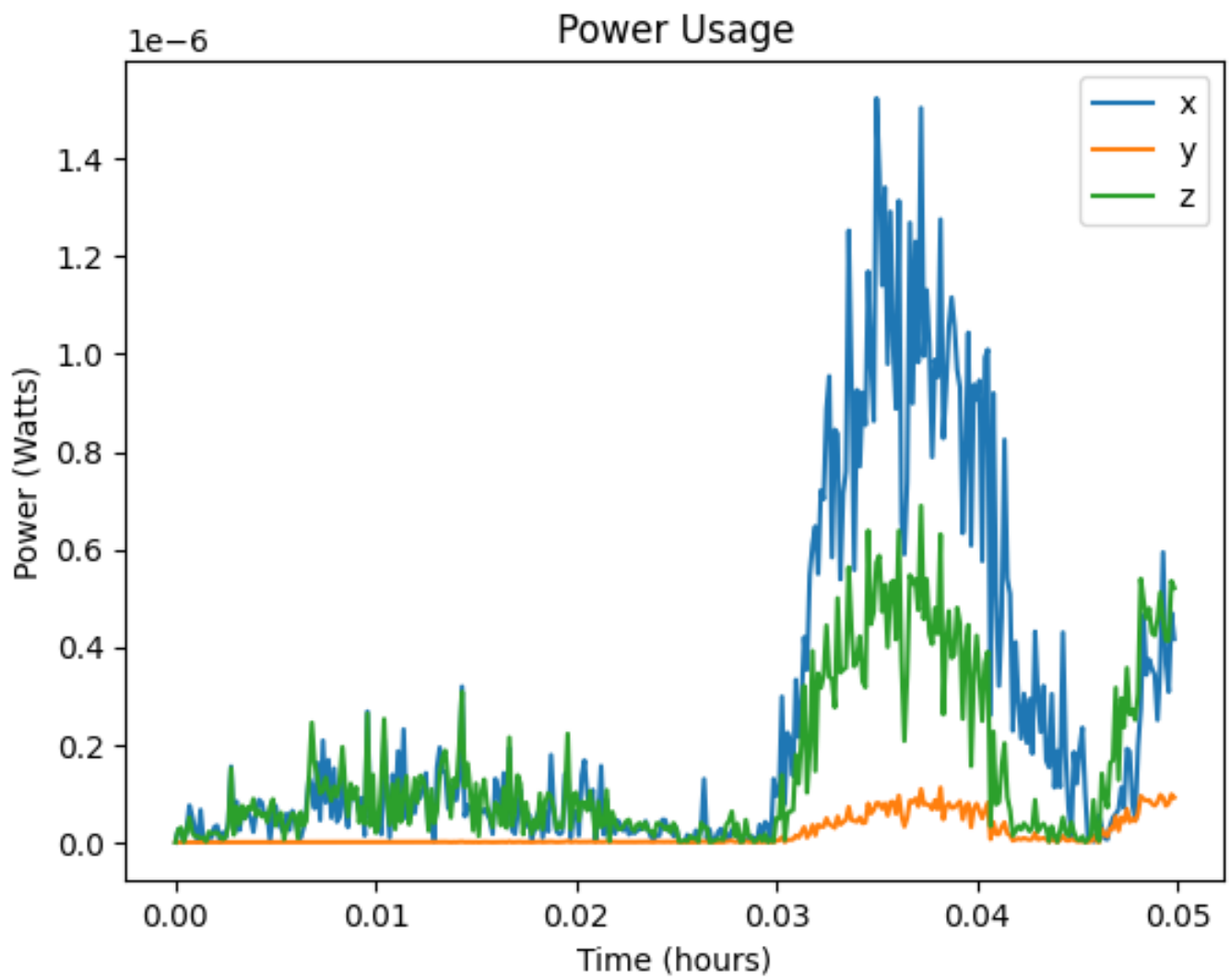
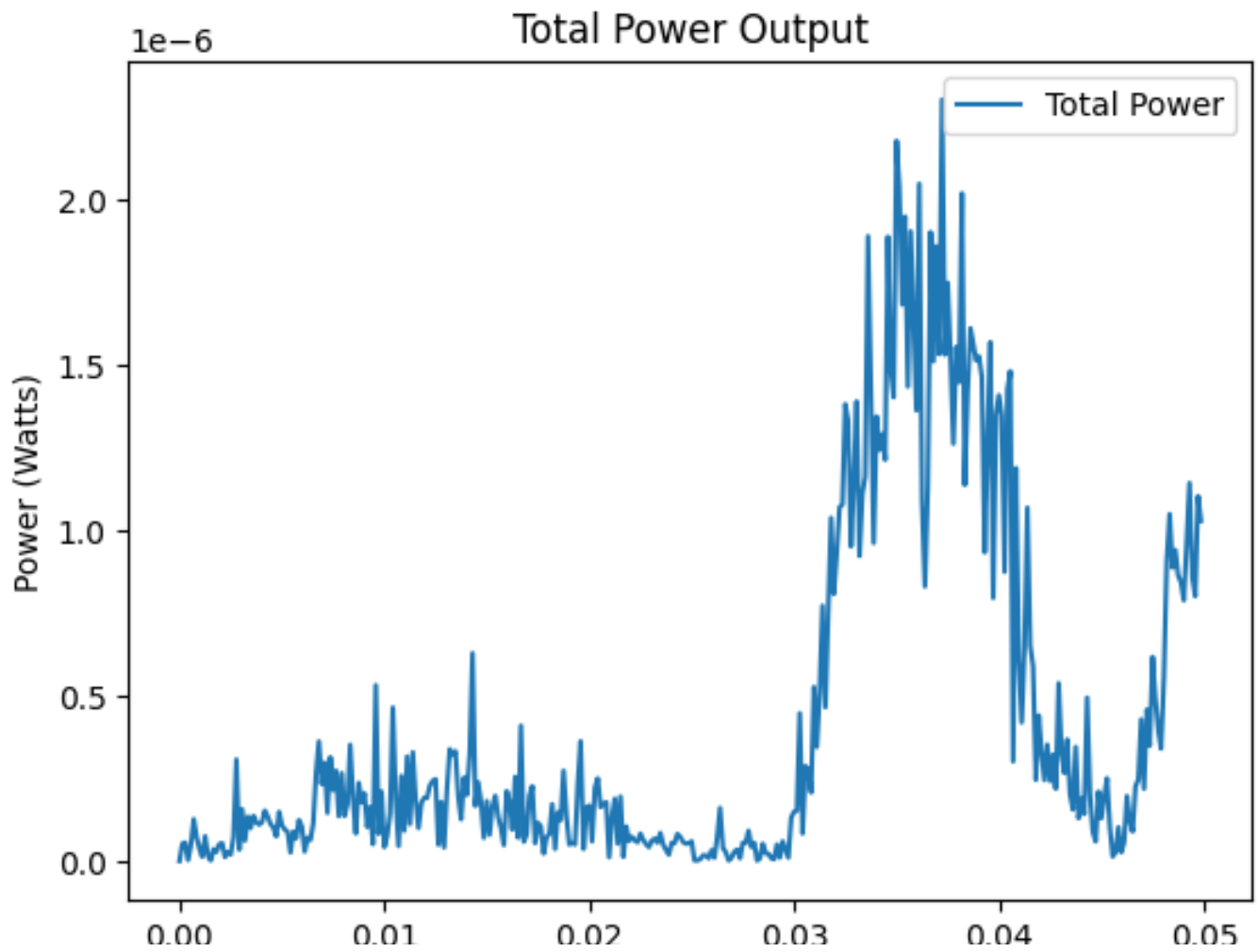
### Quaternion

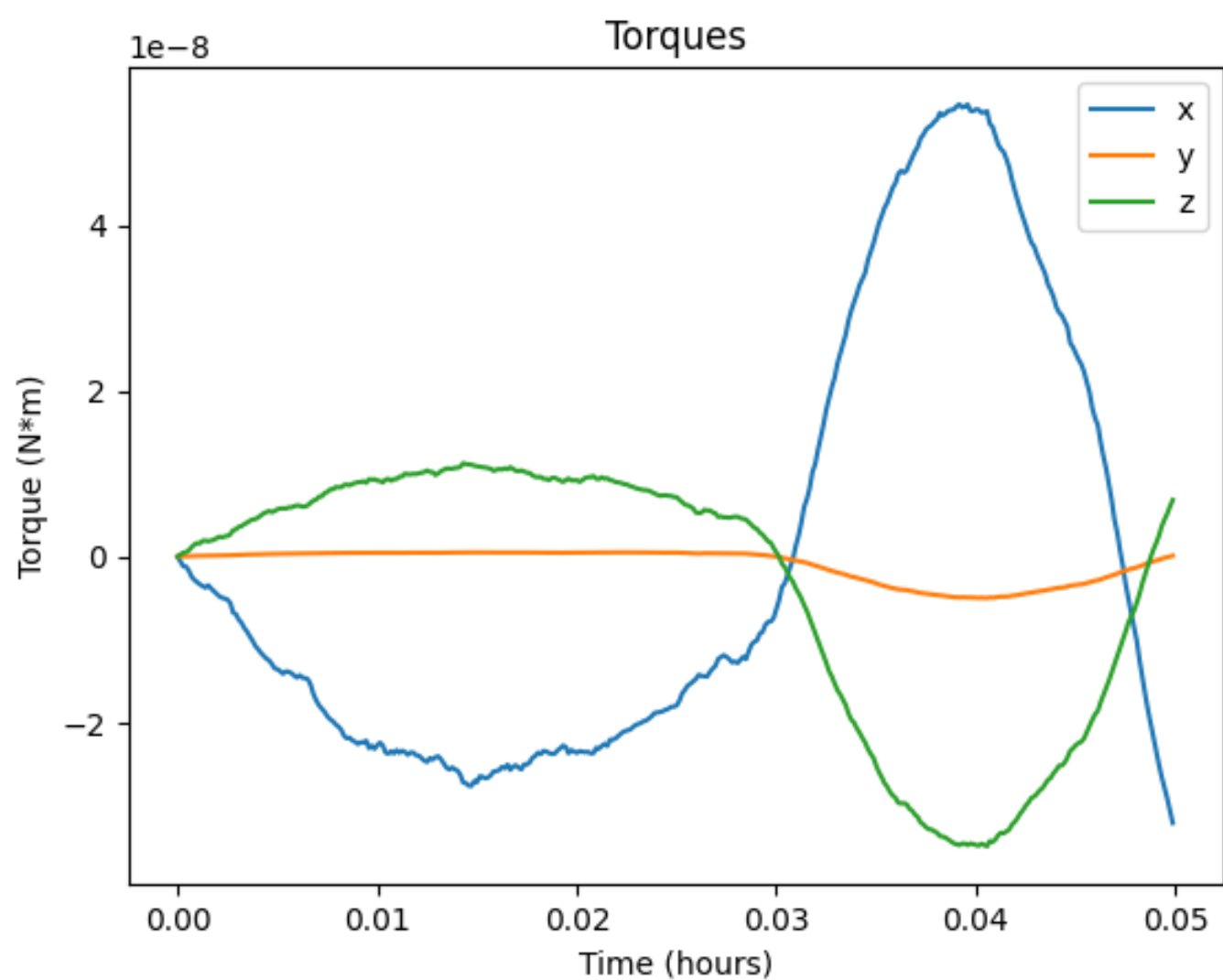
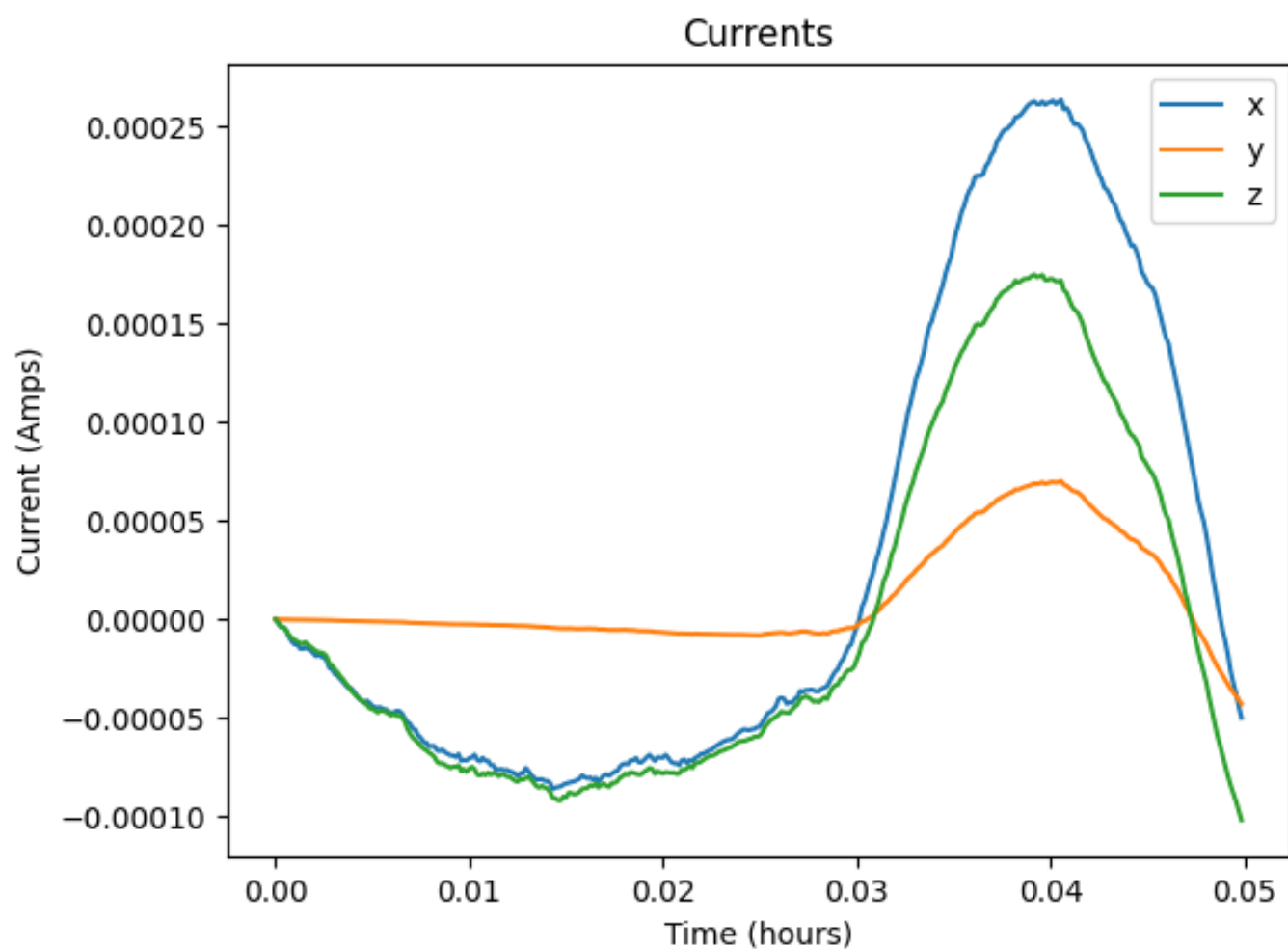


### Angular Velocity

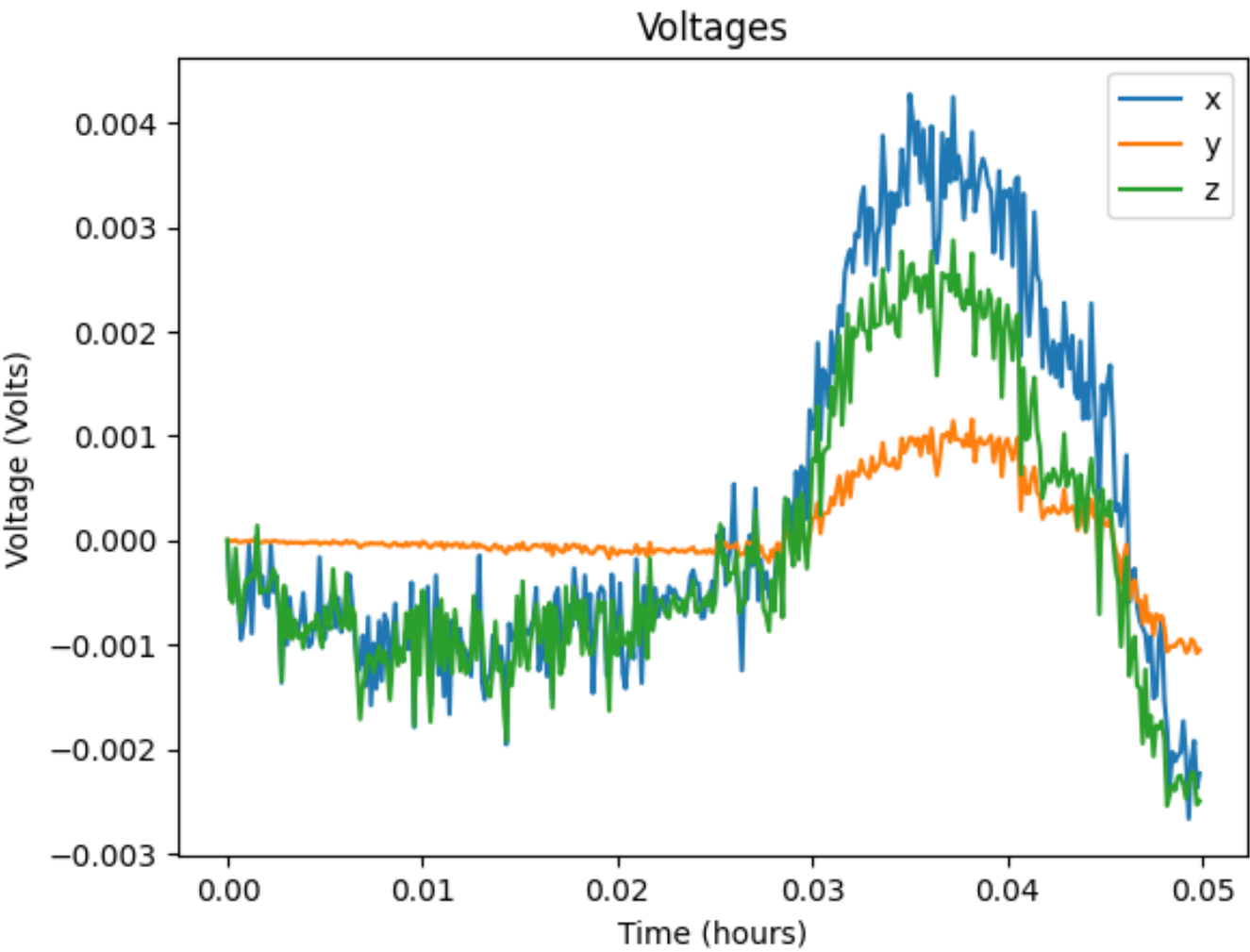
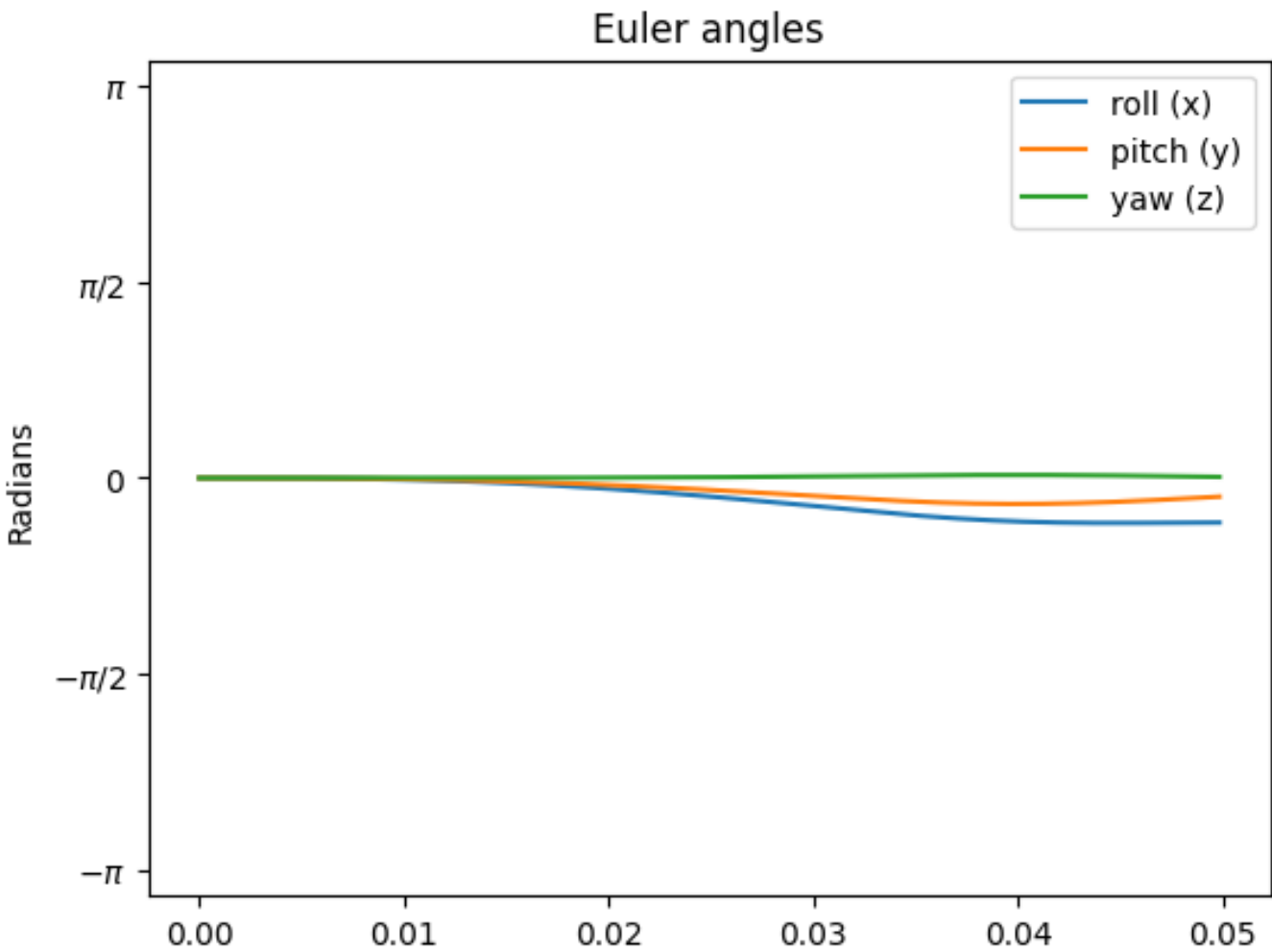


## Magnetorquer Information





Our filtered orientation represented by Euler Angles (counterclockwise rotation about x, y, z). Can bug out sometimes. Near 180 degrees ( $\pi$ ) is the same as zero.



## General Info

Starting speed: [0        0        0        ] degrees/s.

Total simulation time: 0.05 hours

Orbits completed during simulation: 0.0321 orbits.

Hours to detumble: -0.0003 hours.

Orbits to detumble: -0.0002 orbits.

Power consumed to detumble (Total Energy): 0 Jules

Orbital elements: [0, 6828, 9.22e-05, 90, 90, 0]

These define our simulated orbit (see sol\_sim.py in PySOL for more info)

B-dot proportional gain:  $k = 1e-05$

Bang-Bang proportional gain:  $k_p = 1000.0$

Bang-Bang derivative gain:  $k_d = 900.0$

Satellite info:

Ferro Magnetorquer:

Number of turns = 1845

Area =  $3.216990877275948e-05 \text{ m}^2$

$k = 1e-05$

Magnetizing factor = 38.3370626305719

Ferro Magnetorquer:

Number of turns = 1845

Area =  $3.216990877275948e-05 \text{ m}^2$

$k = 1e-05$

Magnetizing factor = 38.3370626305719

Air Magnetorquer:

Number of turns = 654

Area =  $0.008 \text{ m}^2$

$k = 1e-05$