# Tether Conclusions

The following MATLAB Live Script details the conclusions of the tether experiments, including the resulting plots for a total of 30 experiments perfomed on the orange 4-limbed robot on the black mat.

## Extract and define parameters for GaitTest() objects.

**From 20220707 Experiments:**

*Gait B-120* [heavy - not following (restting) - left/up]

*Gait E-120* [heavy - not following - left/up]

*Gait E-60* [heavy - not following - left/up]

*Gait E*-60* [heavy - not following - right/up] Caution! Not real E gait! Limb A not actuating

**From 20220819 Experiments:**

*Gait B-120* [light sheath - not following (restting) - right/up]

**From 20220829 Experiments:**

*Gait B* Follow (Left)* [light sheath - following - left] Caution! Not real B gait! Limb A not actuating

*Gait B* Follow (Right)* [light sheath - following - right] Caution! Not real B gait! Limb A not actuating

*Gait E Left (sheath on)* [light sheath - not following - left]

*Gait E Right (sheath on)* [no sheath - not following - right]

*Gait E Left (sheath off)* [no sheath - not following - left]

*Gait E* Right (sheath off)* [no sheath - not following - right] Caution! Not real E gait! Limb B not actuating

**From 20220901 Experiments:**

*Gait E Left (sheath off)* [no sheath - not following - left (flipped)]

*Gait B Follow (Left) Trial 1* [light sheath - following - left]

*Gait B Follow (Left) Trial 2* [light sheath - following - left (flipped)]

*Gait B Left (Sheath on) Trial 1* [light sheath - following - left (flipped)]

*Gait B Left (Sheath on) Trial 2* [light sheath - following - left (flipped)]

**From 20220908 Experiments:**

*Gait B Right (sheath on)* [sheath - not following - right] (not consistent / semi-following)

*Gait B Right Follow (sheath off) Trial 1* [no sheath - following - right]

*Gait B Right Follow (sheath off) Trial 2* [no sheath - following - right]

*Gait B Left Follow (sheath off) Trial 1* [no sheath - following - left]

*Gait B Left Follow (sheath off) Trial 2* [no sheath - not following - left]

*Gait B Right (sheath off) Trial 1* [no sheath - not following - right] (not consistent / semi-following)

*Gait B Right (sheath off) Trial 2* [no sheath - not following - right] (not consistent / semi-following)

*Gait B Left (sheath off) Trial 1* [no sheath - not following - left] (not consistent / semi-following)

*Gait B Left (sheath off) Trial 2* [no sheath - not following - left] (not consistent / semi-following)

*Gait B Right Follow (sheath on)* [sheath - following - right]

*Gait E Right (sheath off) Trial 1* [no sheath - not following - right] (not consistent / semi-following)

*Gait E Right (sheath off) Trial 2* [no sheath - not following - right] (not consistent / semi-following)

*Gait E Left (sheath off) Trial 1* [no sheath - not following - left] (not consistent / semi-following)

*Gait E Left (sheath off) Trial 2* [no sheath - not following - left] (not consistent / semi-following)

## Build Experiment Matrix

`sorted_exps = 30×7 table`

| | Experiment | Gait | #Cycles | Tether | Protocol | Placement | Trial |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 'B' | '120' | 'H' | 'NF' | 'L' | |
| 2 | 20 | 'B' | '60' | 'NS' | 'F' | 'L' | |
| 3 | 21 | 'B' | '60' | 'NS' | 'F' | 'L' | 2 |
| 4 | 18 | 'B' | '60' | 'NS' | 'F' | 'R' | |
| 5 | 19 | 'B' | '60' | 'NS' | 'F' | 'R' | 2 |
| 6 | 24 | 'B' | '60' | 'NS' | 'NF' | 'L' | |
| 7 | 25 | 'B' | '60' | 'NS' | 'NF' | 'L' | 2 |
| 8 | 22 | 'B' | '60' | 'NS' | 'NF' | 'R' | |
| 9 | 23 | 'B' | '60' | 'NS' | 'NF' | 'R' | 2 |
| 10 | 13 | 'B' | '60' | 'S' | 'F' | 'L' | |
| 11 | 14 | 'B' | '60' | 'S' | 'F' | 'Lf' | |
| 12 | 26 | 'B' | '60' | 'S' | 'F' | 'R' | |
| 13 | 15 | 'B' | '60' | 'S' | 'NF' | 'L' | |
| 14 | 16 | 'B' | '60' | 'S' | 'NF' | 'Lf' | |
| 15 | 5 | 'B' | '120' | 'S' | 'NF' | 'R' | |

| | Experiment | Gait | #Cycles | Tether | Protocol | Placement | Trial |
|---|---|---|---|---|---|---|---|
| 16 | 17 | 'B' | '60' | 'S' | 'NF' | 'R' | |
| 17 | 6 | 'Bs' | '60' | 'S' | 'F' | 'L' | |
| 18 | 7 | 'Bs' | '60' | 'S' | 'F' | 'R' | |
| 19 | 2 | 'E' | '120' | 'H' | 'NF' | 'L' | |
| 20 | 3 | 'E' | '60' | 'H' | 'NF' | 'L' | |
| 21 | 10 | 'E' | '60' | 'NS' | 'NF' | 'L' | |
| 22 | 29 | 'E' | '60' | 'NS' | 'NF' | 'L' | 2 |
| 23 | 30 | 'E' | '60' | 'NS' | 'NF' | 'L' | 3 |
| 24 | 12 | 'E' | '60' | 'NS' | 'NF' | 'Lf' | |
| 25 | 27 | 'E' | '60' | 'NS' | 'NF' | 'R' | |
| 26 | 28 | 'E' | '60' | 'NS' | 'NF' | 'R' | 2 |
| 27 | 8 | 'E' | '60' | 'S' | 'NF' | 'L' | |
| 28 | 9 | 'E' | '60' | 'S' | 'NF' | 'R' | |
| 29 | 4 | 'Es' | '60' | 'H' | 'NF' | 'R' | |
| 30 | 11 | 'Es' | '60' | 'NS' | 'NF' | 'R' | |

## Rotate the data w.r.t. the initial global orientation.

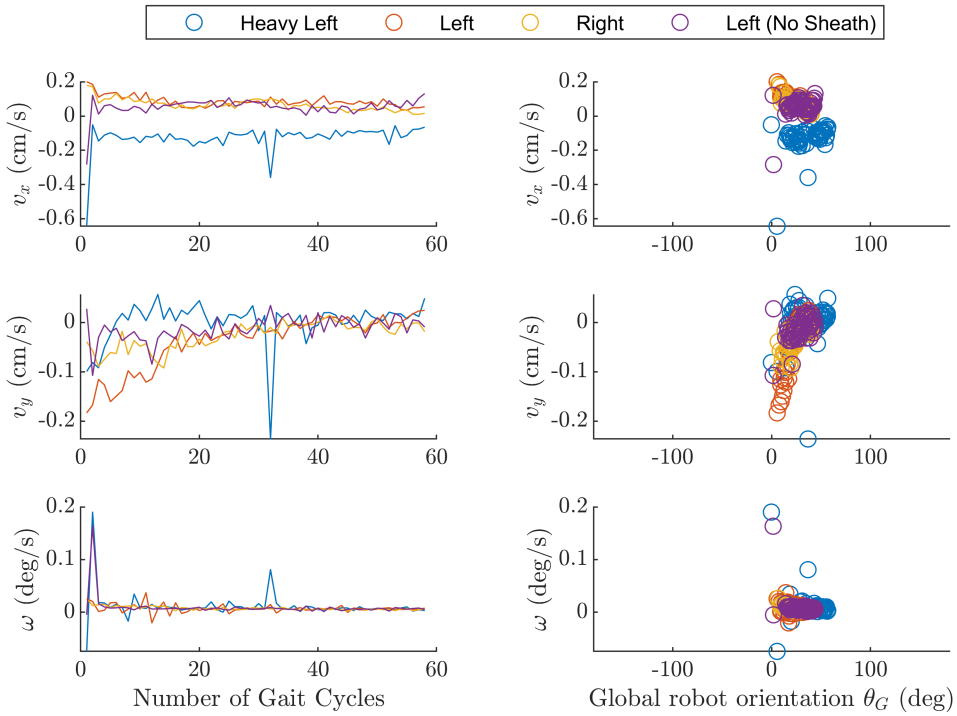
## Instantiate GaitTest() objects for each experimental trial.

This analyzes the data from each trial to find motion primitive twist information.

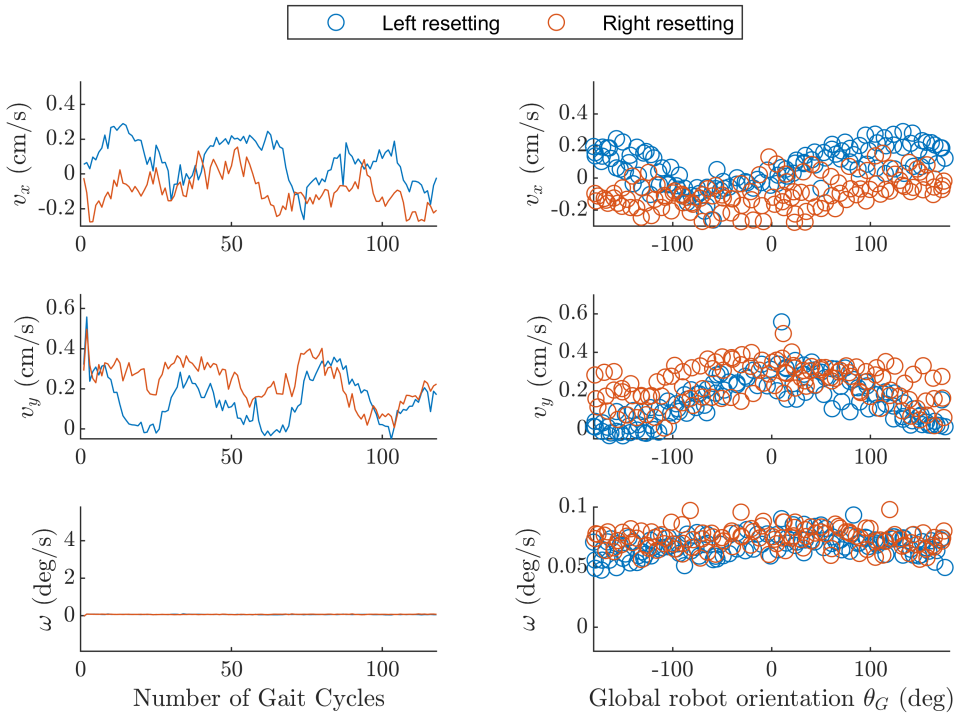
## Plot the full motion data for each experiment.

## Plot the twist data for each experiment.

body velocity) for two experiments of Gait E




for two experiments of Gait B [16,7,5,11,14



omparison of averaged Gait B trials with no she