

one_mobile_imu_both Experiment Report

Matthew Swartwout

June 24, 2016

This is a summary of the data from the one_mobile_imu_both experiment.

Shown below is the summary of the error of all robots combined for both x and y coordinates, and also the error in total distance.

```
summary(continuous$x_error)
```

```
##      Min.    1st Qu.      Median        Mean     3rd Qu.       Max.
## -0.0167900 -0.0015650  0.0002159  0.0001871  0.0021820  0.0074340
```

```
summary(continuous$y_error)
```

```
##      Min.    1st Qu.      Median        Mean     3rd Qu.       Max.
## -1.340e-02 -2.422e-03  2.768e-05 -1.330e-04  2.652e-03  1.379e-02
```

```
summary(continuous$dist_error)
```

```
##      Min.    1st Qu.      Median        Mean     3rd Qu.       Max.
## 8.000e-08 2.252e-03 3.949e-03 4.889e-03 7.475e-03 1.898e-02
```

```
summary(discrete$x_error)
```

```
##      Min.    1st Qu.      Median        Mean     3rd Qu.       Max.
## -0.016850 -0.011950 -0.010310 -0.008499 -0.003960  0.004794
```

```
summary(discrete$y_error)
```

```
##      Min.    1st Qu.      Median        Mean     3rd Qu.       Max.
## -0.007646 -0.002820  0.000364  0.001425  0.006388  0.010870
```

```
summary(discrete$dist_error)
```

```
##      Min.    1st Qu.      Median        Mean     3rd Qu.       Max.
## 8.000e-08 7.496e-03 1.150e-02 1.021e-02 1.355e-02 1.798e-02
```

```
summary(external_data_averages)
```

```
##      Length Class  Mode
## [1,] 1      -none- numeric
```

Shown below are plots representing the robot's motion and error over time.

```
message("ground truth")
```

```
## ground truth
```

```
plot(gazebo$x_position, gazebo$y_position)
title("Ground truth visited locations of robot")
```

Ground truth visited locations of robot

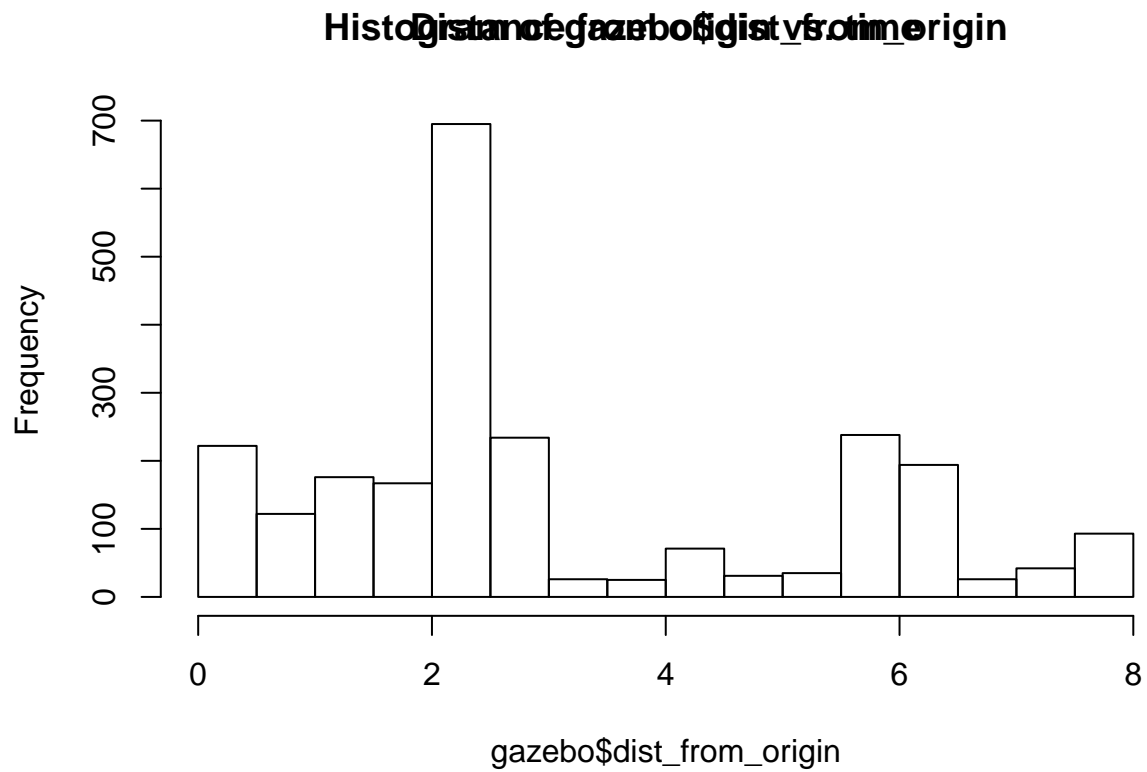


```
message("dist from origin")
```

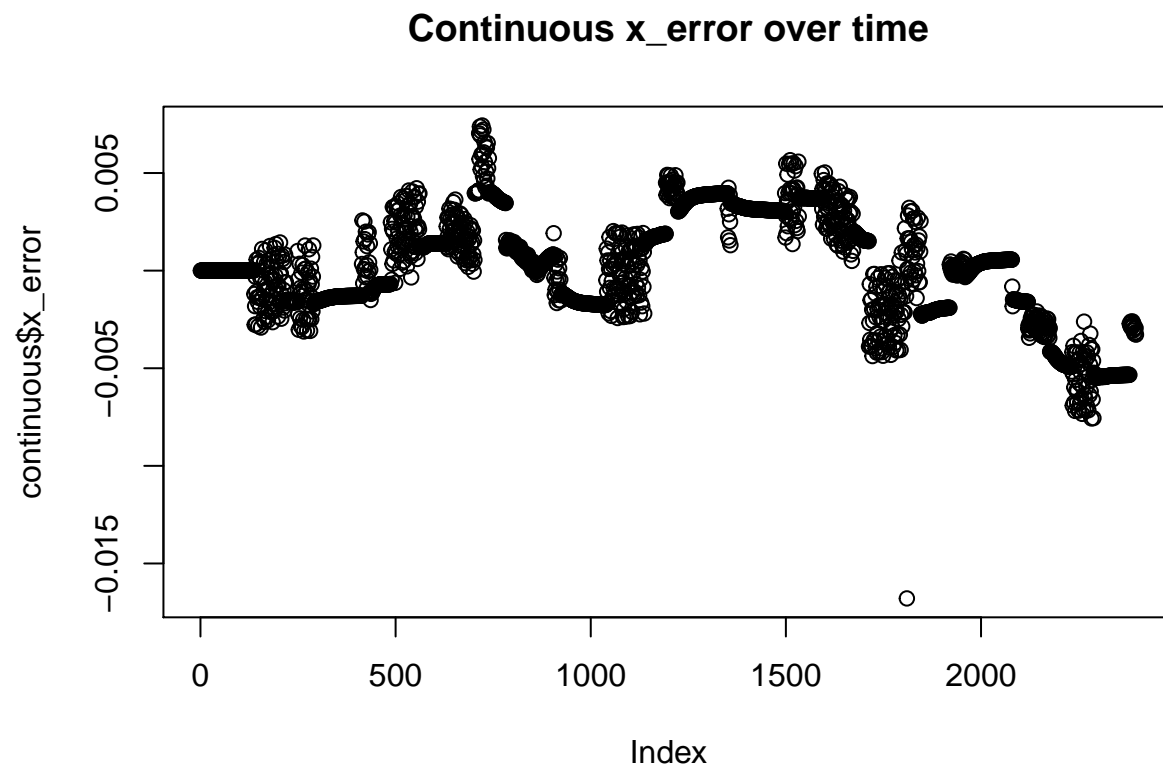
```
## dist from origin
```

```
hist(gazebo$dist_from_origin)
```

```
title("Distance from origin vs. time")
```



```
message("continuous x")  
  
## continuous x  
plot(continuous$x_error)  
title("Continuous x_error over time")
```

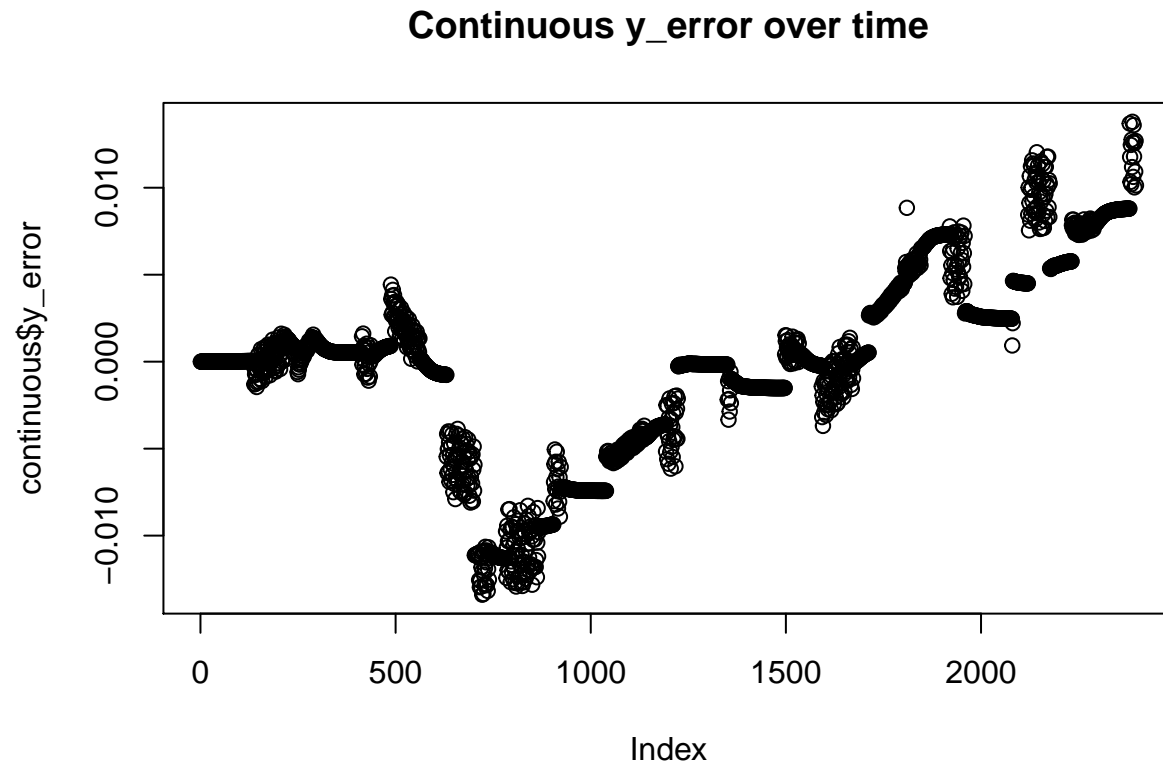


```
message("continuous y")
```

```
## continuous y
```

```
plot(continuous$y_error)
```

```
title("Continuous y_error over time")
```



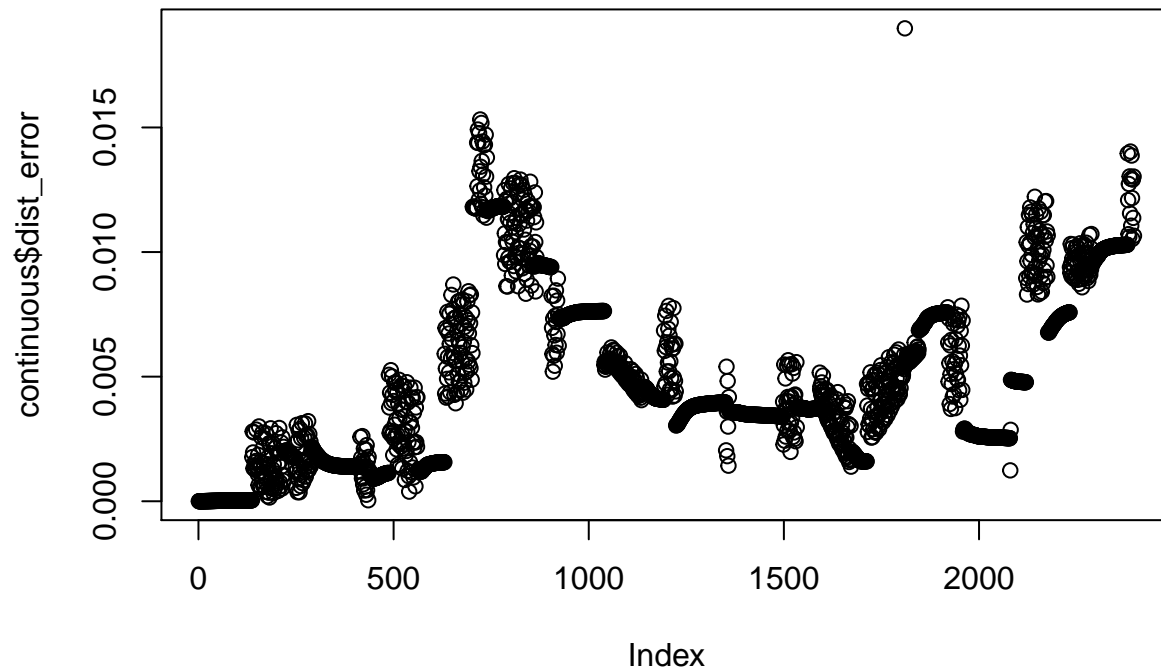
```
message("continuous dist")
```

```
## continuous dist
```

```
plot(continuous$dist_error)
```

```
title("Continuous total distance error over time")
```

Continuous total distance error over time



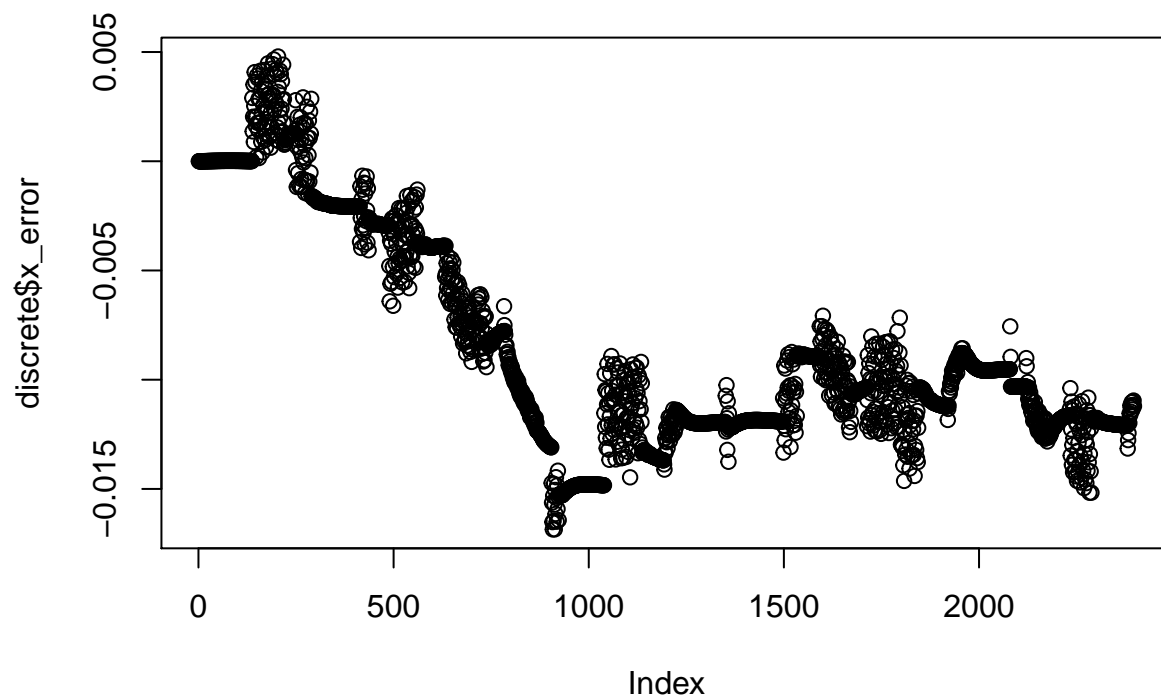
```
message("discrete x")
```

```
## discrete x
```

```
plot(discrete$x_error)
```

```
title("Discrete x_error over time")
```

Discrete x_error over time

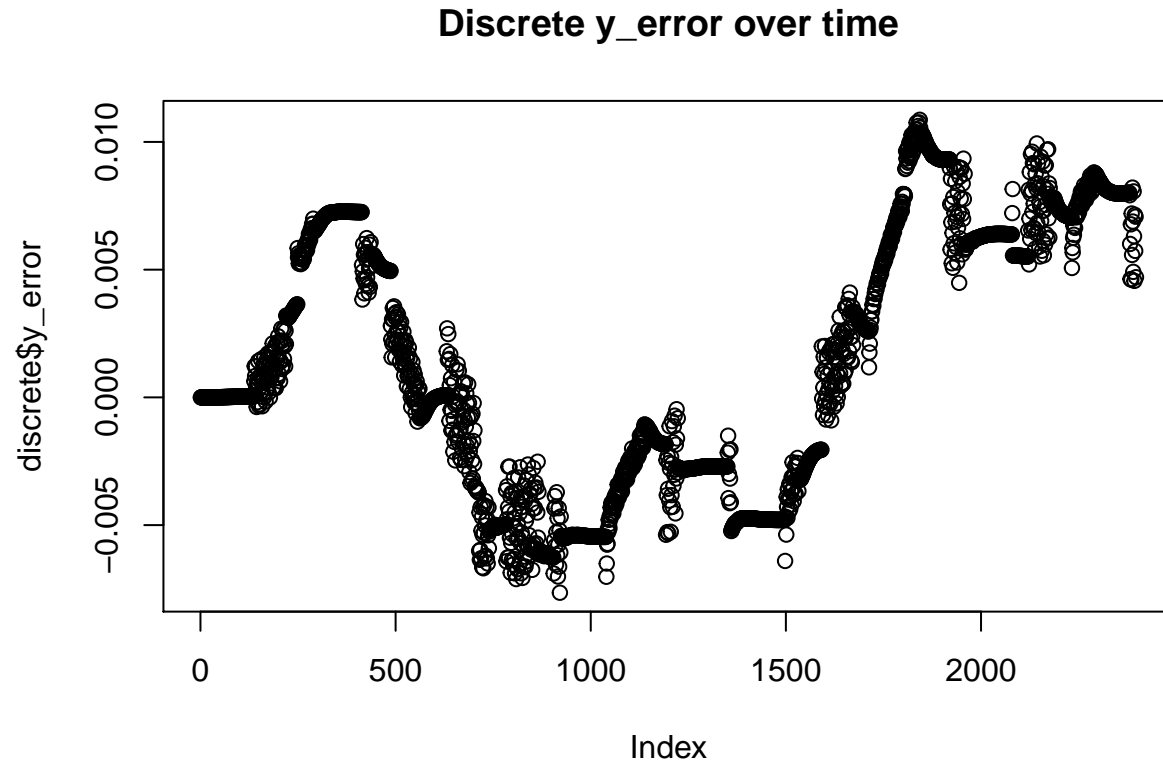


```
message("discrete y")
```

```
## discrete y
```

```
plot(discrete$y_error)
```

```
title("Discrete y_error over time")
```



```
message("discrete dist")
```

```
## discrete dist
```

```
plot (discrete$dist_error)
```

```
title("Discrete total distance error over time")
```

Discrete total distance error over time

