two_stationary_no_gps Turtlebot 2 Report

Matthew Swartwout

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This is a summary of the data from the two_stationary_no_gps experiment, Turtlebot #2.

The runtime of this experiment was 0 hours, 0 minutes, and 41.7 seconds.

The total number of external pose measurements recieved by the robot during this time was 481 which means poses were received at an average of 11.5347722 poses per second.

Shown below is the summary of each filter's error for both x and y coordinates, and also the error in total distance.

```
summary(continuous$x_error)
##
        Min.
               1st Qu.
                           Median
                                       Mean
                                               3rd Qu.
                                                            Max.
## 1.303e-05 1.359e-04 2.664e-04 2.642e-04 3.893e-04 5.103e-04
summary(continuous$y_error)
        Min.
               1st Qu.
                           Median
                                       Mean
                                               3rd Qu.
                                                            Max.
## 6.065e-10 1.666e-08 4.447e-08 4.815e-08 7.488e-08 1.177e-07
summary(continuous$yaw_error)
                                              3rd Qu.
##
        Min.
               1st Qu.
                           Median
                                       Mean
                                                            Max.
## 8.232e-05 1.860e-04 2.271e-04 2.366e-04 2.847e-04 4.372e-04
summary(continuous$dist_error)
##
               1st Qu.
                           Median
                                       Mean
                                              3rd Qu.
## 1.303e-05 1.359e-04 2.664e-04 2.642e-04 3.893e-04 5.103e-04
summary(discrete$x_error)
      Min. 1st Qu. Median
                               Mean 3rd Qu.
## 0.03016 0.03028 0.03041 0.03041 0.03054 0.03066
summary(discrete$y_error)
##
        Min.
               1st Qu.
                           Median
                                       Mean
                                              3rd Qu.
                                                            Max.
## -0.002668 -0.002668 -0.002668 -0.002668 -0.002668 -0.002667
summary(discrete$yaw_error)
                                       Mean
               1st Qu.
                          Median
                                              3rd Qu.
                                                            Max.
## 8.232e-05 1.860e-04 2.271e-04 2.366e-04 2.847e-04 4.372e-04
summary(discrete$dist error)
##
      Min. 1st Qu. Median
                               Mean 3rd Qu.
## 0.03028 0.03040 0.03053 0.03053 0.03065 0.03077
summary(noisy_odom$x_err)
                              Median
         Min.
                 1st Qu.
                                                    3rd Qu.
                                           Mean
```

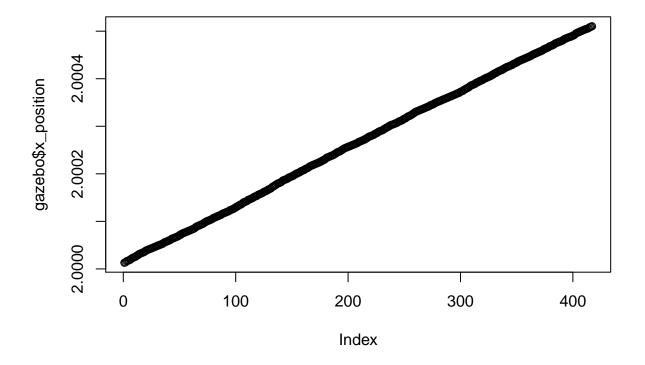
-9.444e-06 -8.491e-06 -7.508e-06 -7.661e-06 -7.023e-06 -5.617e-06

```
summary(noisy_odom$y_err)
        Min.
               1st Qu.
                          Median
                                       Mean
                                              3rd Qu.
## 4.704e-09 5.501e-09 5.724e-09 5.870e-09 6.394e-09 7.026e-09
summary(noisy_odom$dist_err)
                          Median
##
        Min.
               1st Qu.
                                       Mean
                                              3rd Qu.
                                                            Max.
## 5.617e-06 7.023e-06 7.508e-06 7.661e-06 8.491e-06 9.444e-06
if (NROW(gps) > 0) {
    summary(gps$x_err)
    summary(gps$y_err)
    summary(gps$dist_err)
}
if (NROW(noisy_odom) > 0) {
    summary(noisy_odom$x_variance)
    summary(noisy_odom$y_variance)
    summary(noisy_odom$yaw_variance)
}
##
        Min.
               1st Qu.
                          Median
                                       Mean
                                              3rd Qu.
```

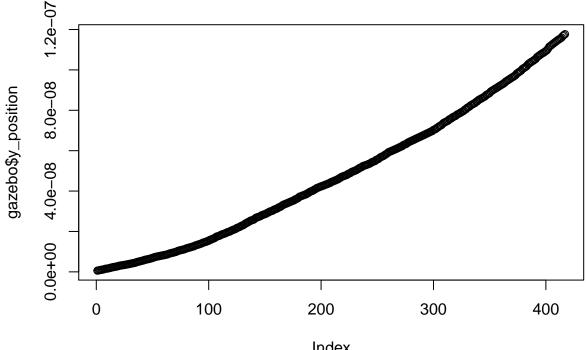
X coordinate of robot over time

9.919e-16 8.575e-15 1.999e-14 2.517e-14 3.366e-14 1.944e-13

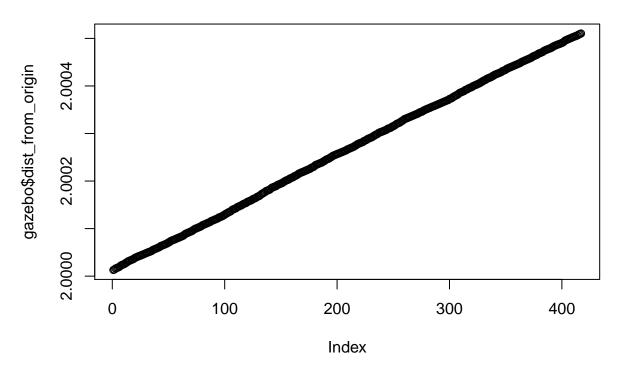
Max.



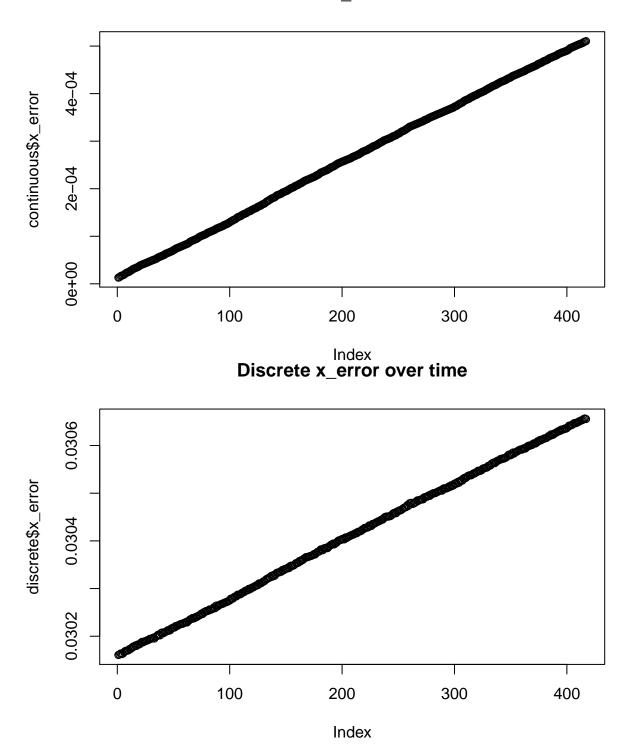
Y coordinate of robot over time



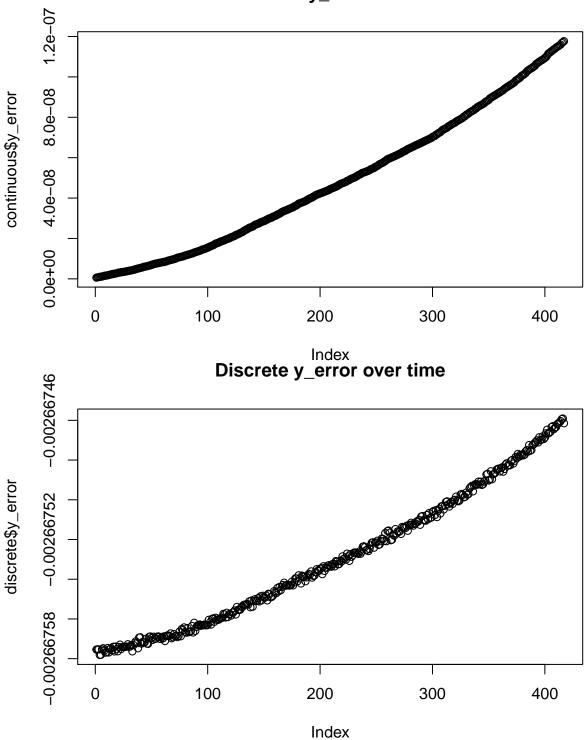
Index
Distance from origin vs. time



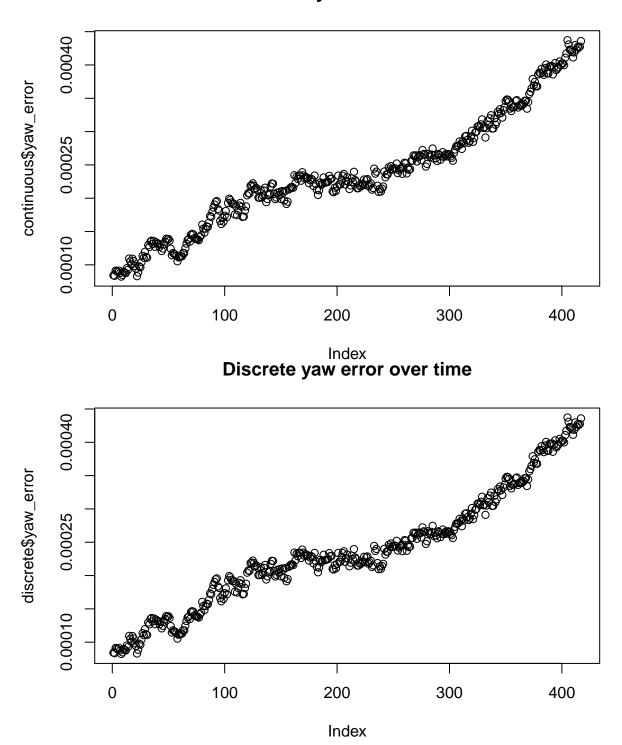
Continuous x_error over time



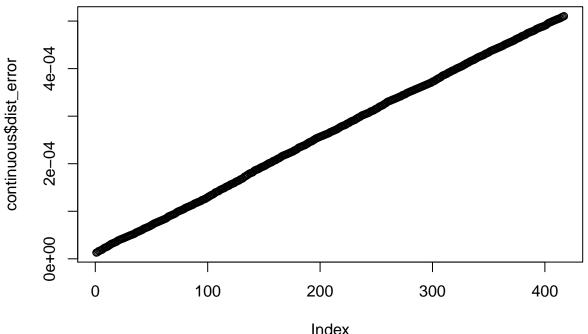




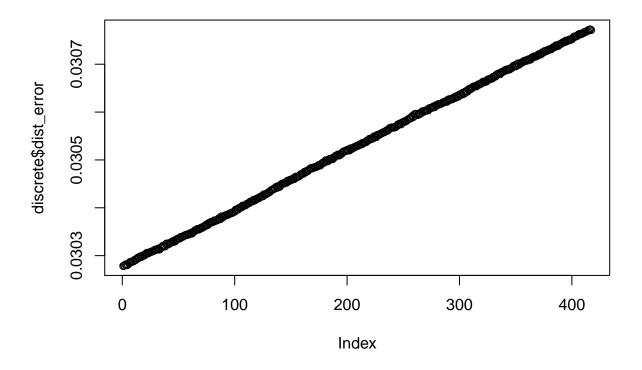
Continuous yaw error over time



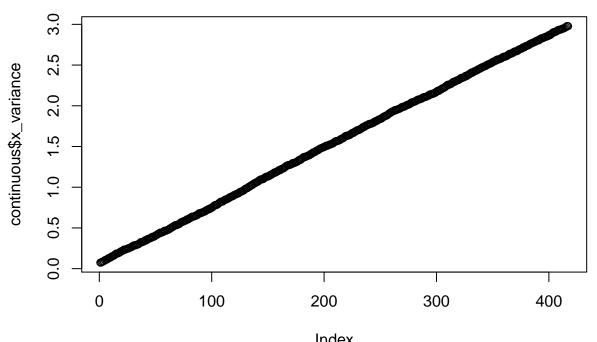
Continuous total distance error over time



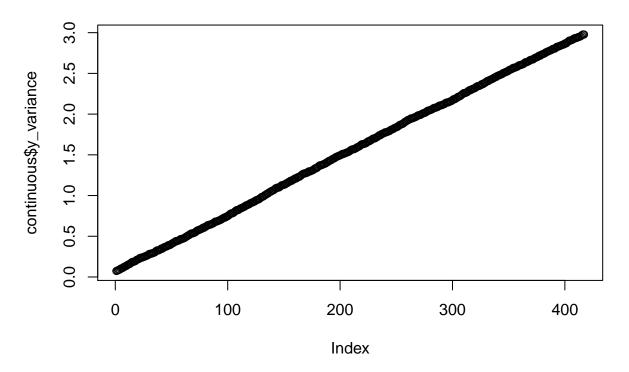
Index
Discrete total distance error over time



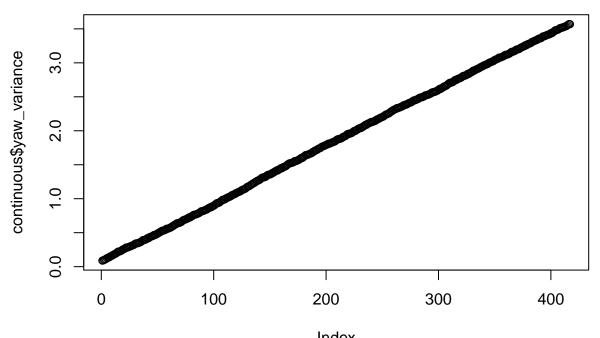
Continuous Filter X Variance Over Time



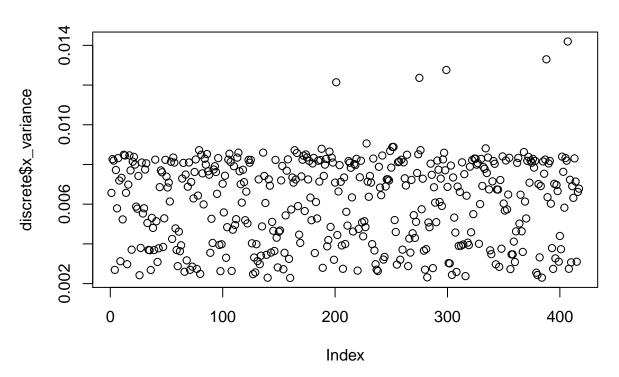
Continuous Filter Y Variance Over Time



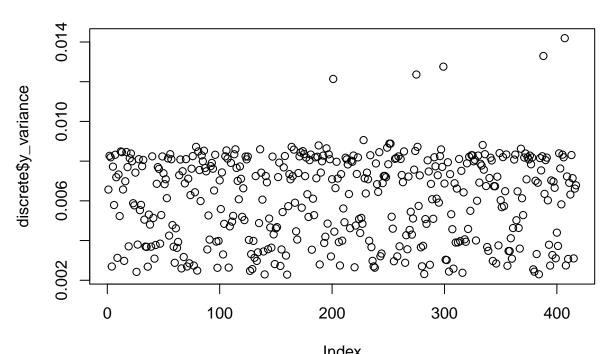
Continuous Filter Yaw Variance Over Time



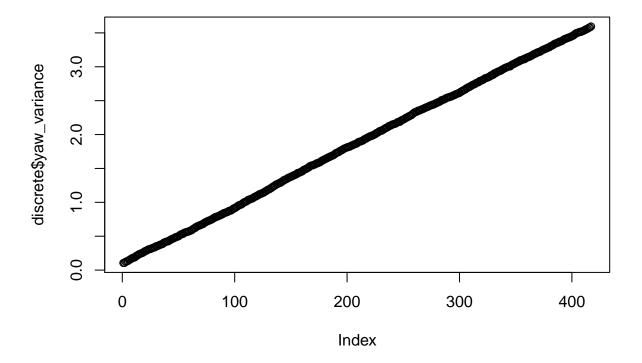
Discrete Filter X Variance Over Time



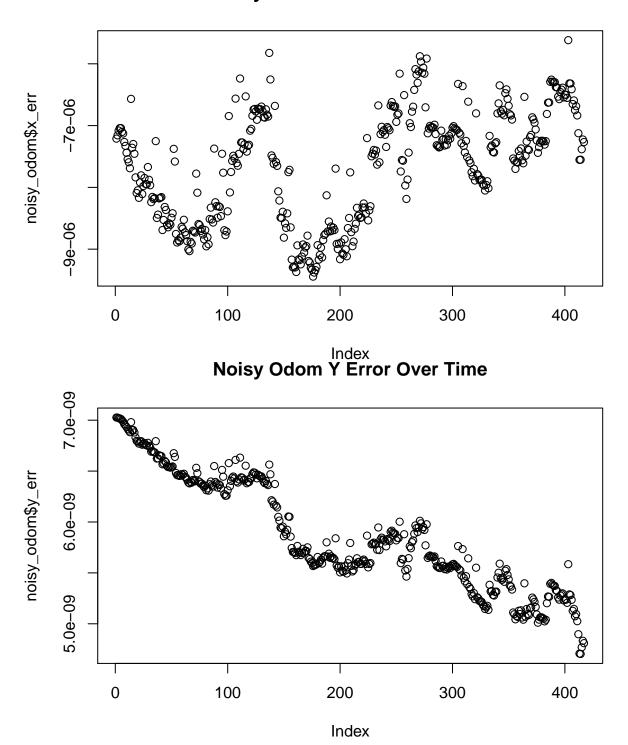
Discrete Filter Y Variance Over Time



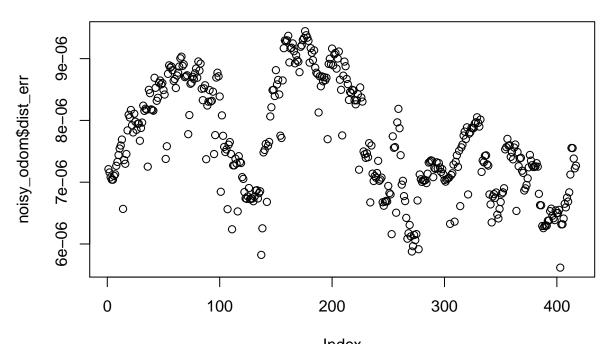
Discrete Filter Yaw Variance Over Time



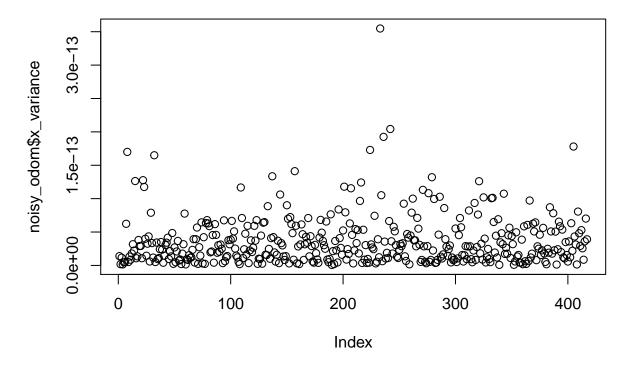
Noisy Odom X Error Over Time



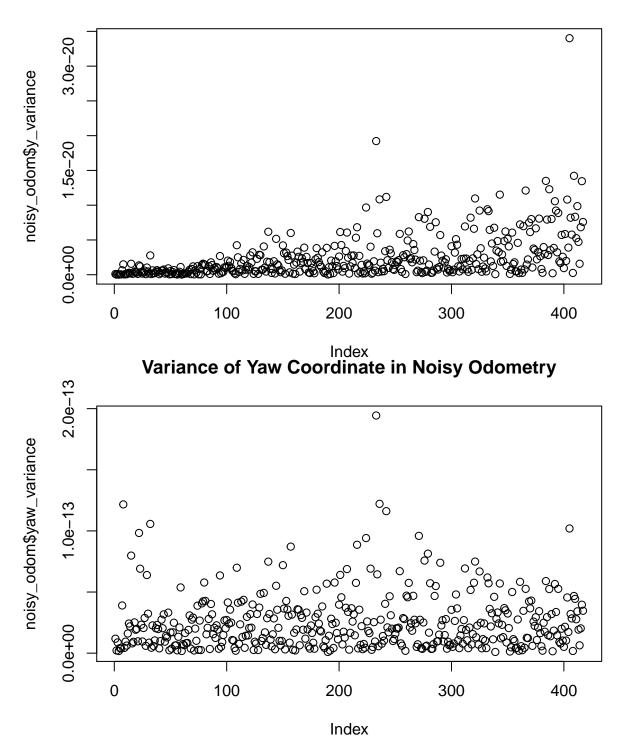
Noisy Odom Horizontal Distance Error Over Time



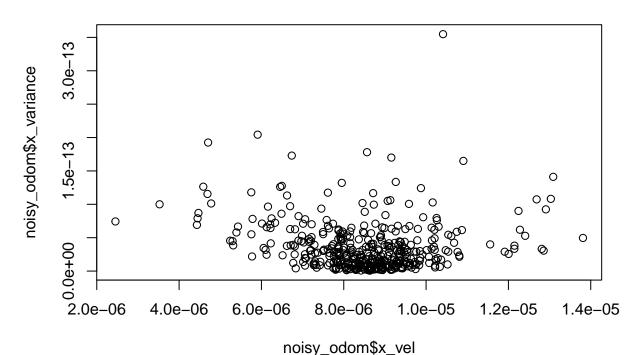
Variance of X Coordinate in Noisy Odometry



Variance of Y Coordinate in Noisy Odometry



Variance vs. Velocity of X in Noisy Odometry



Variance vs. Velocity of Yaw in Noisy Odometry

