

# two\_stationary\_noiseless\_no\_gps Turtlebot 1 Report

Matthew Swartwout

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This is a summary of the data from the two\_stationary\_noiseless\_no\_gps experiment, Turtlebot #1.

The runtime of this experiment was 0 hours, 13 minutes, and 37.5 seconds.

The total number of external pose measurements received by the robot during this time was 0 which means poses were received at an average of 0 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.
## 1.488e-05 2.075e-03 4.118e-03 4.121e-03 6.171e-03 8.215e-03

summary(continuous$y_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 6.450e-10 1.506e-06 5.937e-06 7.867e-06 1.325e-05 2.351e-05

summary(continuous$yaw_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 5.592e-05 1.340e-03 2.932e-03 2.870e-03 4.295e-03 5.755e-03

summary(continuous$dist_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 1.488e-05 2.075e-03 4.118e-03 4.121e-03 6.171e-03 8.215e-03

summary(discrete$x_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 1.488e-05 2.075e-03 4.118e-03 4.121e-03 6.171e-03 8.215e-03

summary(discrete$y_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 6.440e-10 1.505e-06 5.937e-06 7.867e-06 1.325e-05 2.351e-05

summary(discrete$yaw_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 5.592e-05 1.340e-03 2.932e-03 2.870e-03 4.295e-03 5.755e-03

summary(discrete$dist_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 1.488e-05 2.075e-03 4.118e-03 4.121e-03 6.171e-03 8.215e-03

summary(noisy_odom$x_err)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## -6.134e-05 -3.930e-05 -2.807e-05 -3.296e-05 -2.422e-05 -1.638e-05
```

```

summary(noisy_odom$y_err)

##      Min.    1st Qu.     Median      Mean    3rd Qu.     Max.
## 1.099e-08 4.642e-08 6.130e-08 6.004e-08 7.197e-08 1.060e-07

summary(noisy_odom$dist_err)

##      Min.    1st Qu.     Median      Mean    3rd Qu.     Max.
## 1.638e-05 2.422e-05 2.807e-05 3.296e-05 3.930e-05 6.134e-05

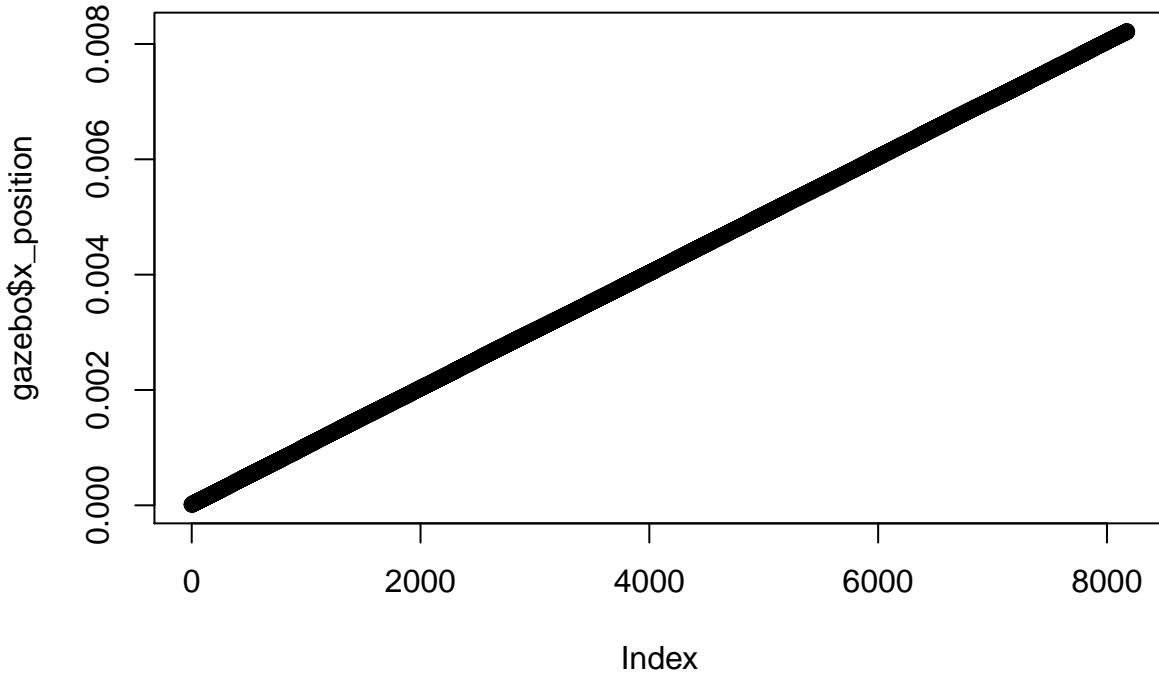
if (NROW(gps) > 0) {
  summary(gps$x_err)
  summary(gps$y_err)
  summary(gps$dist_err)
}

if (NROW(noisy_odom) > 0) {
  summary(noisy_odom$x_variance)
  summary(noisy_odom$y_variance)
  summary(noisy_odom$yaw_variance)
}

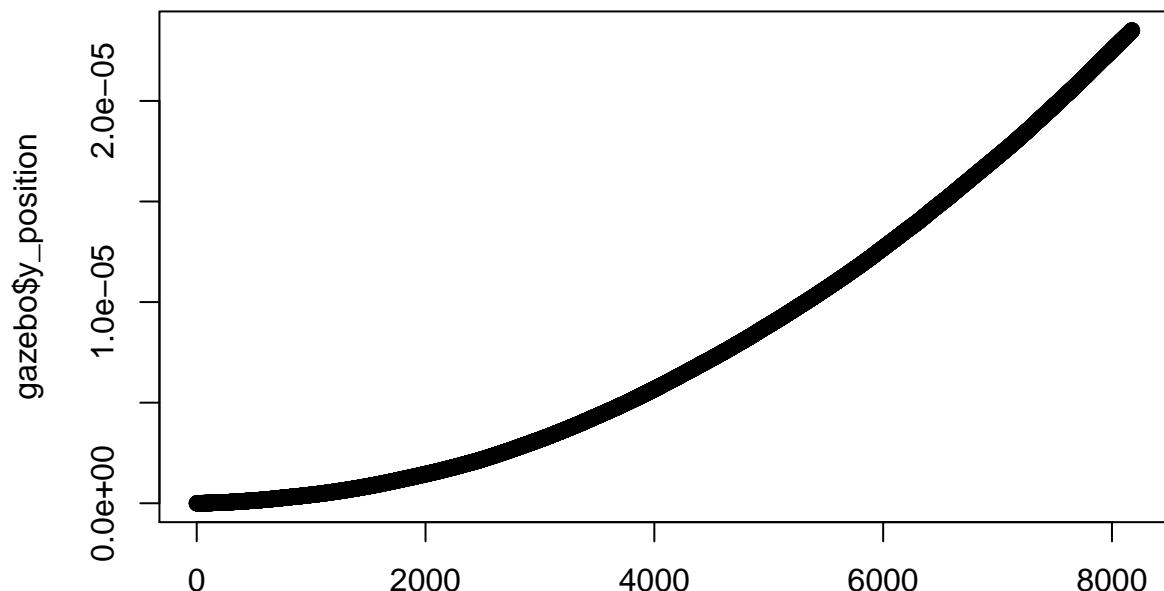
##      Min.    1st Qu.     Median      Mean    3rd Qu.     Max.
## 7.470e-16 8.716e-15 1.786e-14 2.363e-14 3.208e-14 2.842e-13

```

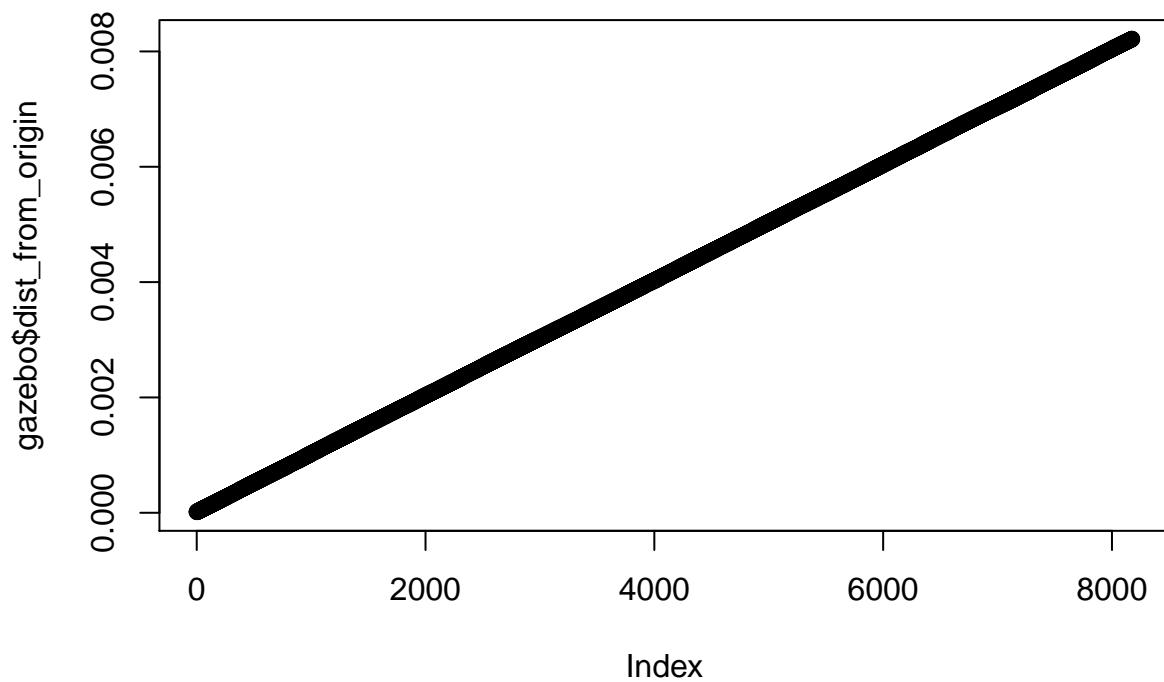
### X coordinate of robot over time



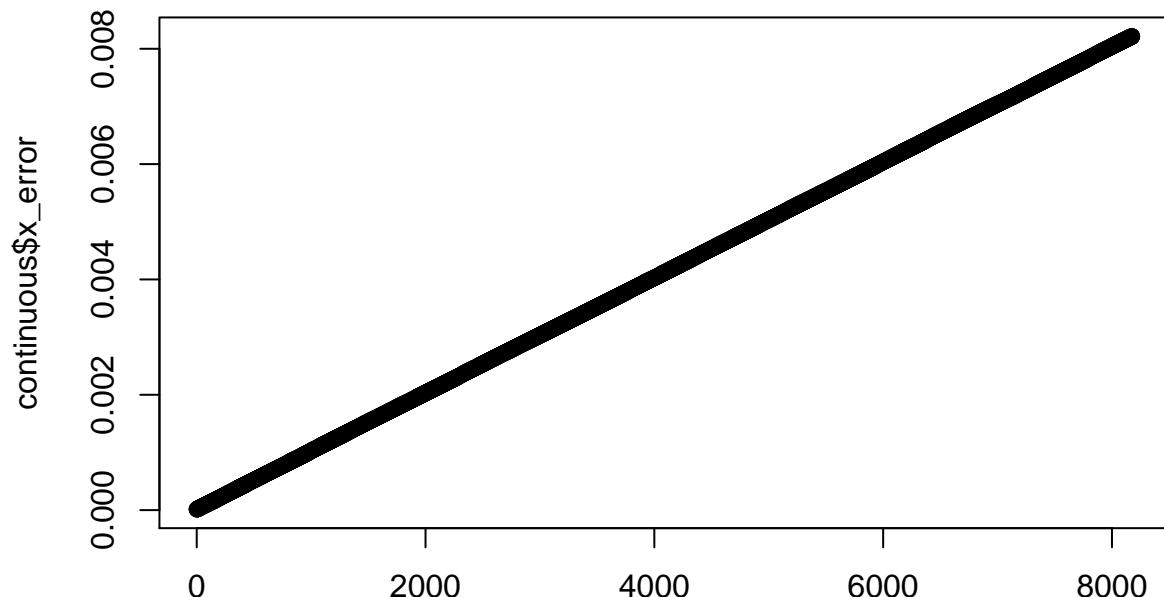
**Y coordinate of robot over time**



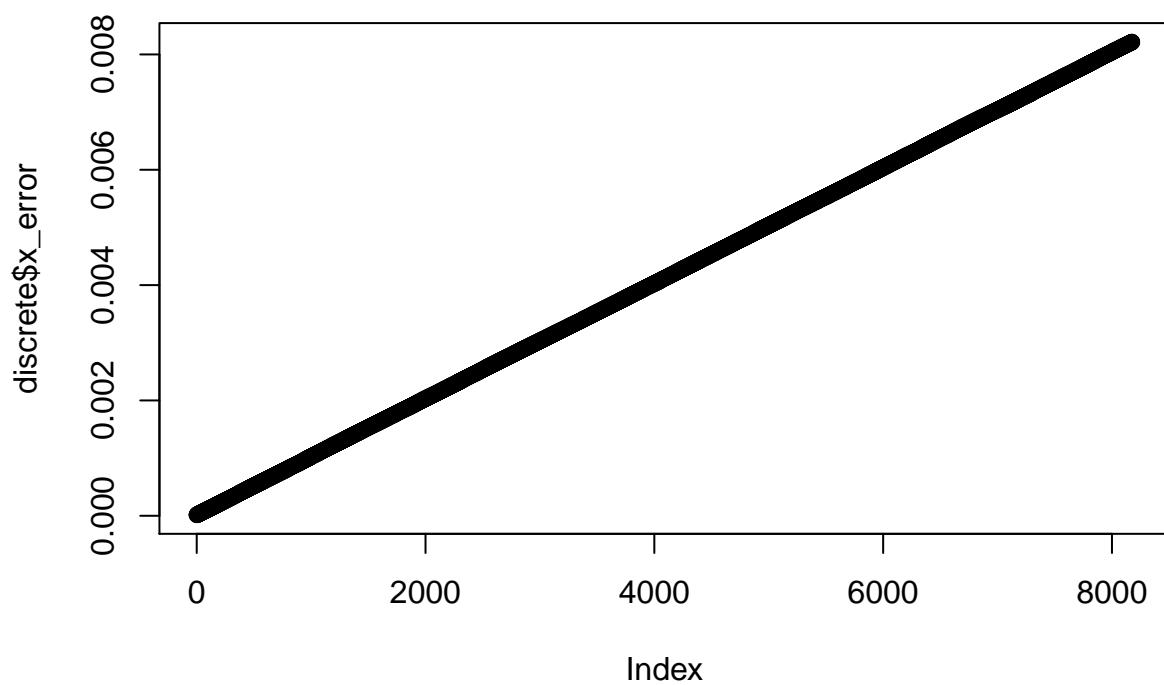
**Distance from origin vs. time<sup>Index</sup>**



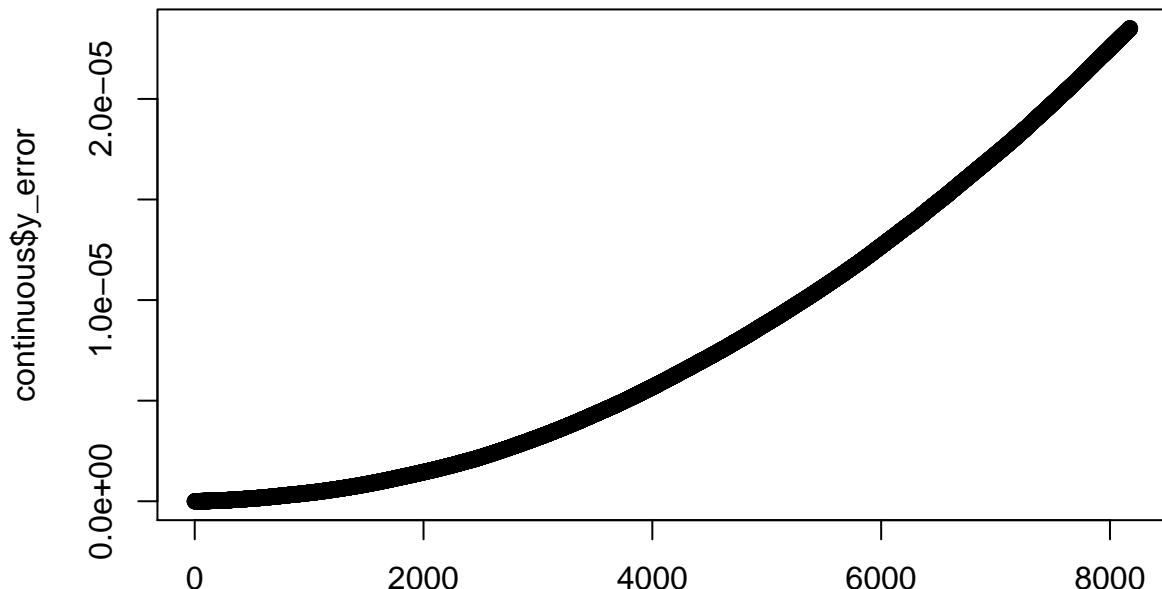
**Continuous x\_error over time**



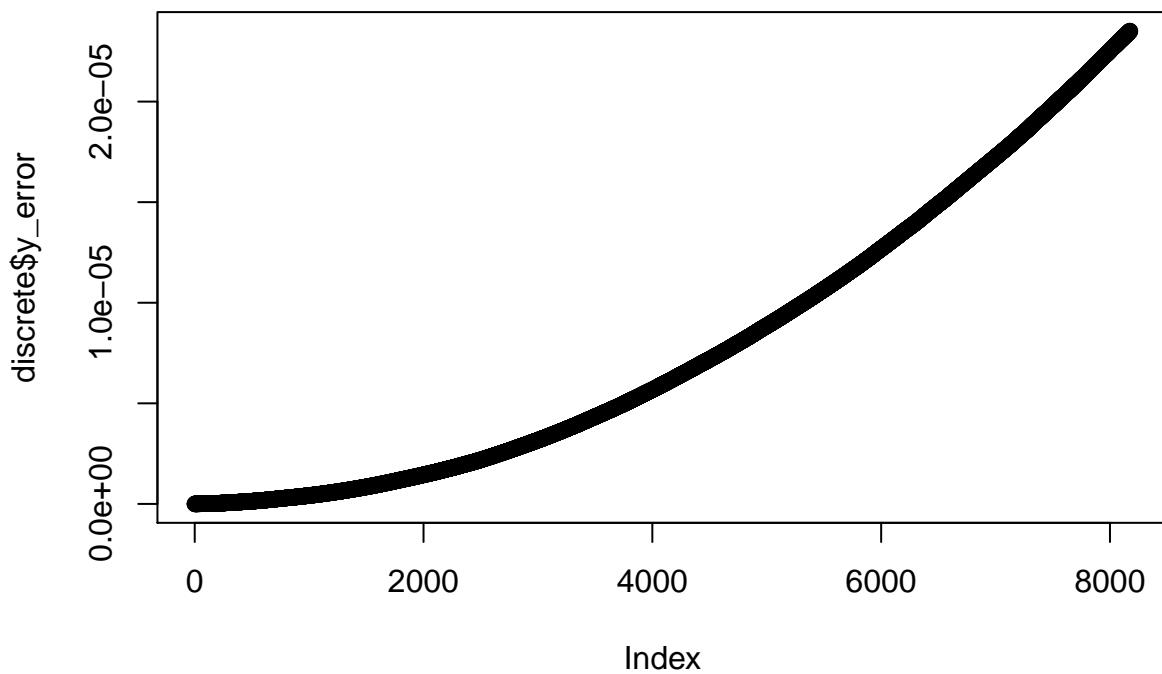
**Discrete x\_error over time**



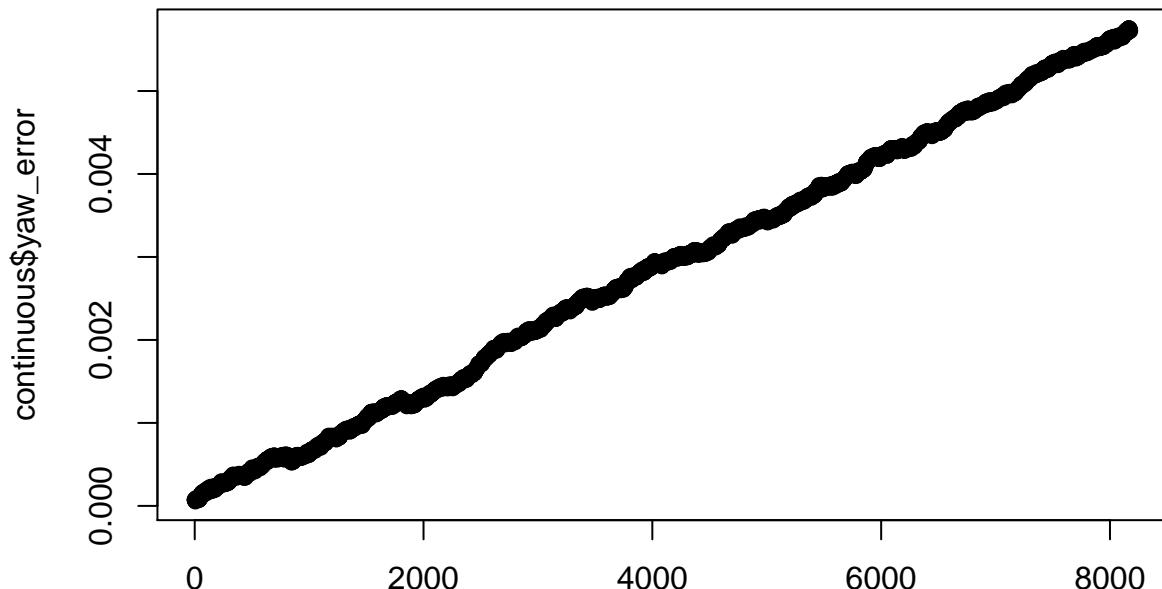
**Continuous y\_error over time**



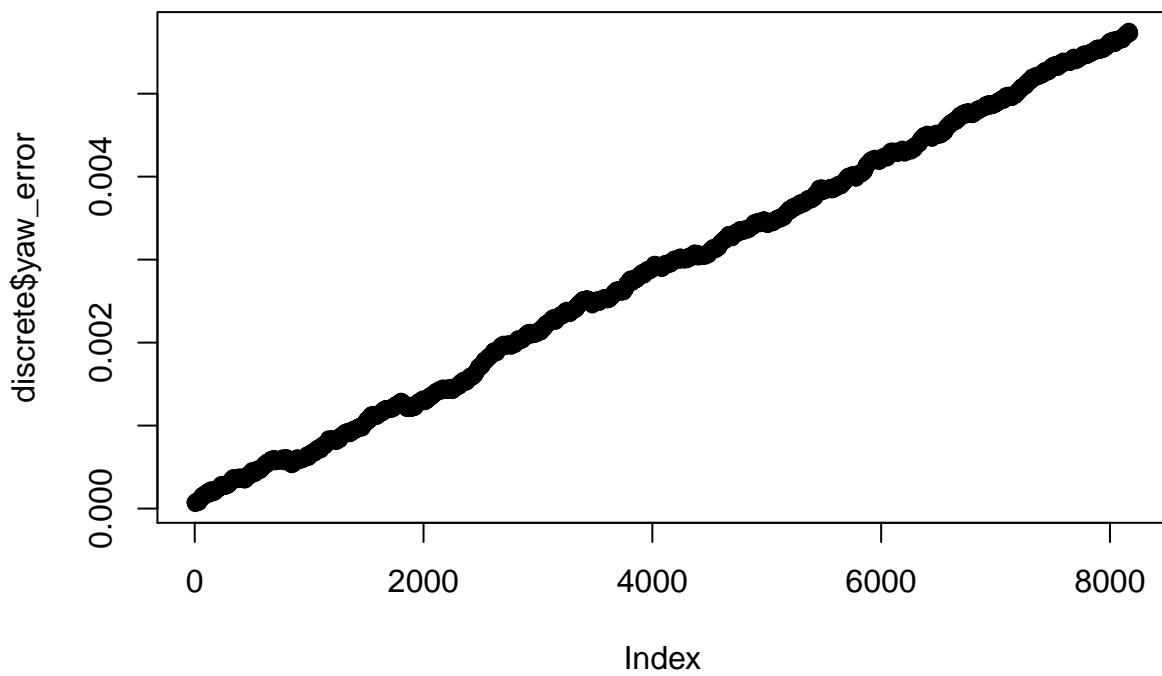
**Discrete y\_error over time**



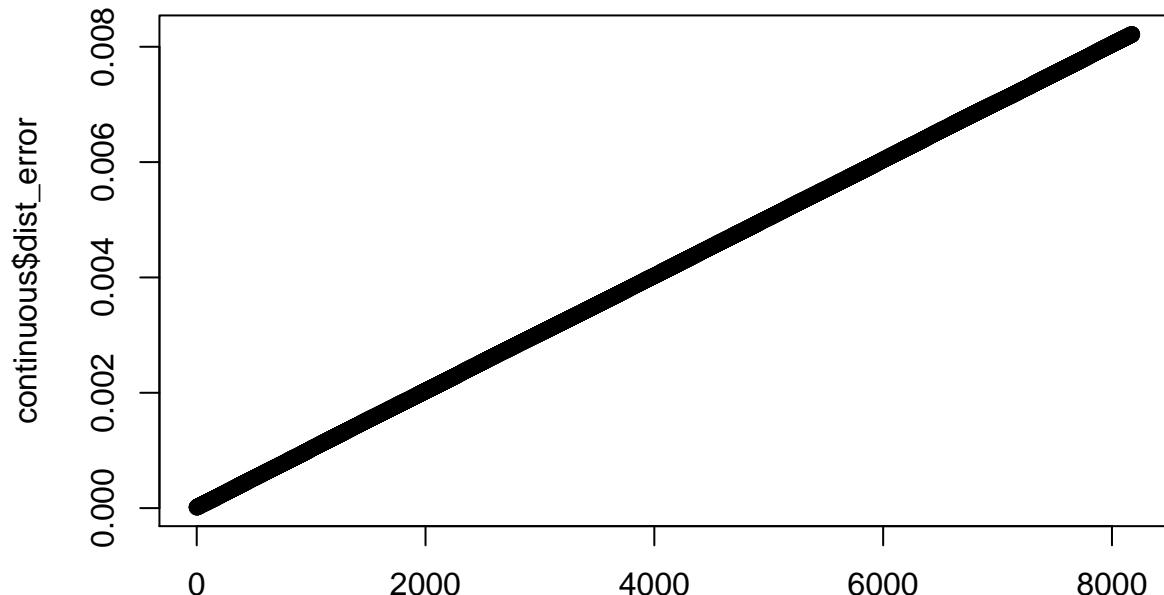
**Continuous yaw error over time**



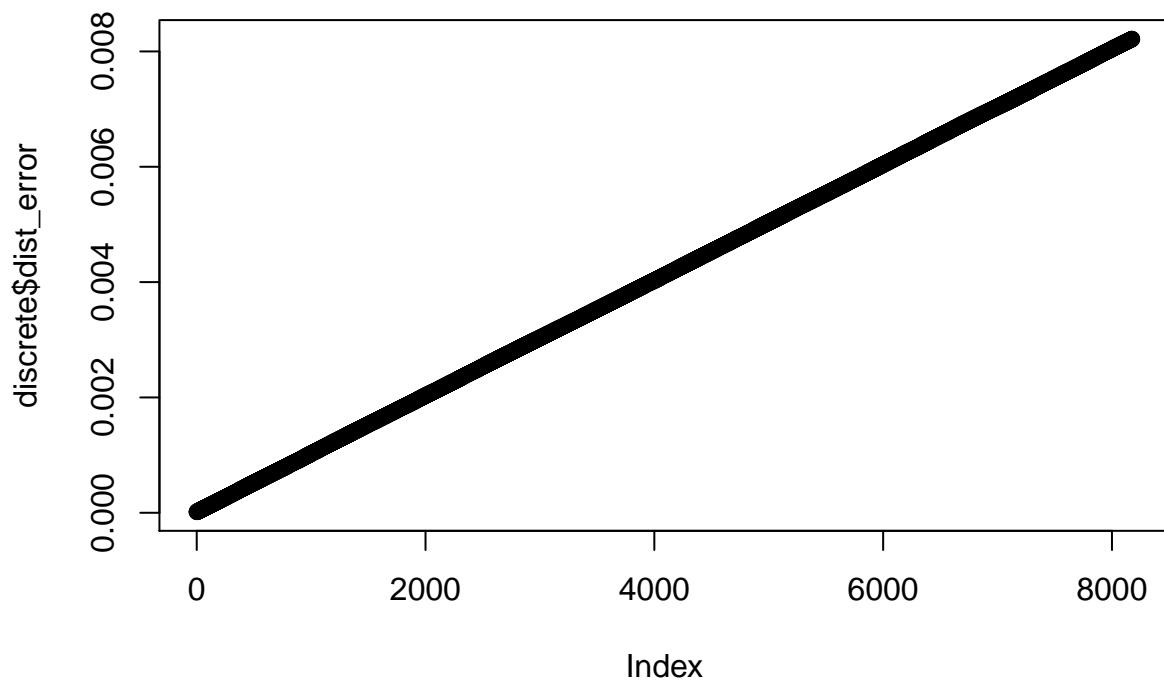
**Discrete yaw error over time**



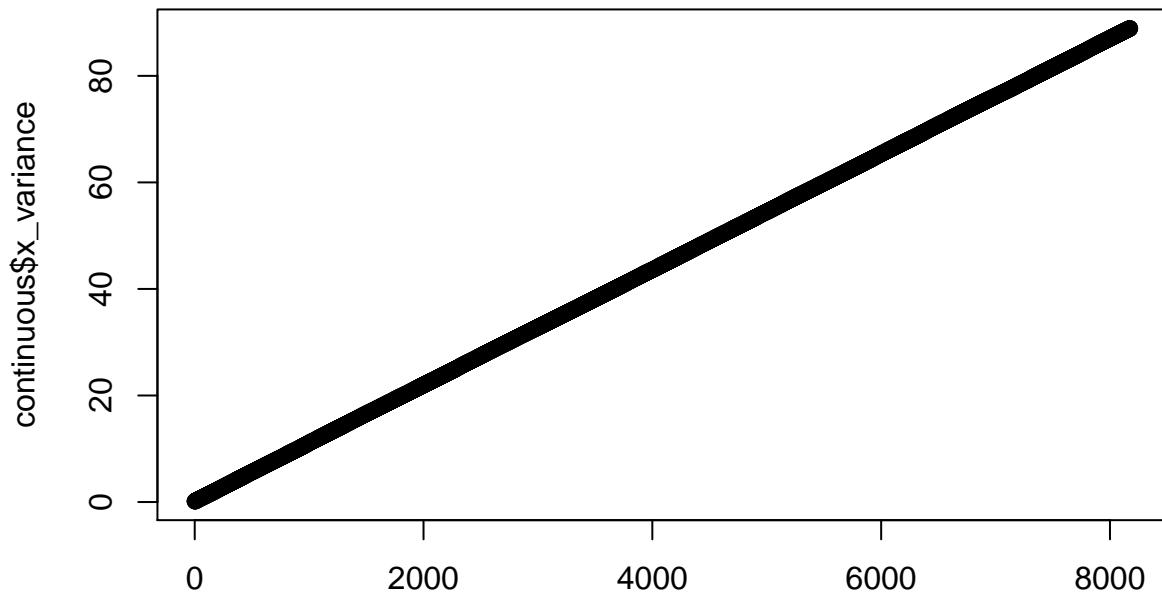
**Continuous total distance error over time**



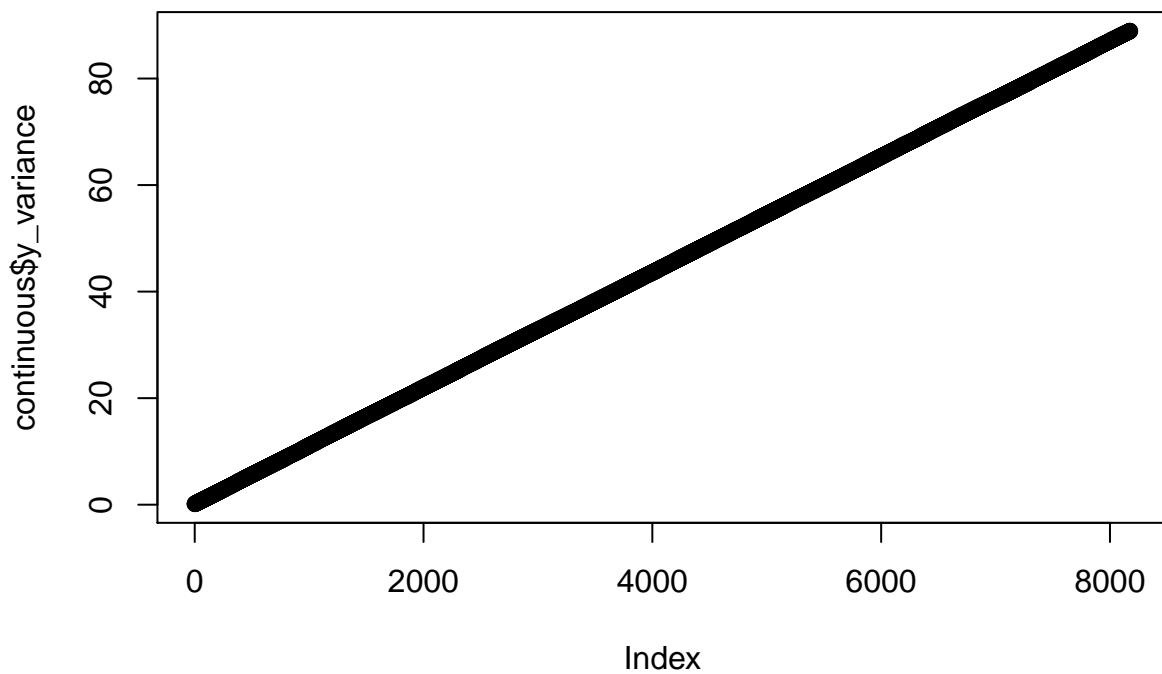
**Discrete total distance error over time**



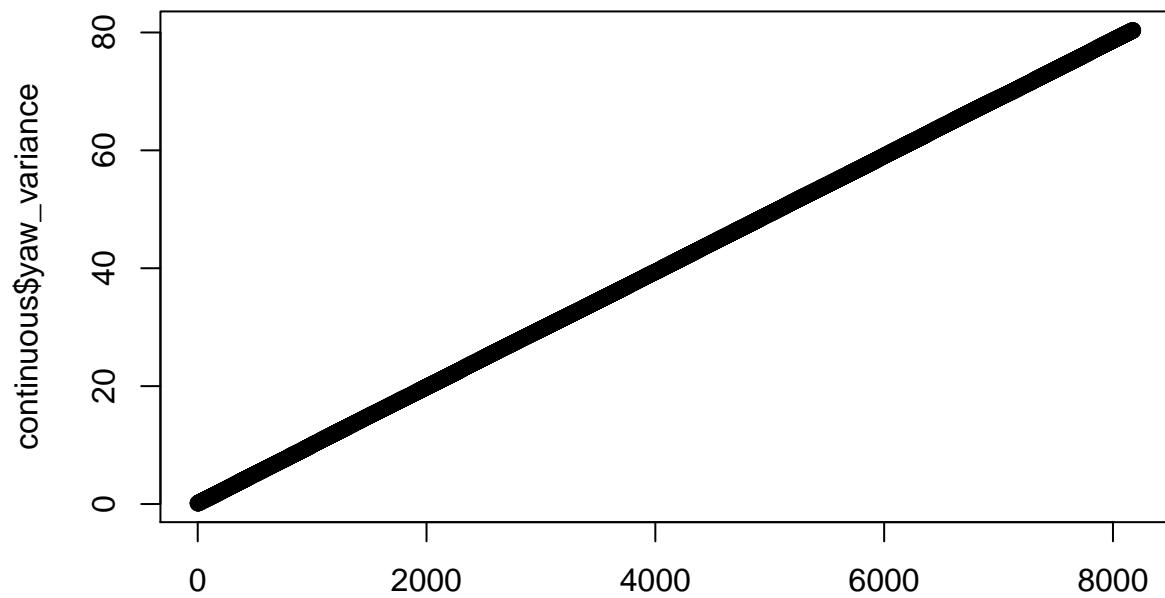
**Continuous Filter X Variance Over Time**



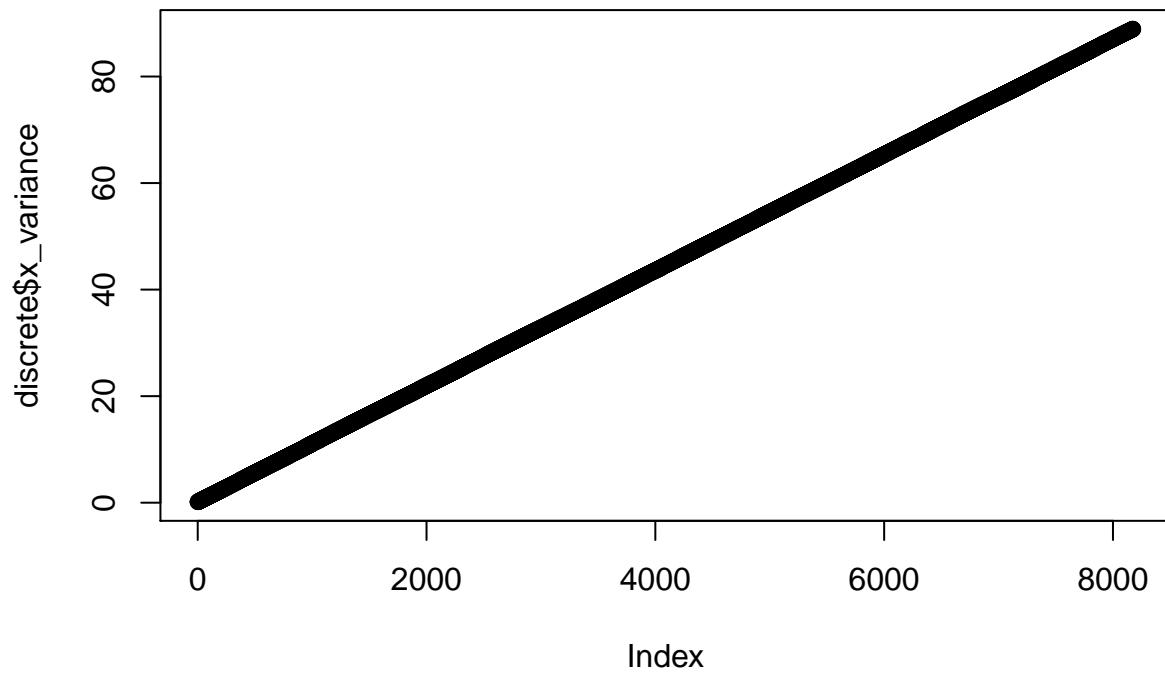
**Continuous Filter Y Variance Over Time**



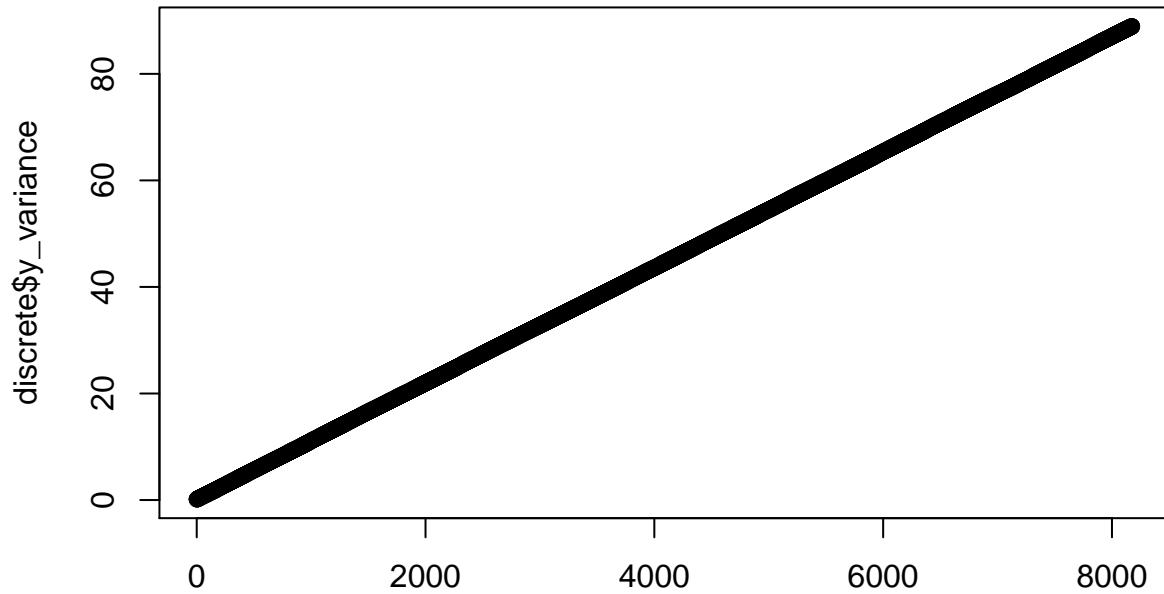
**Continuous Filter Yaw Variance Over Time**



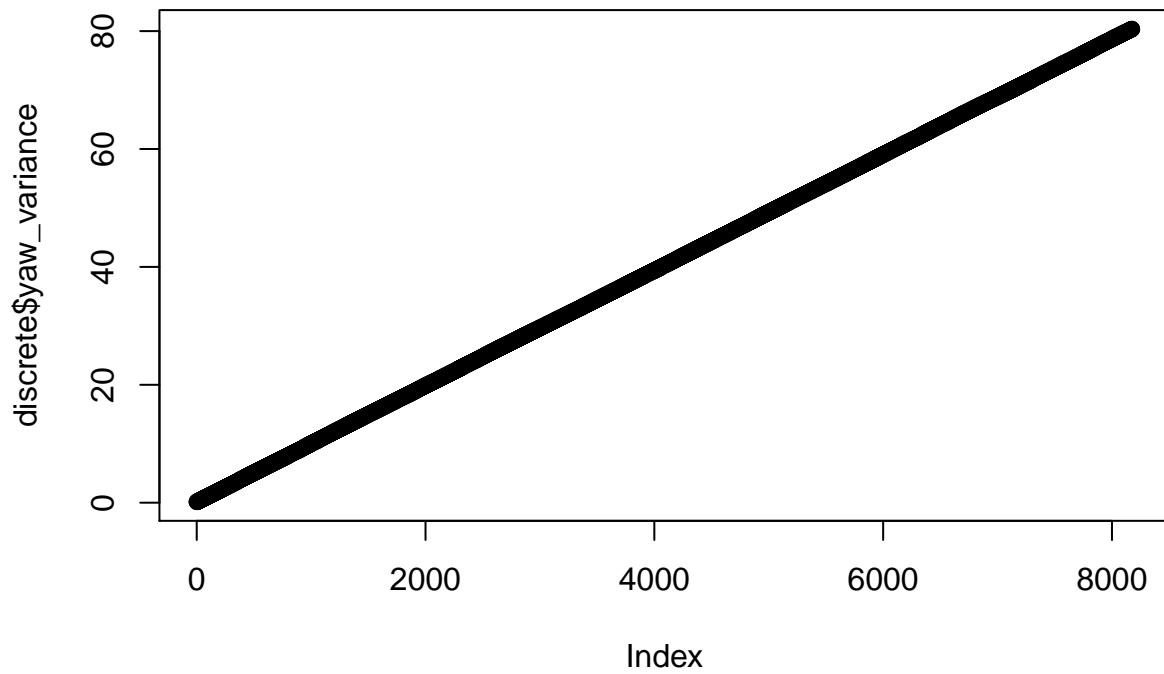
**Discrete Filter X Variance Over Time**



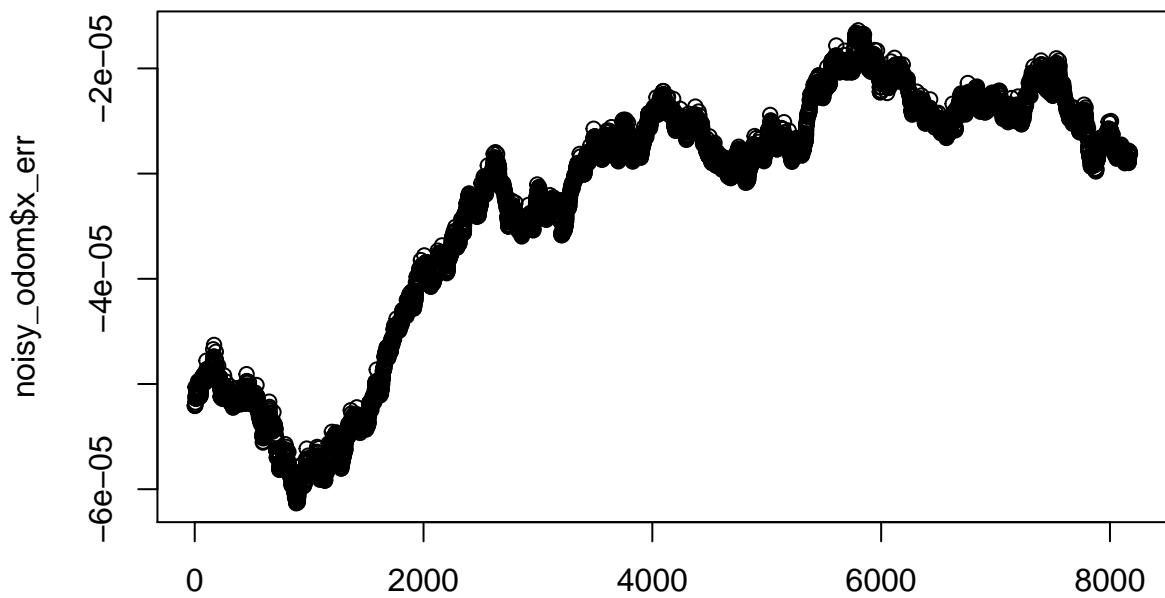
**Discrete Filter Y Variance Over Time**



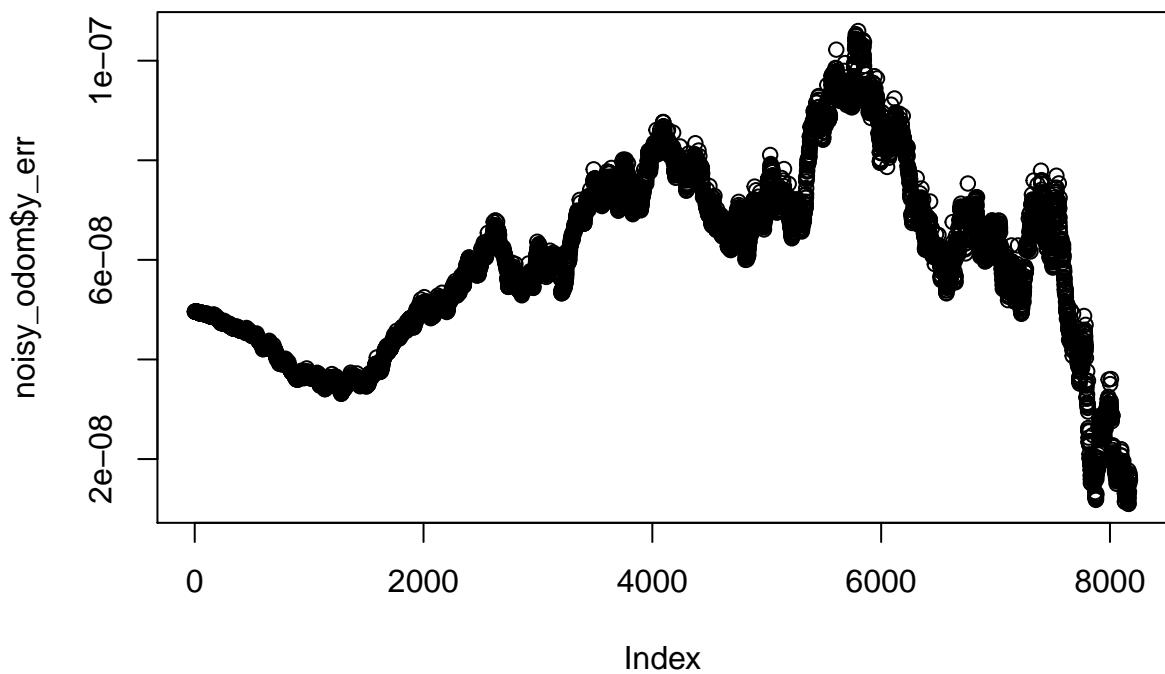
**Discrete Filter Yaw Variance Over Time**



**Noisy Odom X Error Over Time**



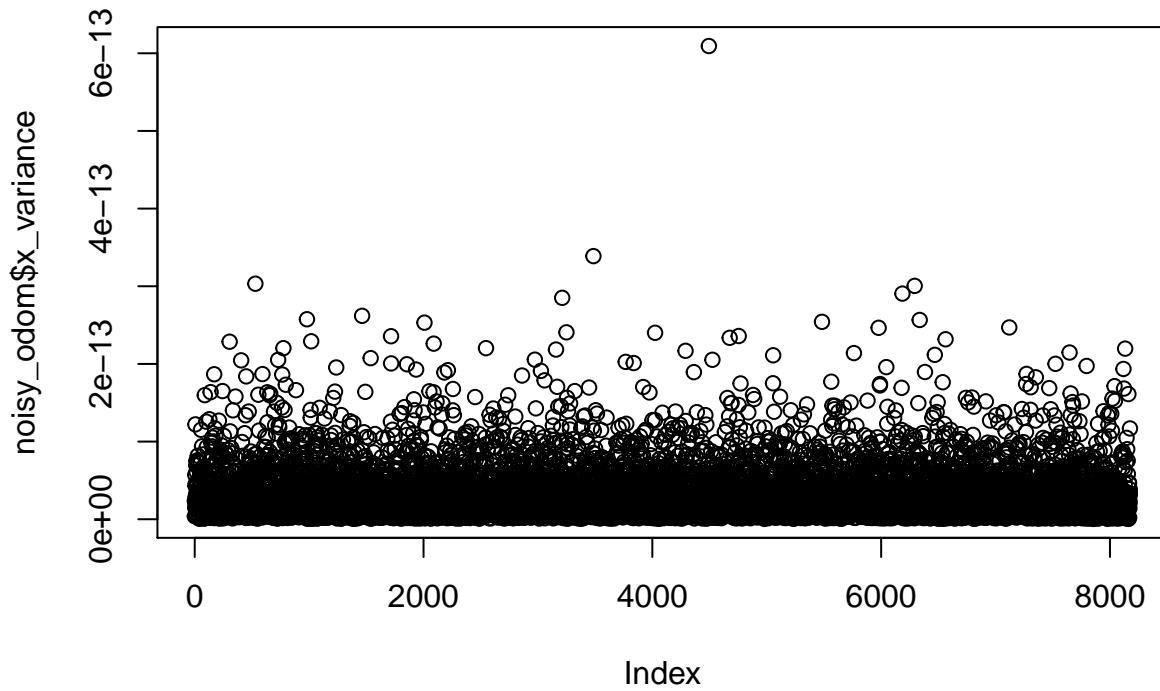
**Noisy Odom Y Error Over Time**



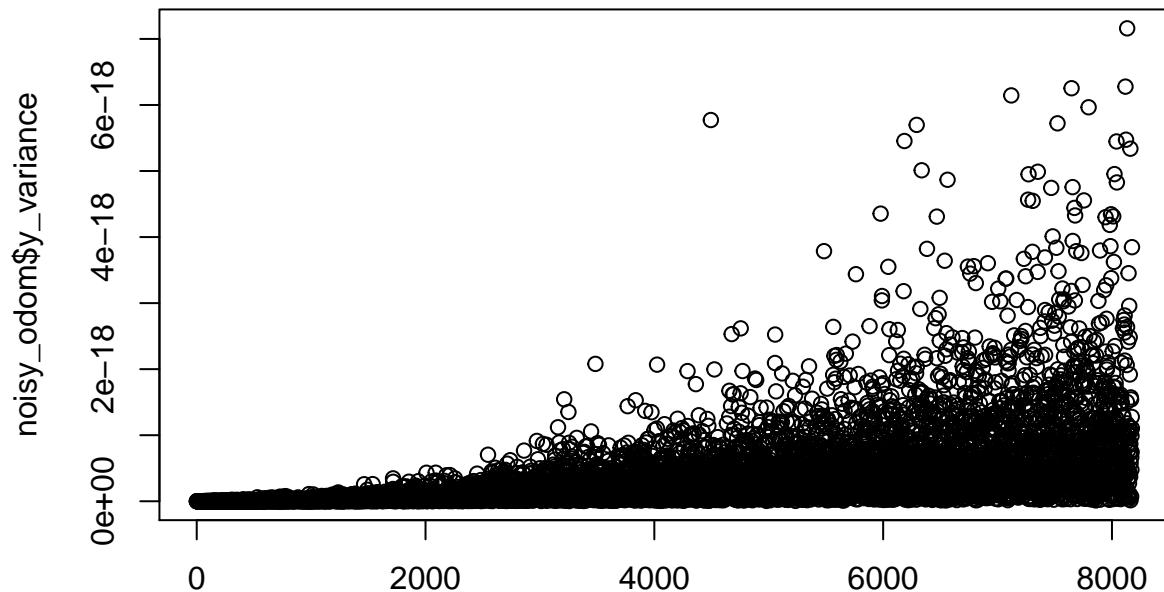
### Noisy Odom Horizontal Distance Error Over Time



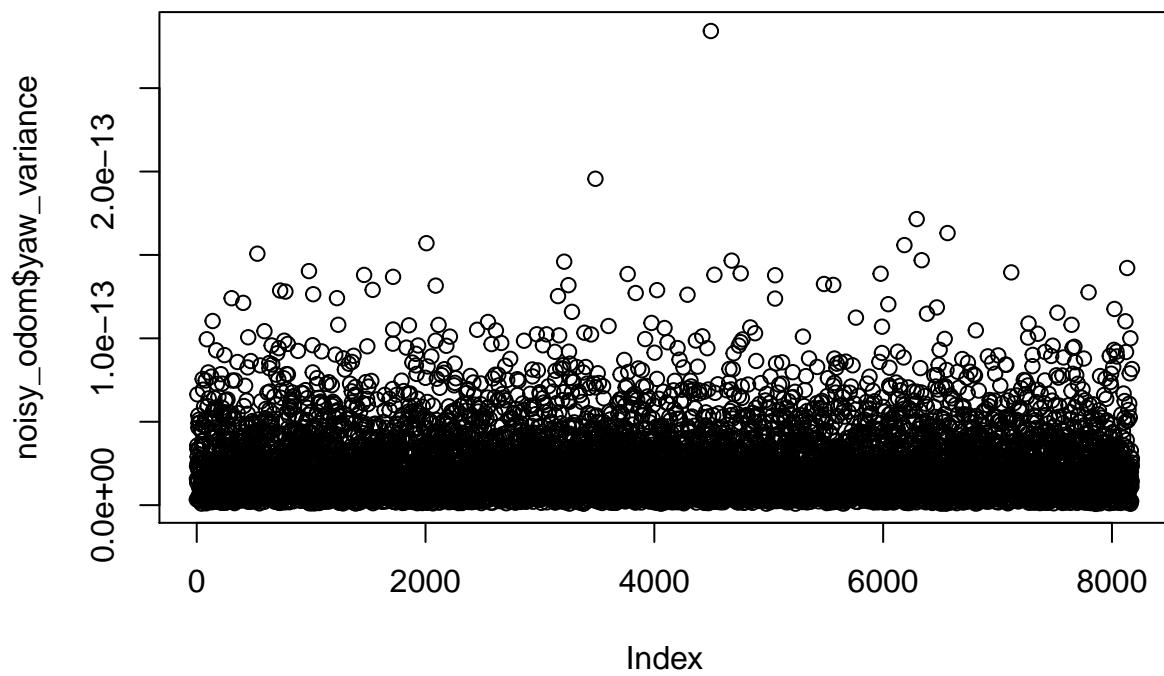
### Variance of X Coordinate in Noisy Odometry



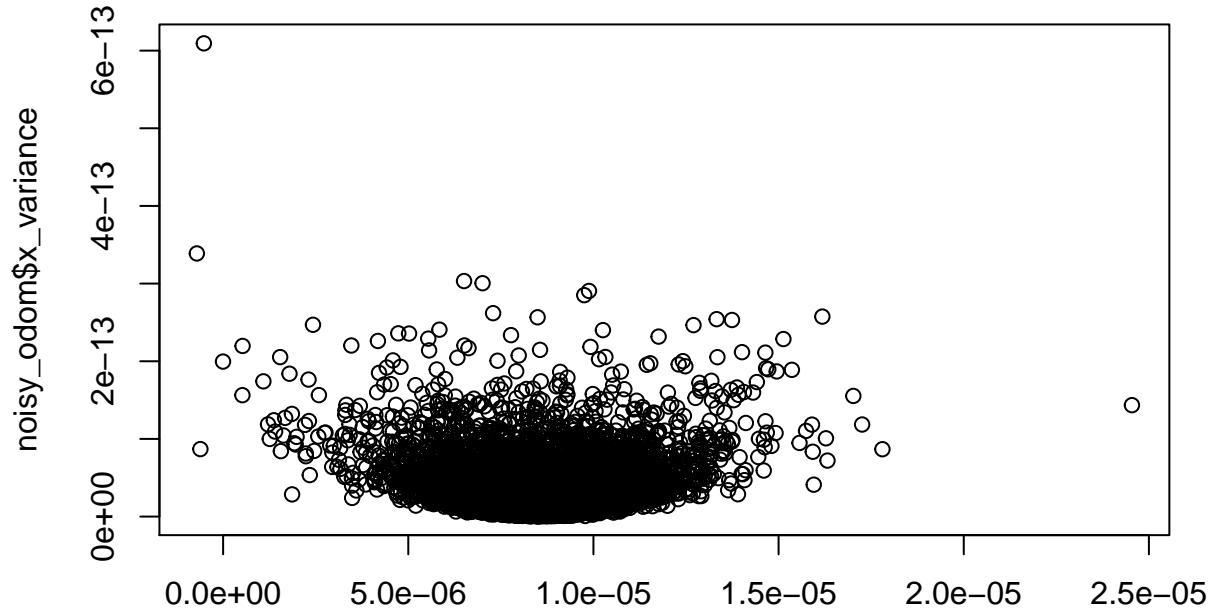
**Variance of Y Coordinate in Noisy Odometry**



**Variance of Yaw Coordinate in Noisy Odometry**



**Variance vs. Velocity of X in Noisy Odometry**



**Variance vs. Velocity of Yaw in Noisy Odometry**

