

# one\_mobile Turtlebot 1 Report

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## Loading required package: data.table
## Loading required package: fitdistrplus
## Loading required package: MASS
## Loading required package: survival
## Loading required package: methods

This is a summary of the data from the one_mobile experiment, Turtlebot #1.

The runtime of this experiment was 0 hours, 25 minutes, and 7.6 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.
## -28.6700 -21.1600 -14.2700 -12.5300  0.2439  6.1330

summary(continuous$y_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -5.74900 -0.06006  2.58900  3.67200  7.18000 16.53000

summary(continuous$yaw_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -3.14100 -1.59700  0.04786  0.02887  1.69300  3.14200

summary(continuous$dist_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.000014 10.660000 15.490000 16.050000 21.670000 28.700000

summary(discrete$x_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -5.42400 -0.70040 -0.09425 -0.14840  0.55110  4.07700

summary(discrete$y_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -4.1840 -0.4973  0.1222  0.1893  0.8155  5.5940

summary(discrete$yaw_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -3.1410 -1.2800 -0.4858 -0.2251  0.9126  3.1400

summary(discrete$dist_error)
```

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##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.000014 0.595300 1.171000 1.366000 1.762000 6.037000
summary(noisy_odom$x_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -21.24000 -8.39800 -4.80200 -5.40500 -0.01768 3.09200
summary(noisy_odom$y_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -11.5600 -8.5480 -5.2160 -3.8220 -0.3434 12.2800
summary(noisy_odom$dist_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.00001 2.80700 8.88600 8.81200 13.03000 21.29000
if (NROW(gps) > 0) {
  summary(gps$x_err)
  summary(gps$y_err)
  summary(gps$dist_err)
}

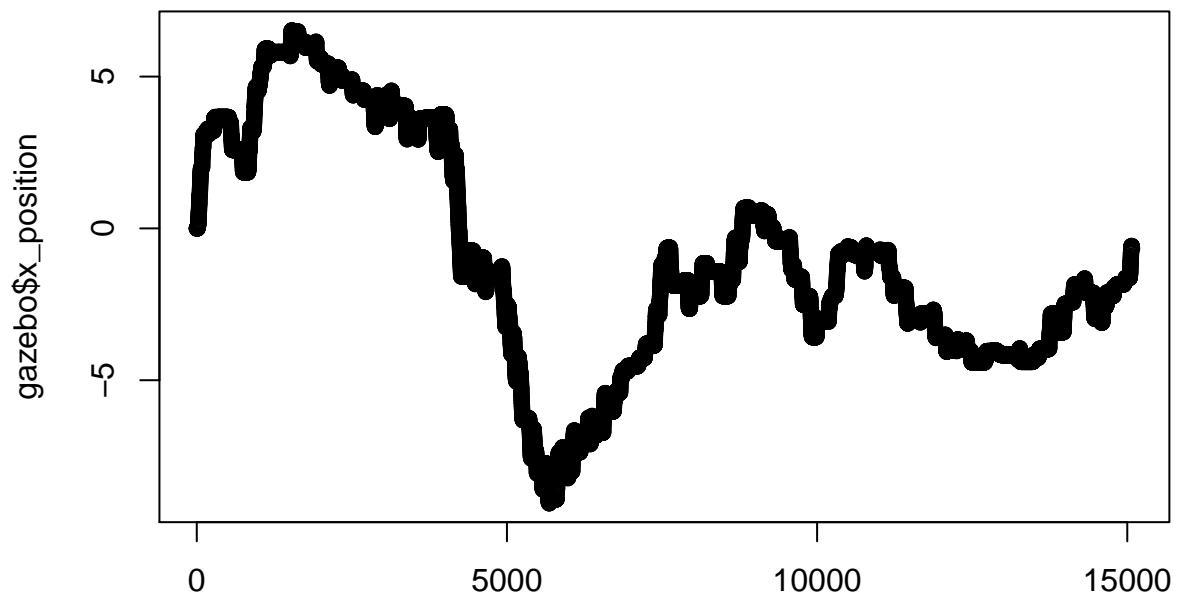
##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.981 2.871 4.440 4.658 6.068 11.530

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

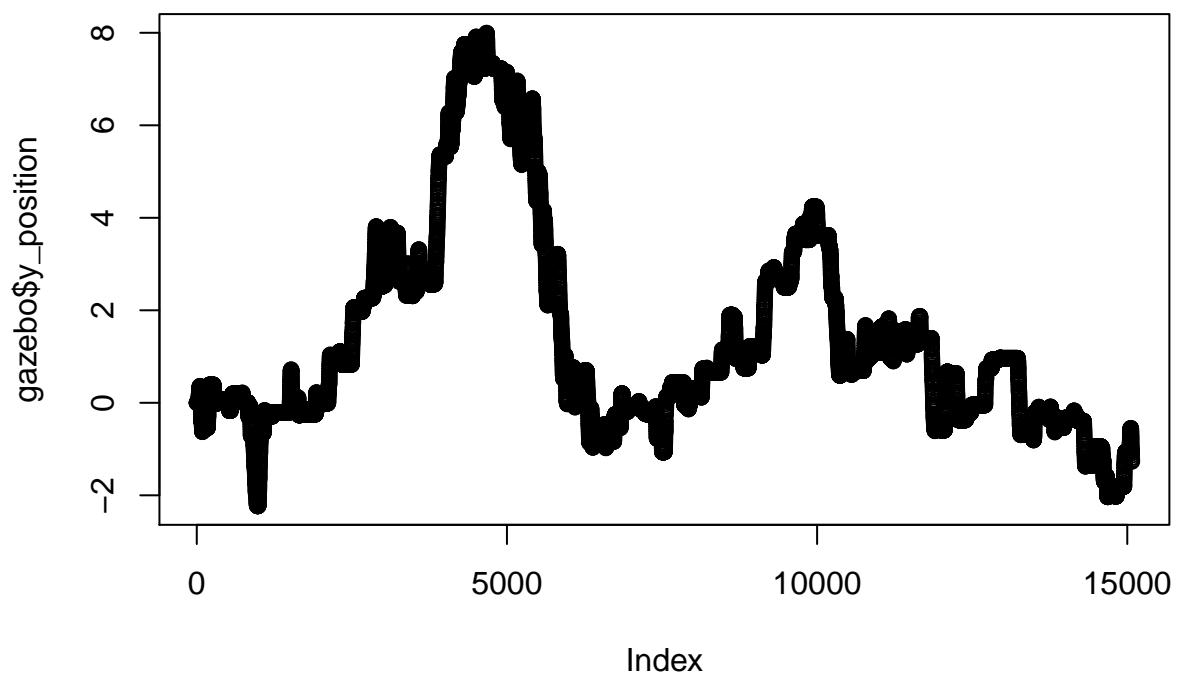
##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.000e+00 2.337e-06 4.544e-06 8.858e-04 7.276e-06 8.737e-03

```

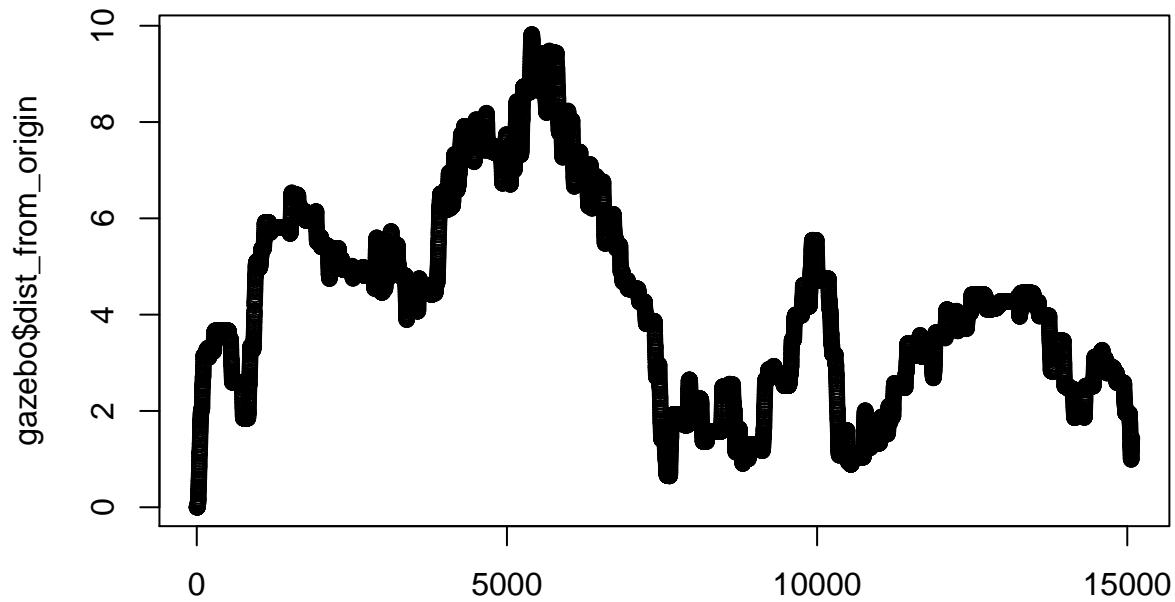
**X coordinate of robot over time**



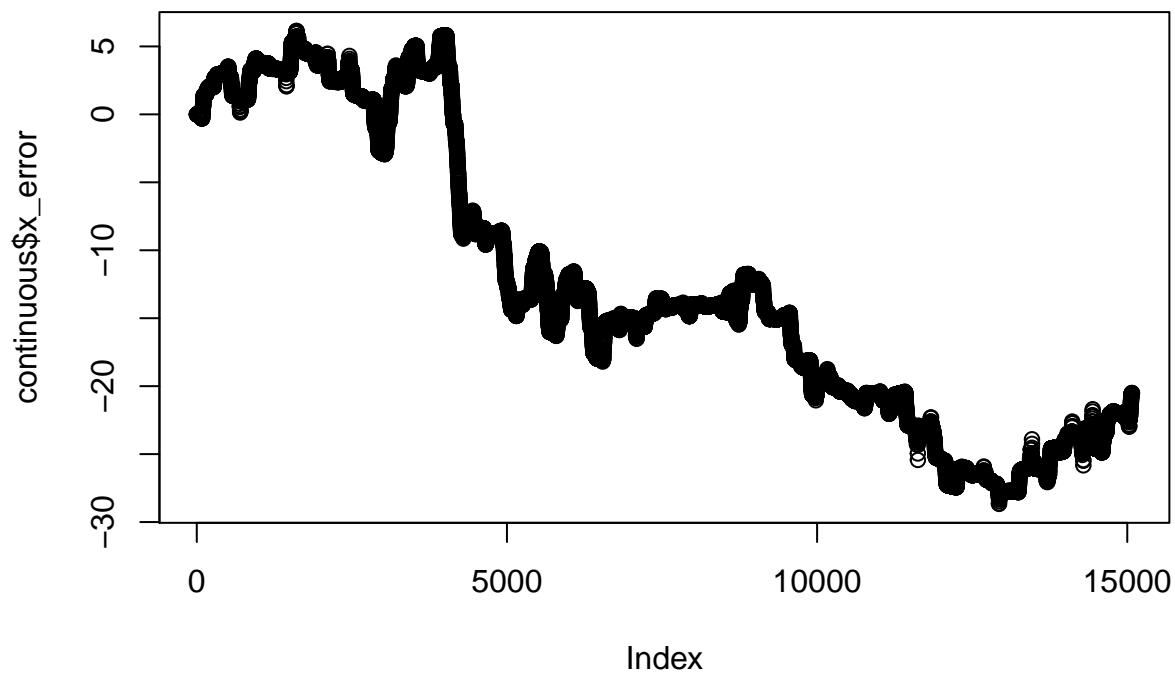
**Y coordinate of robot over time**



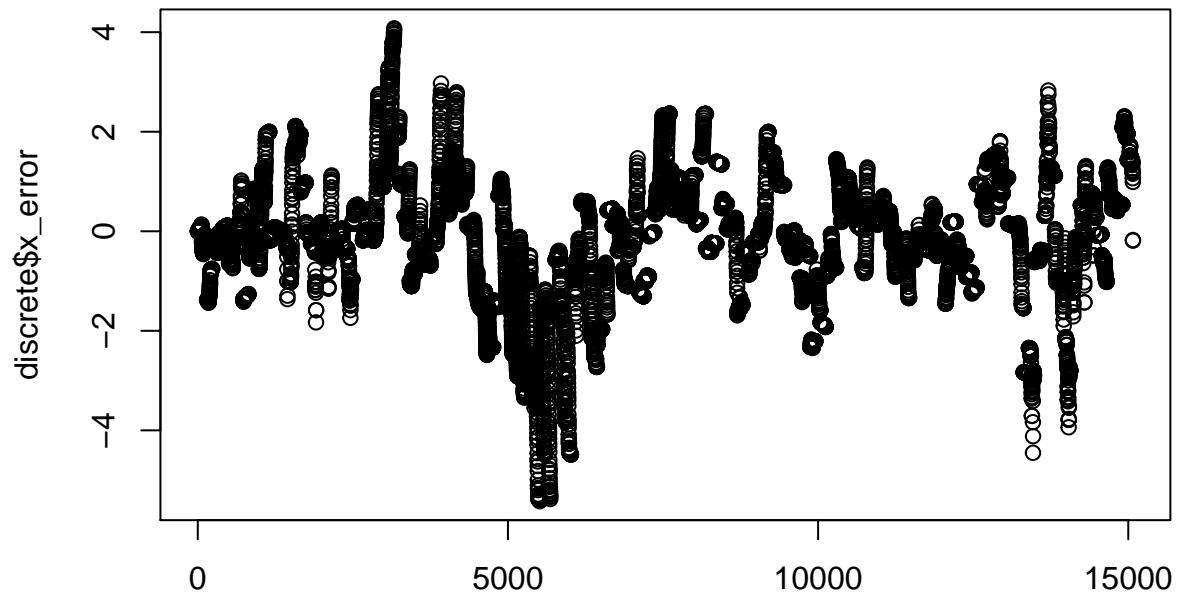
**Distance from origin vs. time**



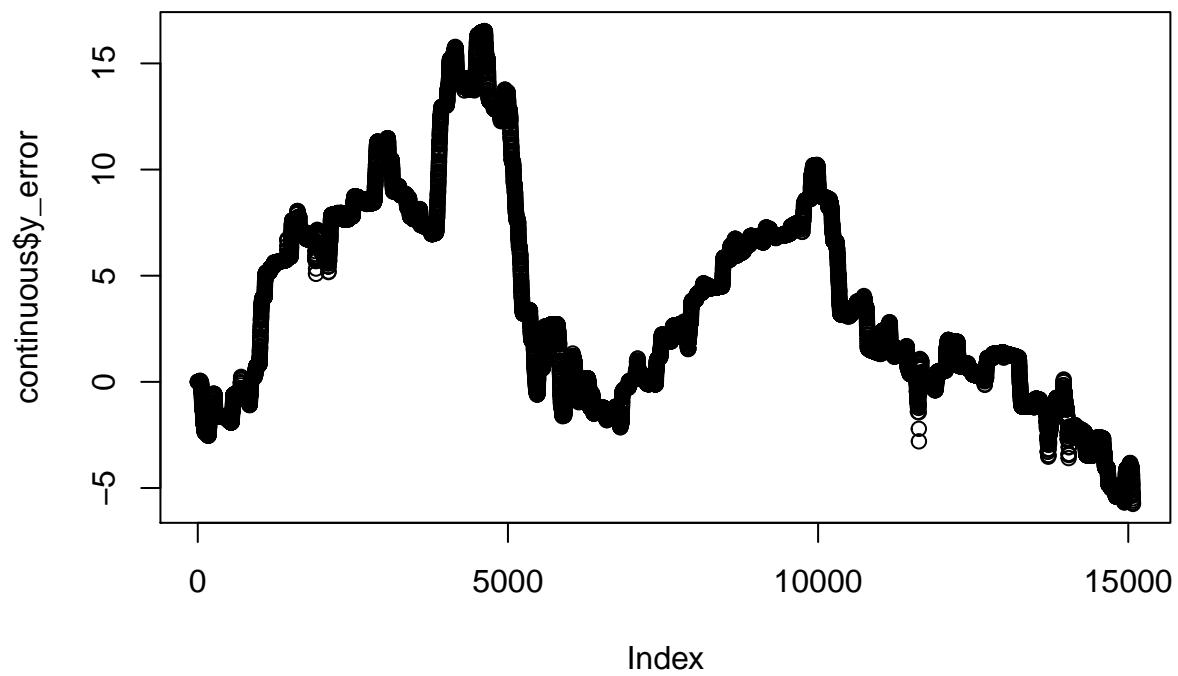
**Continuous x\_error over time**



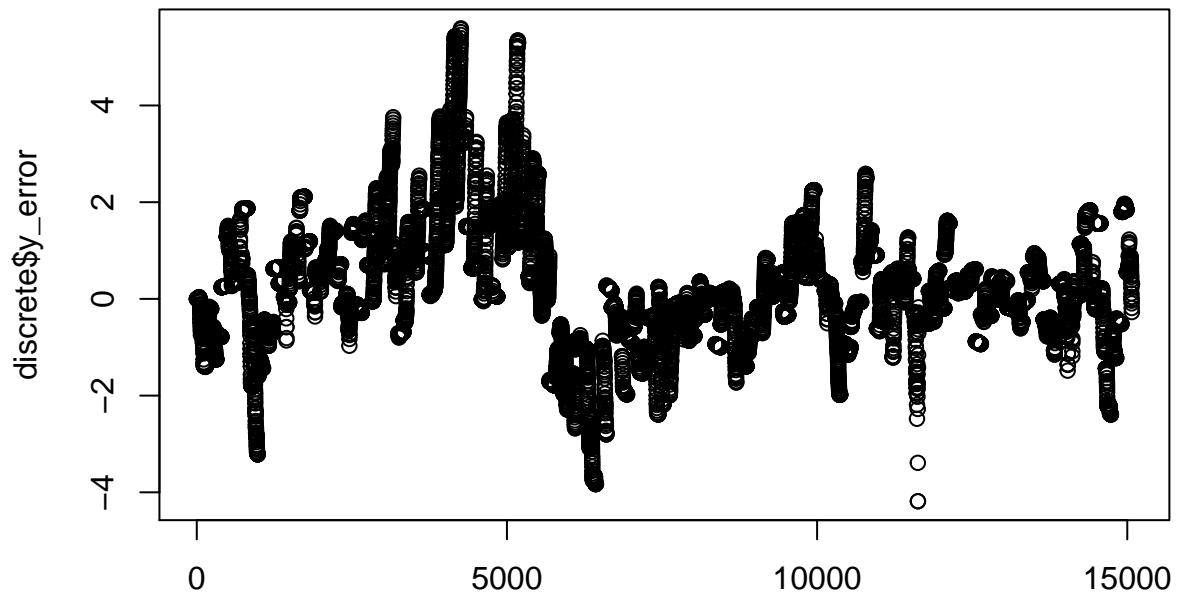
**Discrete x\_error over time**



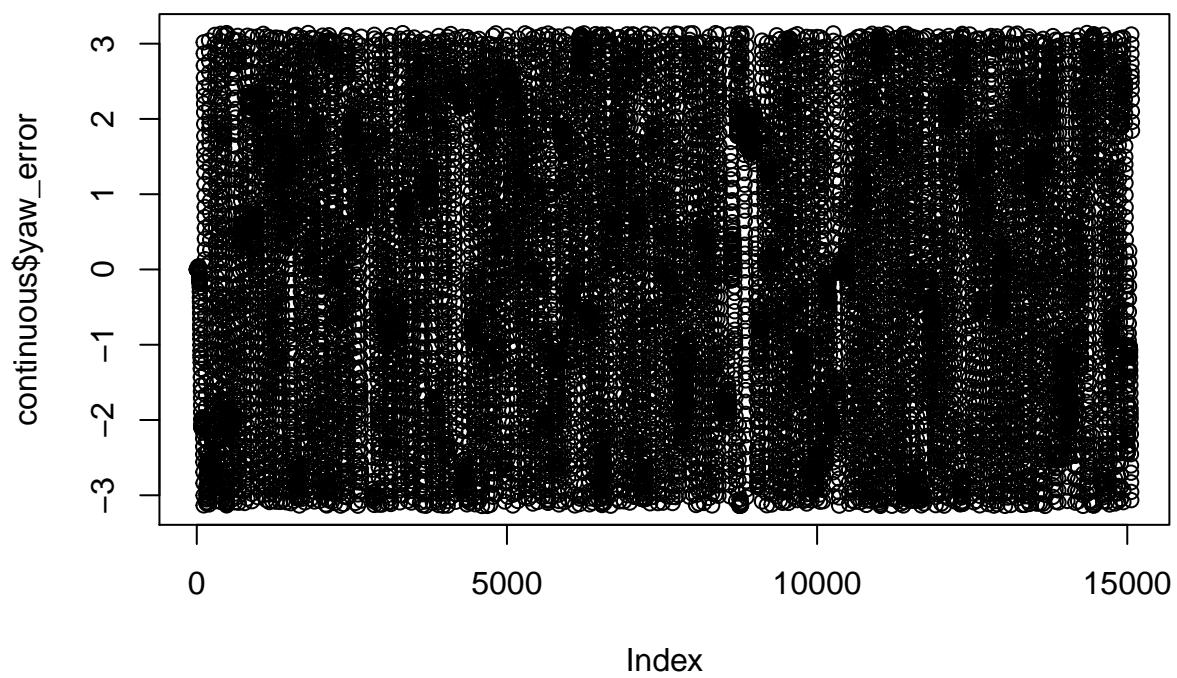
**Continuous y\_error over time**



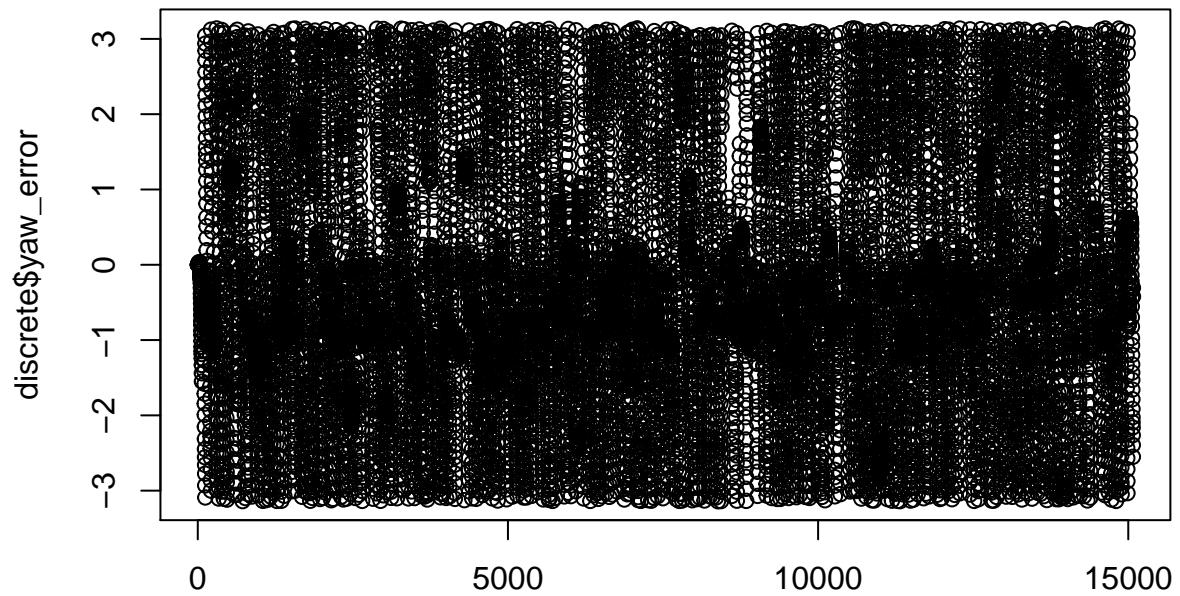
**Discrete y\_error over time**



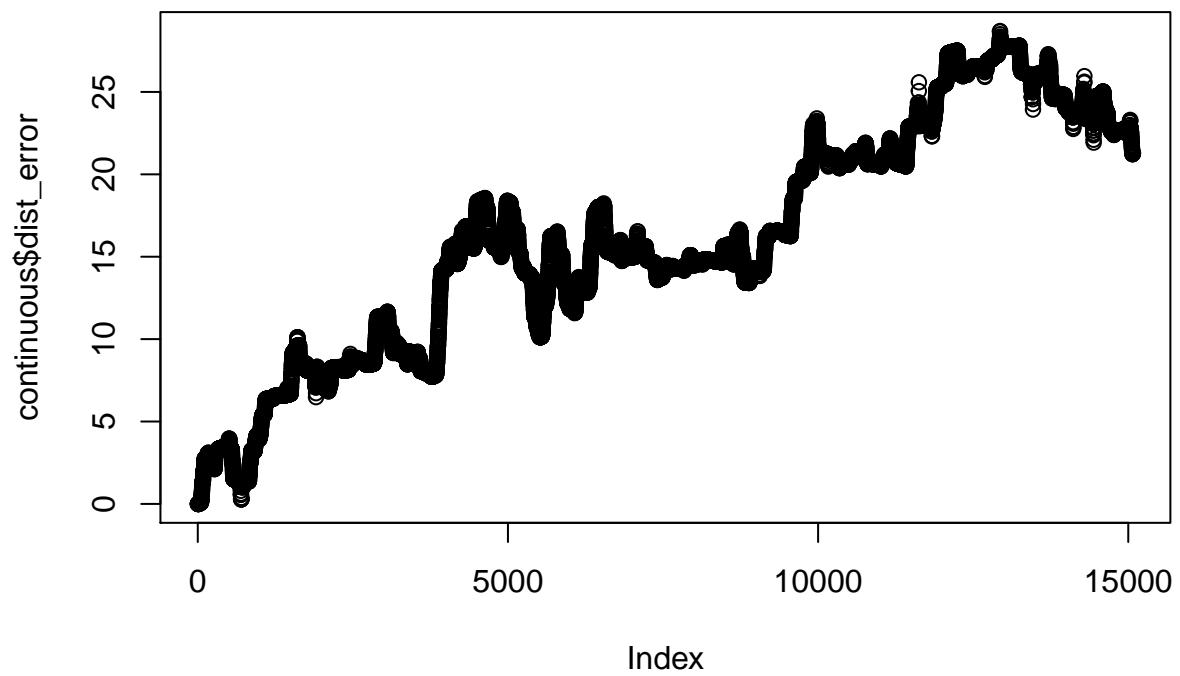
**Continuous yaw error over time**



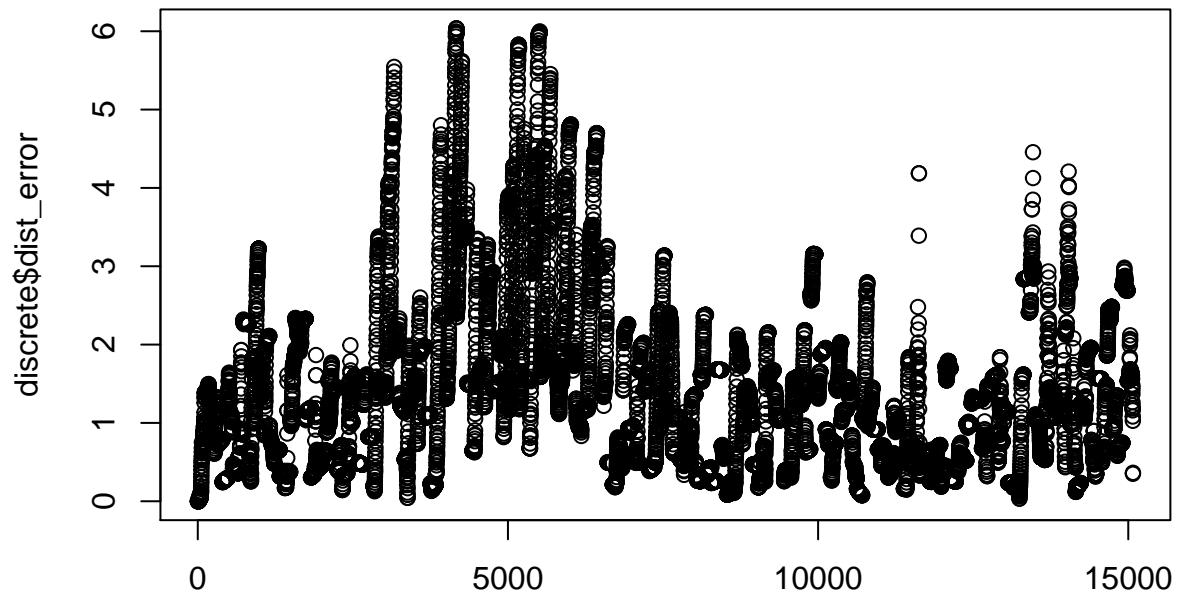
**Discrete yaw error over time**



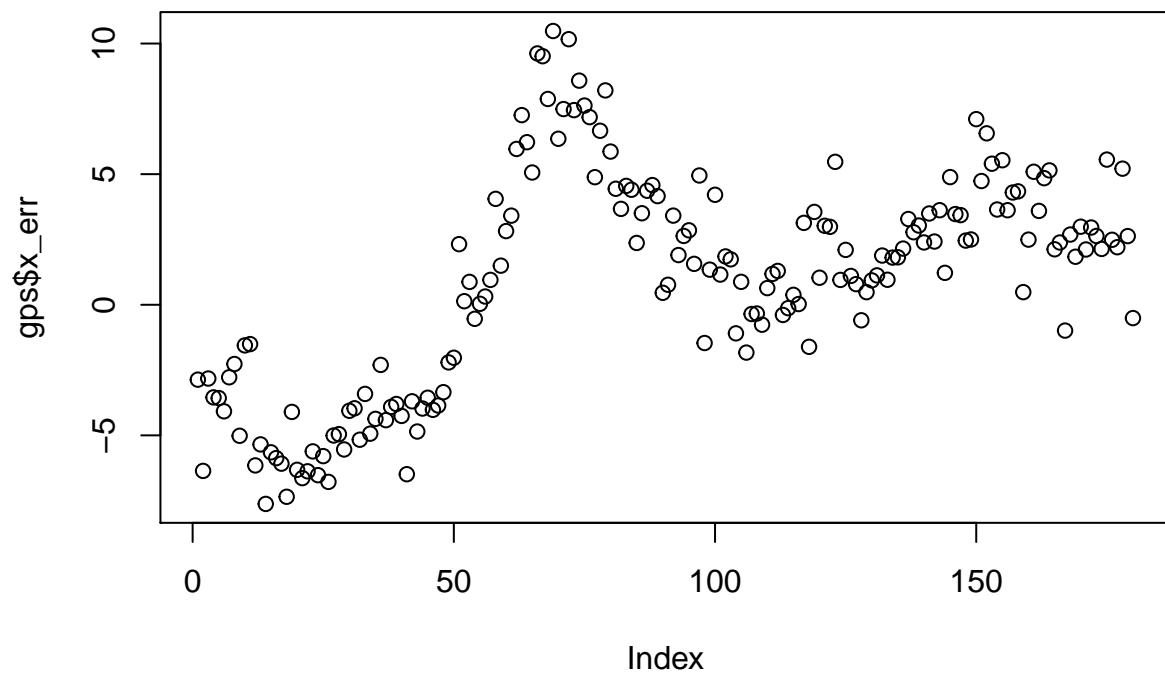
**Continuous total distance error over time**



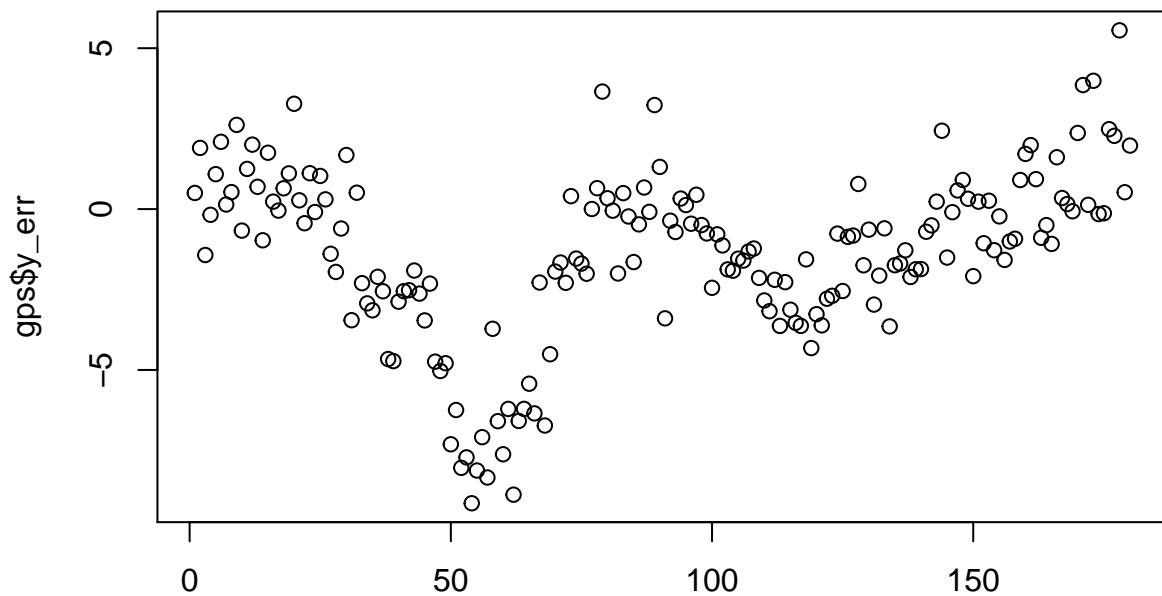
**Discrete total distance error over time**



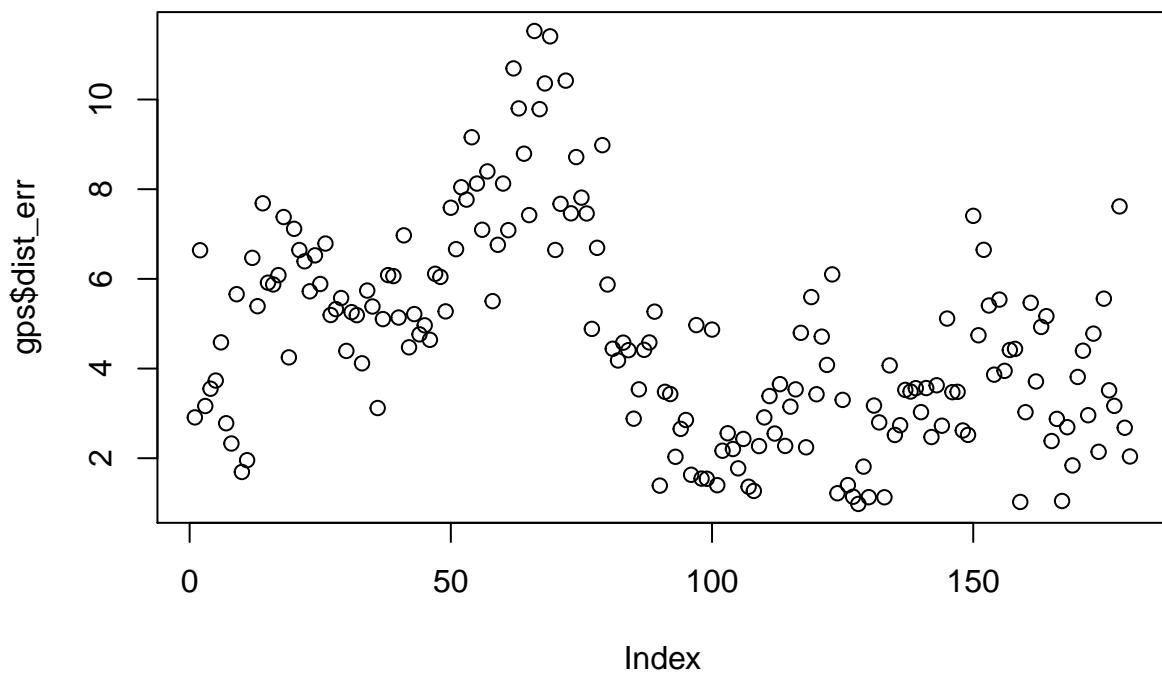
**GPS X Error Over Time**



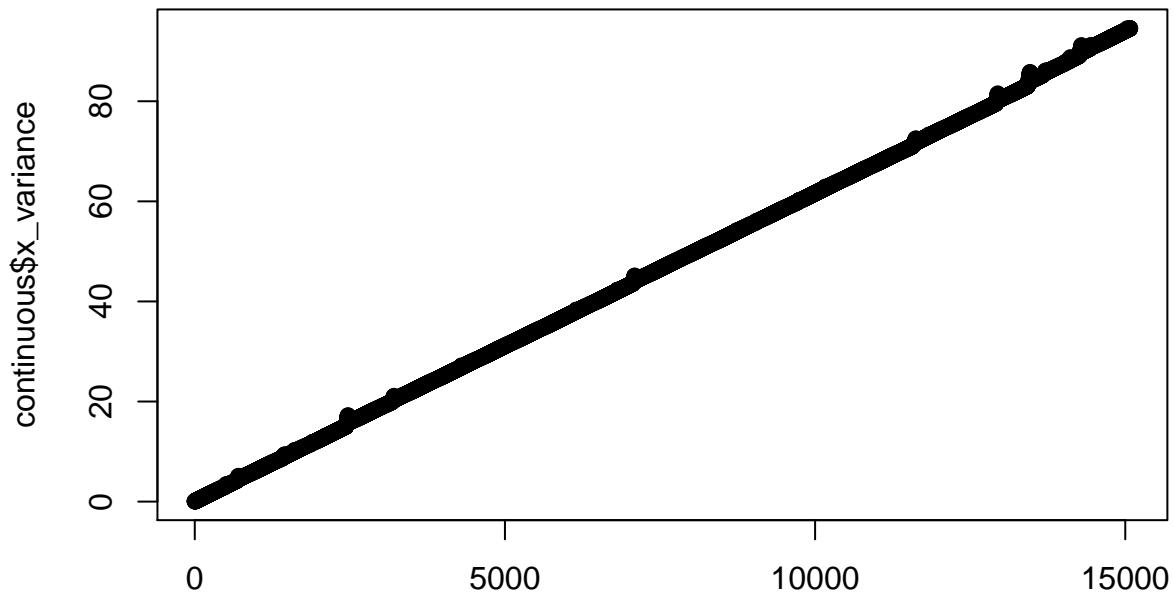
**GPS Y Error Over Time**



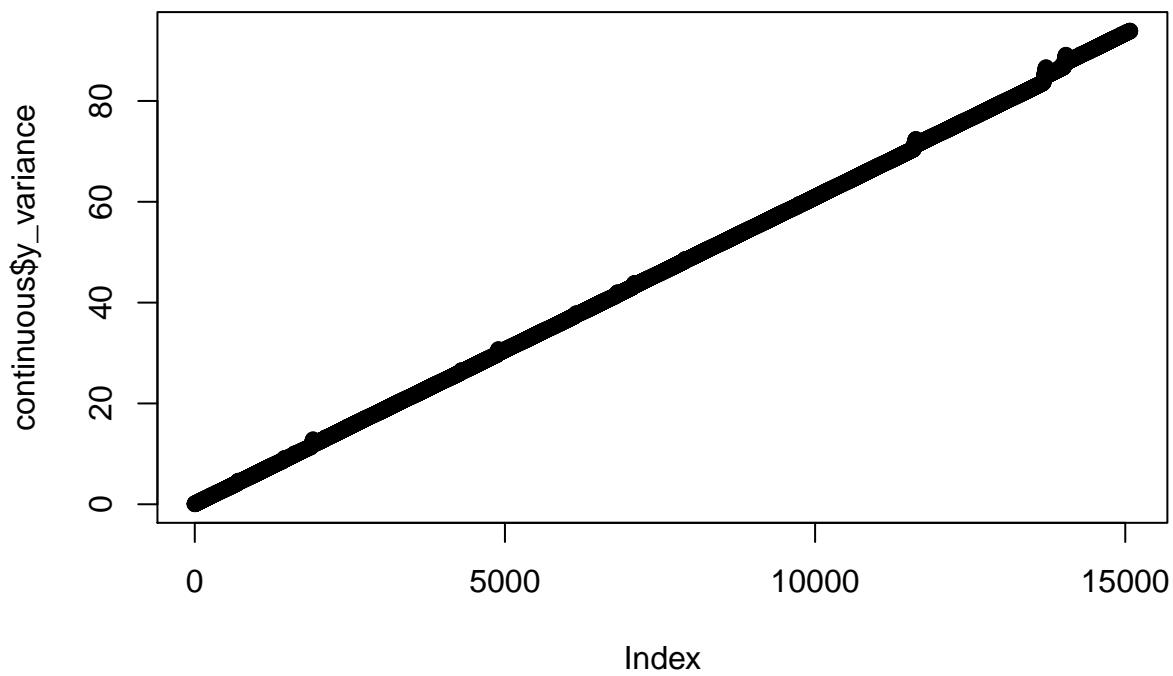
**GPS Horizontal Distance Error Over Time**



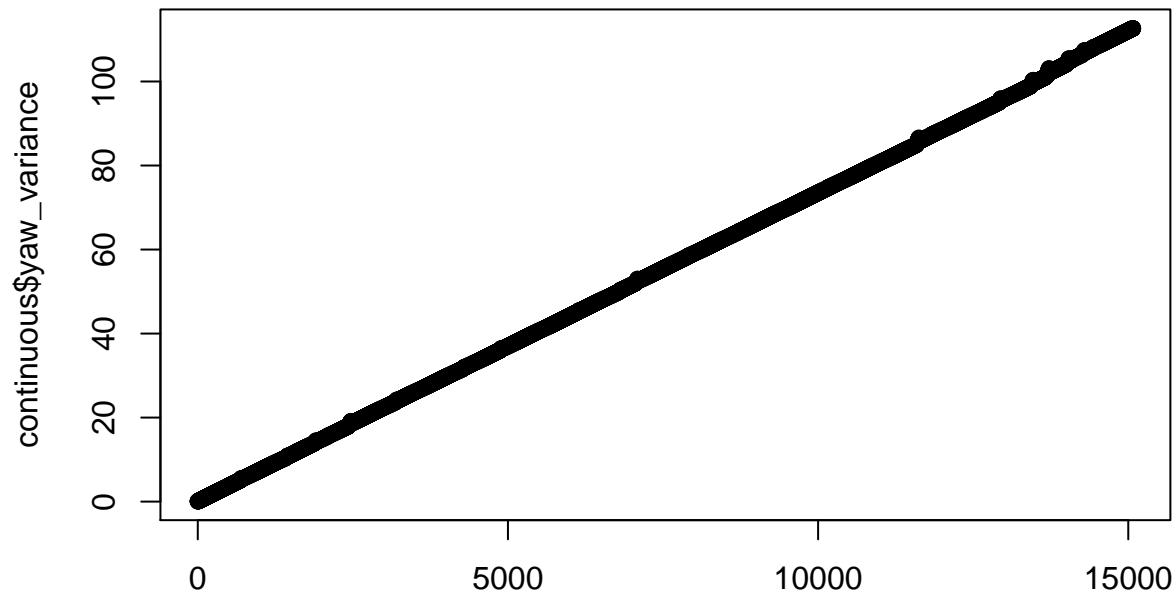
**Continuous Filter X Variance Over Time**



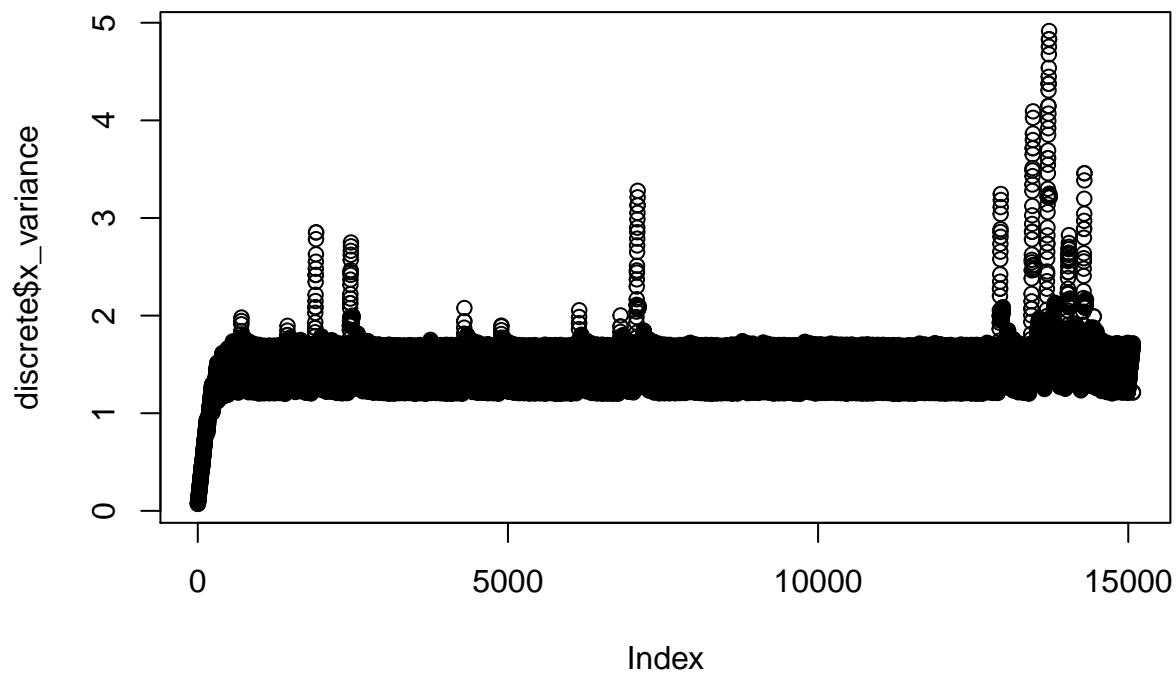
**Continuous Filter Y Variance Over Time**



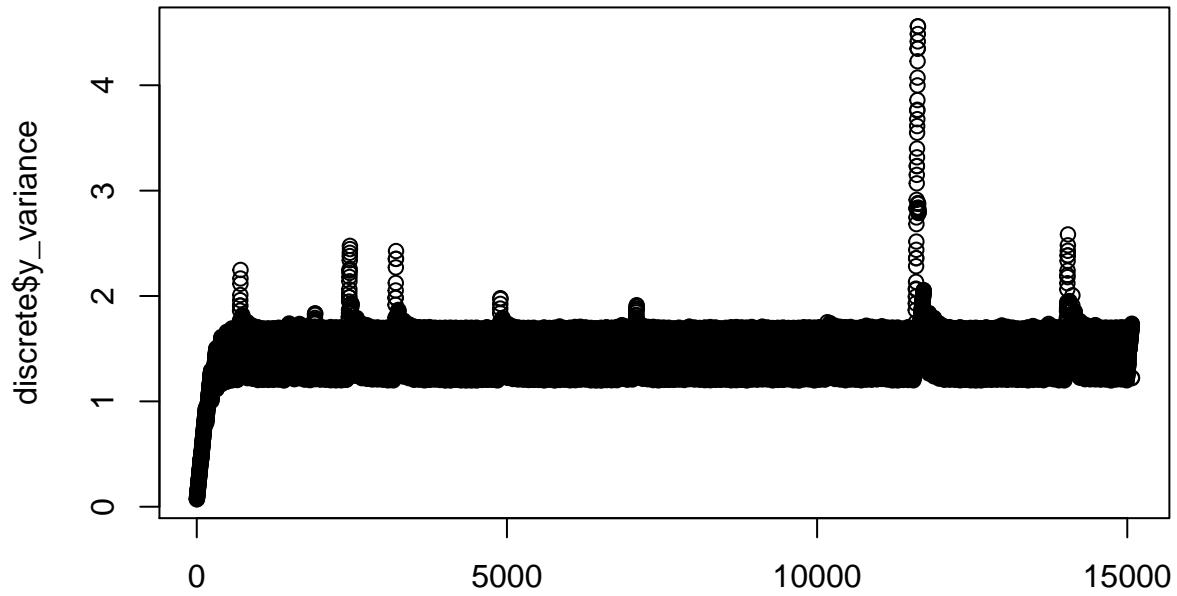
**Continuous Filter Yaw Variance Over Time**



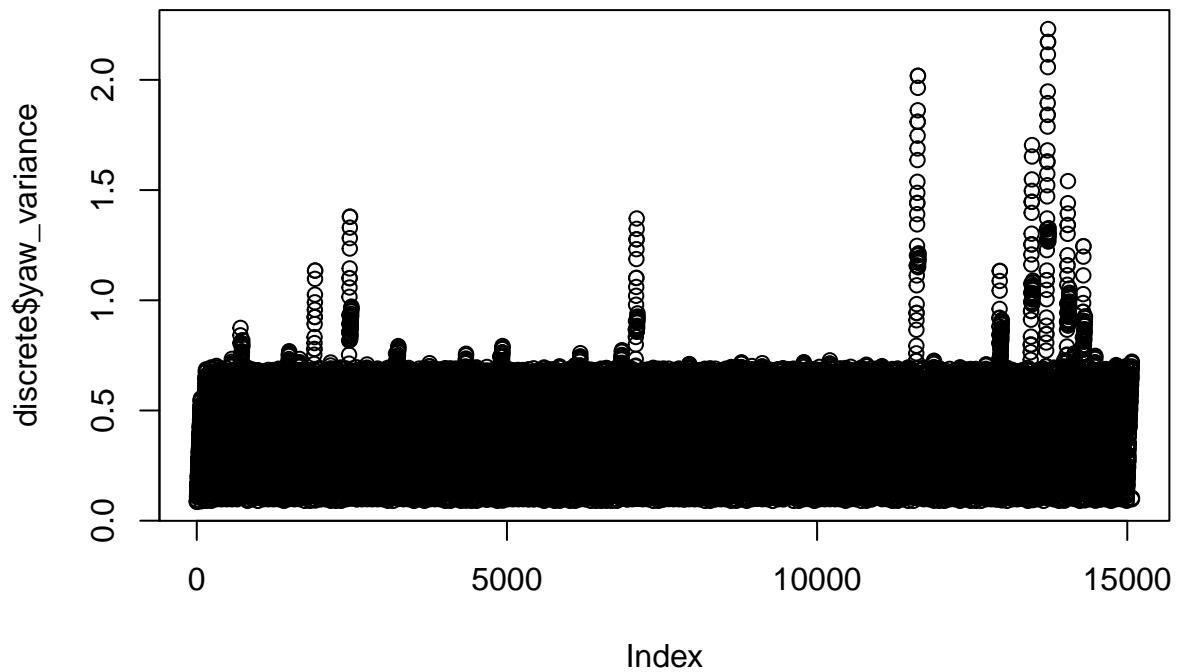
**Discrete Filter X Variance Over Time**



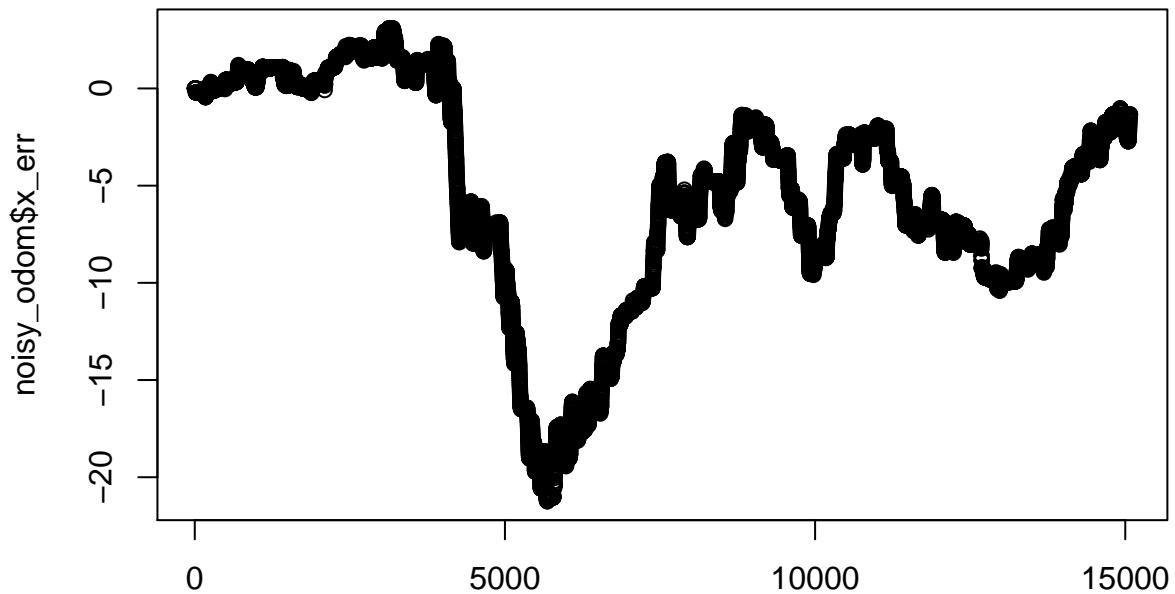
**Discrete Filter Y Variance Over Time**



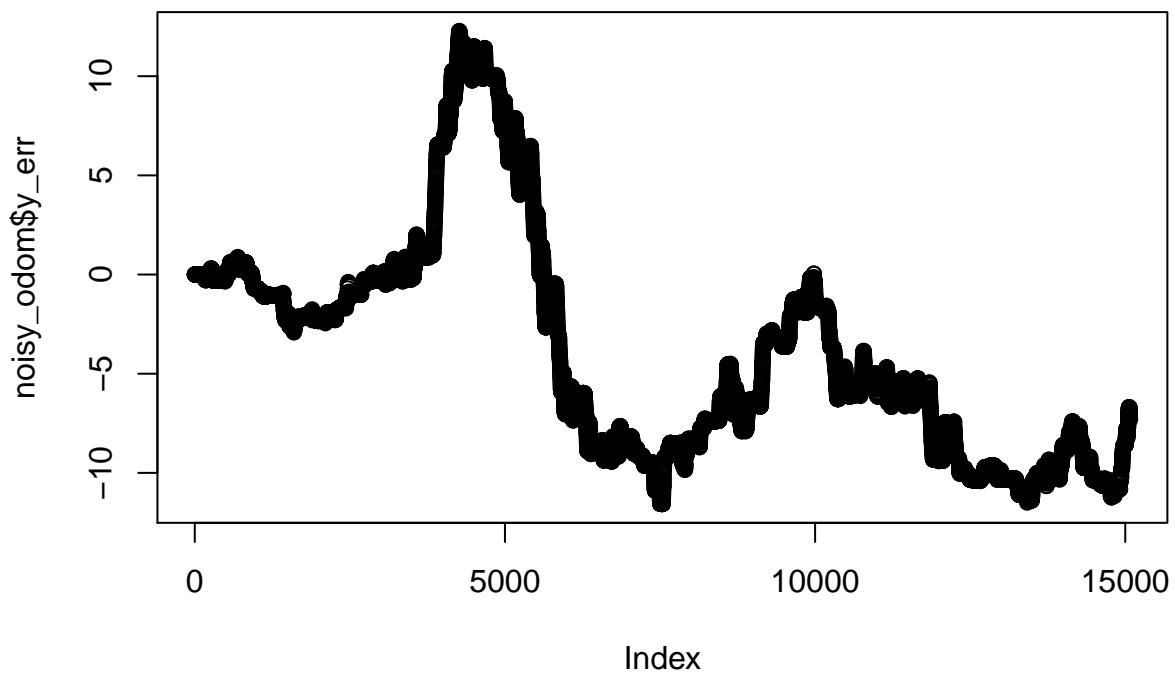
**Discrete Filter Yaw Variance Over Time**



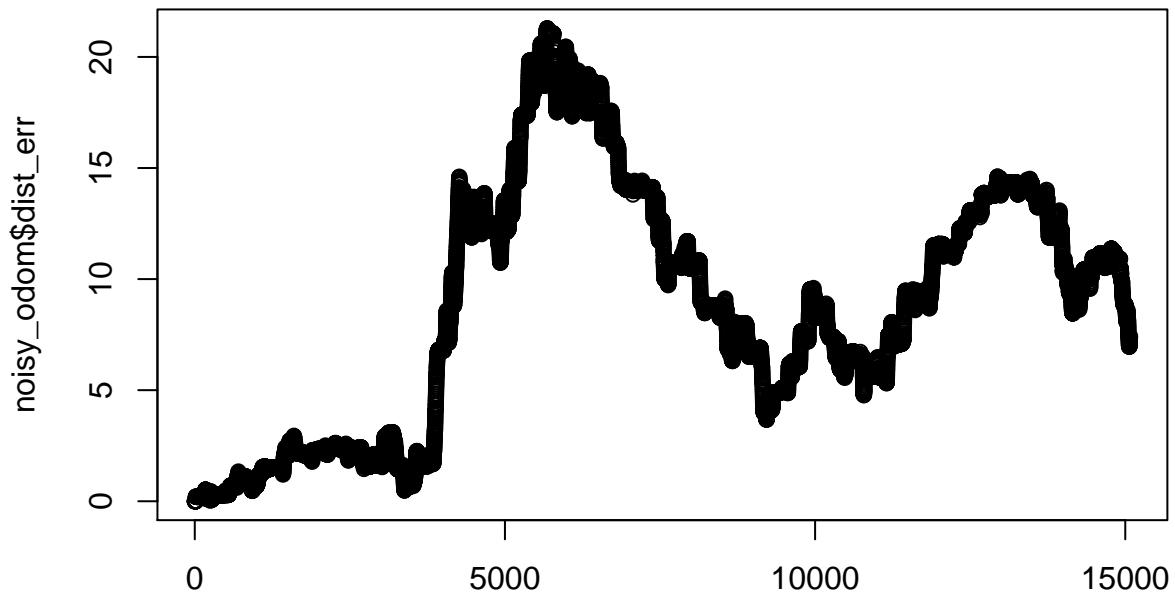
**Noisy Odom X Error Over Time**



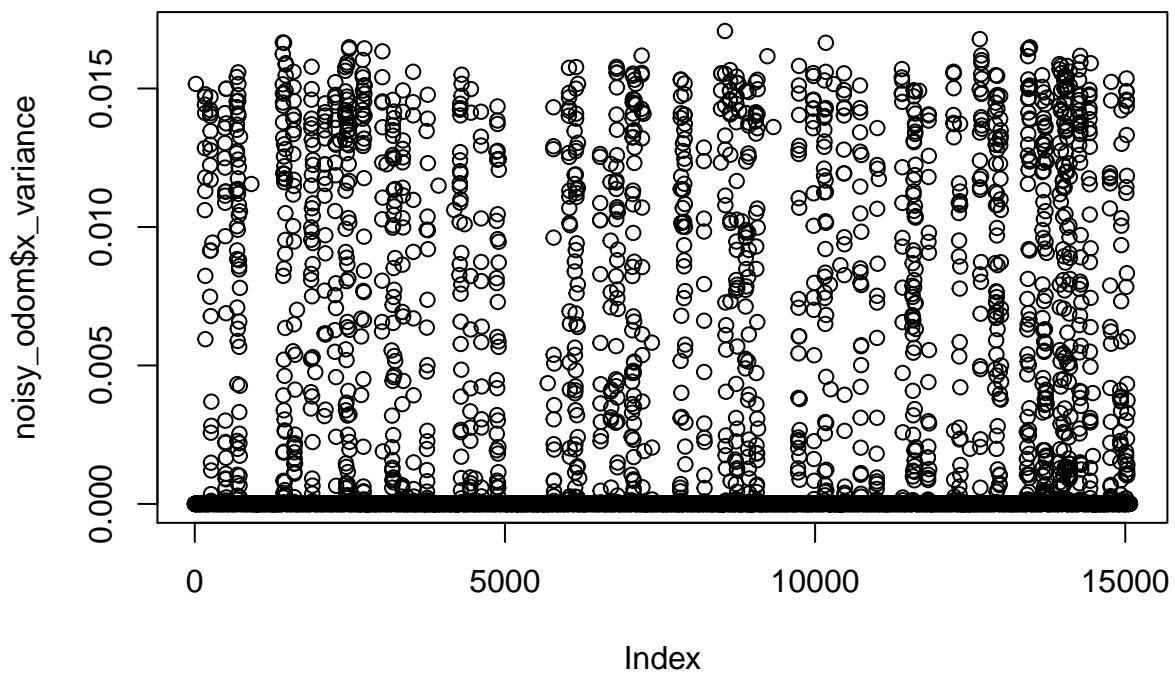
**Noisy Odom Y Error Over Time**



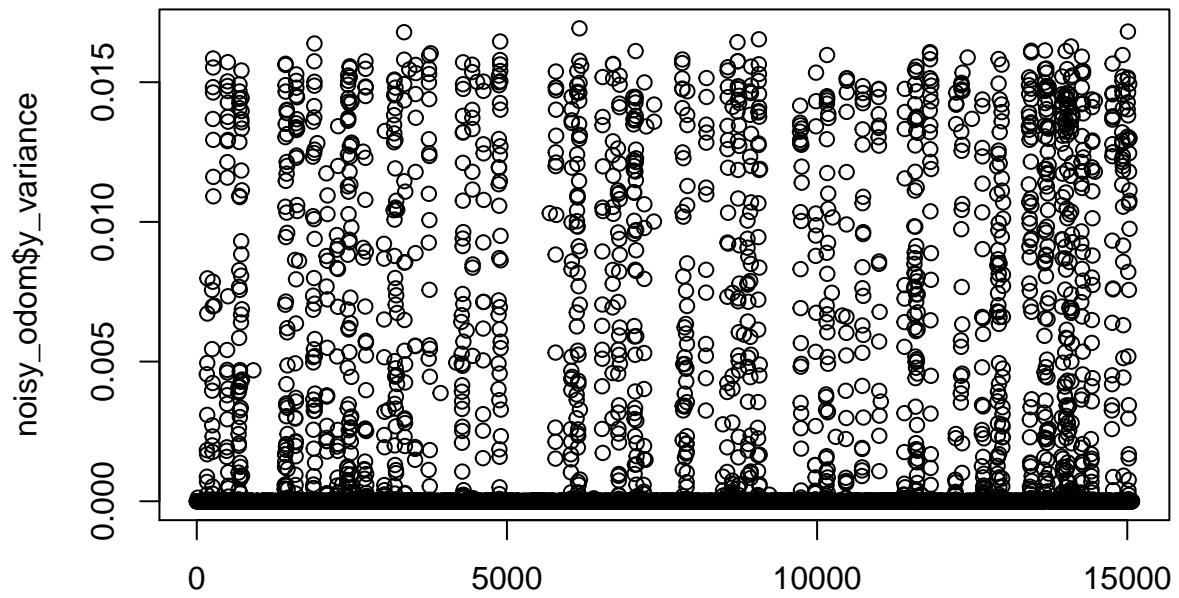
### Noisy Odom Horizontal Distance Error Over Time



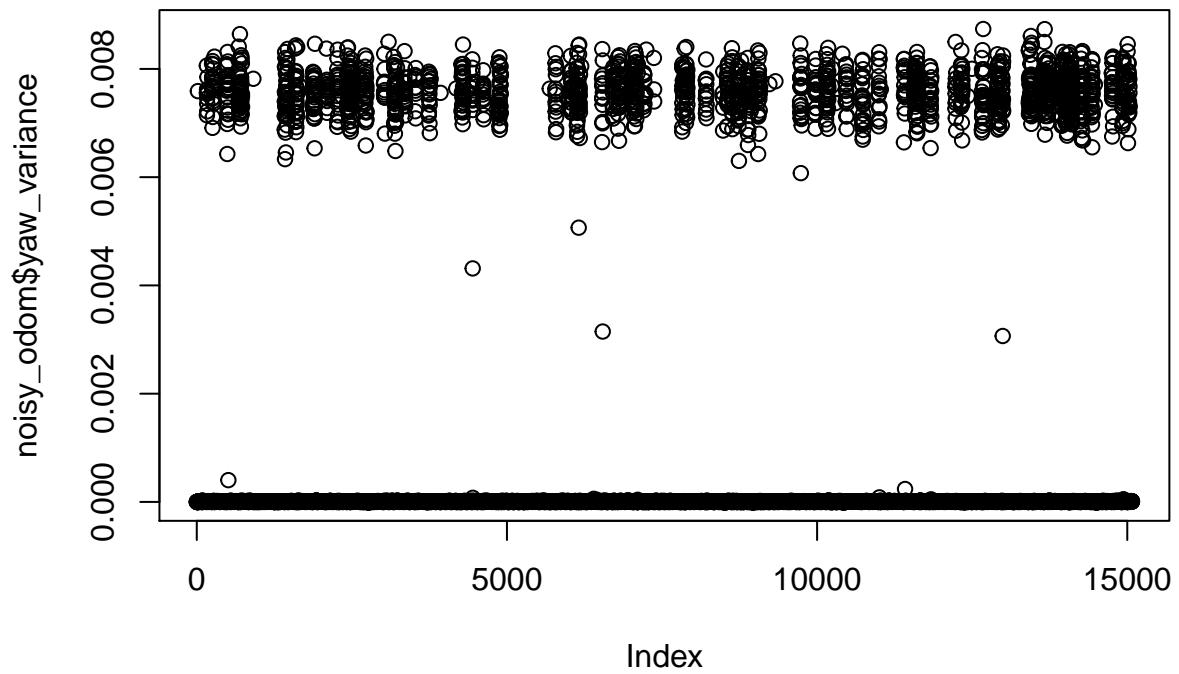
Variance of X Coordinate in Noisy Odometry



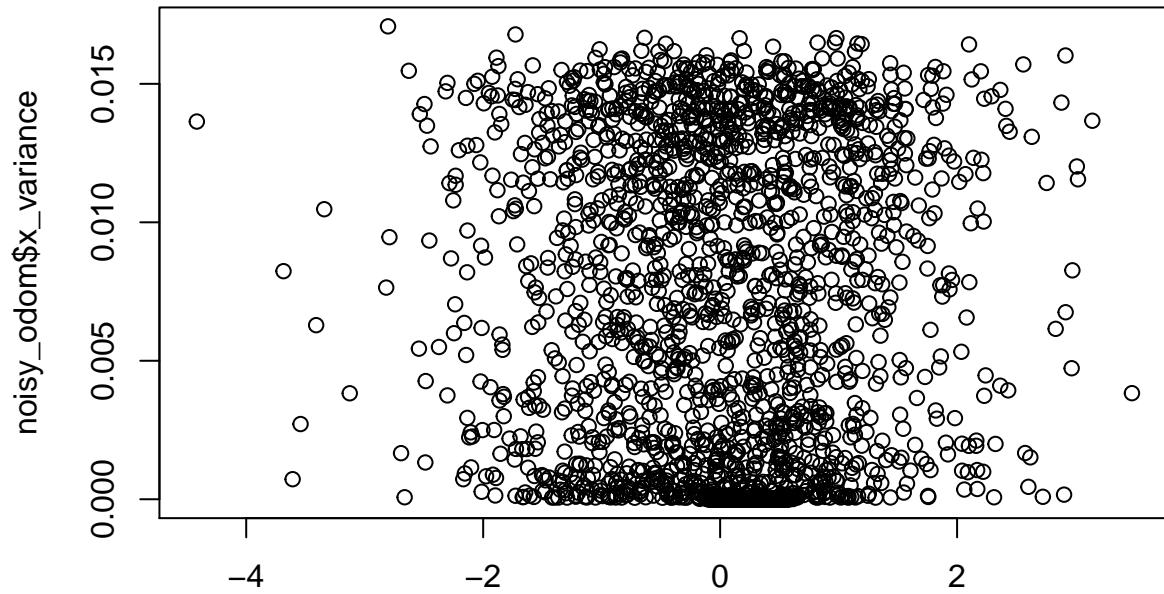
**Variance of Y Coordinate in Noisy Odometry**



**Variance of Yaw Coordinate in Noisy Odometry**



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



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

