

# two\_mobile\_no\_gps Turtlebot 2 Report

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This is a summary of the data from the two\_mobile\_no\_gps experiment, Turtlebot #2.

The runtime of this experiment was 0 hours, 25 minutes, and 22.3 seconds.

The total number of external pose measurements received by the robot during this time was 3014 which means poses were received at an average of 1.9798988 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.
## -7.19700 -0.02515 3.11500 2.70700 5.80300 12.11000

summary(continuous$y_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -0.1367 13.5200 17.6700 18.9600 21.6100 50.7900

summary(continuous$yaw_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -3.141000 -1.555000 -0.002368 0.006113 1.583000 3.142000

summary(continuous$dist_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.000002 14.27000 19.17000 19.72000 21.84000 52.21000

summary(discrete$x_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -26.2600 -16.0900 -6.4010 -9.4620 -2.8980 0.1895

summary(discrete$y_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -13.0600 -7.2450 -3.8490 -4.1790 0.1792 4.9130

summary(discrete$yaw_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -3.141000 -1.555000 -0.001661 0.008992 1.586000 3.142000

summary(discrete$dist_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.02646 4.73000 7.70100 10.97000 17.94000 28.98000

summary(noisy_odom$x_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -11.6900 -9.0000 -4.6330 -6.3500 -3.7300 0.2693
```

```

summary(noisy_odom$y_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -0.3182  1.9270  5.3090  4.1960  6.0480  8.7320

summary(noisy_odom$dist_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.000023  4.283000  7.788000  7.720000 11.430000 13.210000

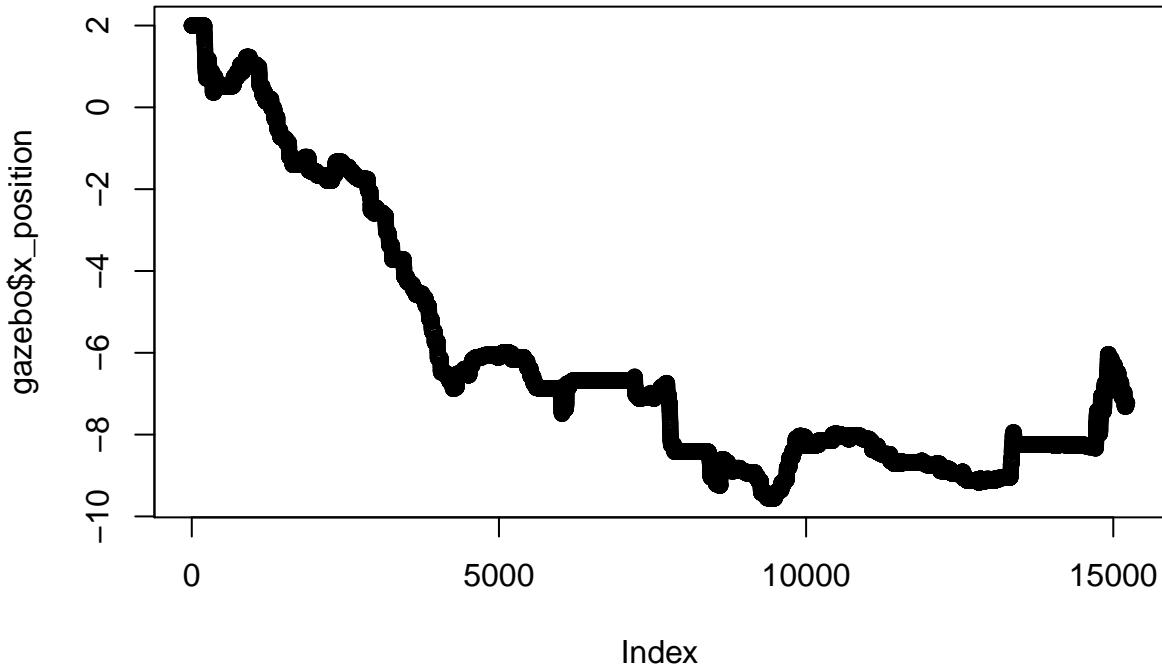
if (NROW(gps) > 0) {
  summary(gps$x_err)
  summary(gps$y_err)
  summary(gps$dist_err)
}

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

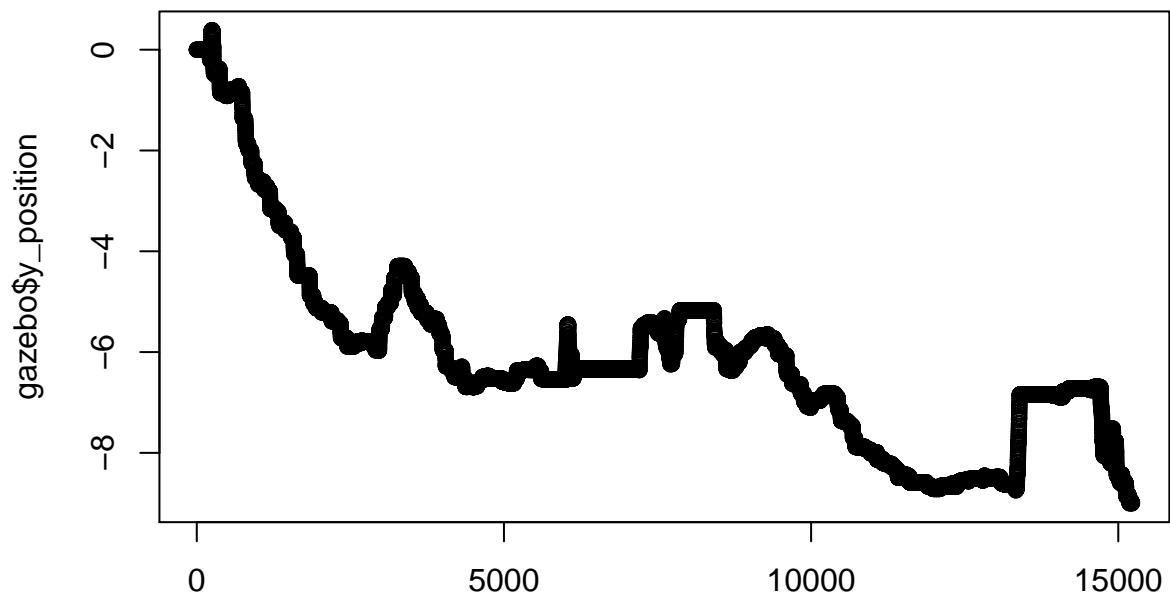
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.000e+00 2.136e-06 3.662e-06 4.574e-04 5.217e-06 9.015e-03

```

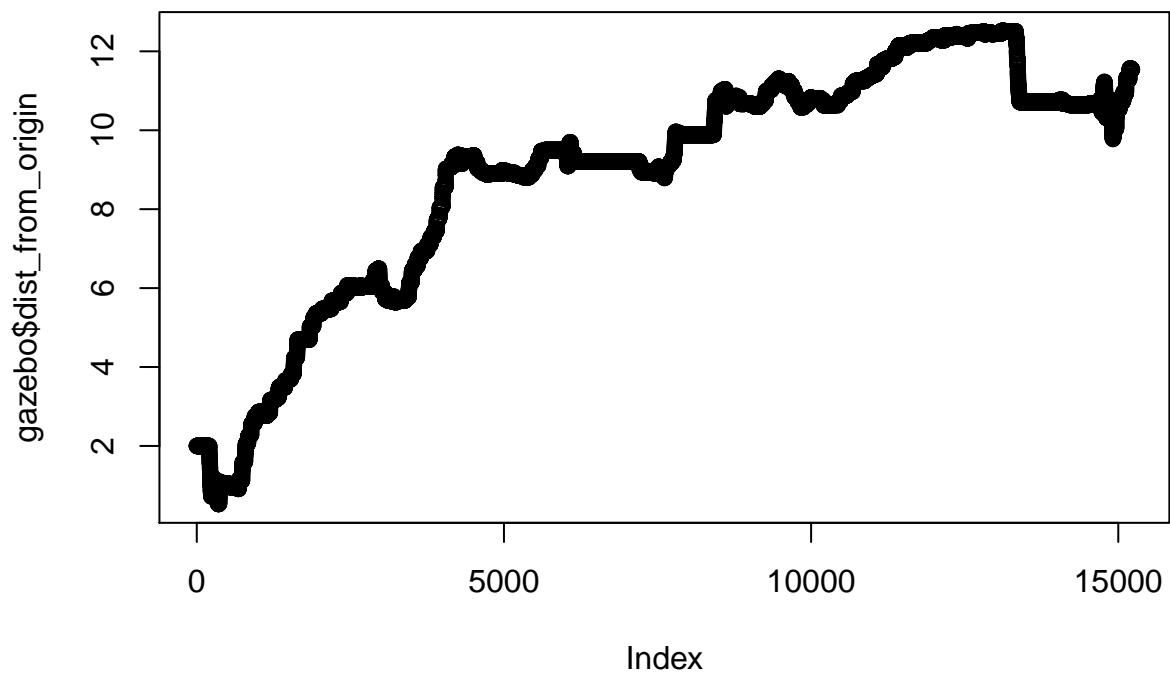
### X coordinate of robot over time



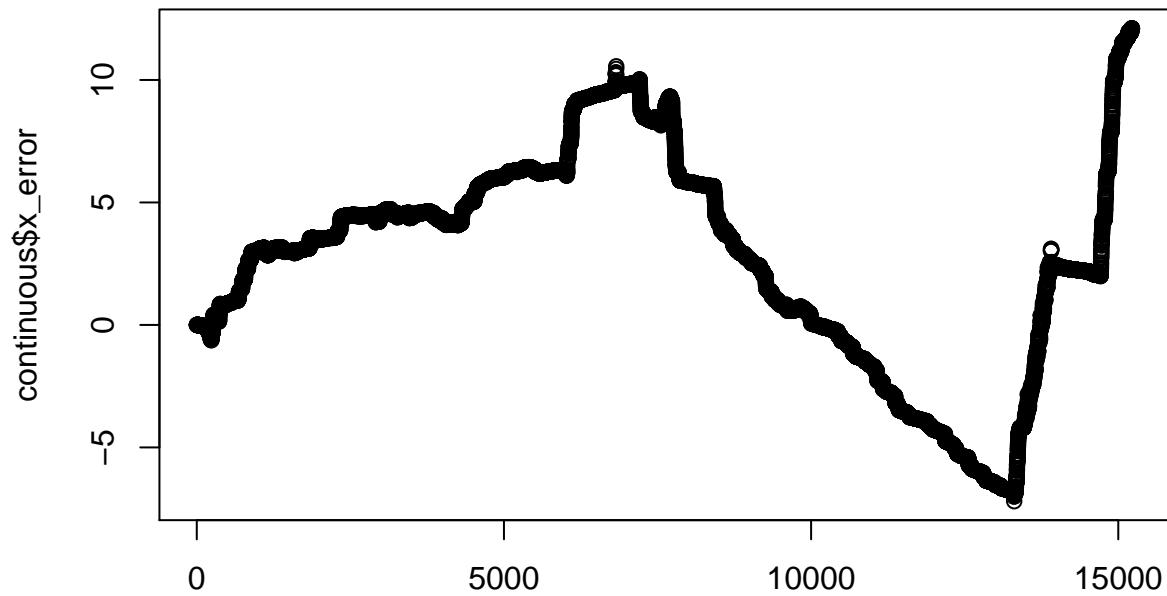
**Y coordinate of robot over time**



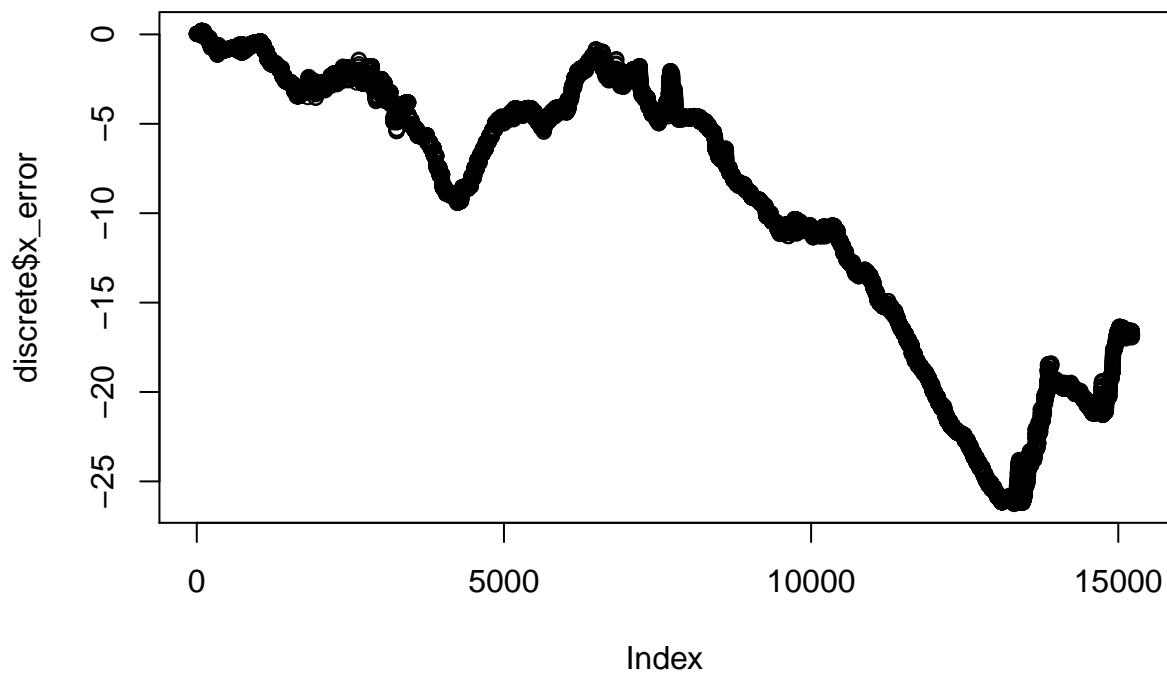
**Distance from origin vs. time**



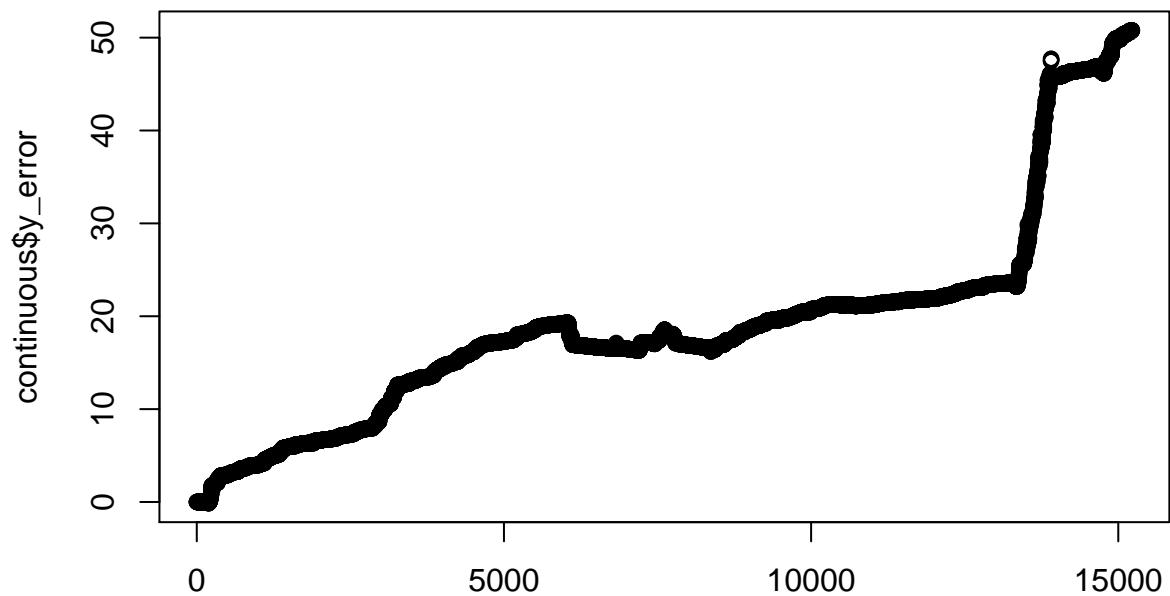
**Continuous x\_error over time**



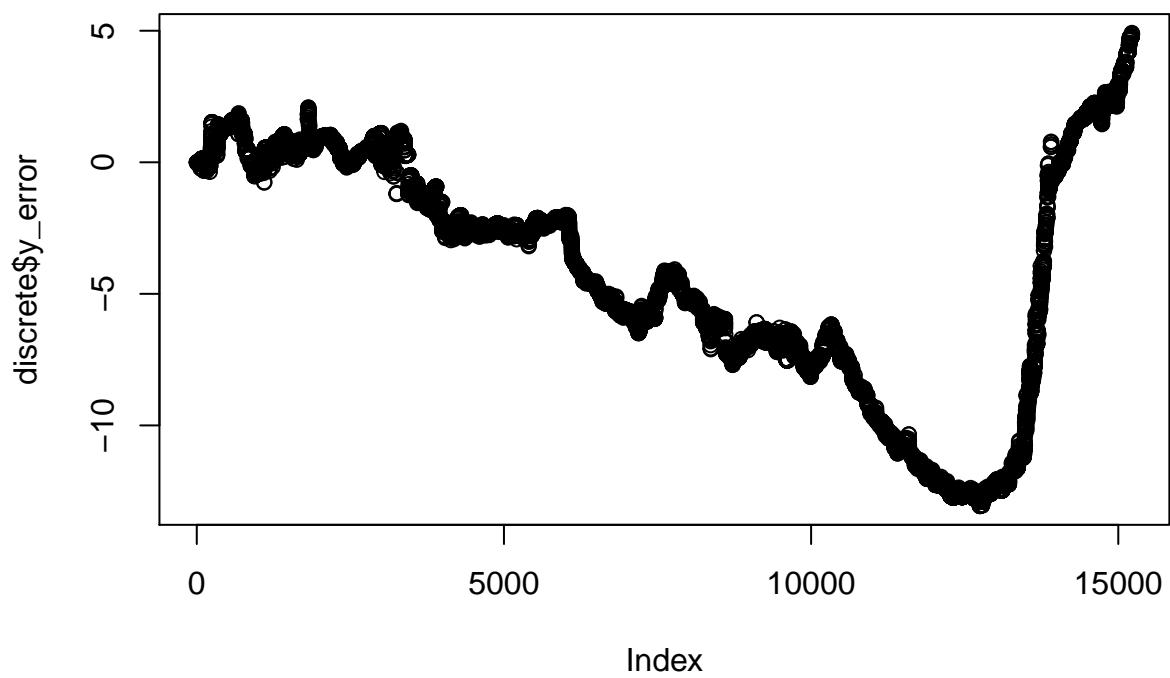
**Discrete x\_error over time**



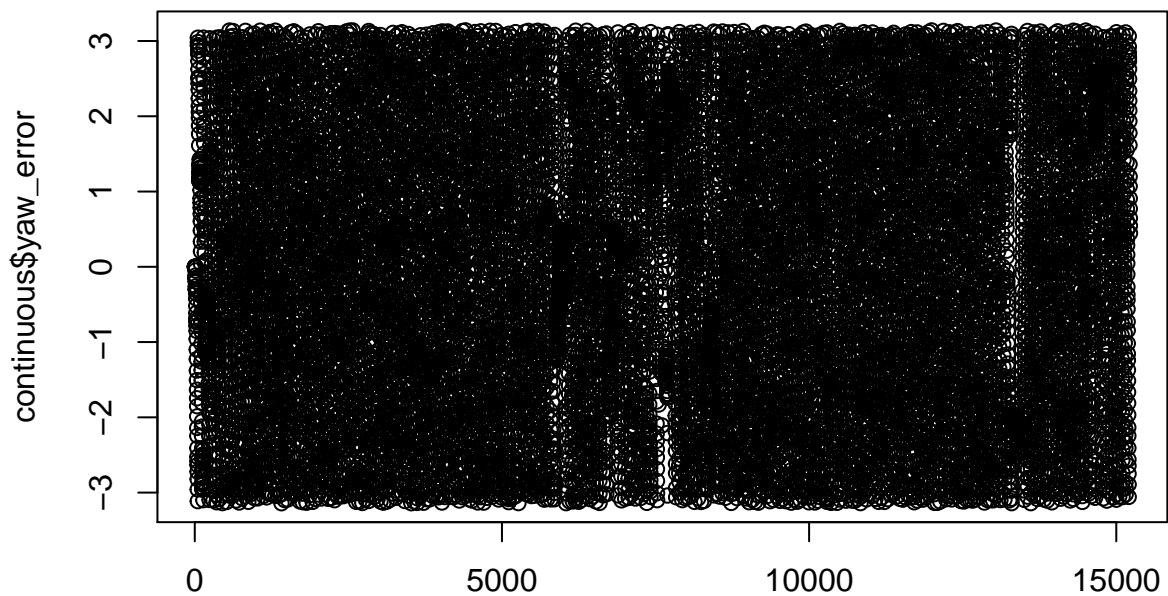
**Continuous y\_error over time**



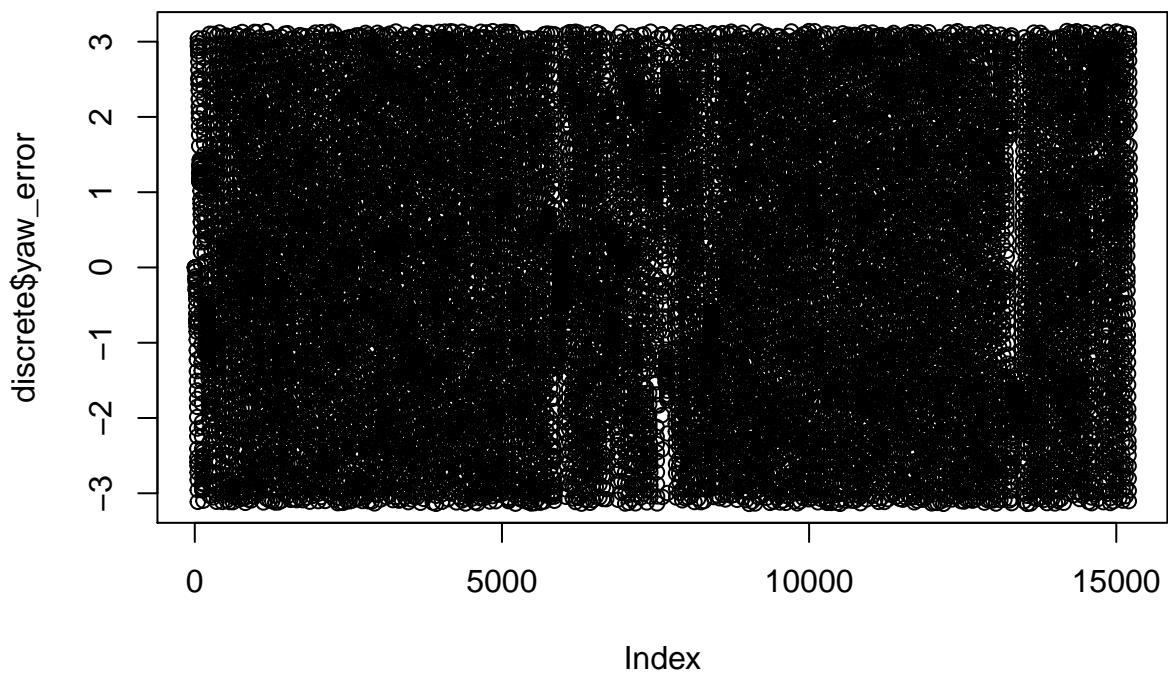
**Discrete y\_error over time**



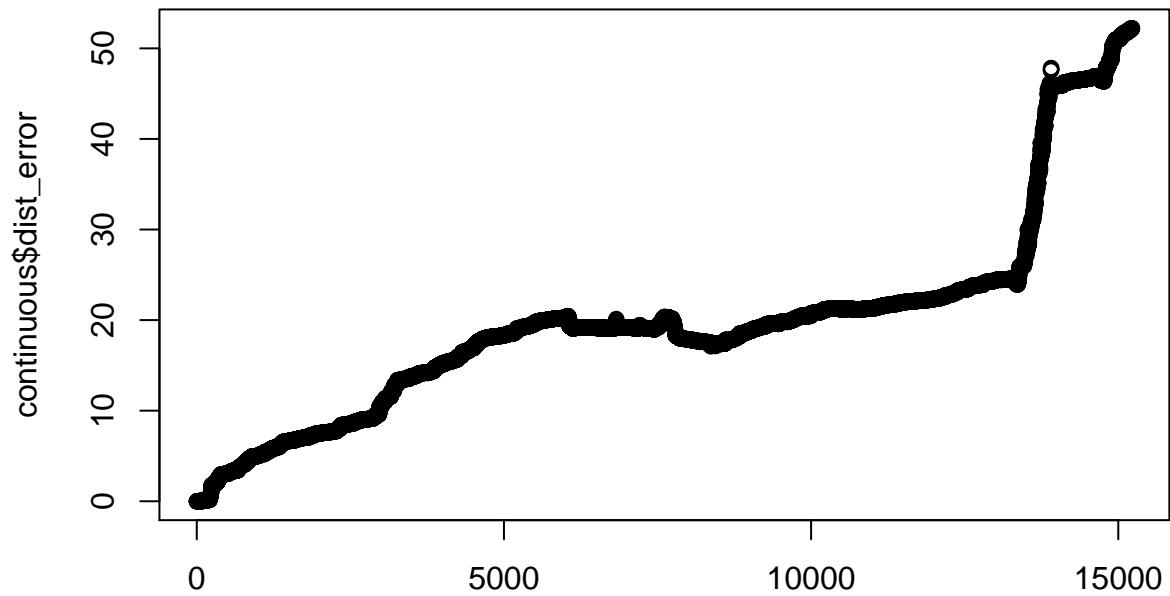
**Continuous yaw error over time**



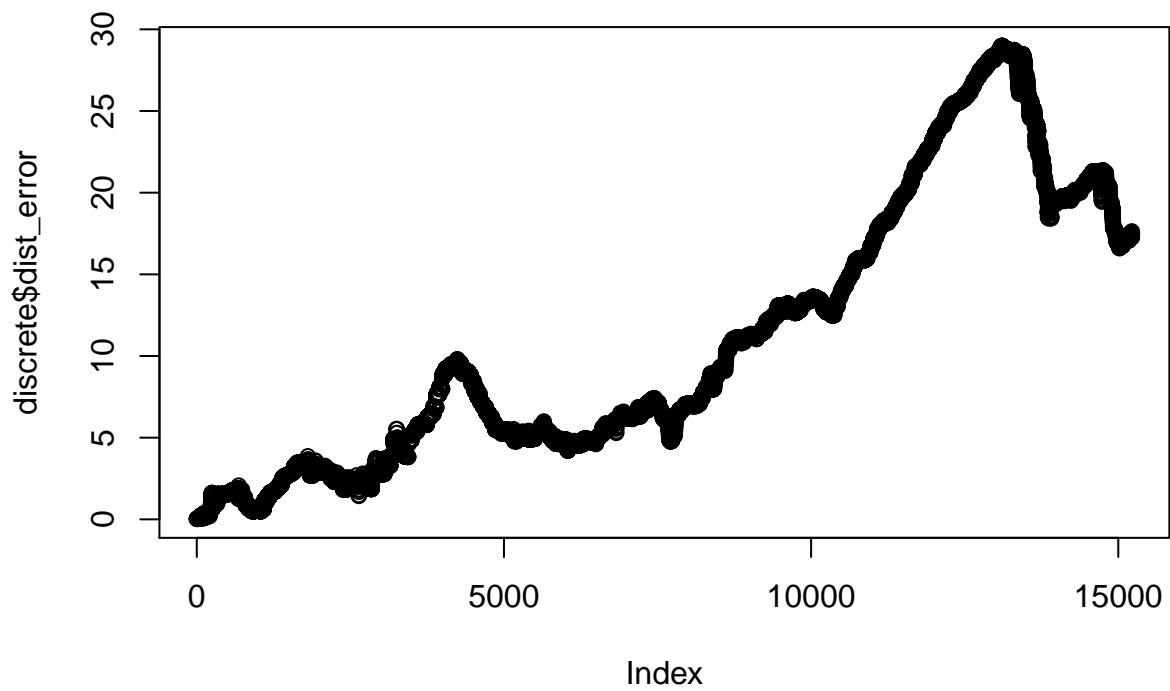
**Discrete yaw error over time**



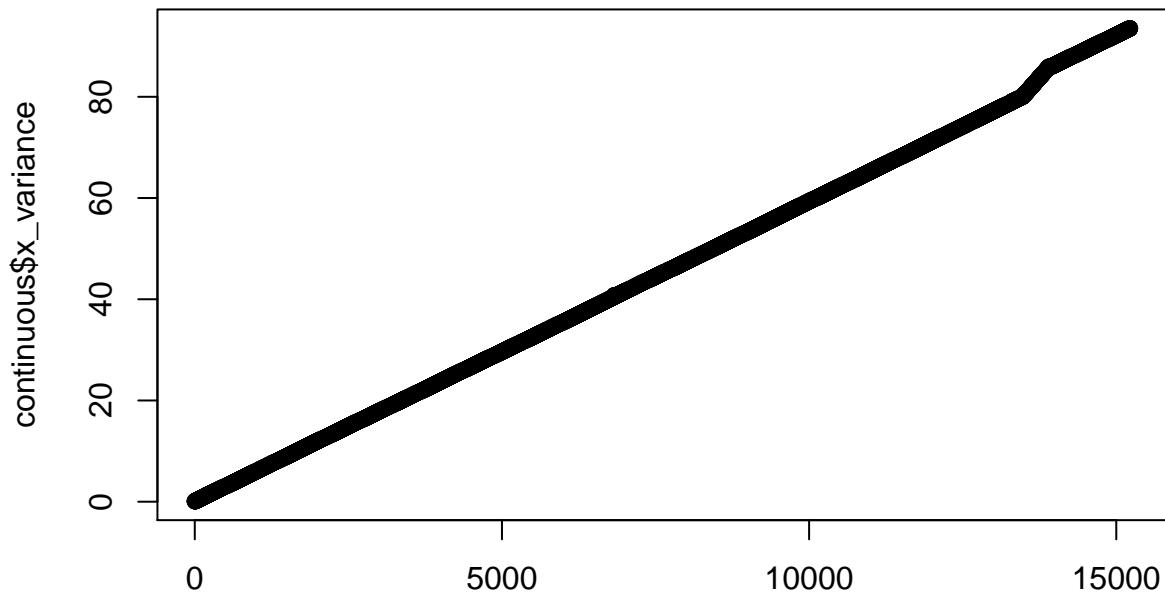
**Continuous total distance error over time**



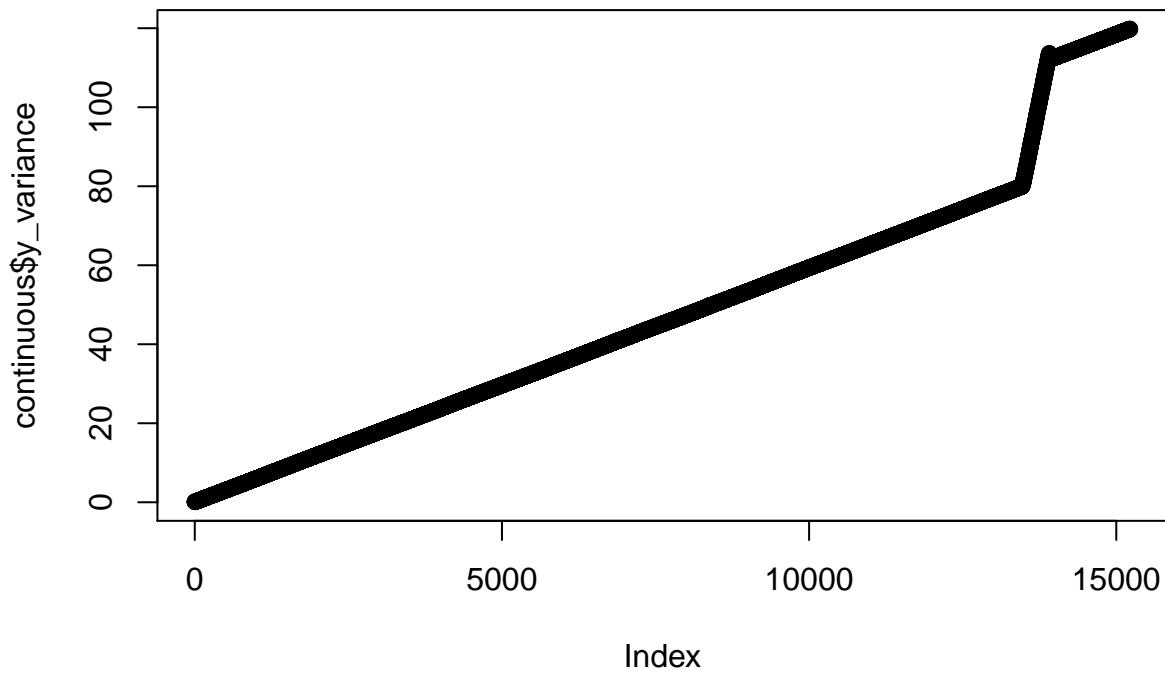
**Discrete total distance error over time**



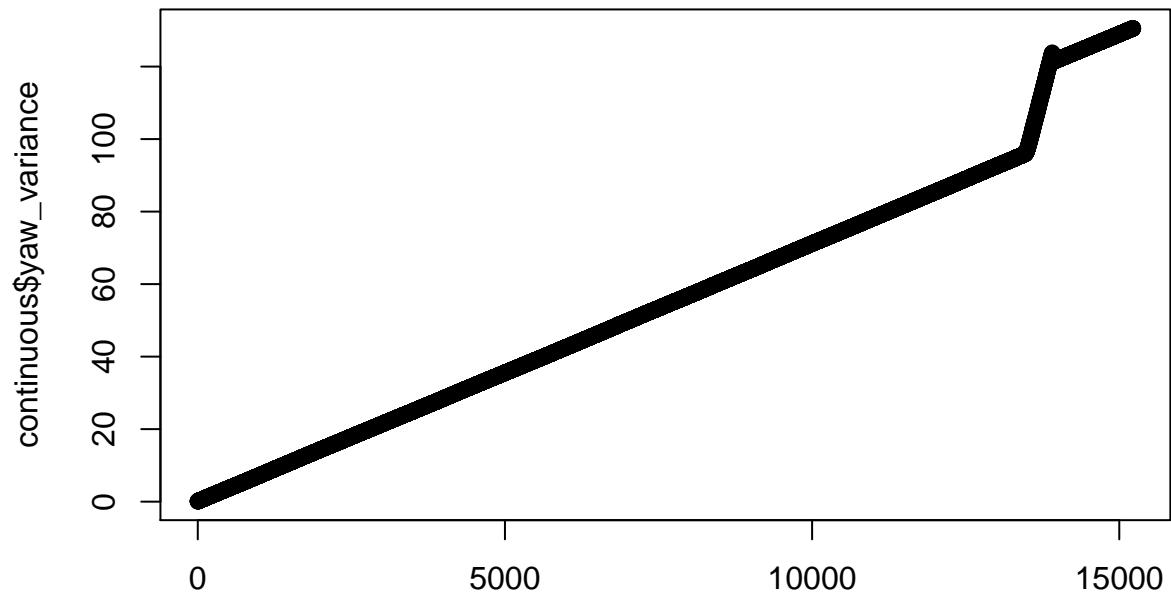
**Continuous Filter X Variance Over Time**



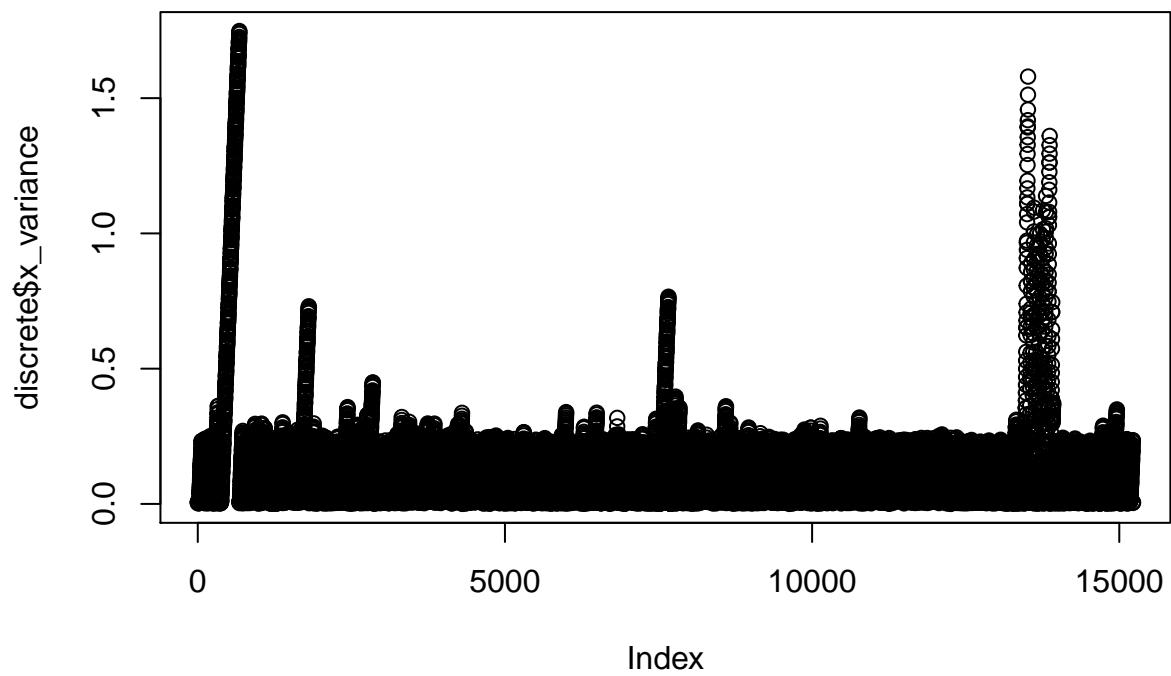
**Continuous Filter Y Variance Over Time**



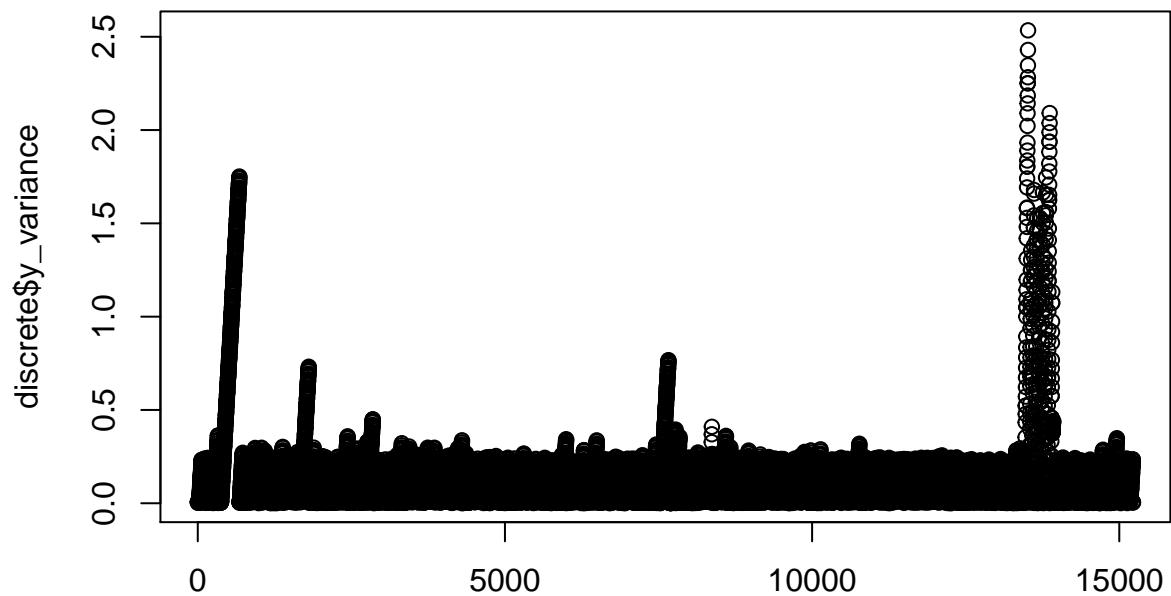
**Continuous Filter Yaw Variance Over Time**



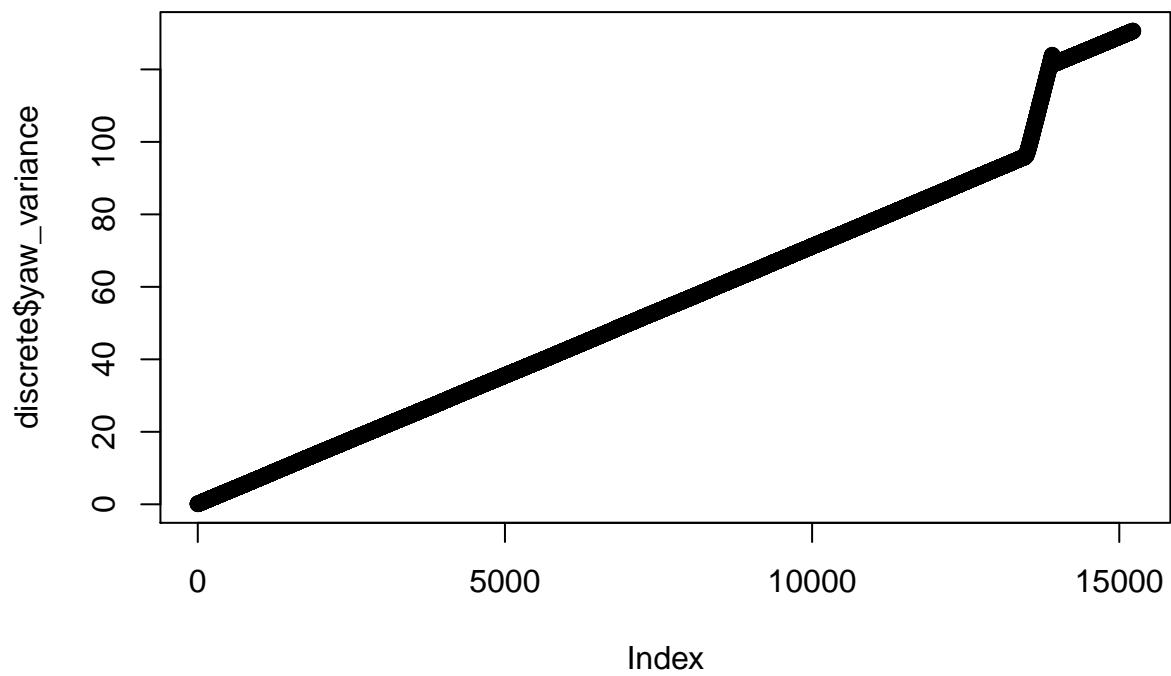
**Discrete Filter X Variance Over Time**



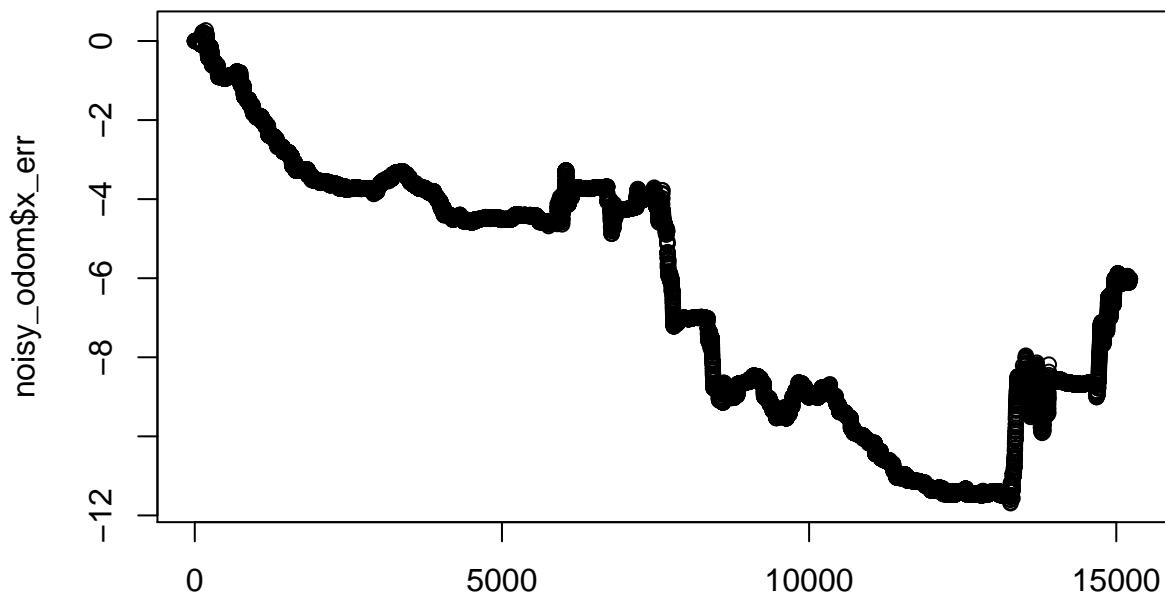
**Discrete Filter Y Variance Over Time**



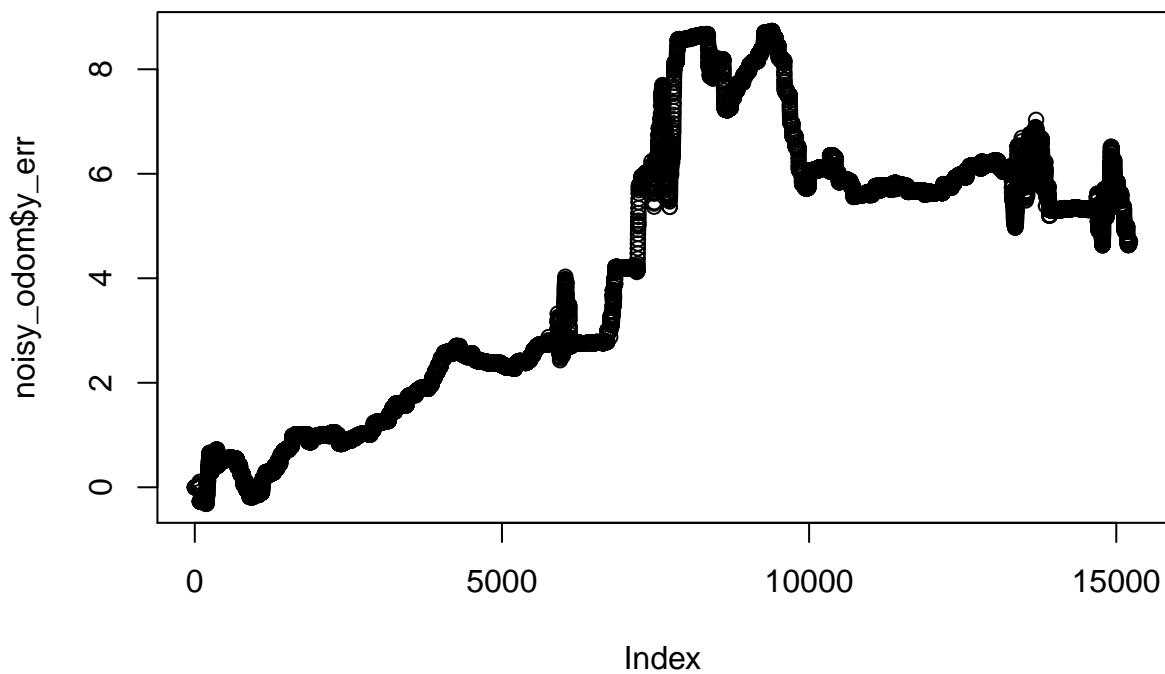
**Discrete Filter Yaw Variance Over Time**



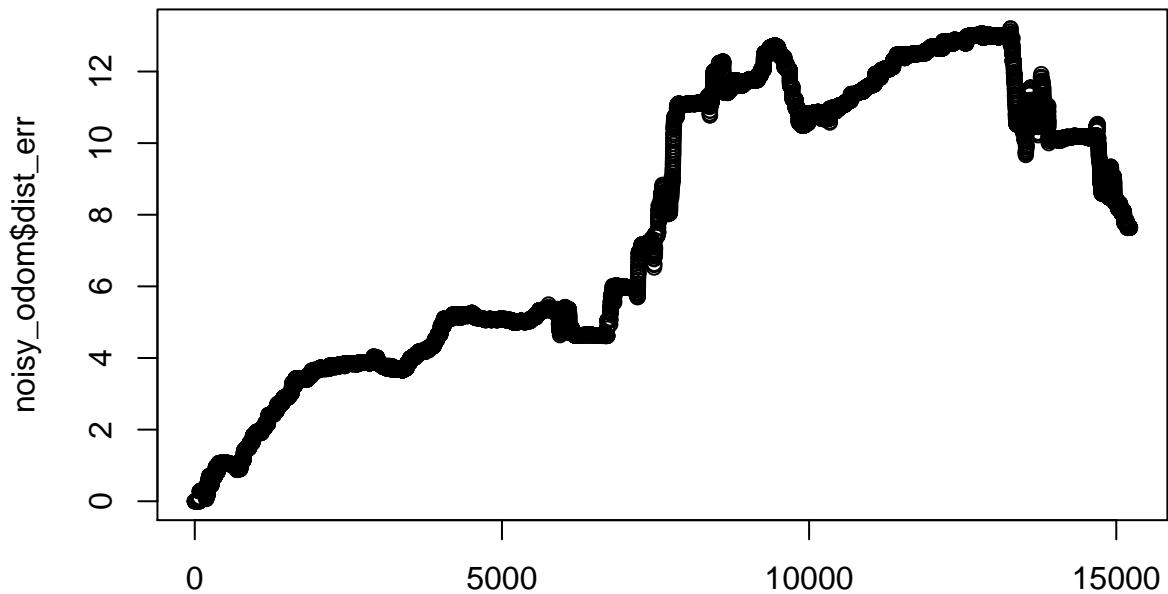
**Noisy Odom X Error Over Time**



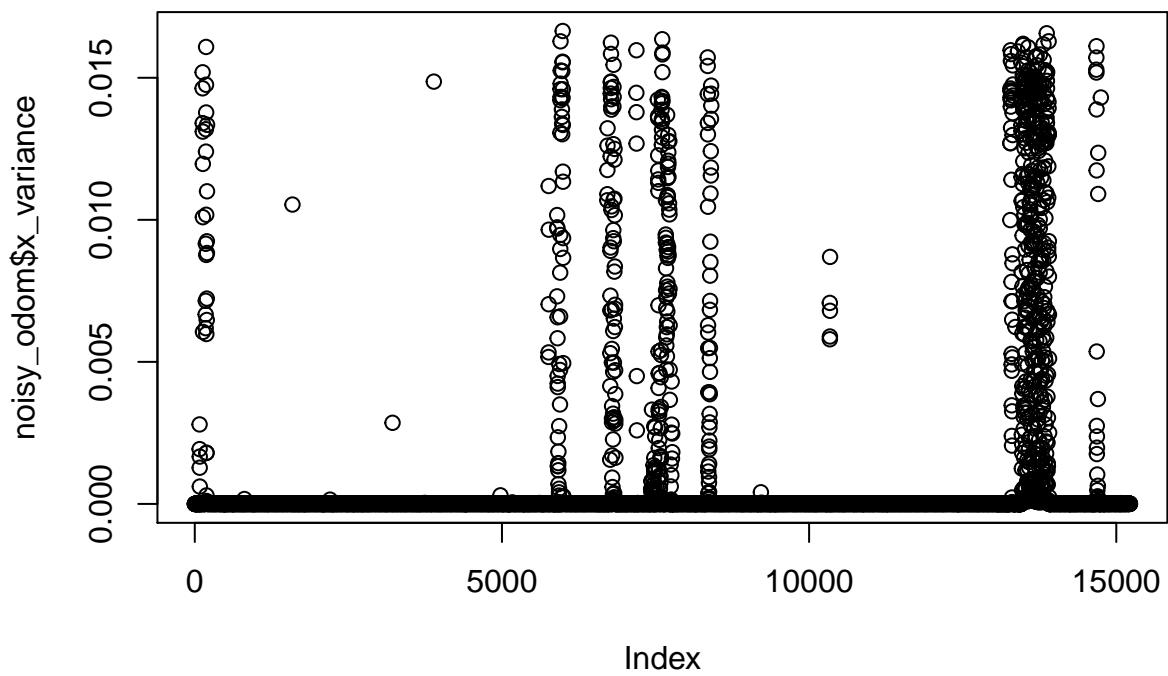
**Noisy Odom Y Error Over Time**



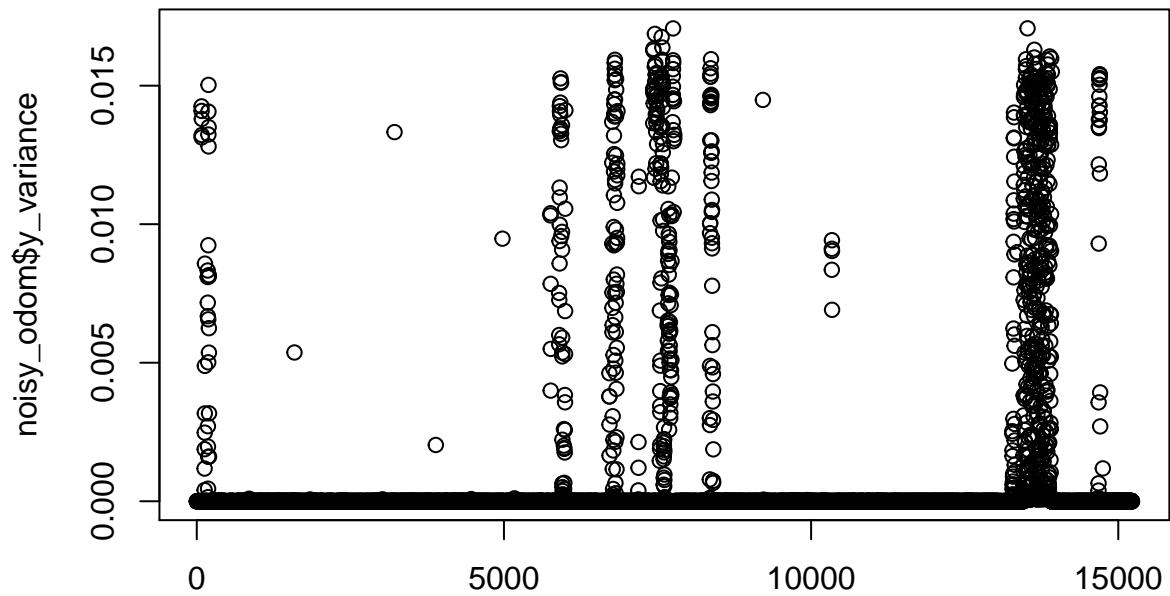
### Noisy Odom Horizontal Distance Error Over Time



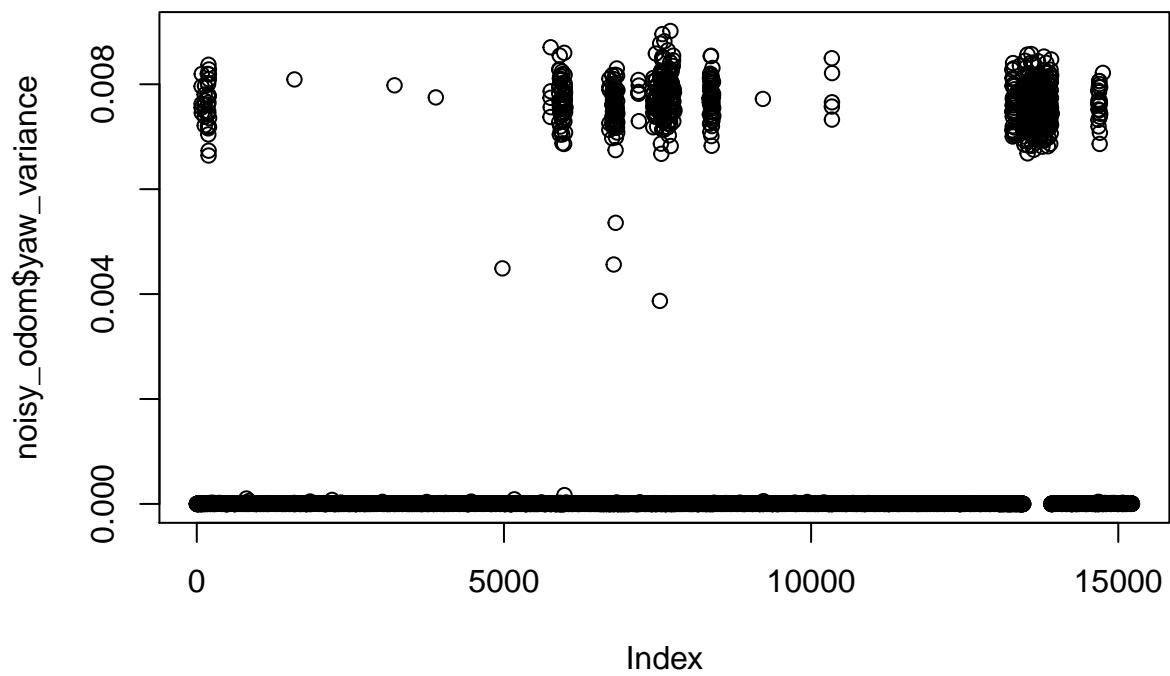
Variance of X Coordinate in Noisy Odometry



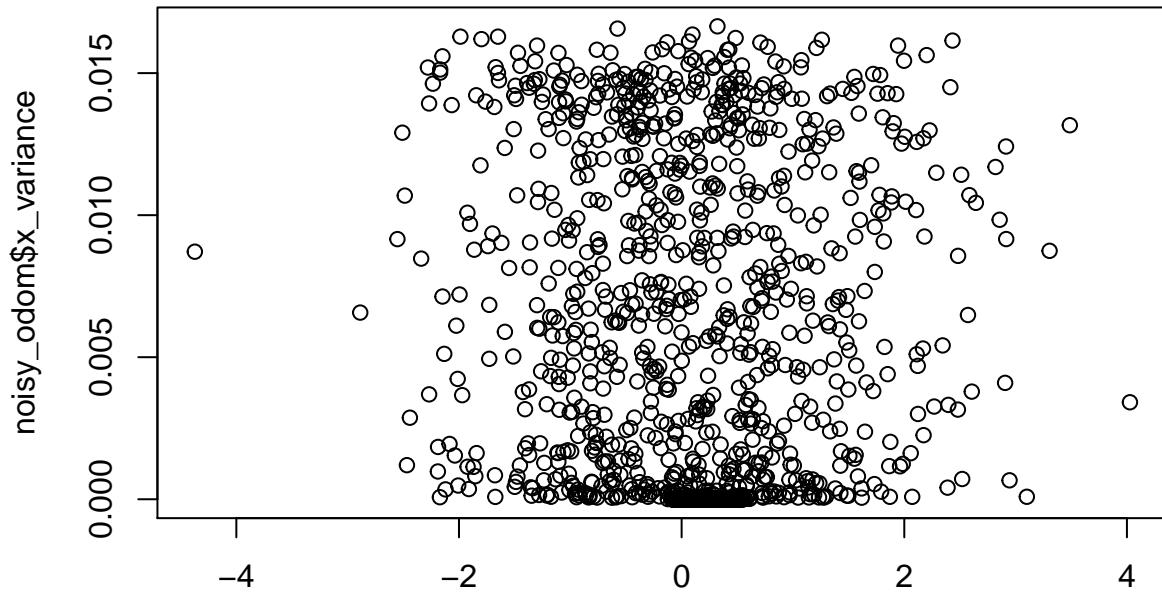
**Variance of Y Coordinate in Noisy Odometry**



**Variance of Yaw Coordinate in Noisy Odometry**



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



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

