

# two\_mobile\_noiseless\_no\_gps Turtlebot 2 Report

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

The runtime of this experiment was 0 hours, 25 minutes, and 8 seconds.

The total number of external pose measurements received by the robot during this time was 1401 which means poses were received at an average of 0.9290451 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.
## -4.964 -2.445 -2.444 -2.094 -1.551  0.489

summary(continuous$y_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -14.330 -14.320 -14.320 -7.662  3.645  6.971

summary(continuous$yaw_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -3.140000 -1.589000  0.001891 -0.003130  1.569000  3.140000

summary(continuous$dist_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.000014  4.998000 14.530000 10.410000 14.530000 14.540000

summary(discrete$x_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -10.26000 -5.58000 -4.87200 -4.99300 -4.87200  0.04781

summary(discrete$y_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -9.8680 -2.5660  0.6549 -0.7879  0.6549  1.5580

summary(discrete$yaw_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -3.141000 -1.545000 -0.040020 -0.007893  1.547000  3.141000

summary(discrete$dist_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.02744  4.91600  4.91600  5.51100  6.17200 11.07000

summary(noisy_odom$x_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -13.050 -7.771 -4.110 -5.519 -3.667  1.598
```

```

summary(noisy_odom$y_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -9.1660 -2.4980 -1.2950 -2.1020 -0.6434  0.7044

summary(noisy_odom$dist_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.000036 3.689000 4.346000 6.072000 8.603000 15.190000

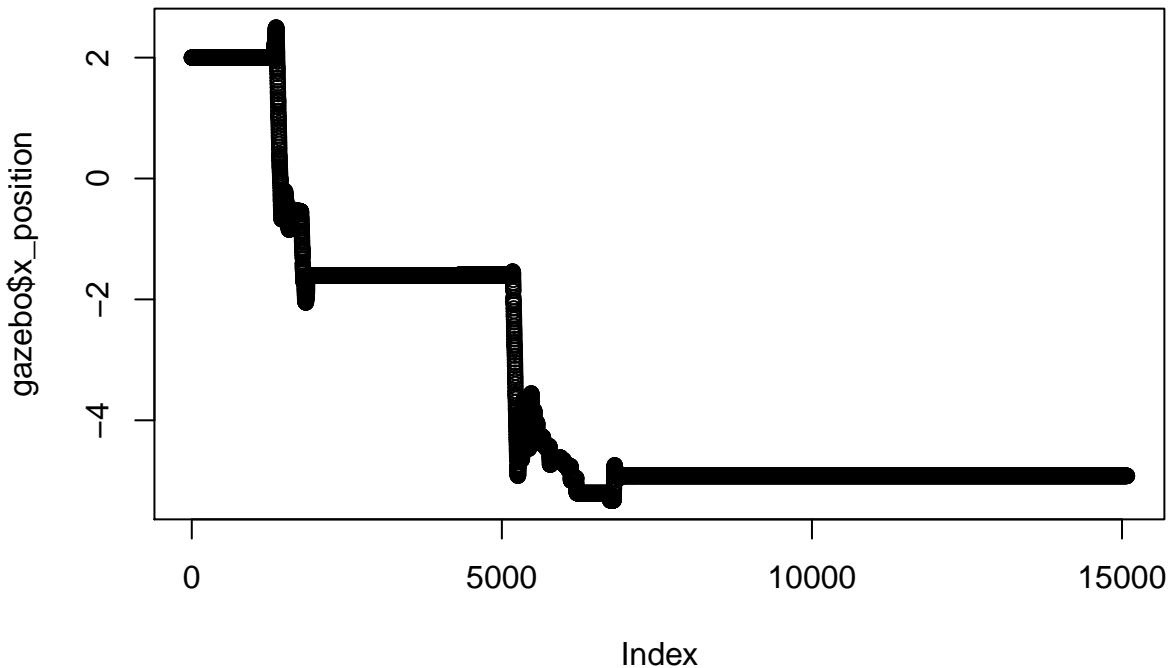
if (NROW(gps) > 0) {
  summary(gps$x_err)
  summary(gps$y_err)
  summary(gps$dist_err)
}

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

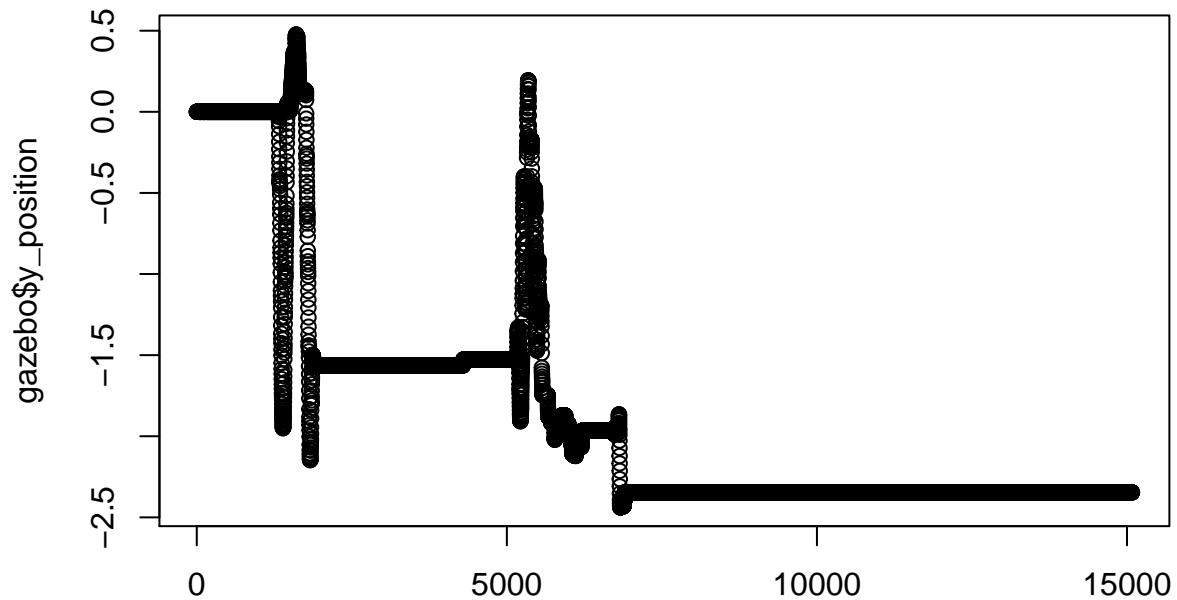
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.000e+00 4.178e-06 7.278e-03 4.579e-03 7.665e-03 8.847e-03

```

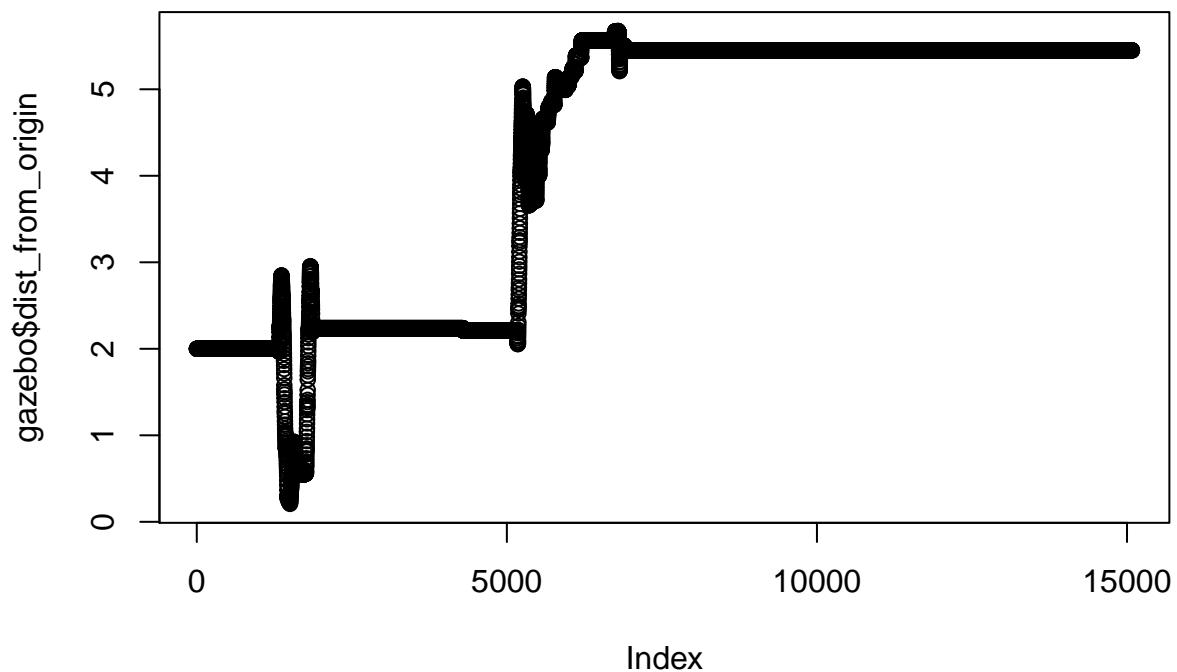
## X coordinate of robot over time



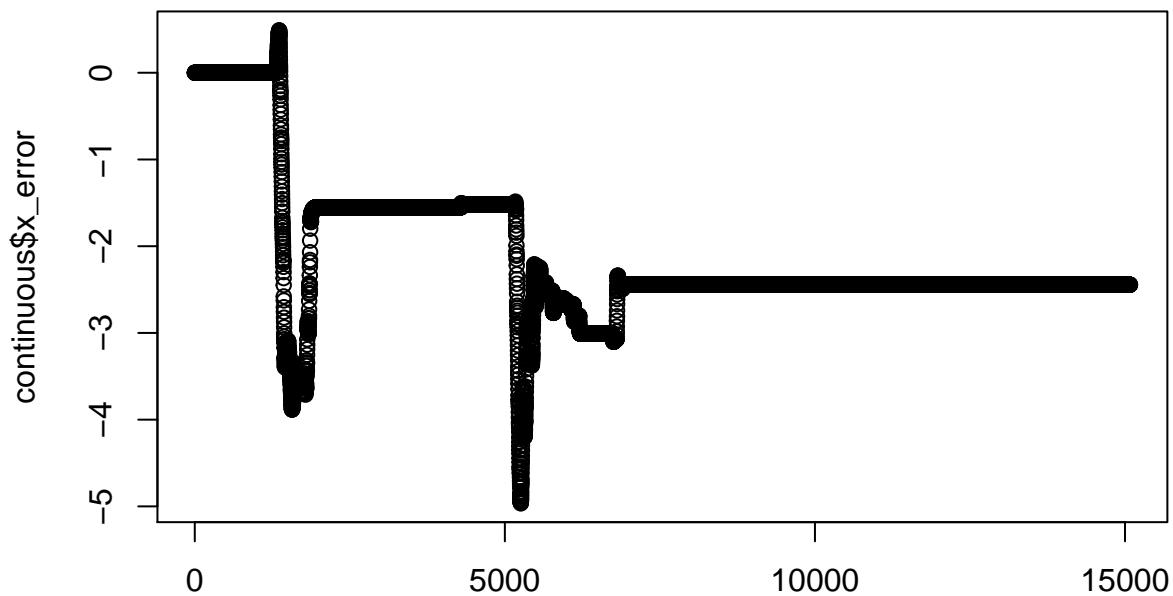
**Y coordinate of robot over time**



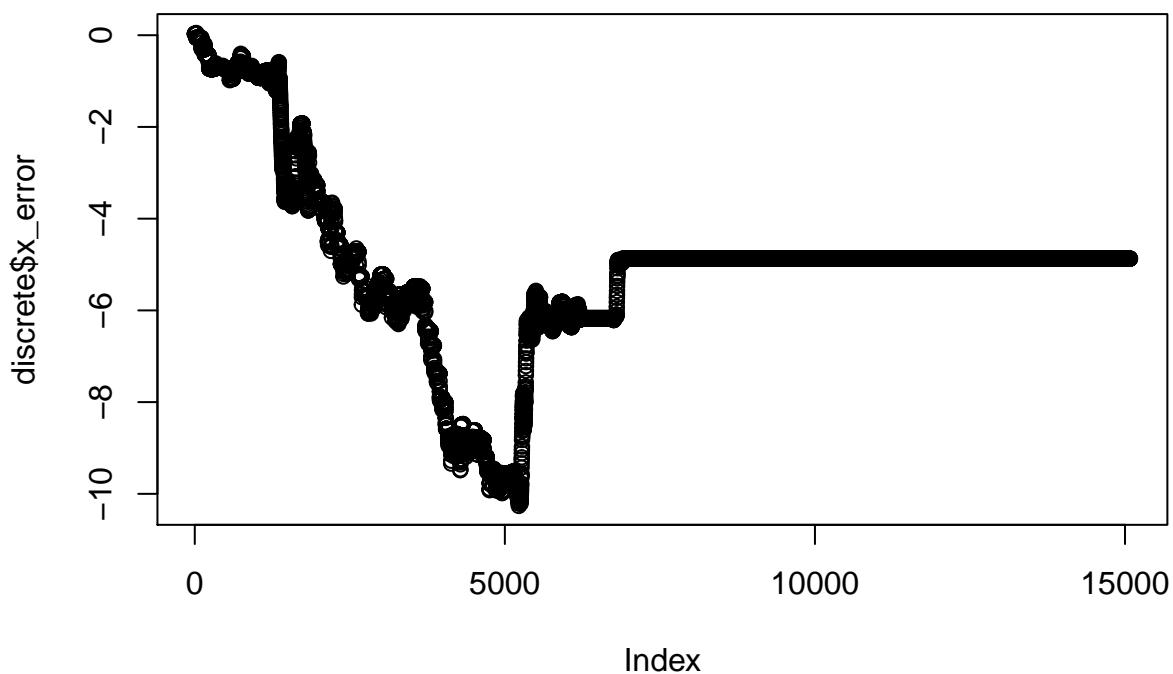
**Distance from origin vs. time**



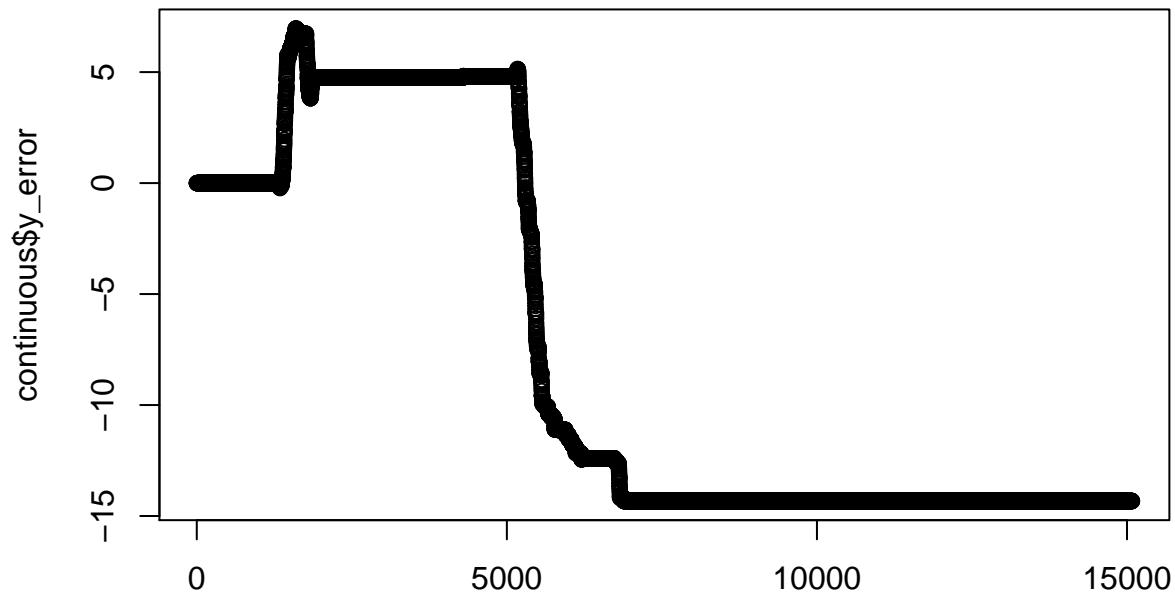
**Continuous x\_error over time**



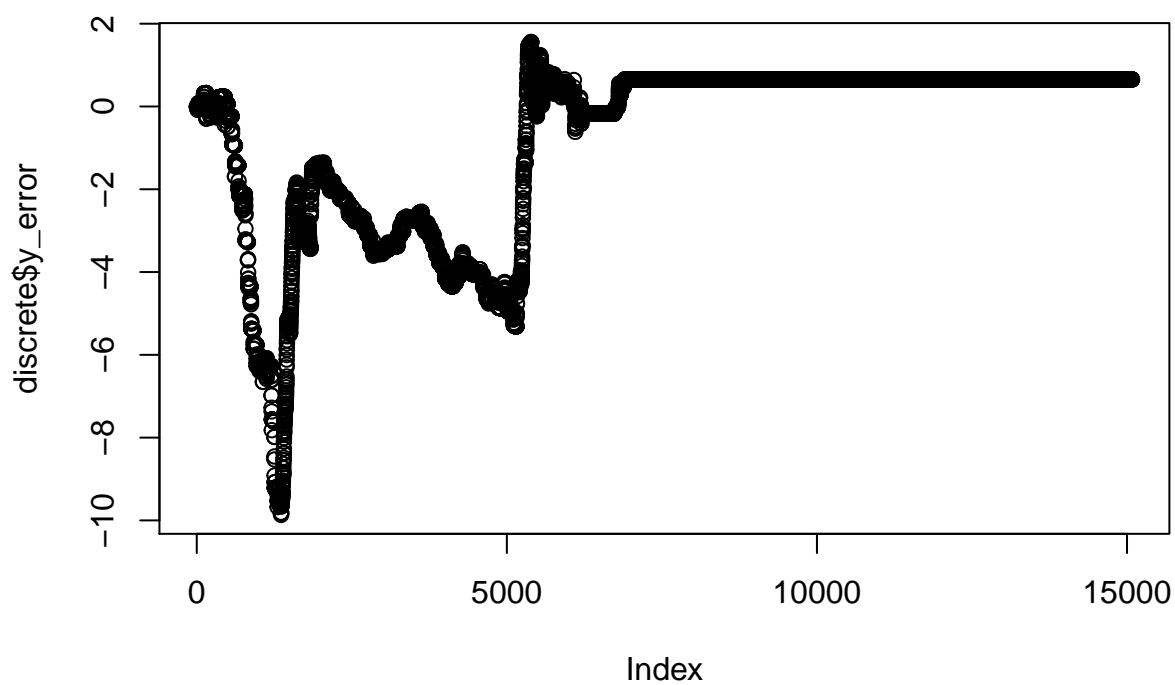
**Discrete x\_error over time**



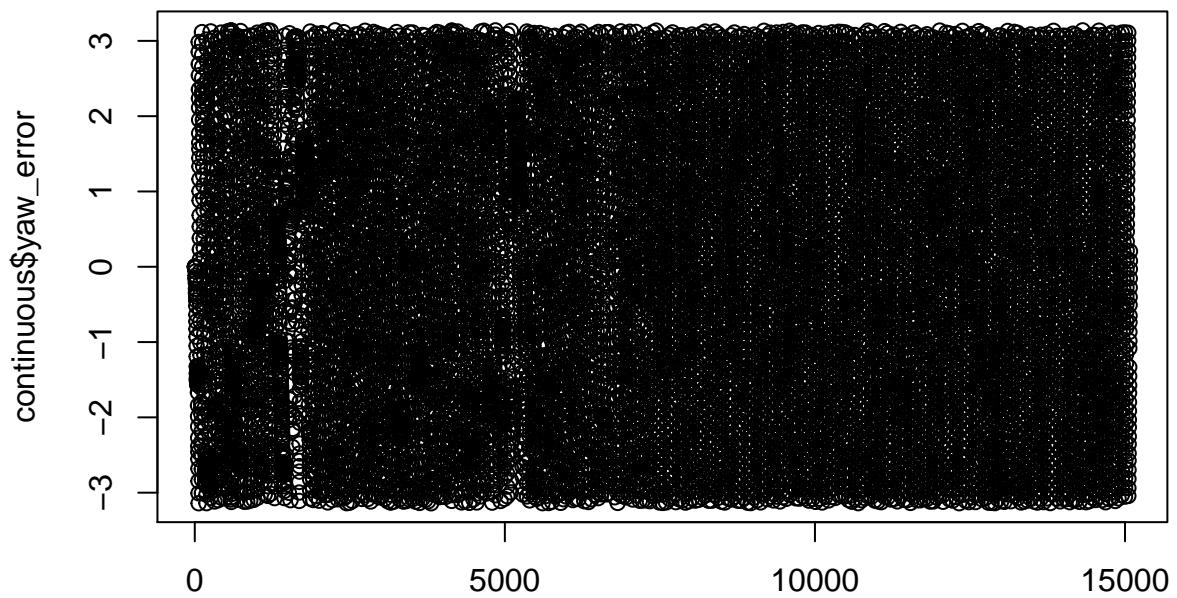
**Continuous y\_error over time**



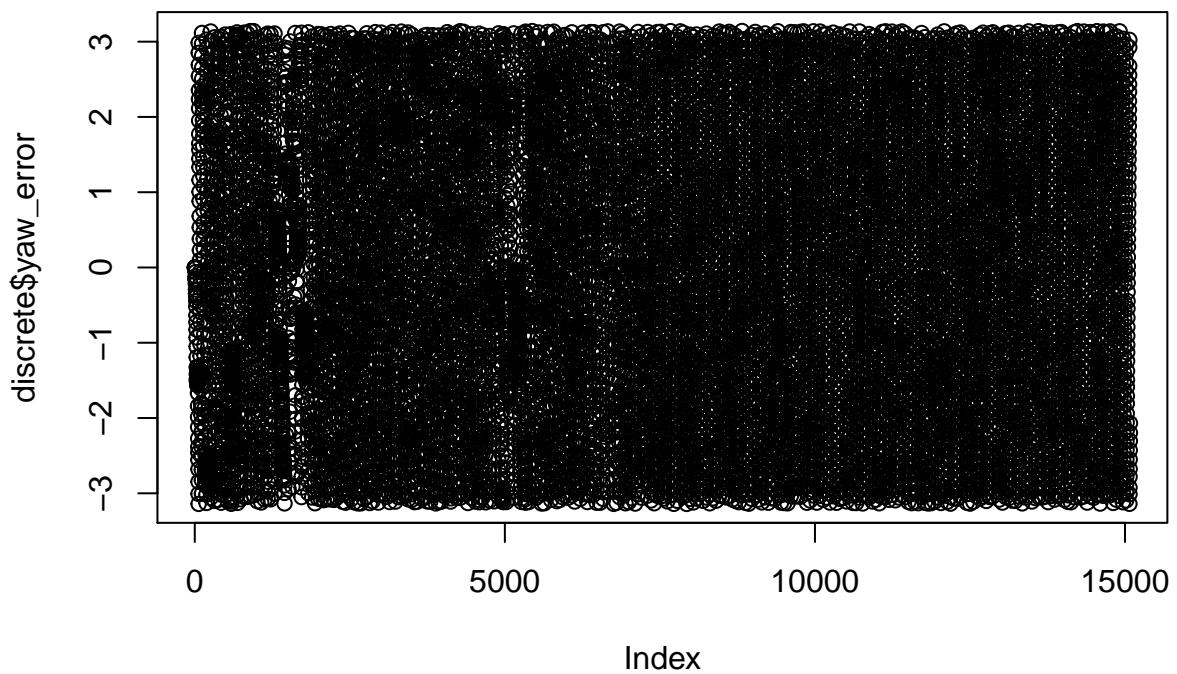
**Discrete y\_error over time**



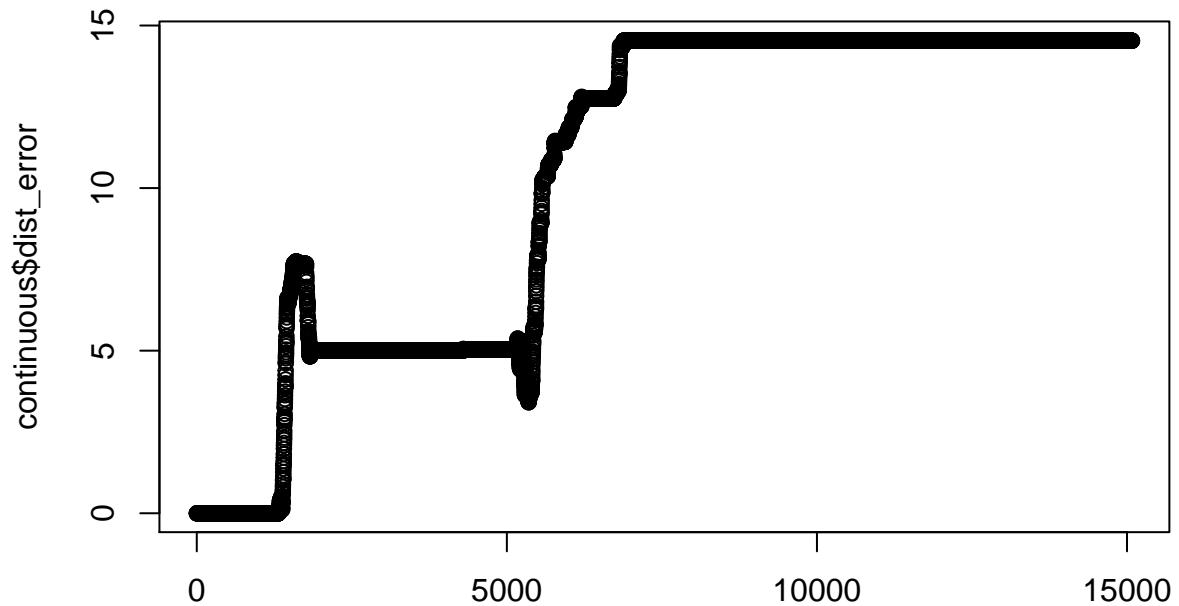
**Continuous yaw error over time**



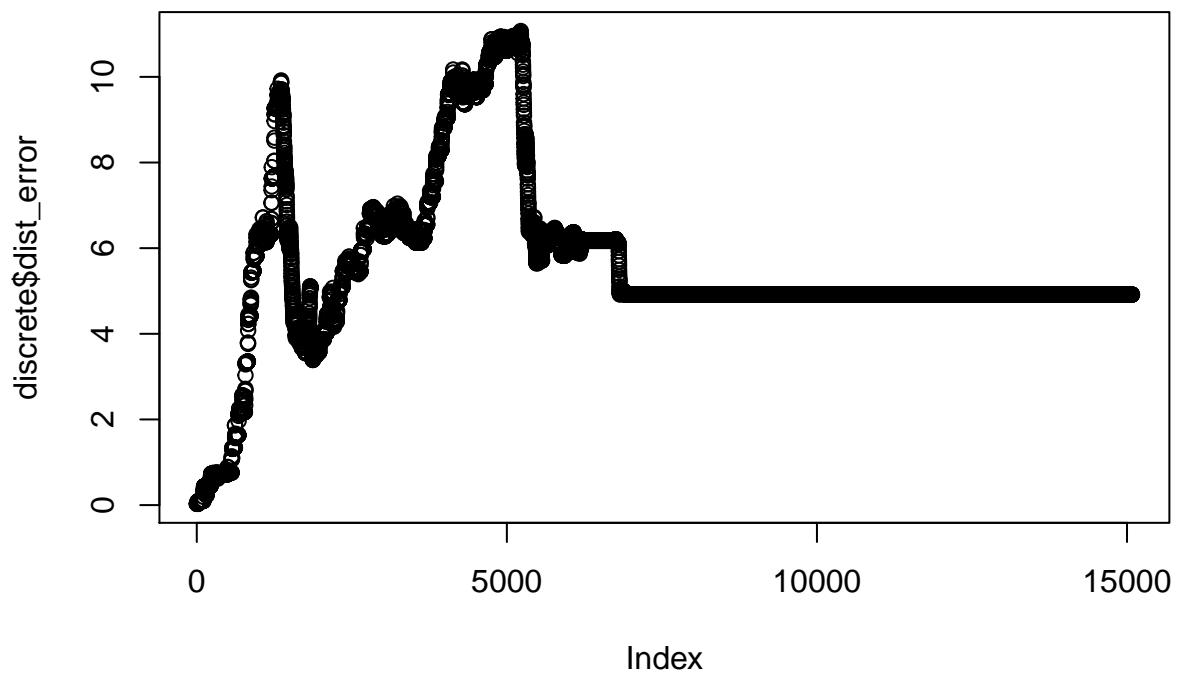
**Discrete yaw error over time**



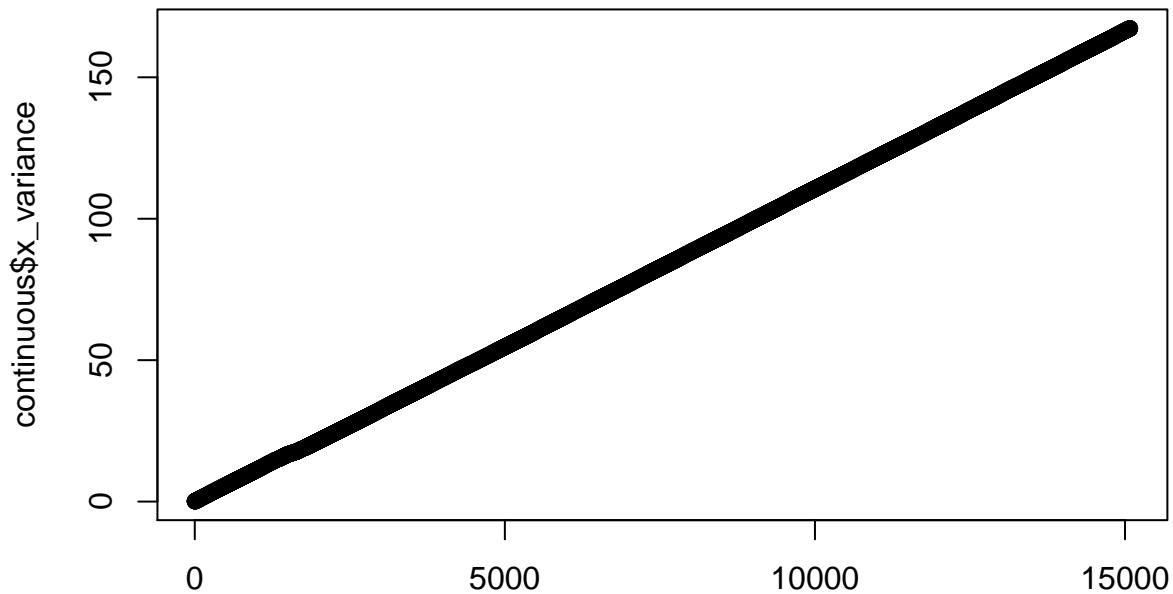
**Continuous total distance error over time**



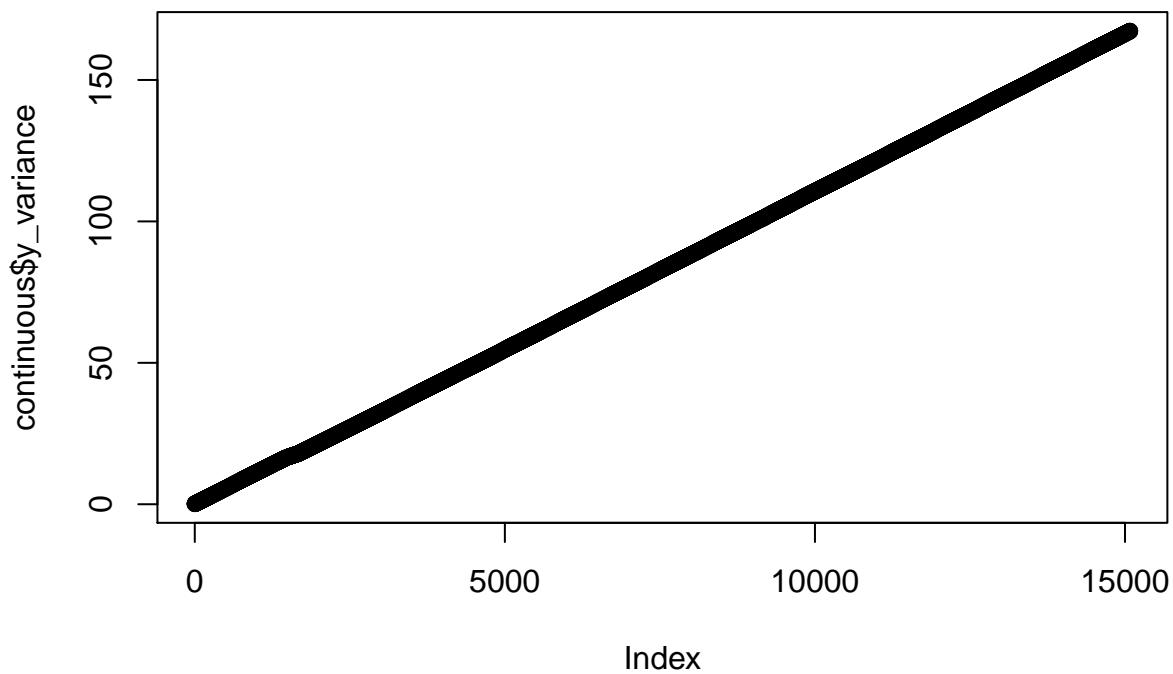
**Discrete total distance error over time**



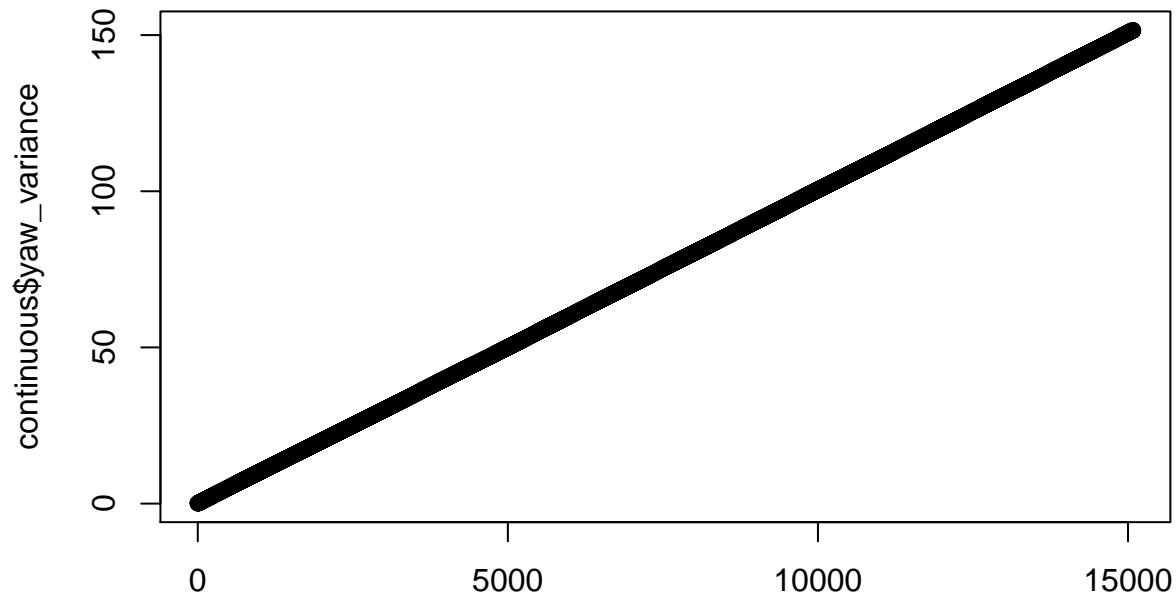
**Continuous Filter X Variance Over Time**



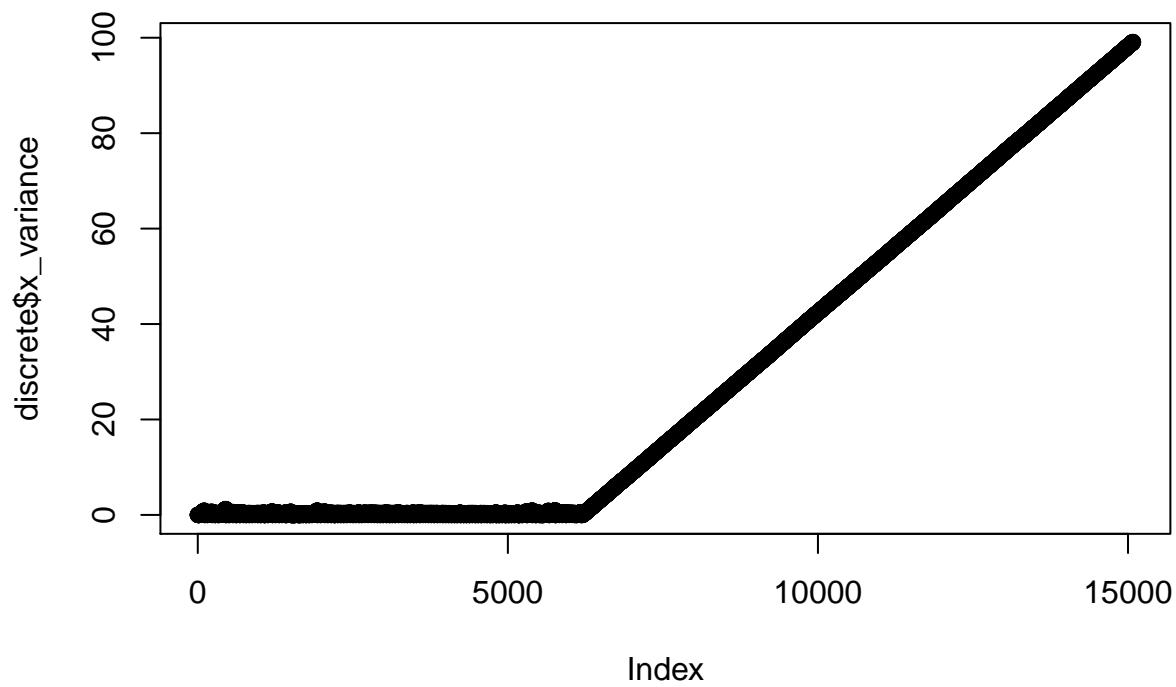
**Continuous Filter Y Variance Over Time**



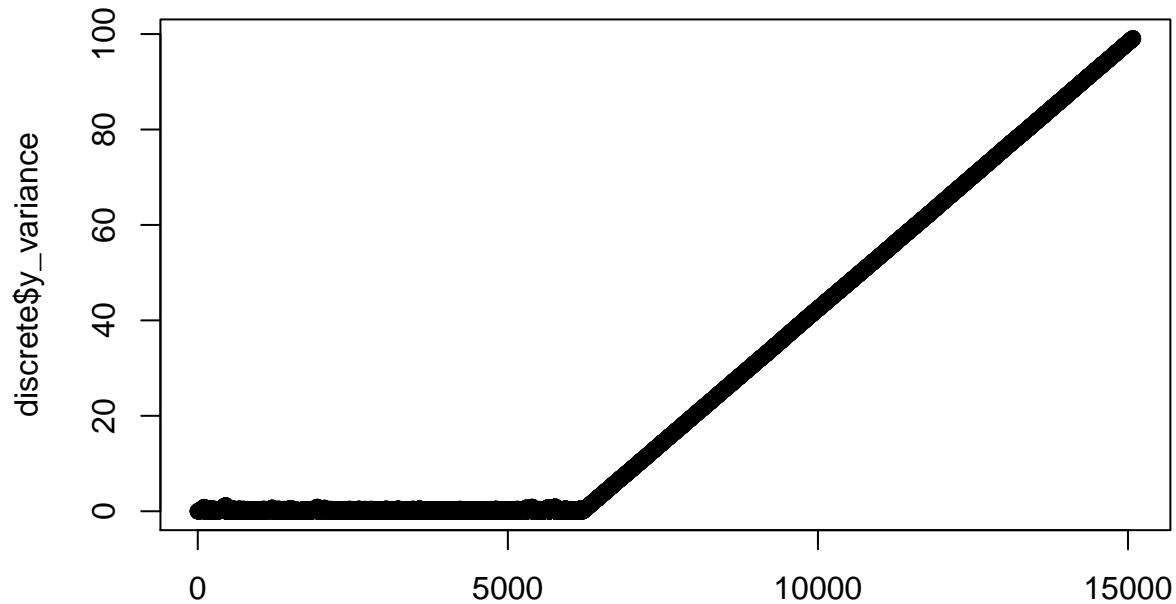
**Continuous Filter Yaw Variance Over Time**



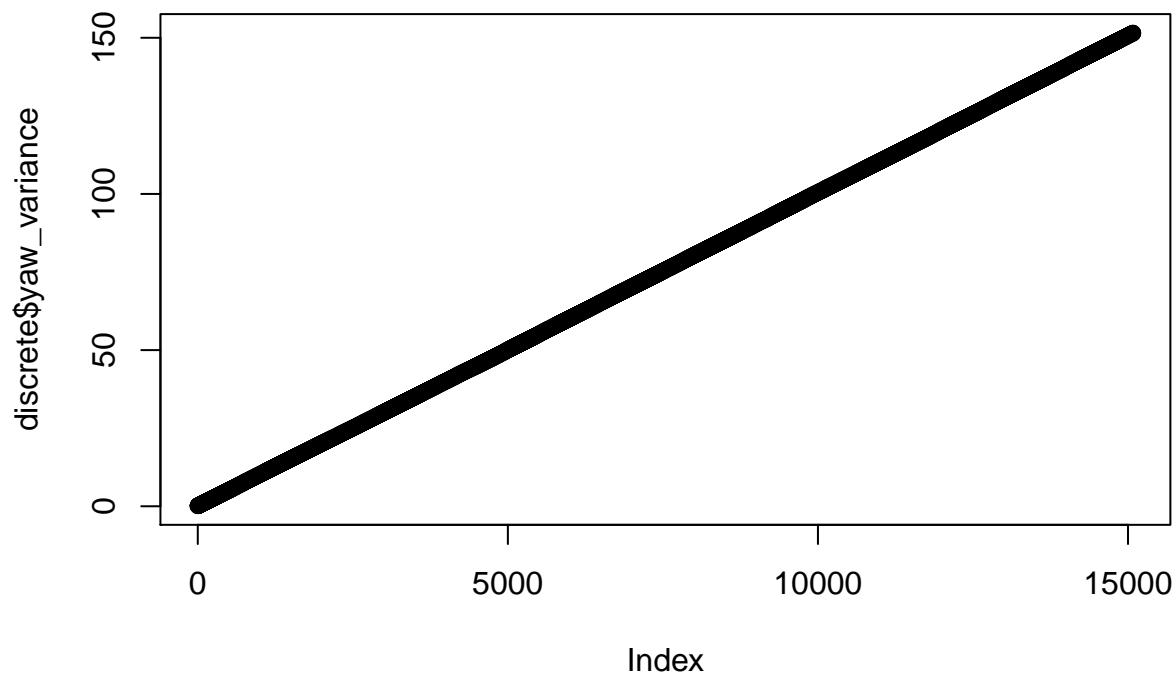
**Discrete Filter X Variance Over Time**



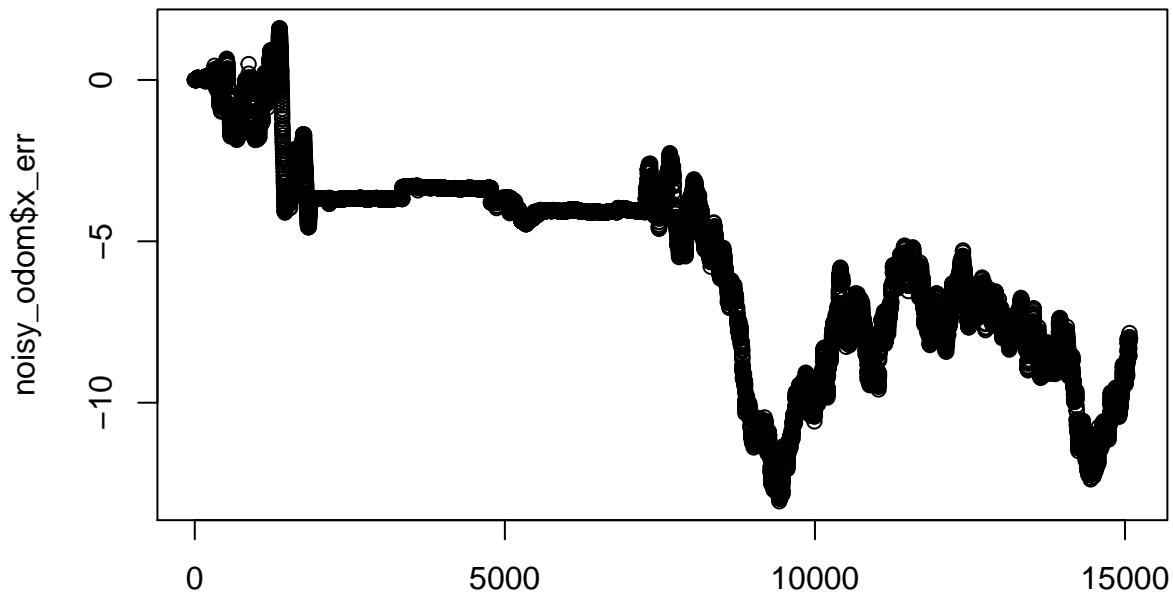
**Discrete Filter Y Variance Over Time**



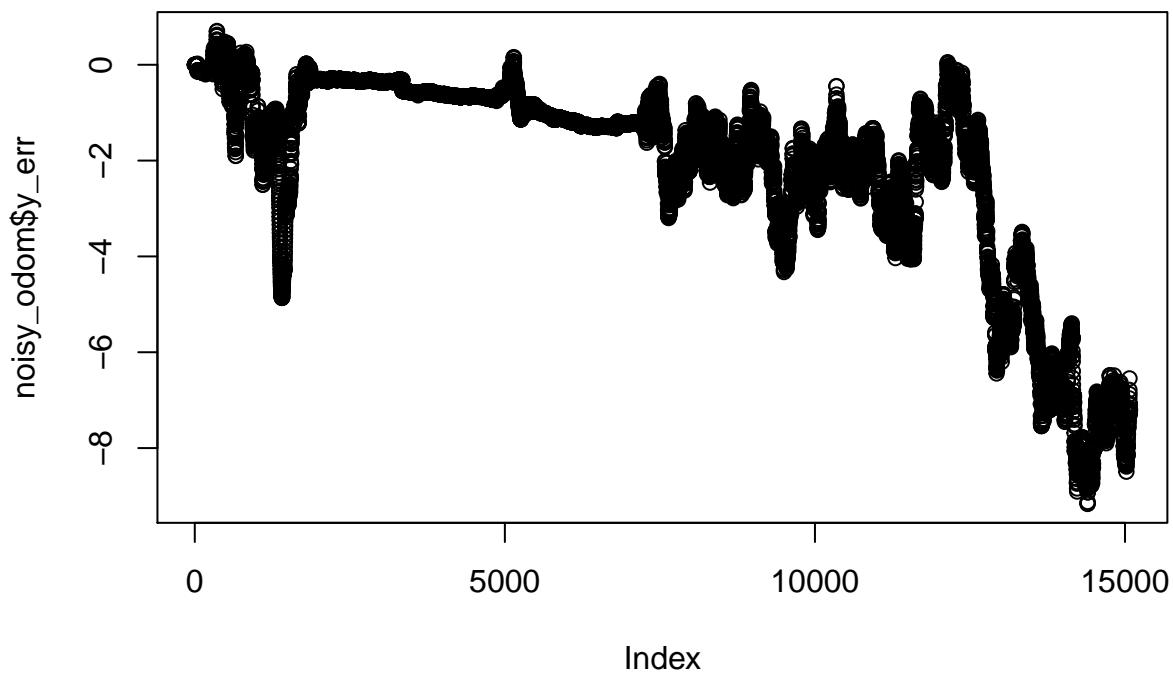
**Discrete Filter Yaw Variance Over Time**



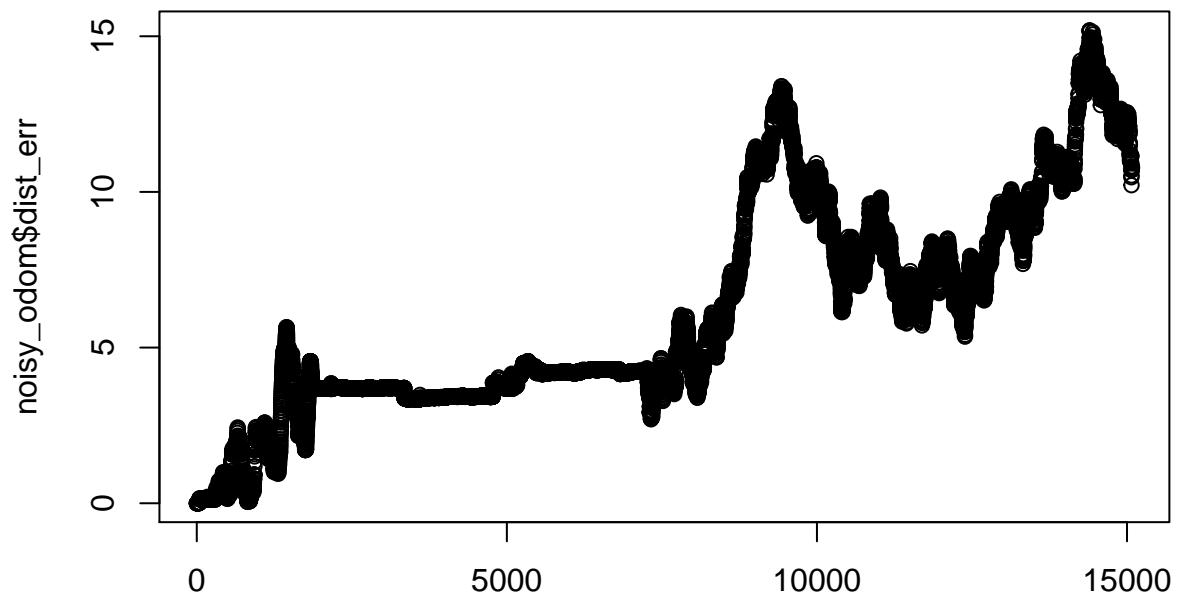
**Noisy Odom X Error Over Time**



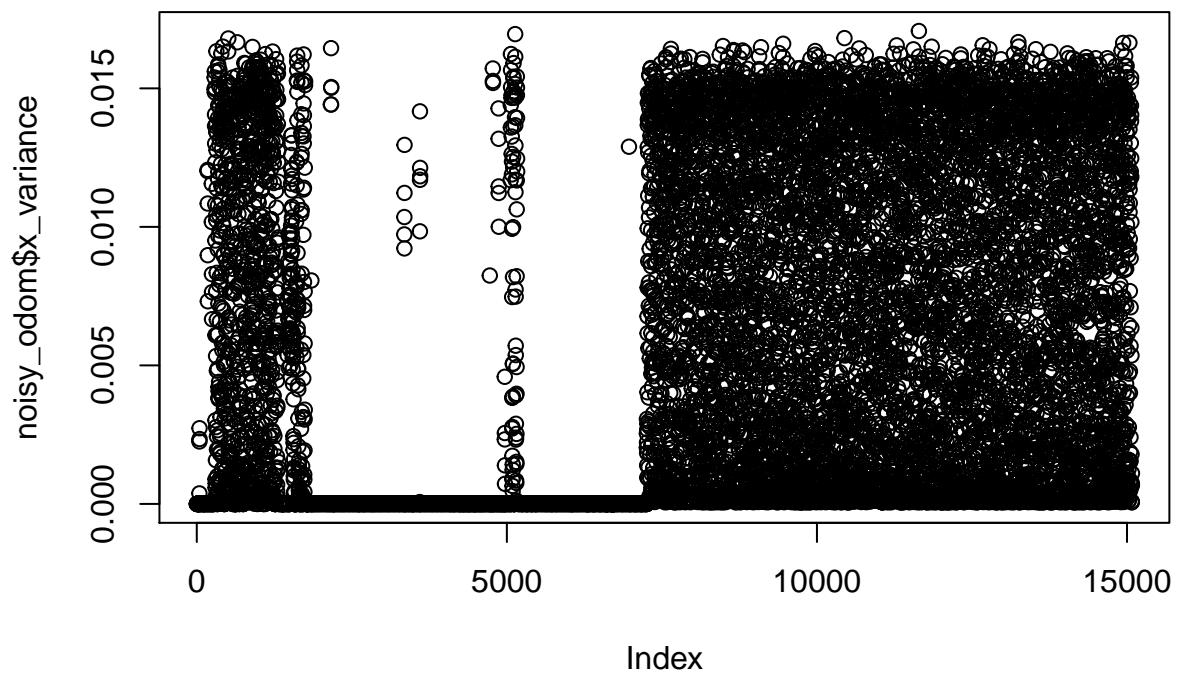
**Noisy Odom Y Error Over Time**



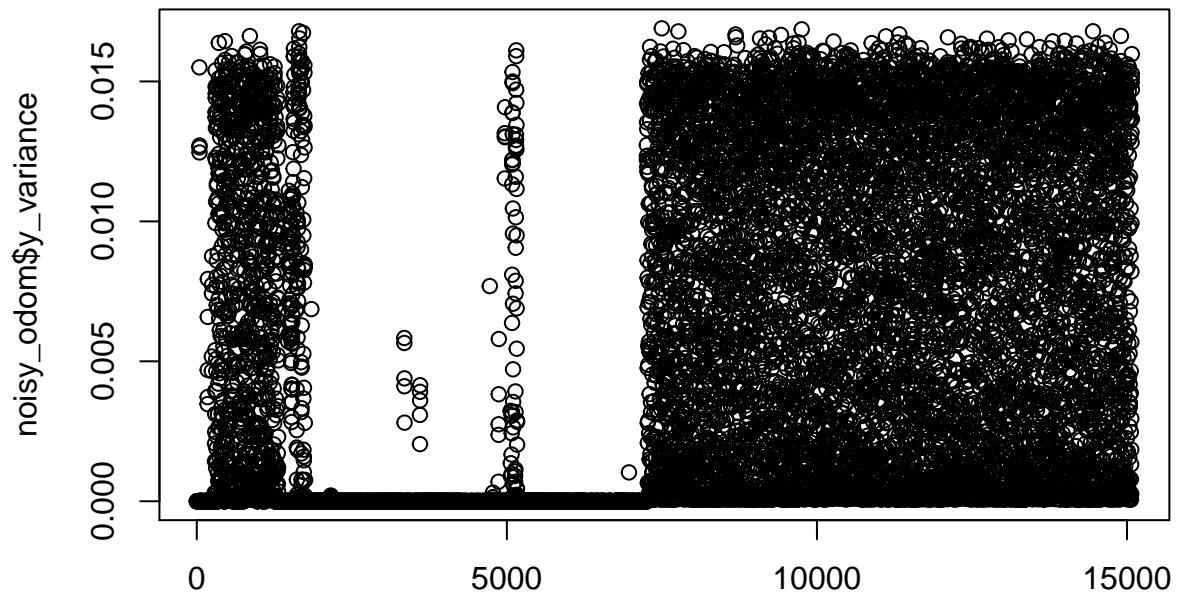
Noisy Odom Horizontal Distance Error Over Time



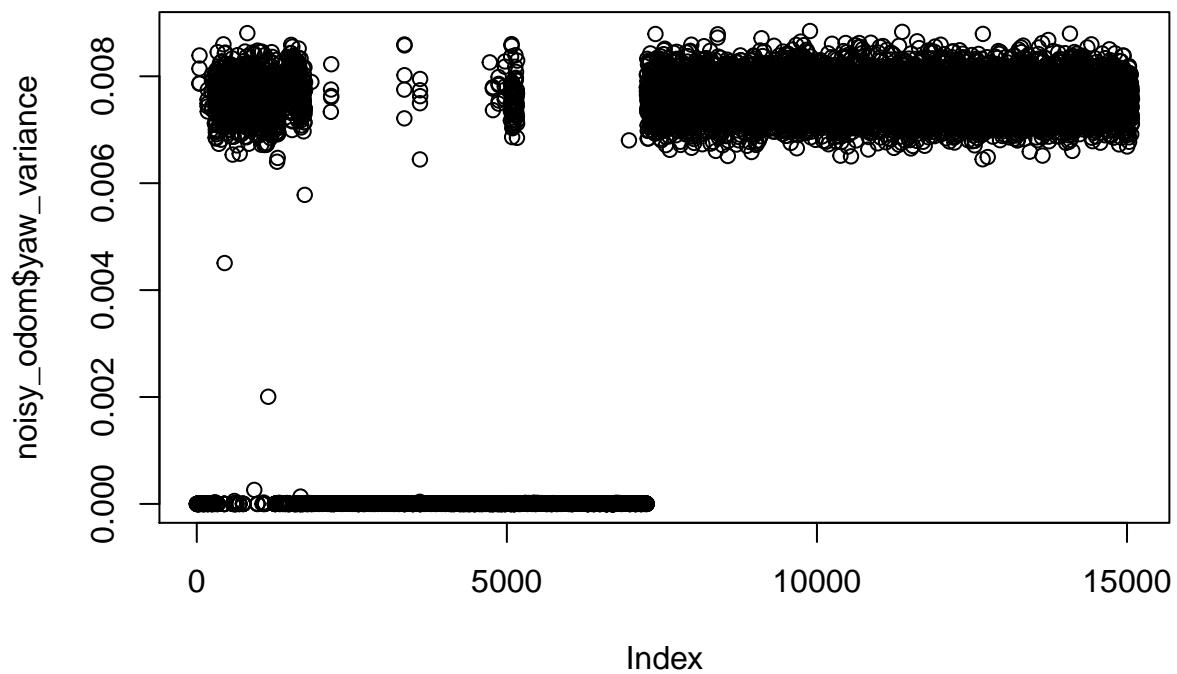
Variance of X Coordinate in Noisy Odometry



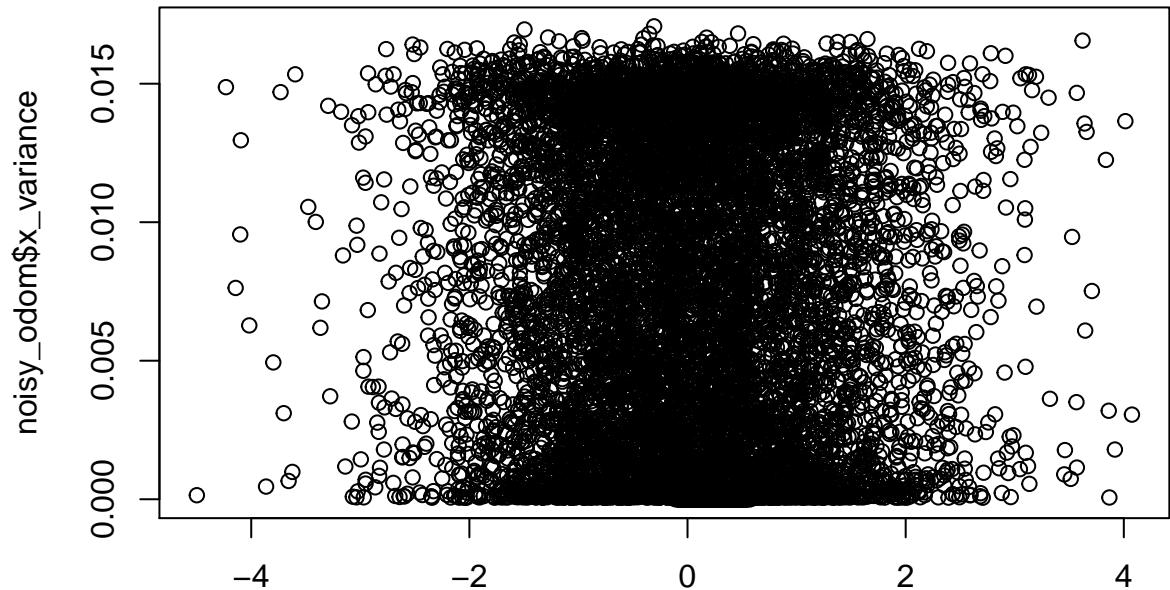
**Variance of Y Coordinate in Noisy Odometry**



**Variance of Yaw Coordinate in Noisy Odometry**



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



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

