

# one\_mobile\_noiseless\_no\_gps Turtlebot 1 Report

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

The runtime of this experiment was 0 hours, 25 minutes, and 9.8 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.  
## -1.921e-07 3.010e-05 4.472e-05 4.466e-05 5.931e-05 7.092e-05
```

```
summary(continuous$y_error)
```

```
##      Min.    1st Qu.    Median     Mean    3rd Qu.    Max.  
## -7.126e-05 -6.029e-05 -4.565e-05 -4.561e-05 -3.102e-05 1.360e-09
```

```
summary(continuous$yaw_error)
```

```
##      Min.    1st Qu.    Median     Mean    3rd Qu.    Max.  
## -3.1410000 -1.5610000 -0.0044750 0.0009888 1.5680000 3.1410000
```

```
summary(continuous$dist_error)
```

```
##      Min.    1st Qu.    Median     Mean    3rd Qu.    Max.  
## 1.564e-05 5.140e-05 6.715e-05 6.555e-05 7.989e-05 8.539e-05
```

```
summary(discrete$x_error)
```

```
##      Min.    1st Qu.    Median     Mean    3rd Qu.    Max.  
## -1.921e-07 3.010e-05 4.472e-05 4.466e-05 5.931e-05 7.092e-05
```

```
summary(discrete$y_error)
```

```
##      Min.    1st Qu.    Median     Mean    3rd Qu.    Max.  
## -7.126e-05 -6.029e-05 -4.565e-05 -4.561e-05 -3.102e-05 1.360e-09
```

```
summary(discrete$yaw_error)
```

```
##      Min.    1st Qu.    Median     Mean    3rd Qu.    Max.  
## -3.1420000 -1.5630000 -0.0064430 -0.0003762 1.5650000 3.1410000
```

```
summary(discrete$dist_error)
```

```
##      Min.    1st Qu.    Median     Mean    3rd Qu.    Max.  
## 1.564e-05 5.140e-05 6.715e-05 6.555e-05 7.989e-05 8.539e-05
```

```
summary(noisy_odom$x_err)
```

```
##      Min.    1st Qu.    Median     Mean    3rd Qu.    Max.  
## -3.6700 -0.3600  0.8475  1.2370  2.8930  7.0590
```

```

summary(noisy_odom$y_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -6.0070 -0.9083  0.5120  0.7339  2.1420 10.6400

summary(noisy_odom$dist_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.000012  2.239000  3.451000  3.533000  4.576000 10.790000

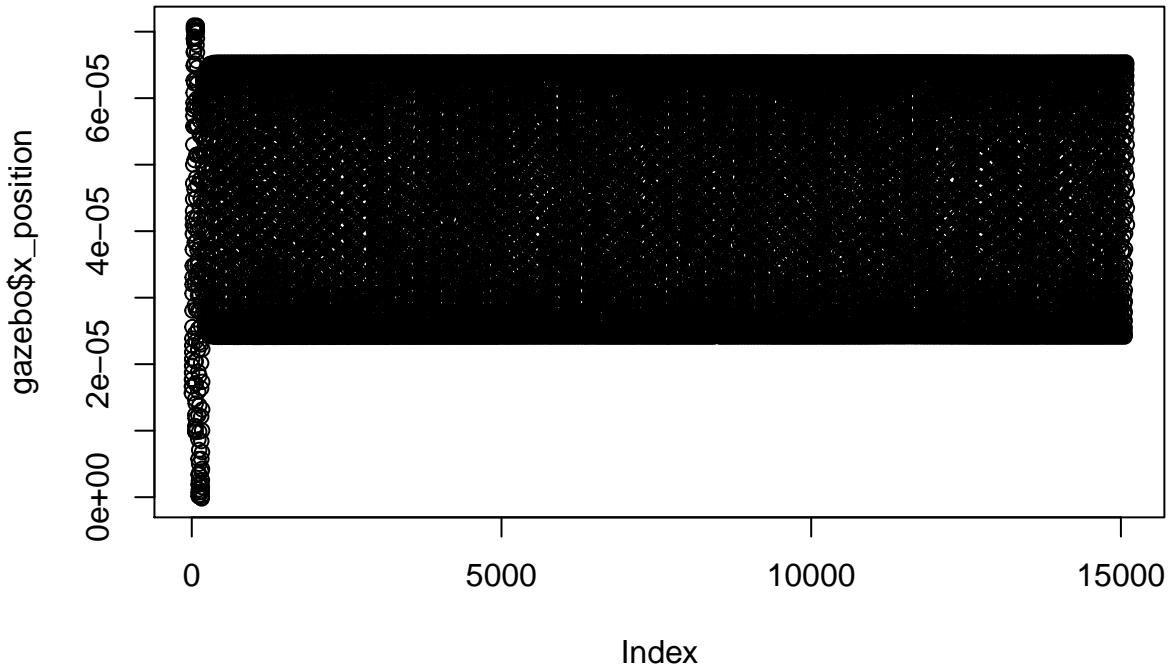
if (NROW(gps) > 0) {
  summary(gps$x_err)
  summary(gps$y_err)
  summary(gps$dist_err)
}

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

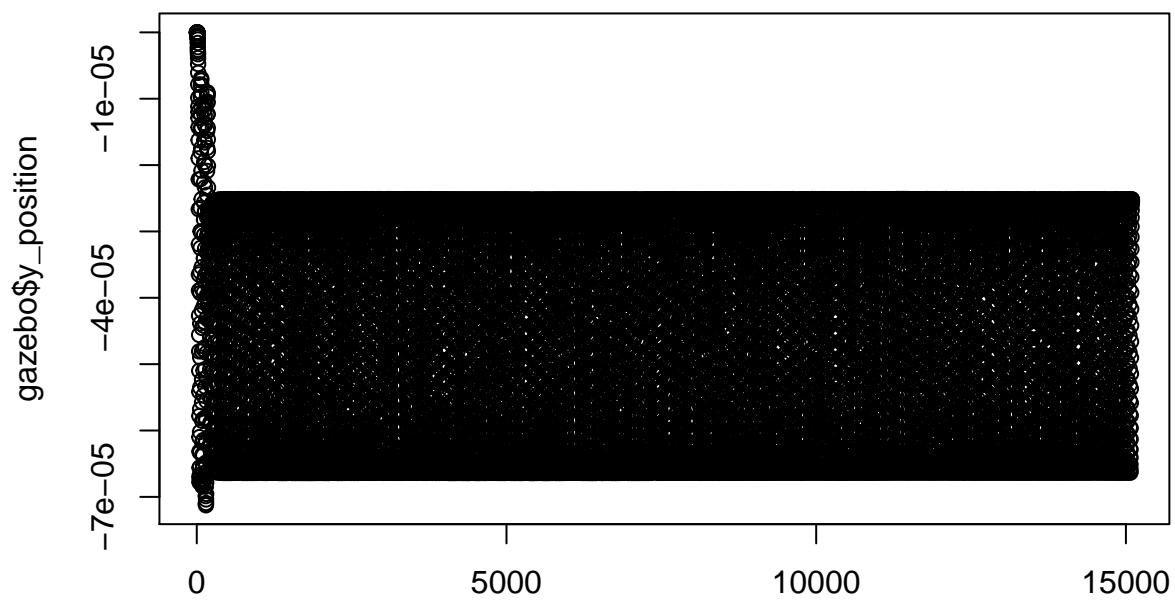
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.000000  0.007350  0.007583  0.007496  0.007812  0.008975

```

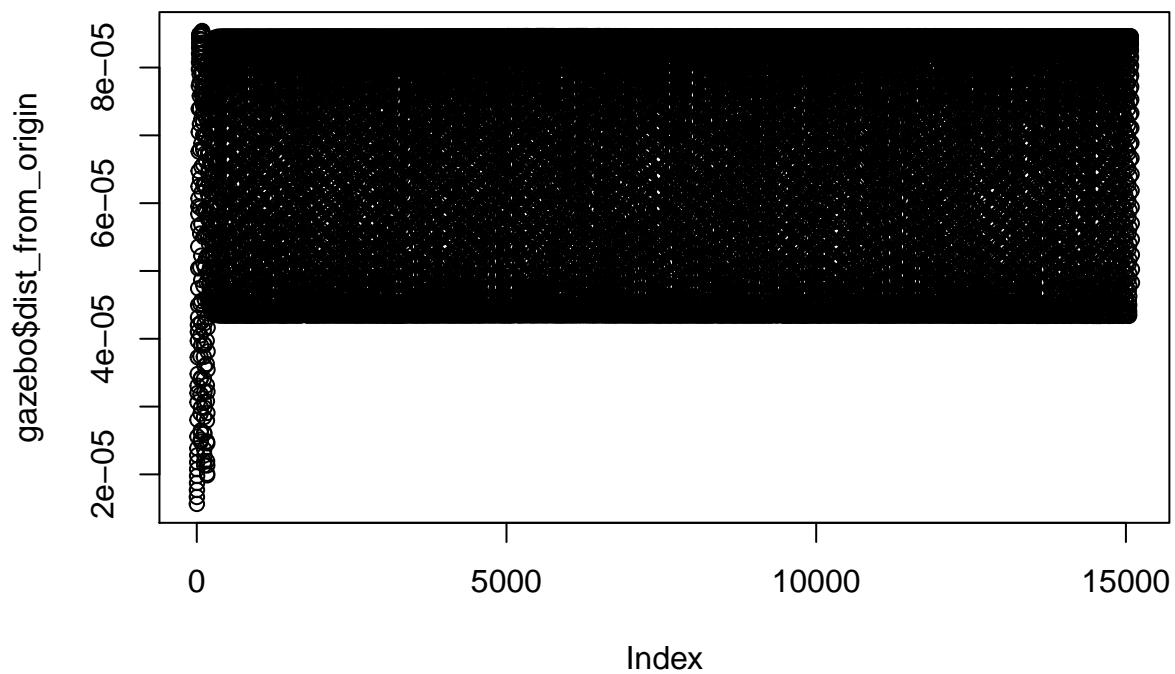
## X coordinate of robot over time



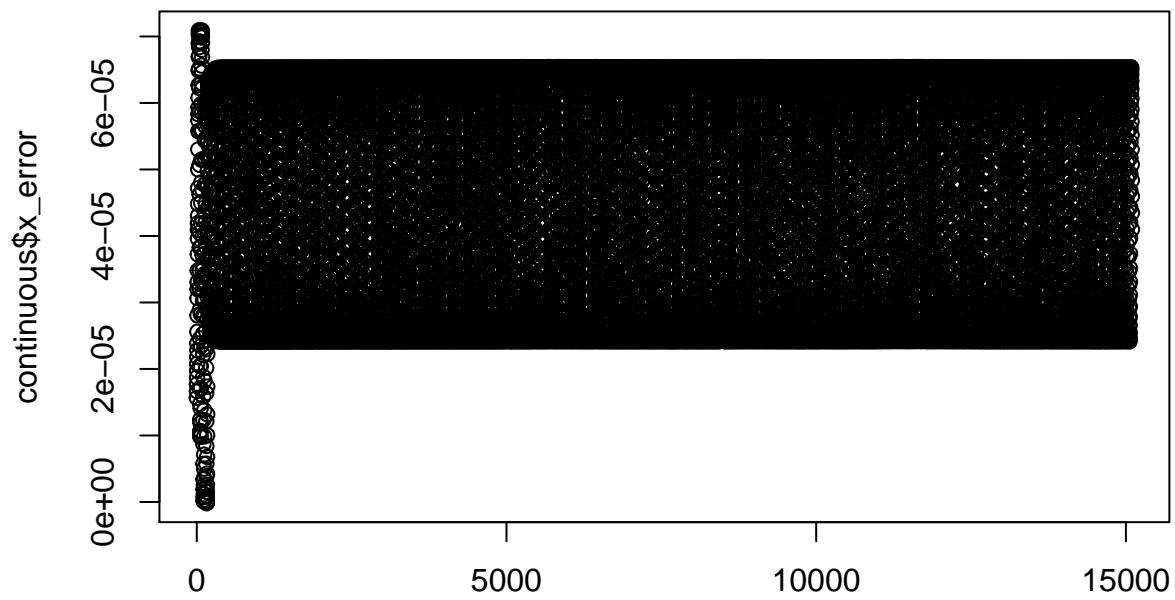
**Y coordinate of robot over time**



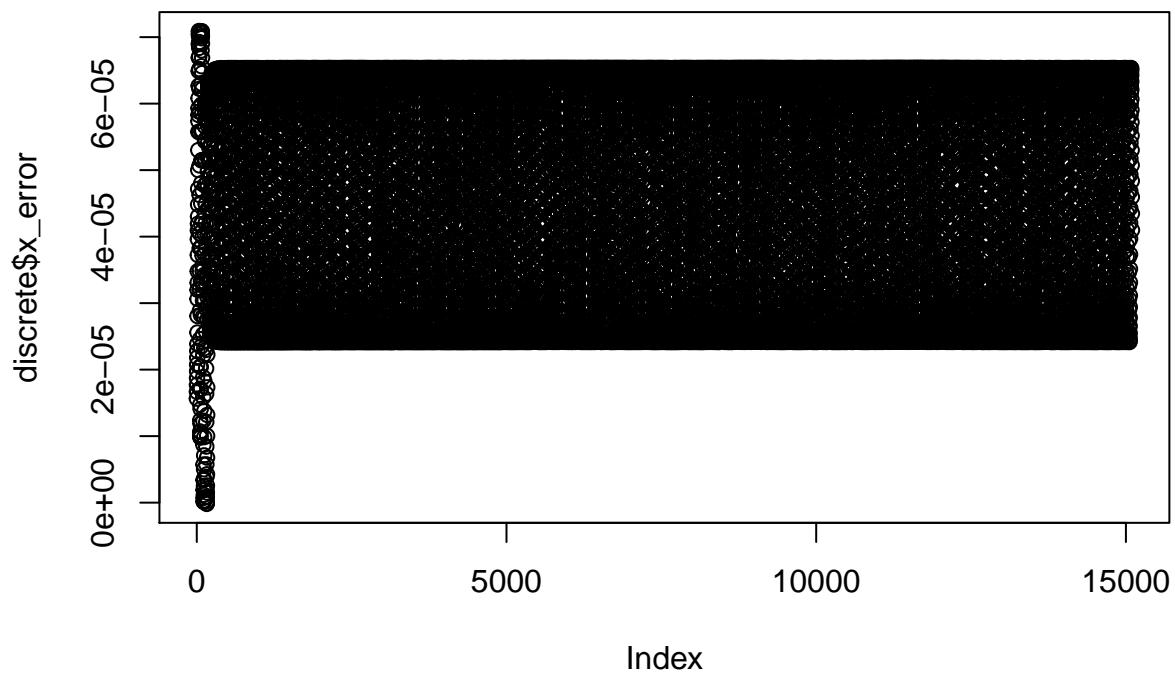
**Distance from origin vs. time**



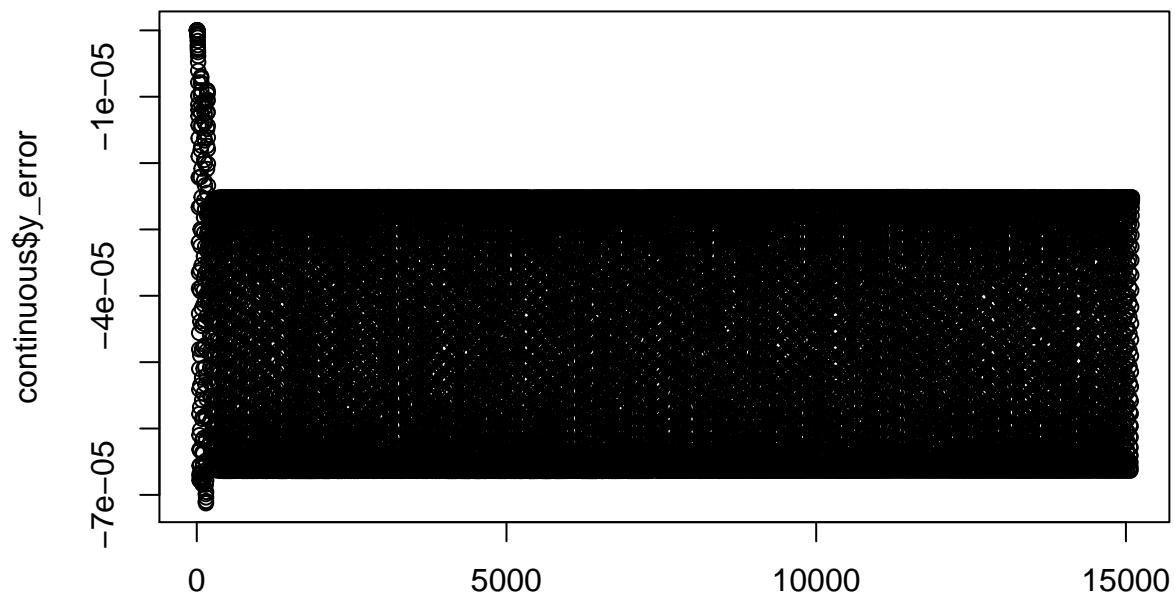
**Continuous x\_error over time**



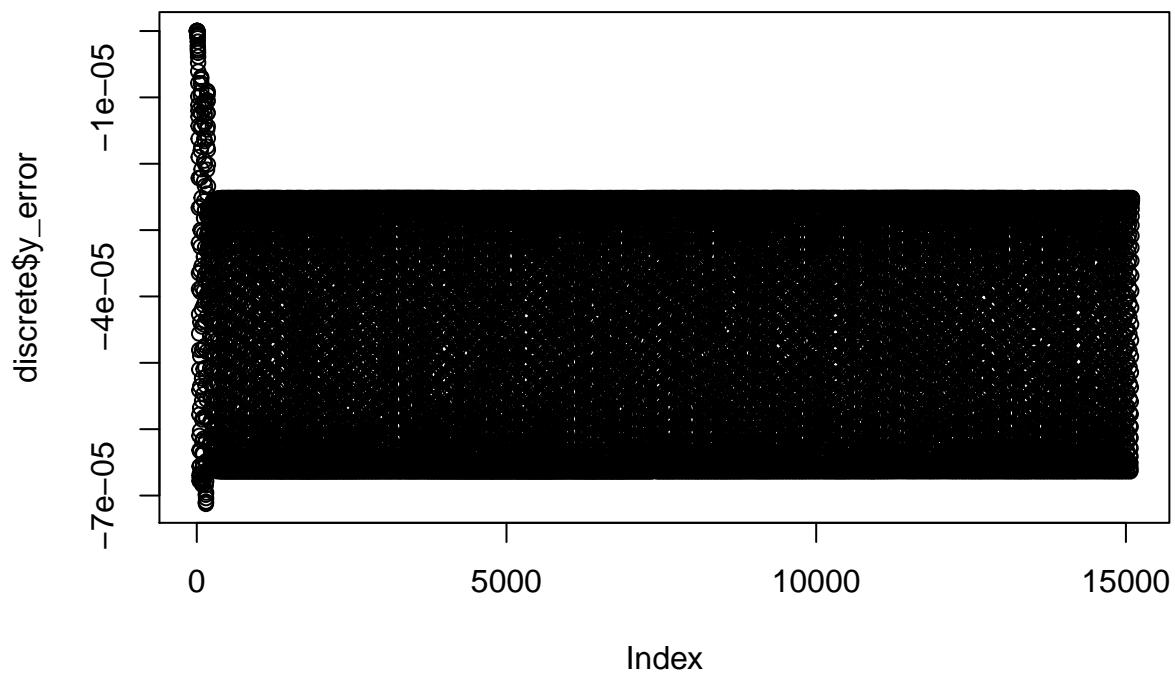
**Discrete x\_error over time**



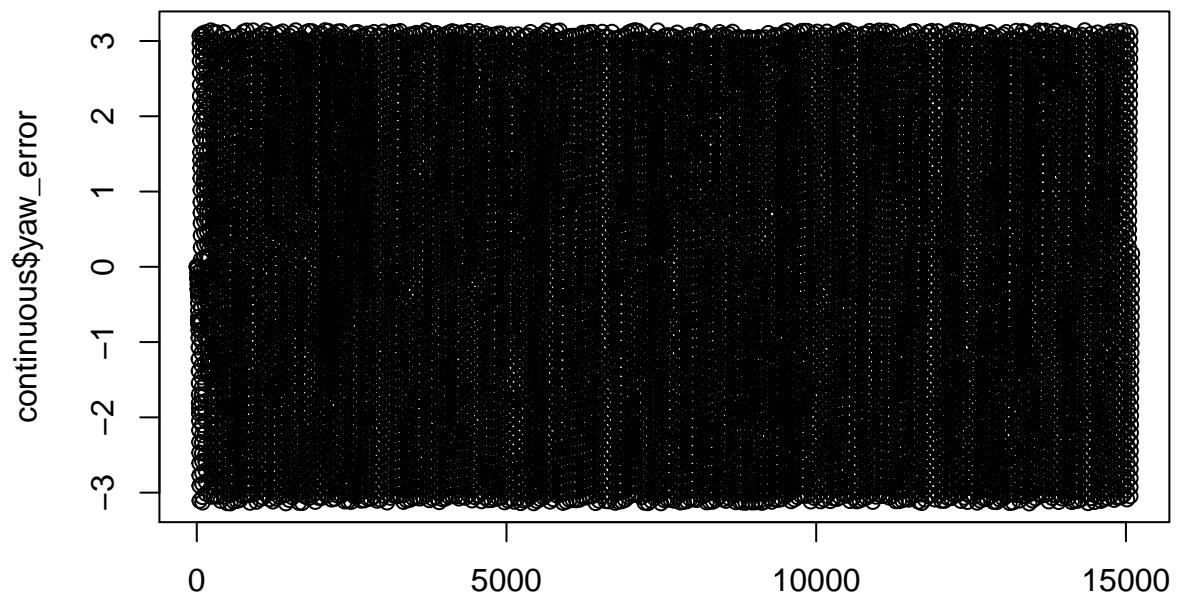
**Continuous y\_error over time**



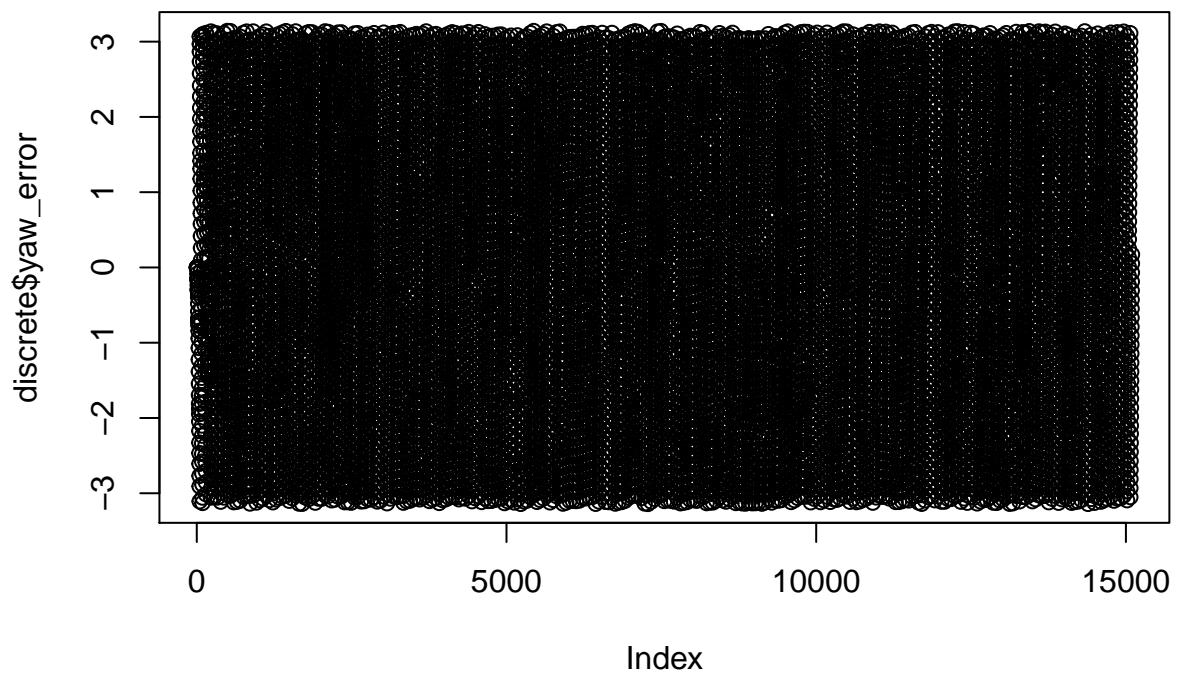
**Discrete y\_error over time**



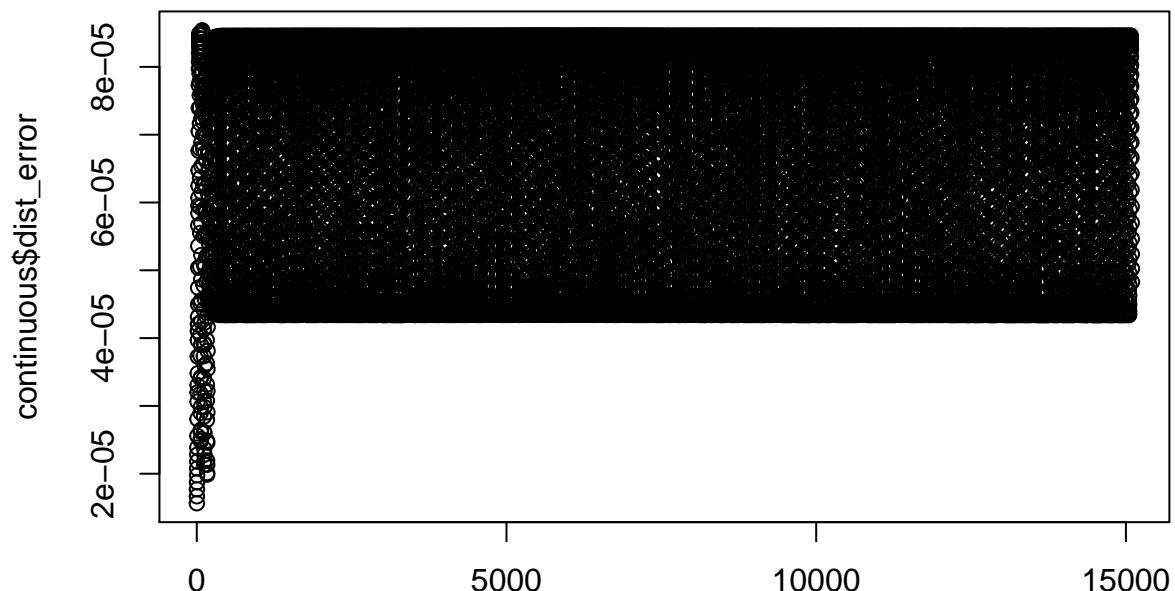
**Continuous yaw error over time**



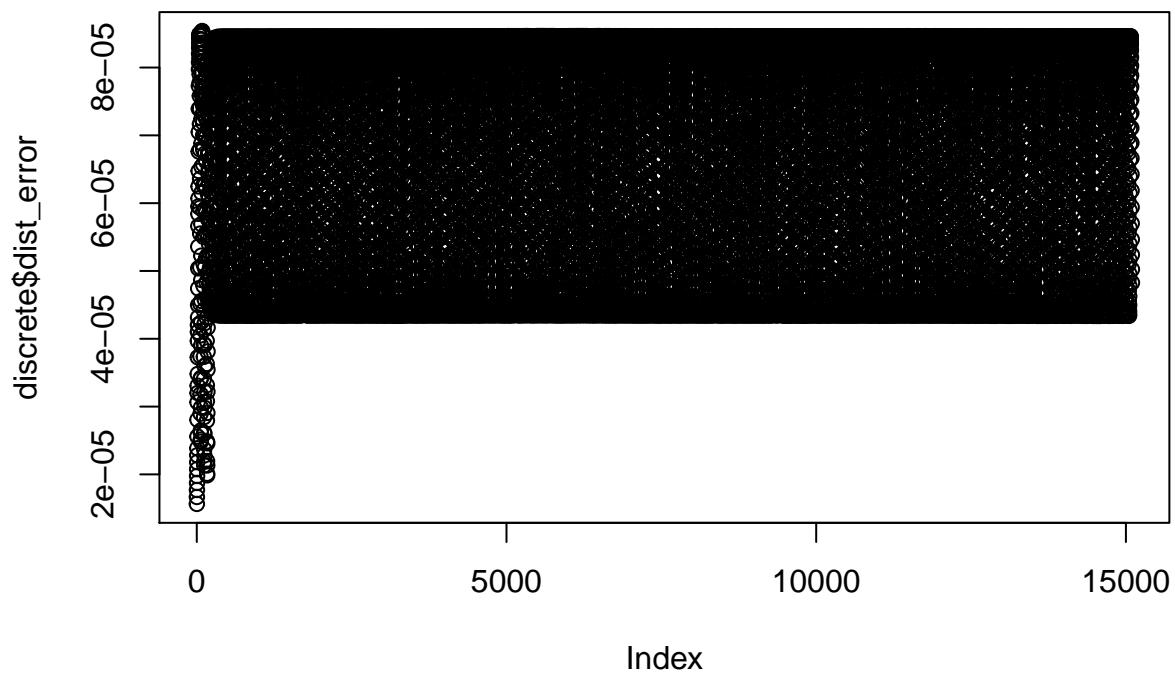
**Discrete yaw error over time**



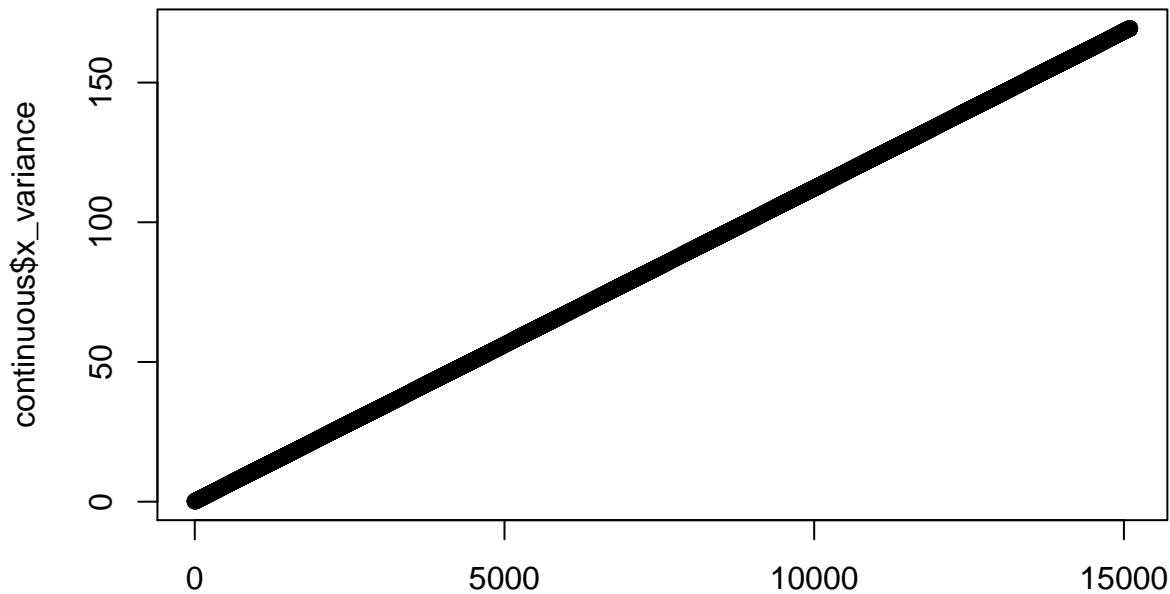
**Continuous total distance error over time**



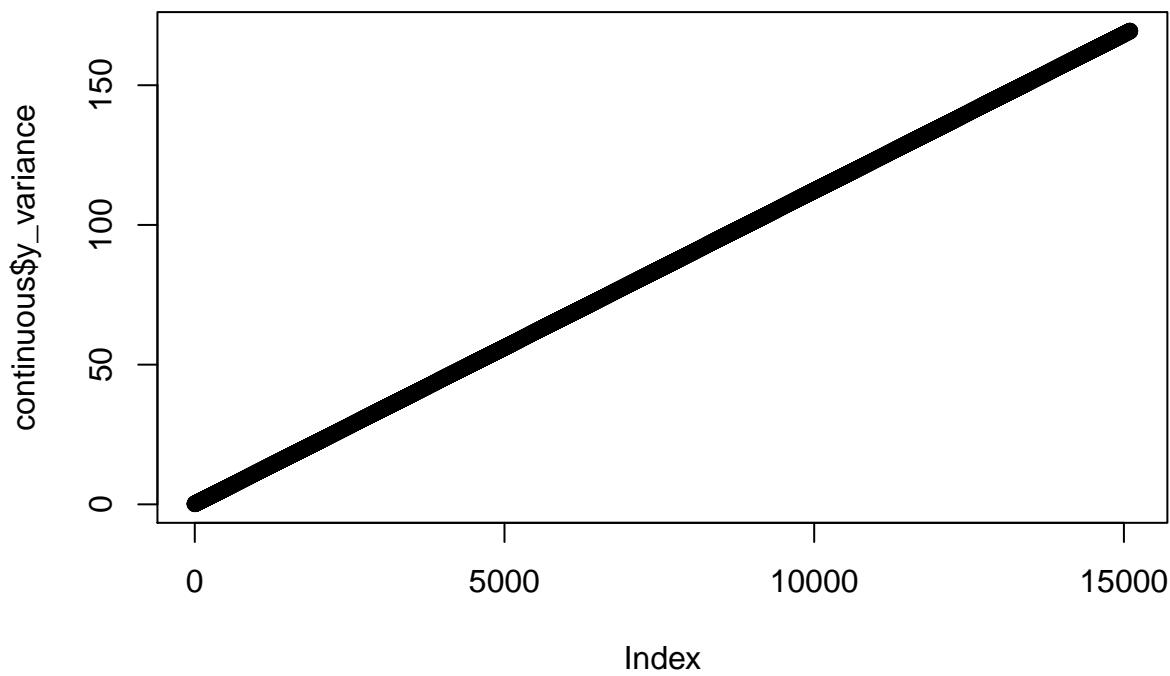
**Discrete total distance error over time**



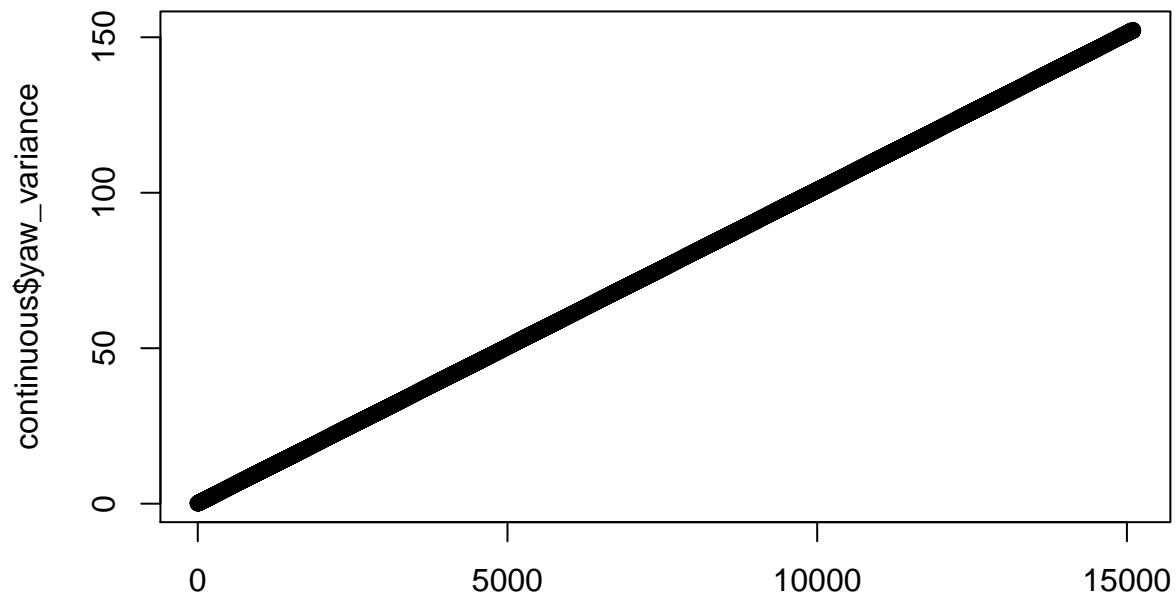
**Continuous Filter X Variance Over Time**



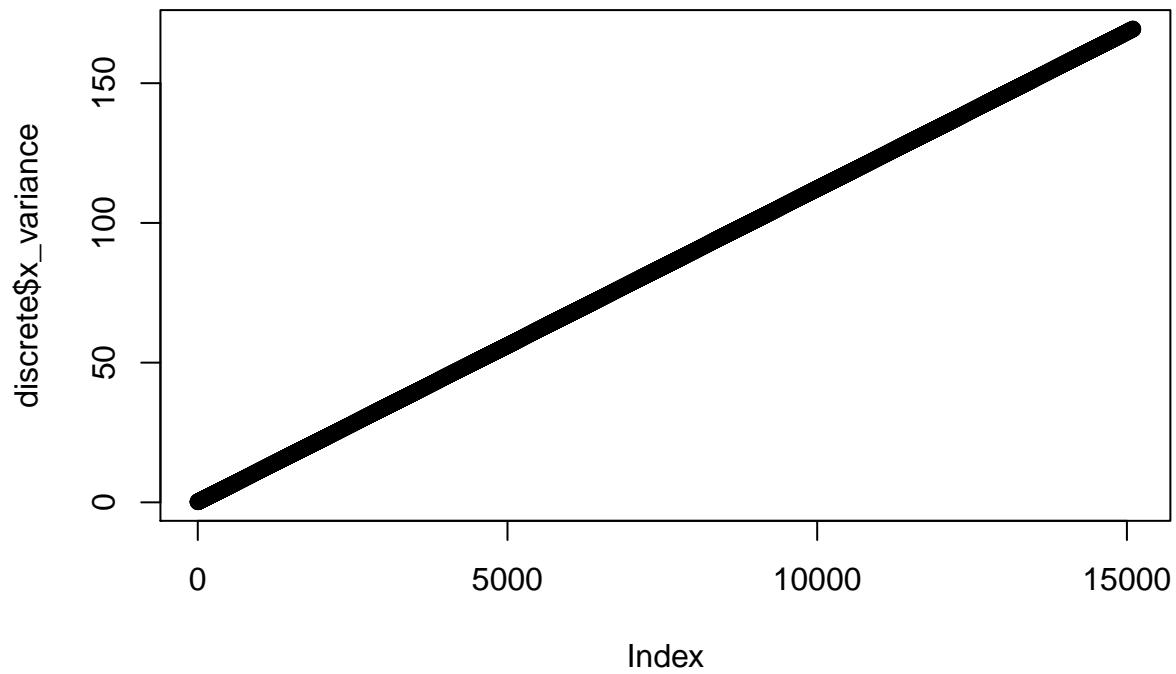
**Continuous Filter Y Variance Over Time**



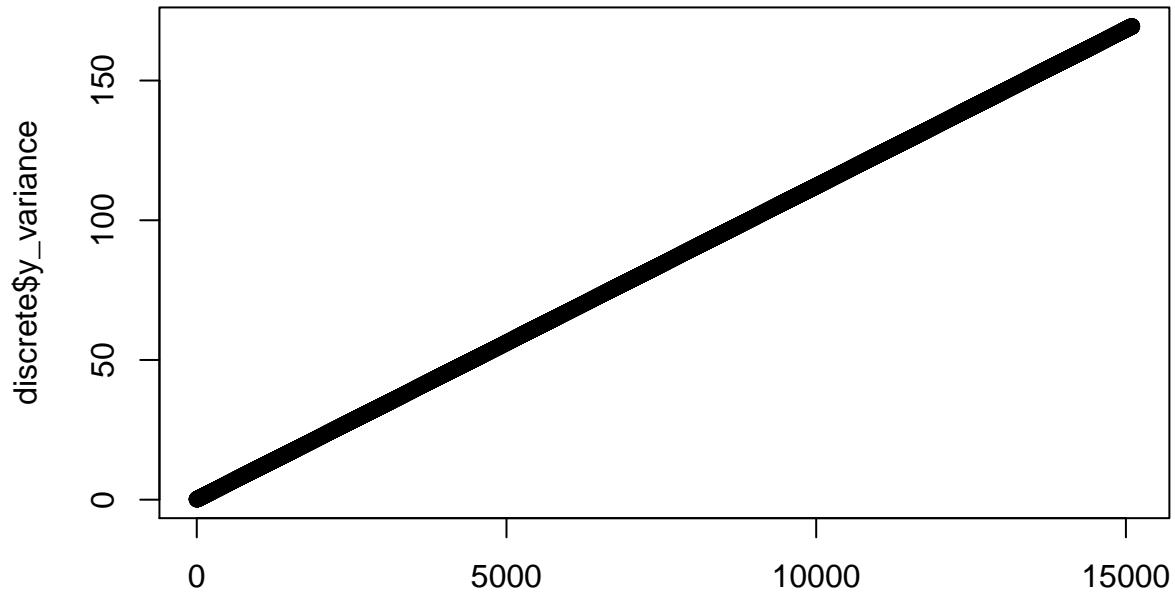
**Continuous Filter Yaw Variance Over Time**



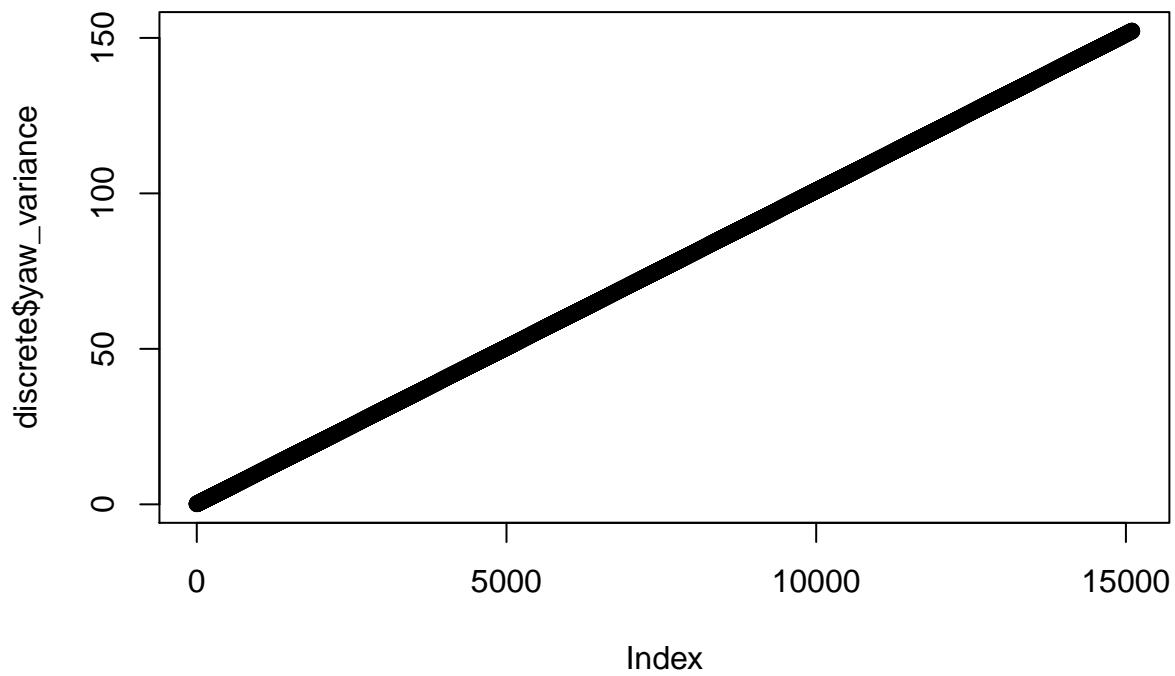
**Discrete Filter X Variance Over Time**



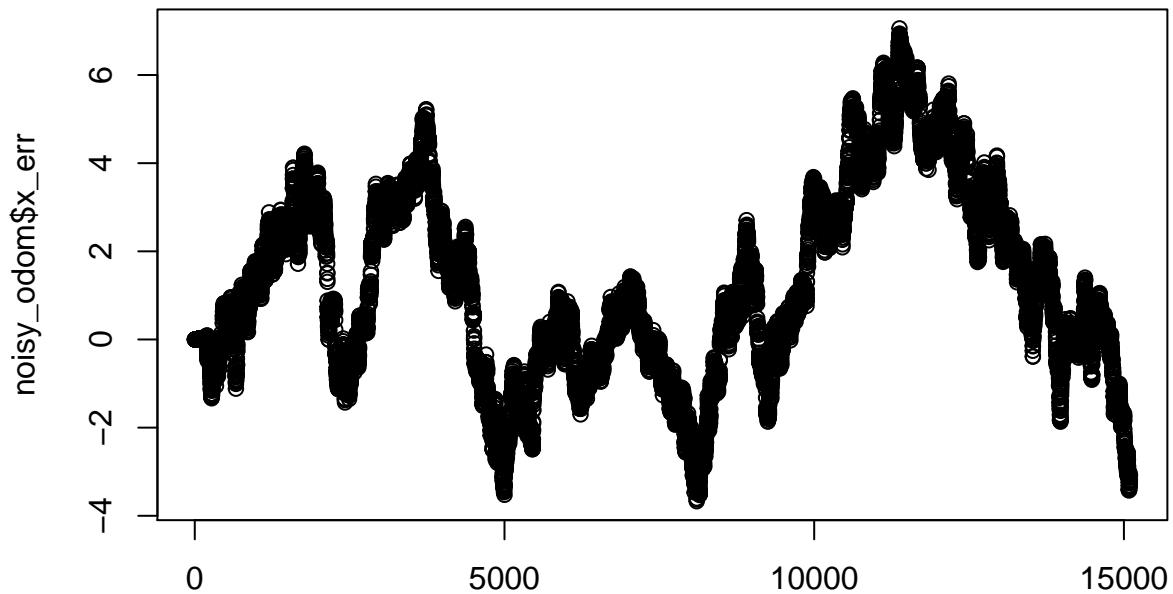
**Discrete Filter Y Variance Over Time**



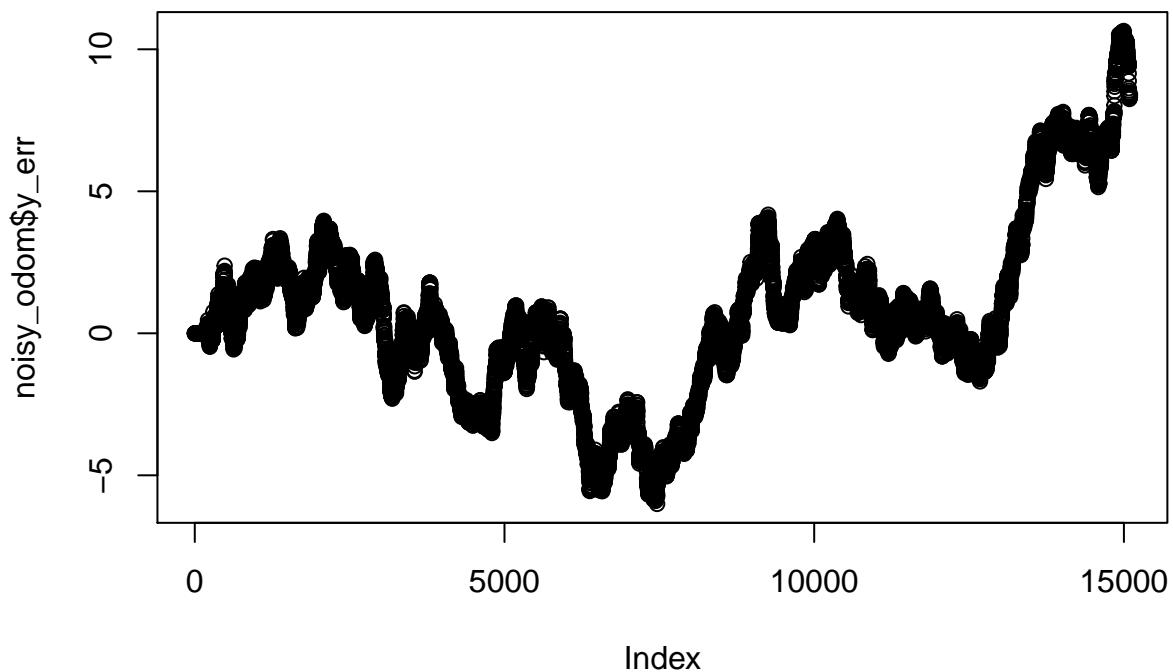
**Discrete Filter Yaw Variance Over Time**



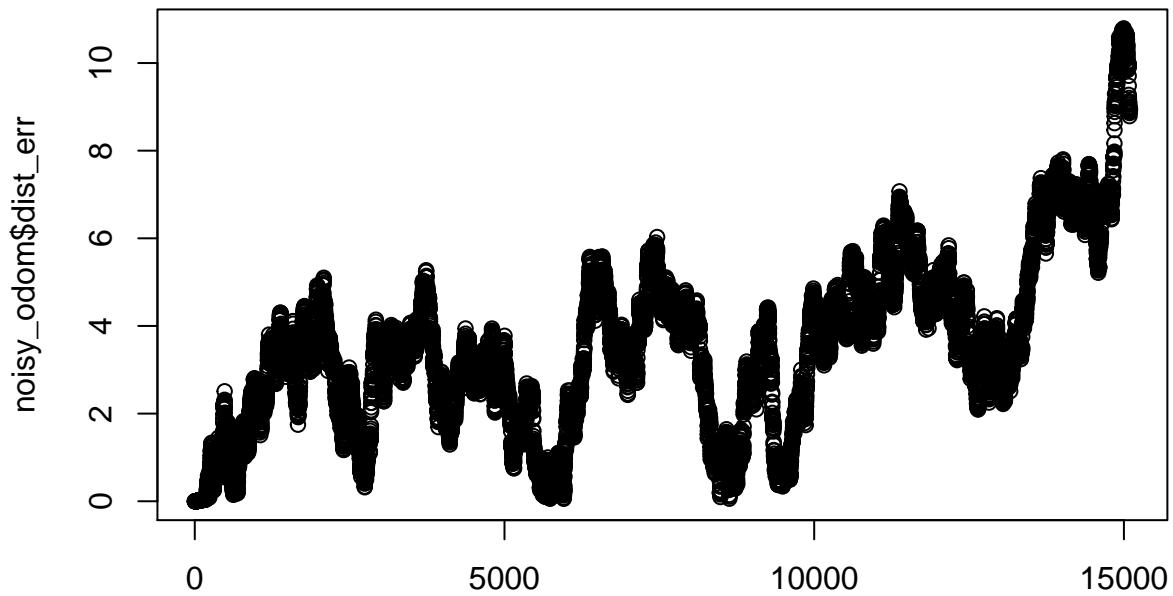
**Noisy Odom X Error Over Time**



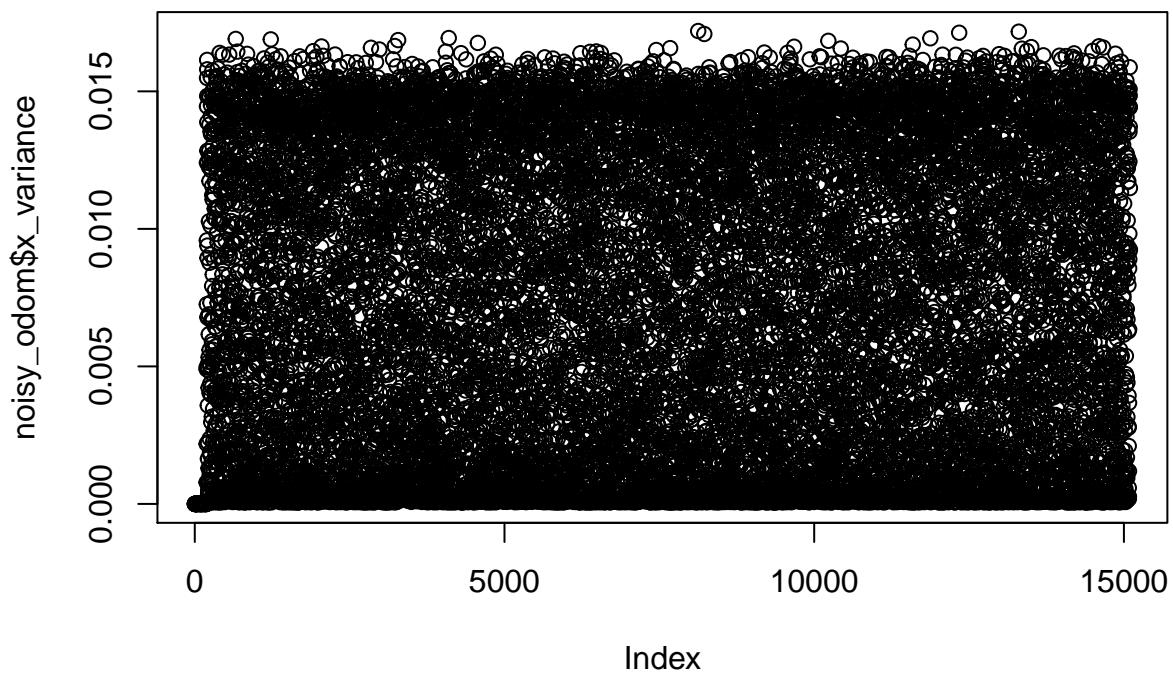
**Noisy Odom Y Error Over Time**



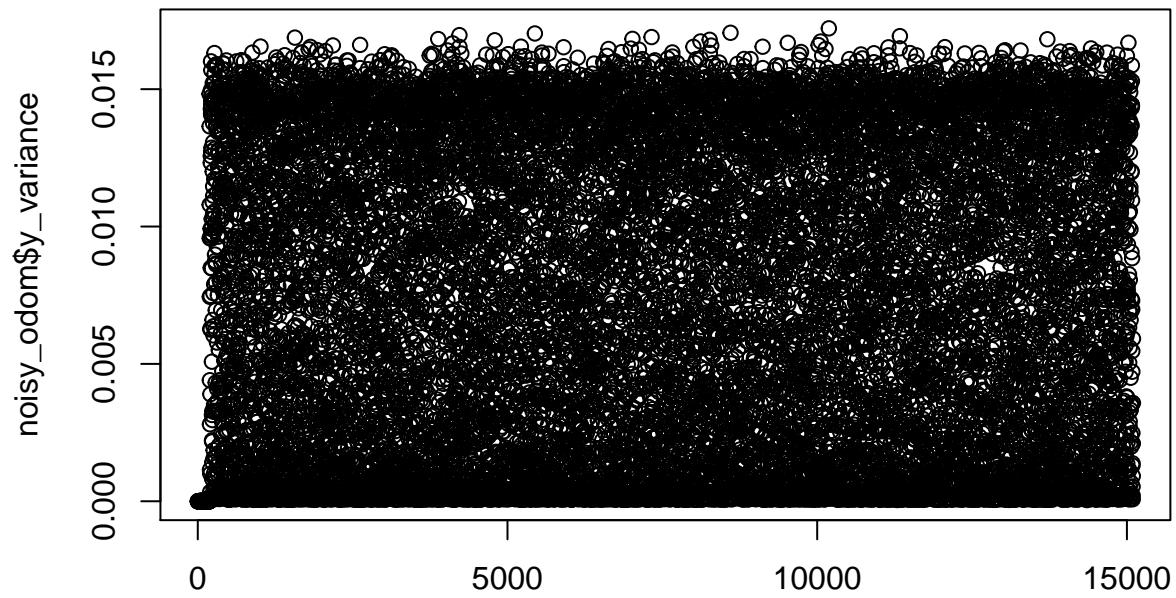
### Noisy Odom Horizontal Distance Error Over Time



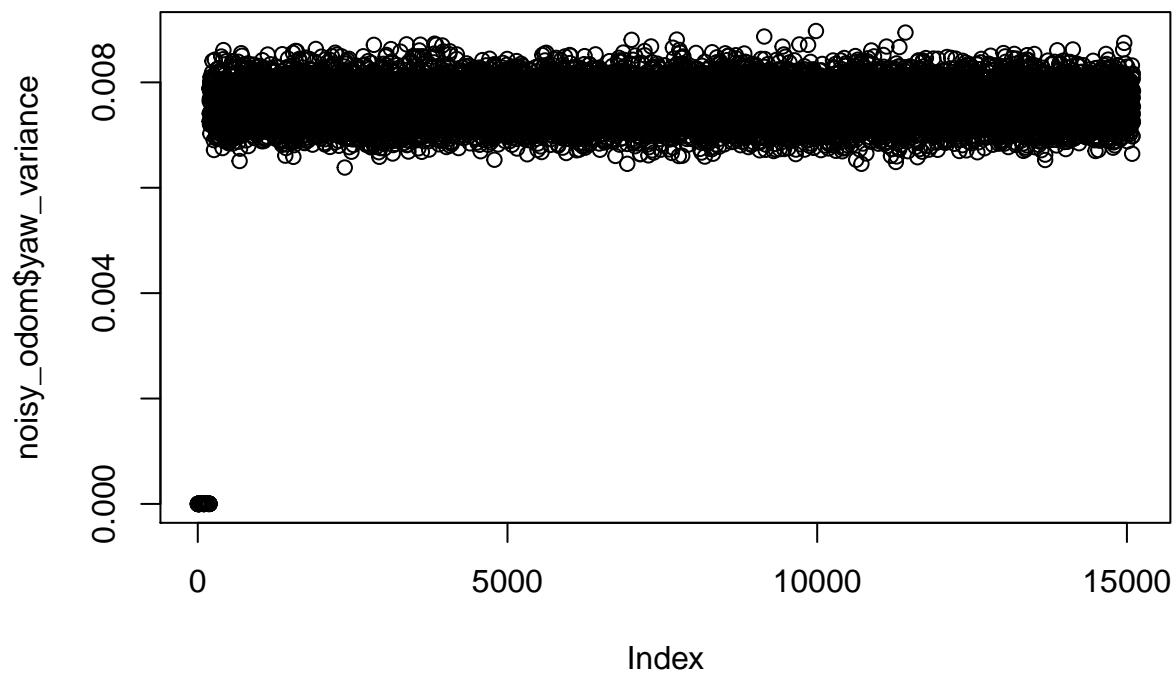
Variance of X Coordinate in Noisy Odometry



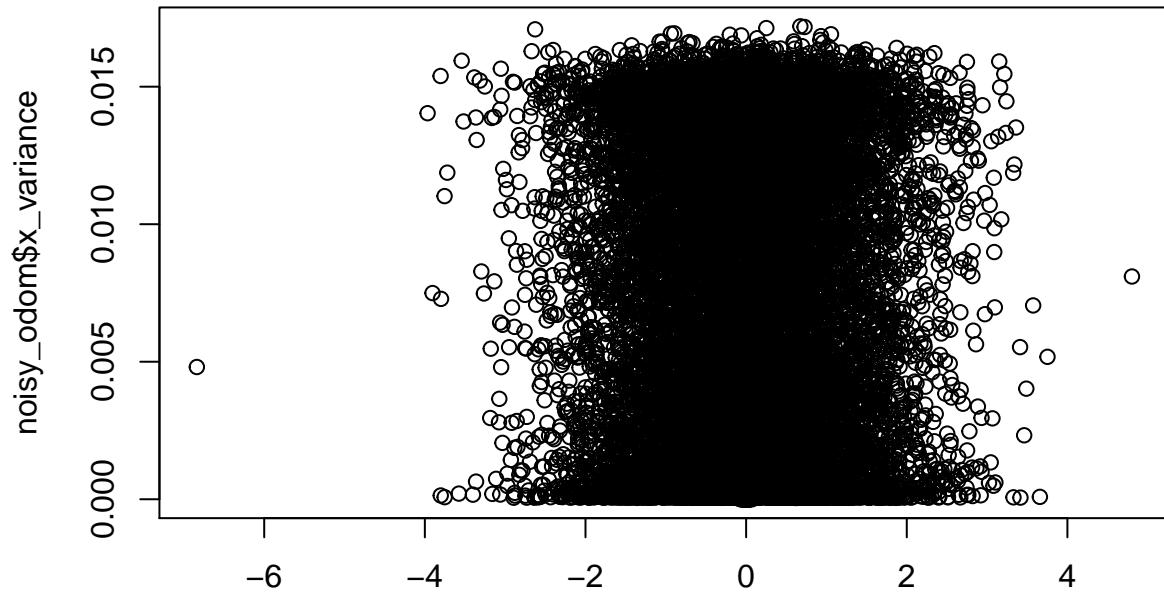
**Variance of Y Coordinate in Noisy Odometry**



**Variance of Yaw Coordinate in Noisy Odometry**



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



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

