

# 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, 6 minutes, and 40.6 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.
## -0.0579  7.1790  7.8900  7.8300  9.0520 12.6600
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -1.307   4.603   6.328   9.263  12.180  24.170
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -3.14100 -1.57300  0.05442  0.05513  1.71500  3.14000
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.000013  8.796000 10.350000 12.690000 15.200000 26.390000
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -1.8550 -0.2575  0.4299  0.4947  1.3260  4.5310
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -6.16300 -0.90910  0.17760  0.01794  1.15800  5.31600
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -3.1400 -1.4520 -0.5391 -0.2733  1.0190  3.1410
```

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

```

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.000015 0.790300 1.627000 1.820000 2.455000 6.353000
summary(noisy_odom$x_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -5.6810 -2.0000 -0.1198 -1.1800  0.0138  0.9061
summary(noisy_odom$y_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -0.4558  0.6422  1.1280  2.6360  5.0920  6.4730
summary(noisy_odom$dist_err)

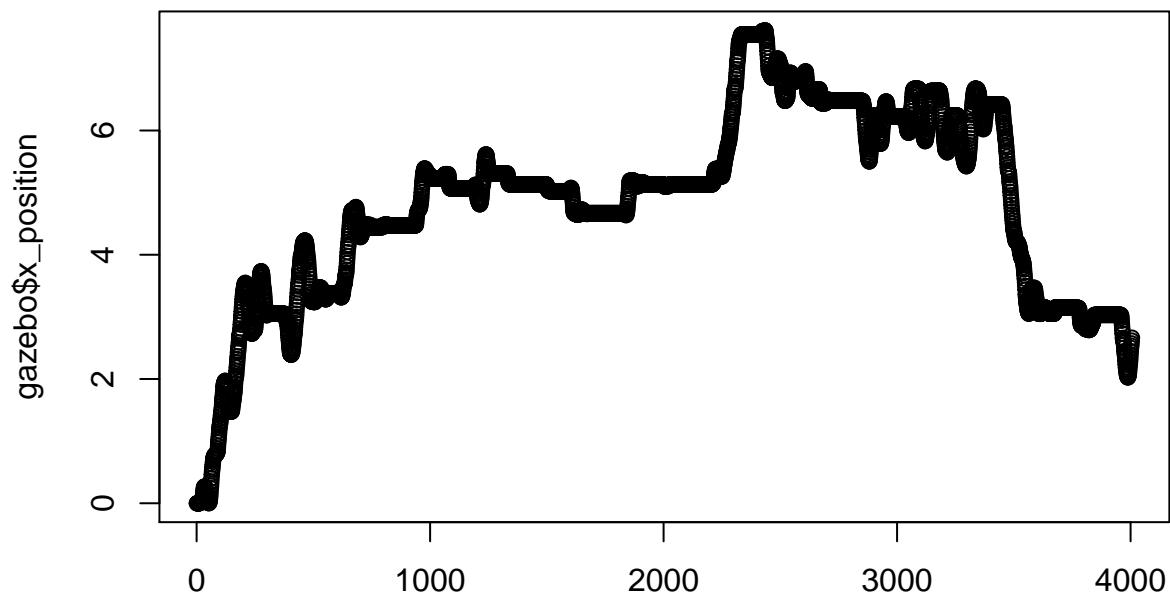
##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.000008 0.781800 1.136000 3.080000 5.374000 8.195000
if (NROW(gps) > 0) {
  summary(gps$x_err)
  summary(gps$y_err)
  summary(gps$dist_err)
}

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 2.533   6.110   7.952   8.654  11.730  14.750
if (NROW(noisy_odom) > 0) {
  summary(noisy_odom$x_variance)
  summary(noisy_odom$y_variance)
  summary(noisy_odom$yaw_variance)
}

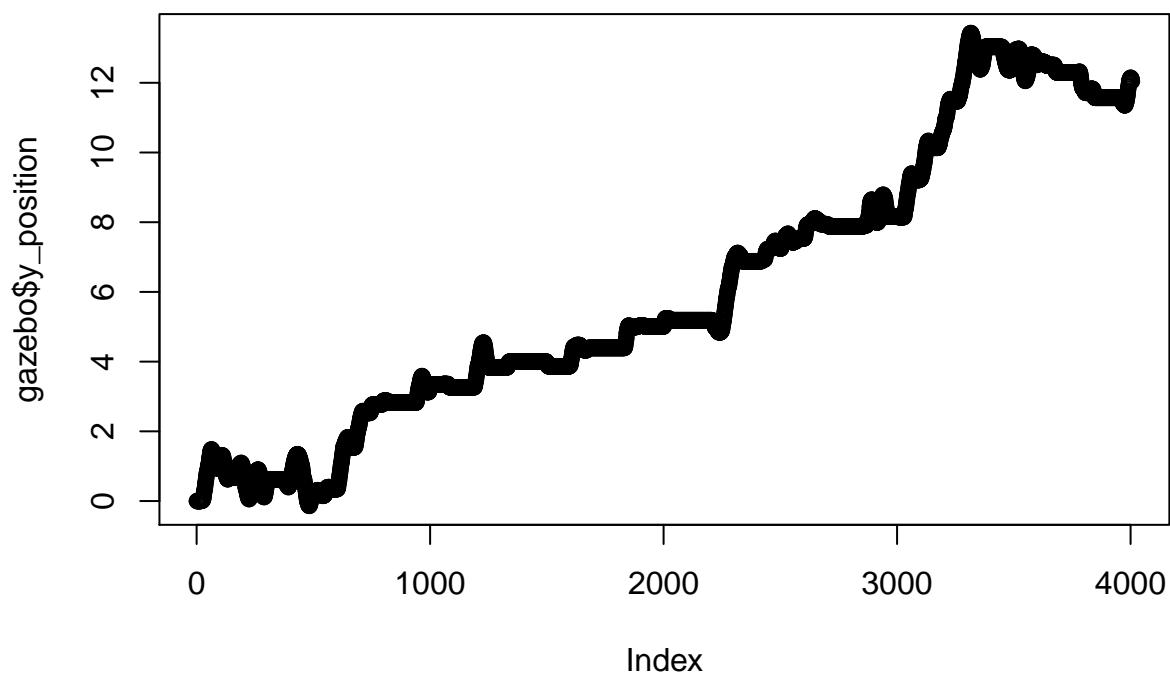
##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.000e+00 2.306e-06 4.412e-06 4.808e-04 6.904e-06 8.695e-03

```

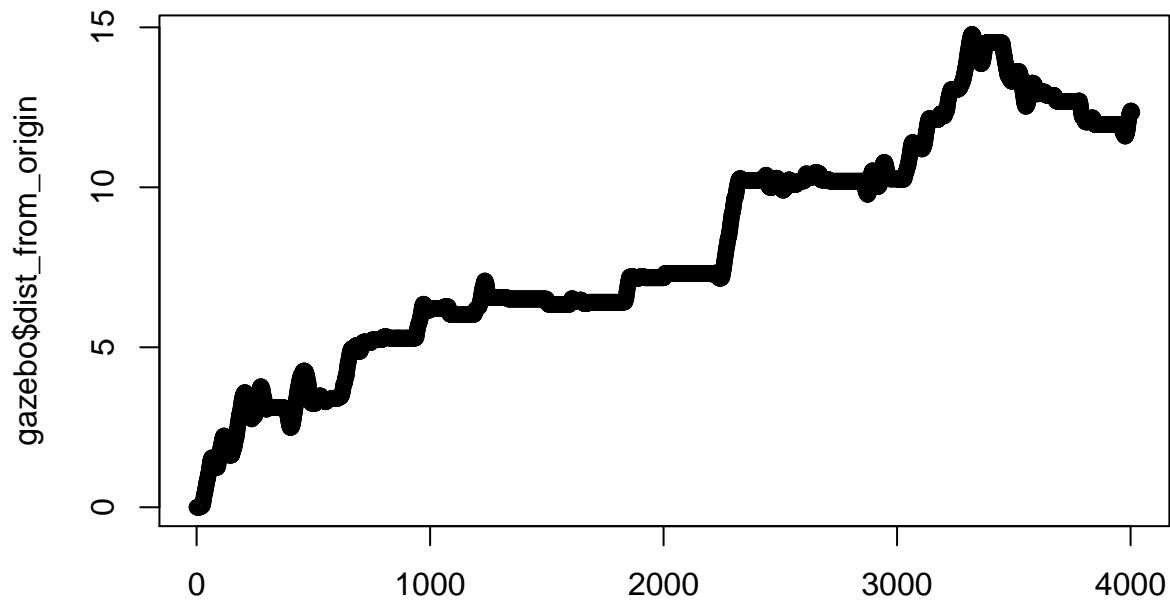
**X coordinate of robot over time**



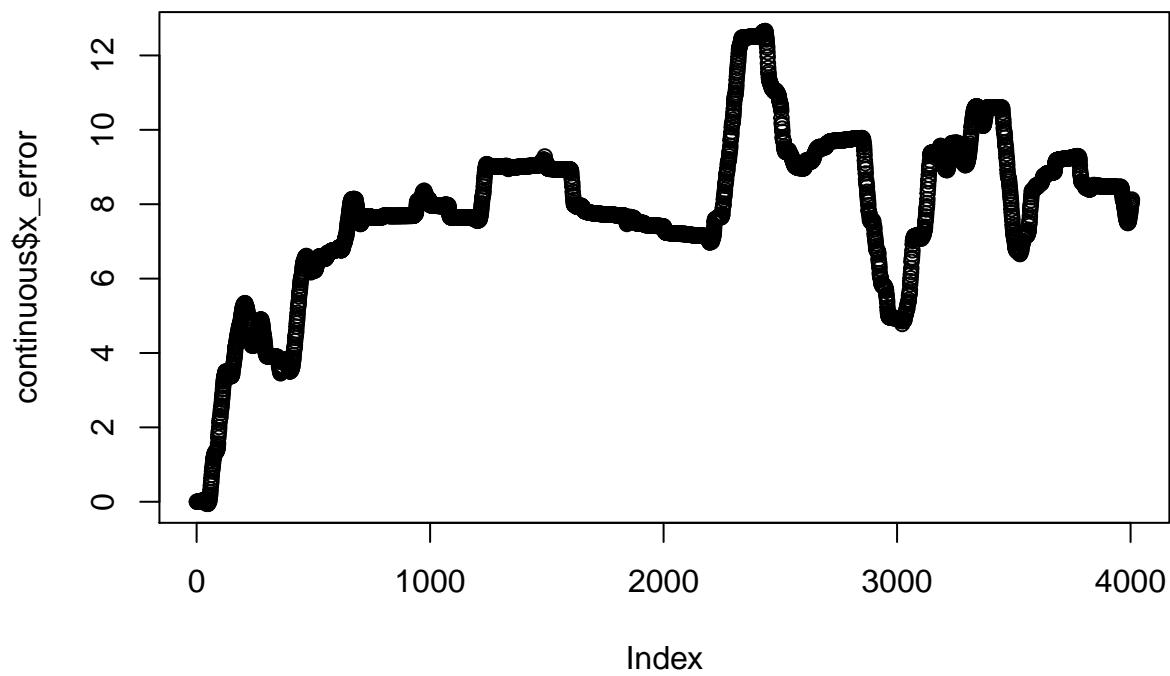
**Y coordinate of robot over time**



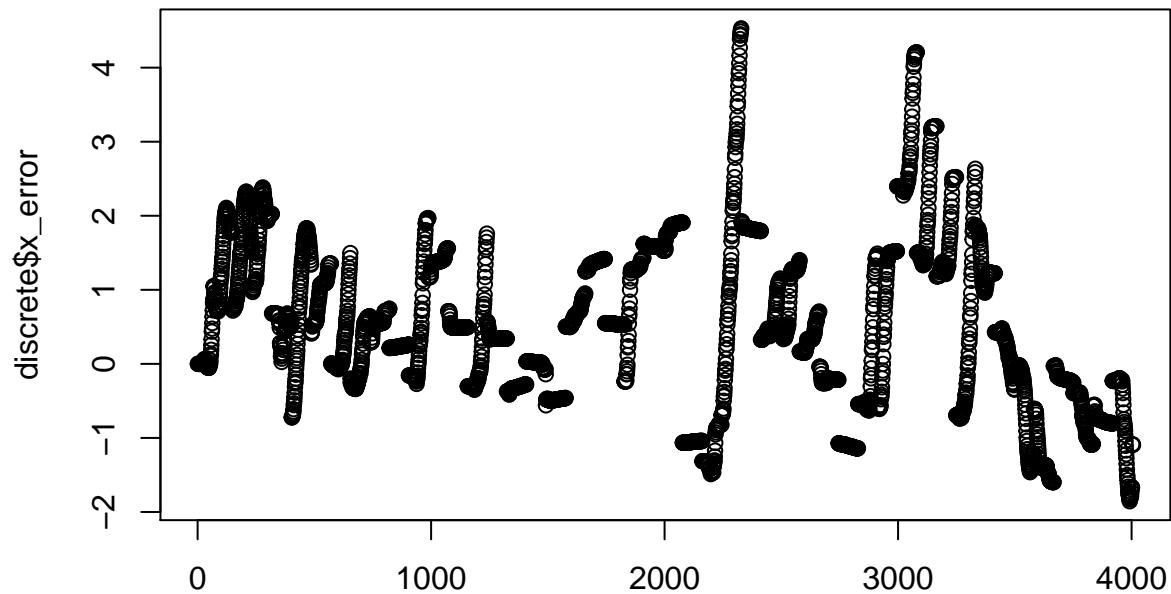
**Distance from origin vs. time**



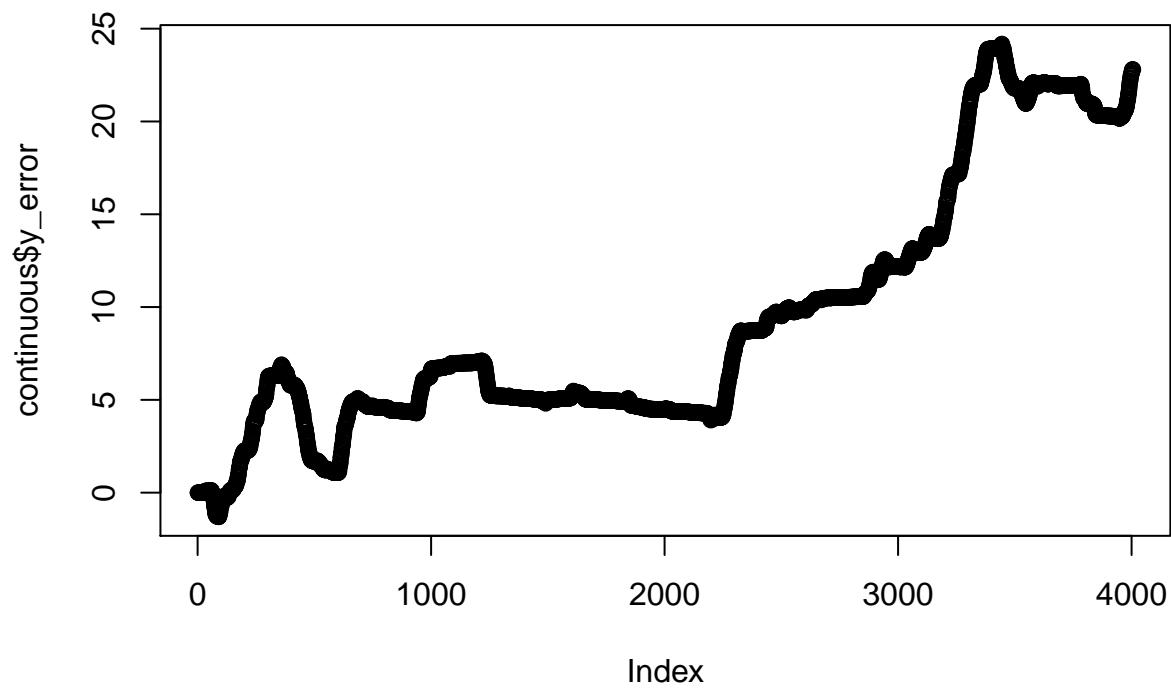
**Continuous x\_error over time**



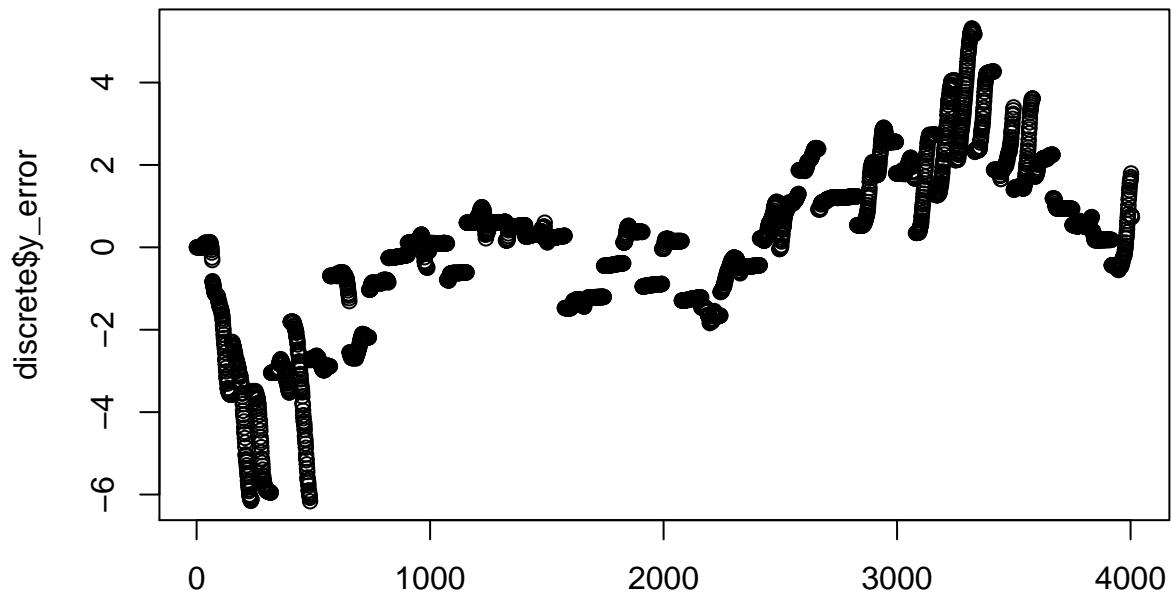
**Discrete x\_error over time**



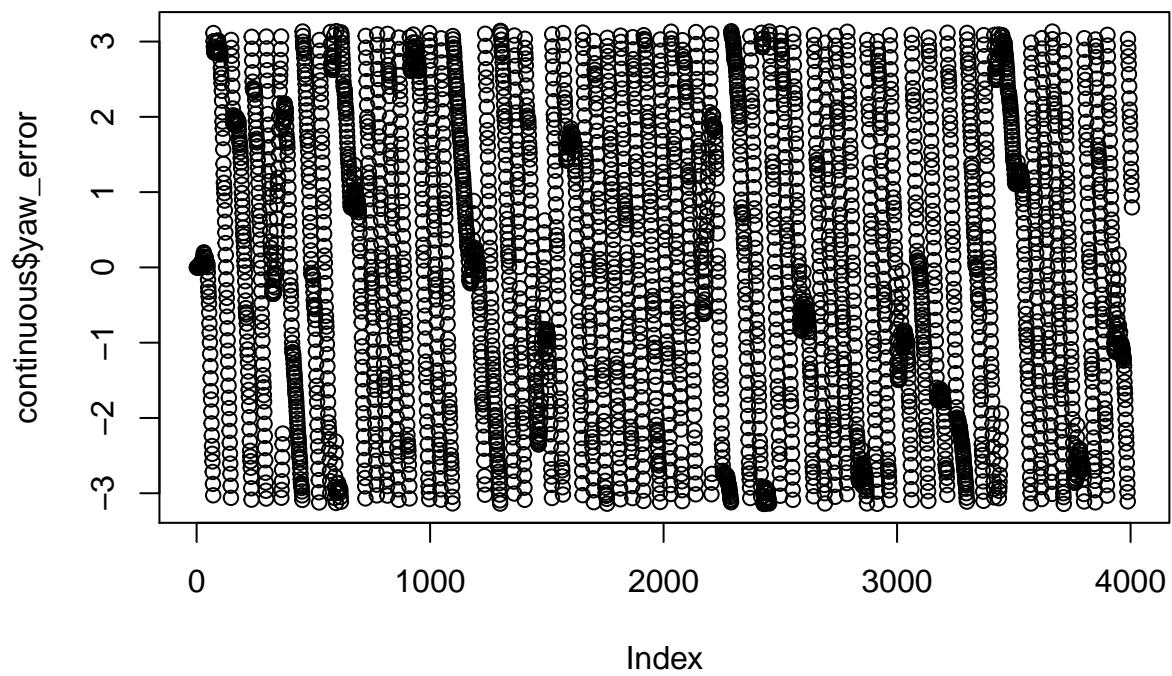
**Continuous y\_error over time**



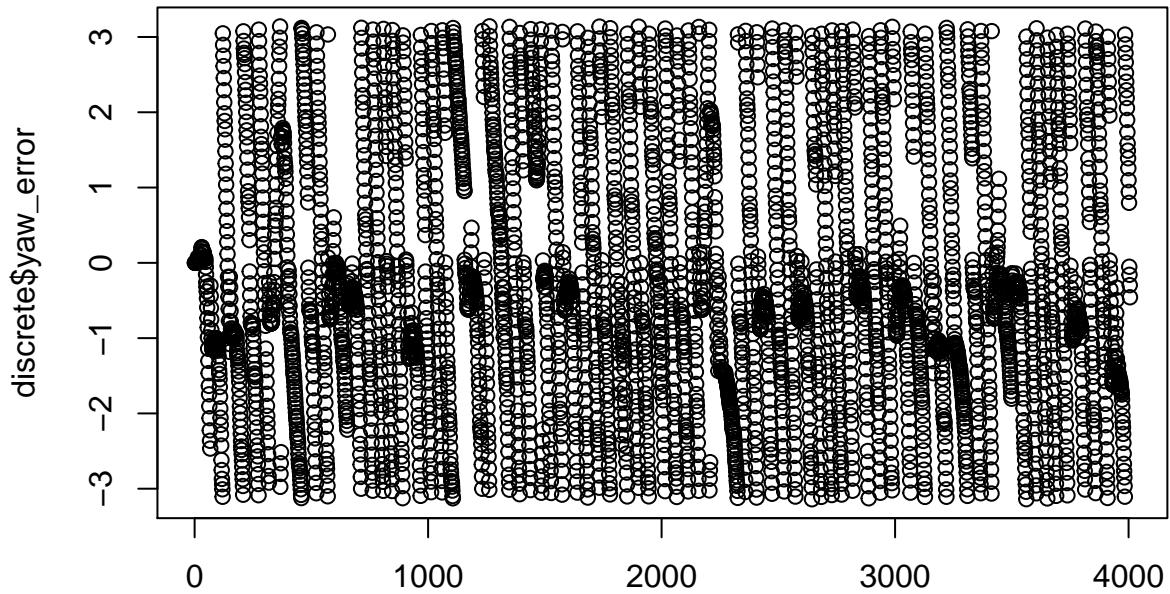
**Discrete y\_error over time**



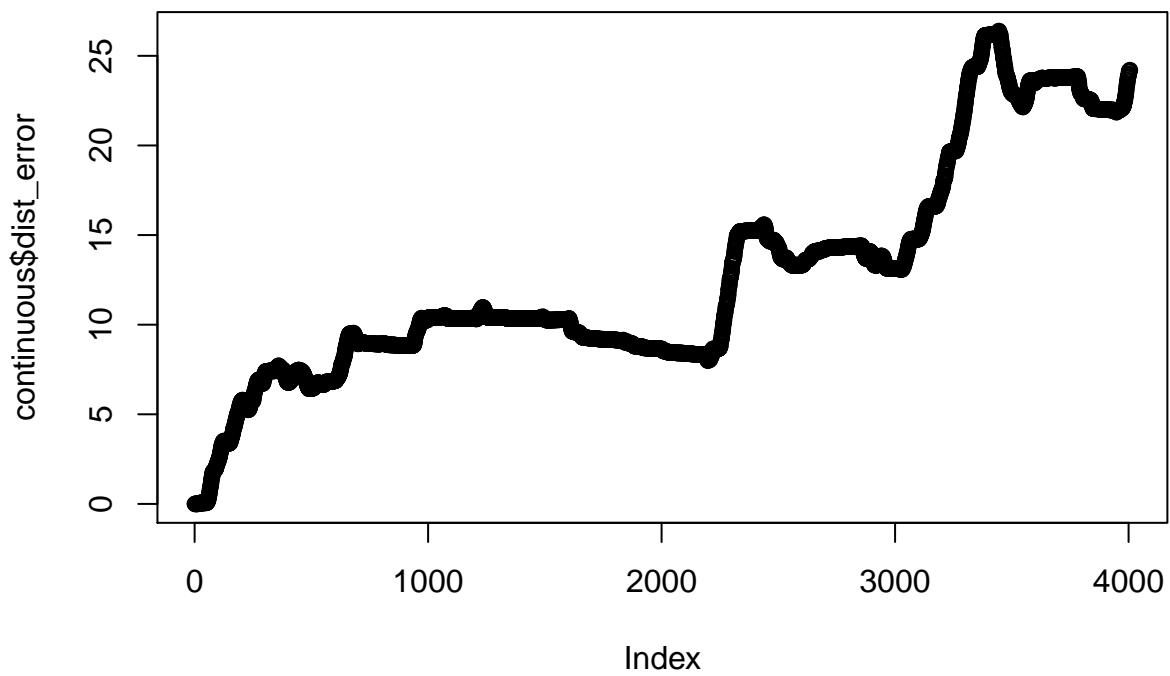
**Continuous yaw error over time**



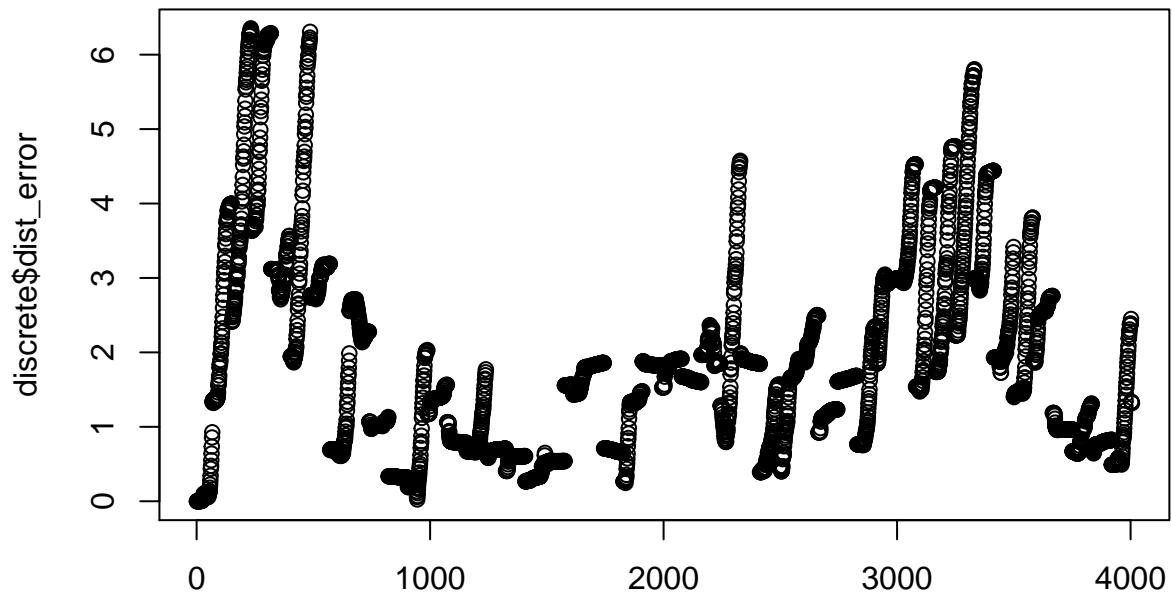
**Discrete yaw error over time**



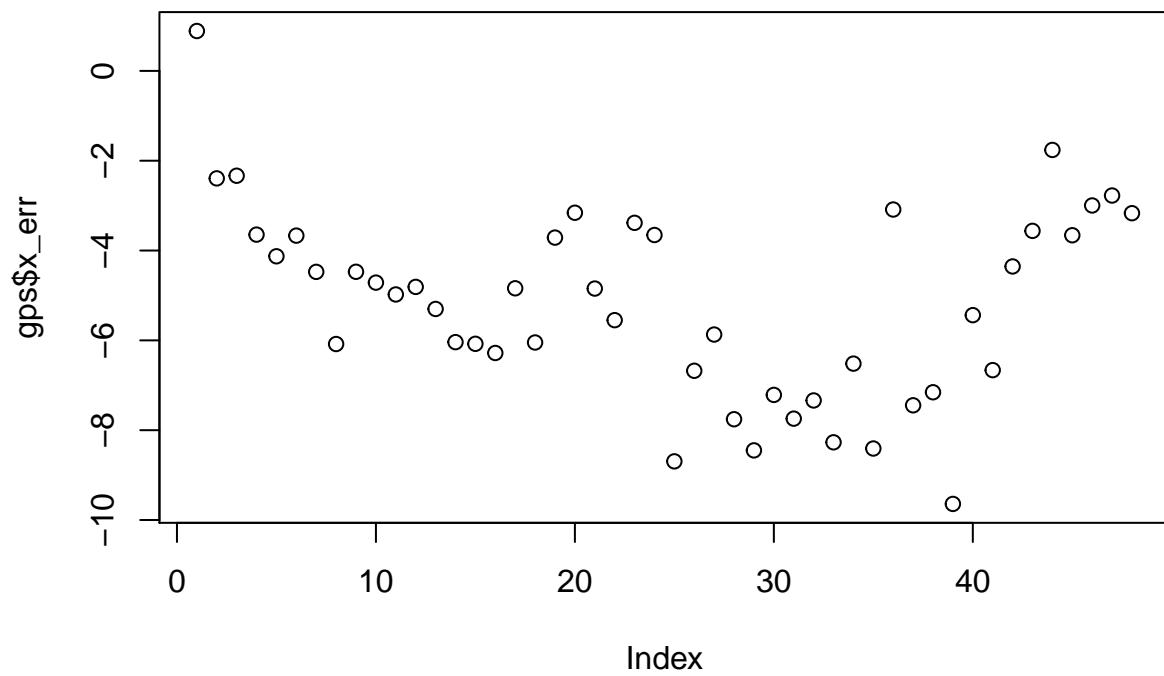
**Continuous total distance error over time**



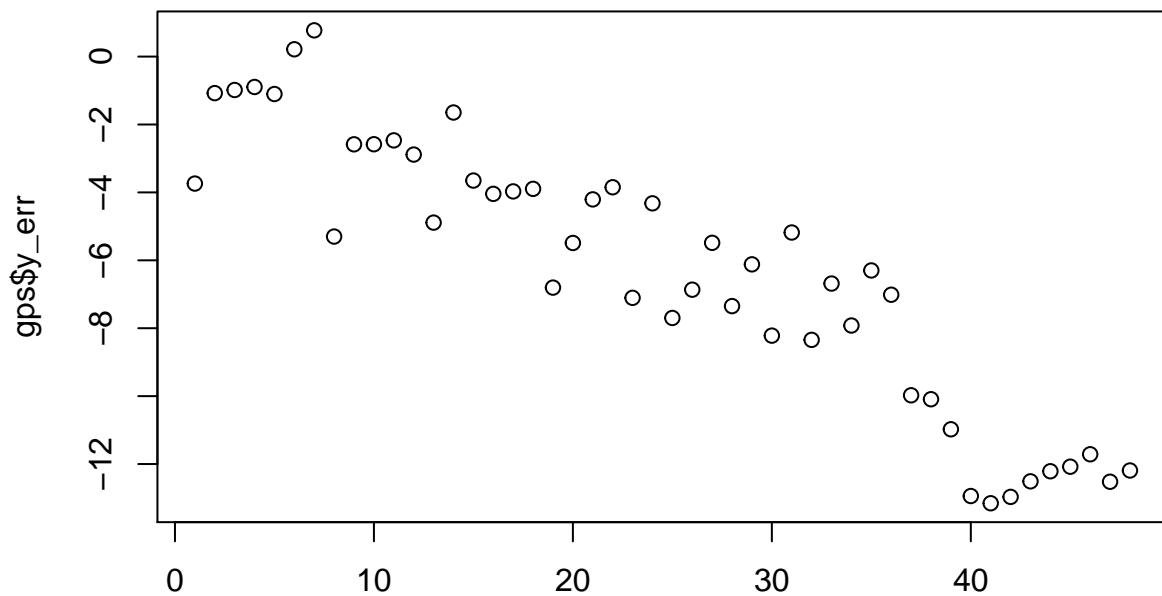
**Discrete total distance error over time**



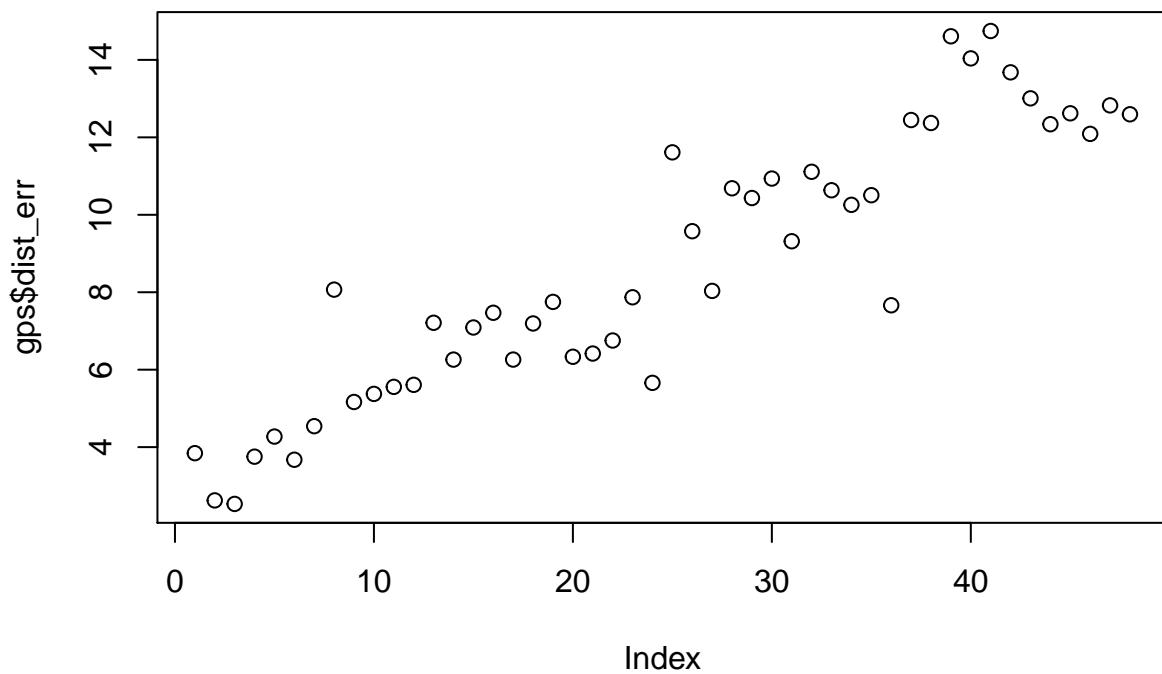
**GPS X Error Over Time**



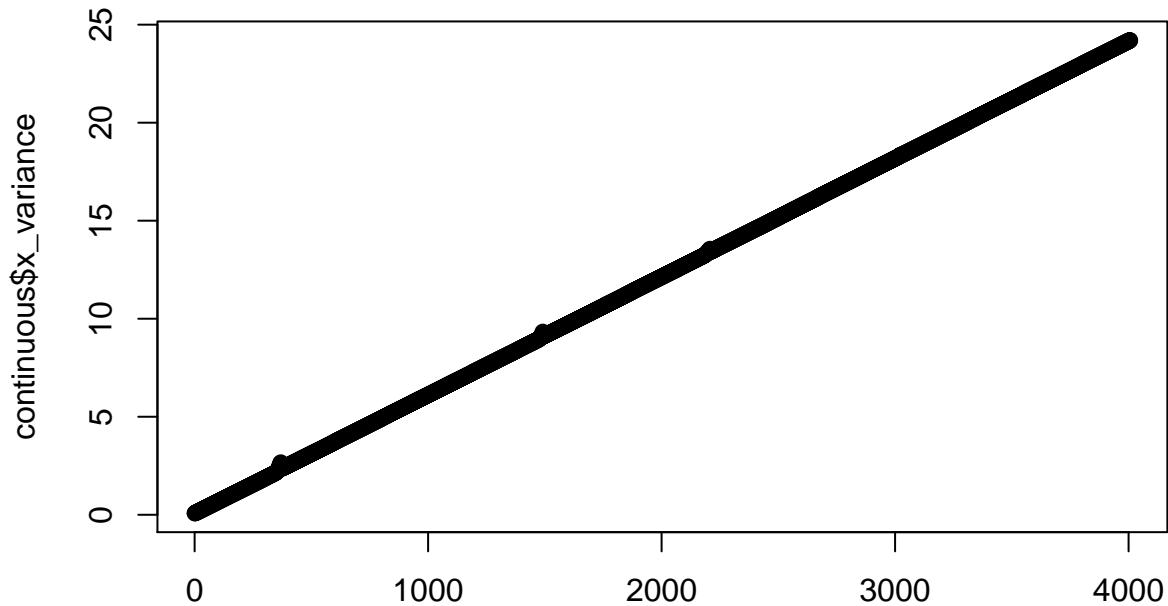
**GPS Y Error Over Time**



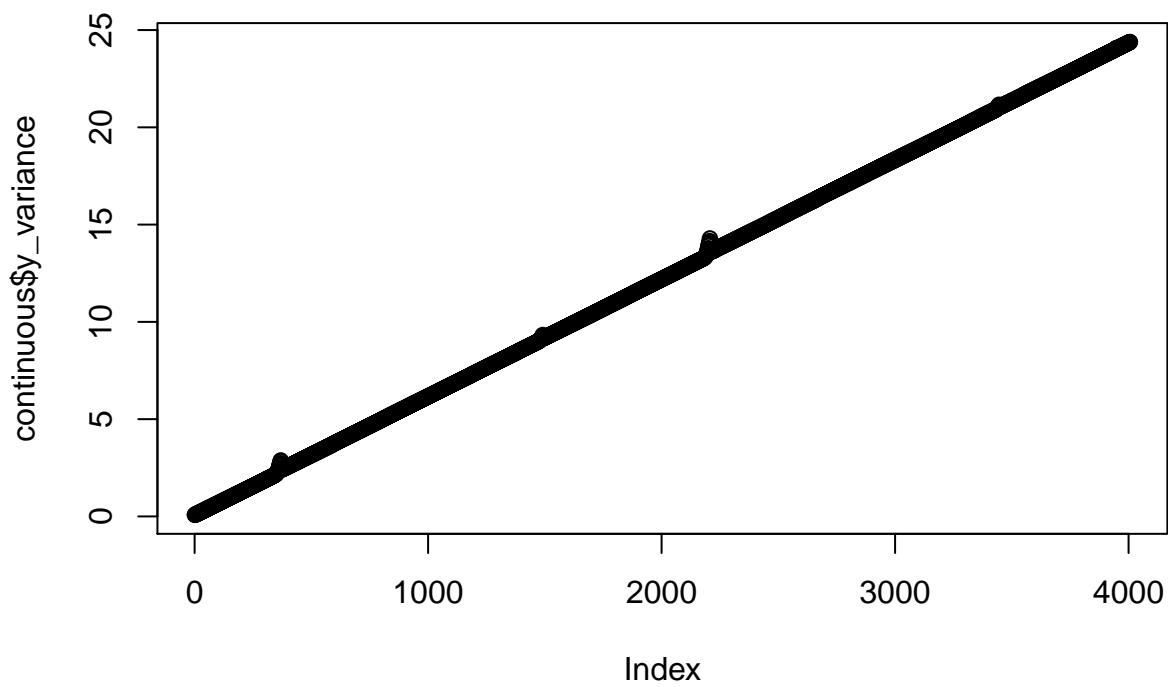
**GPS Horizontal Distance Error Over Time**



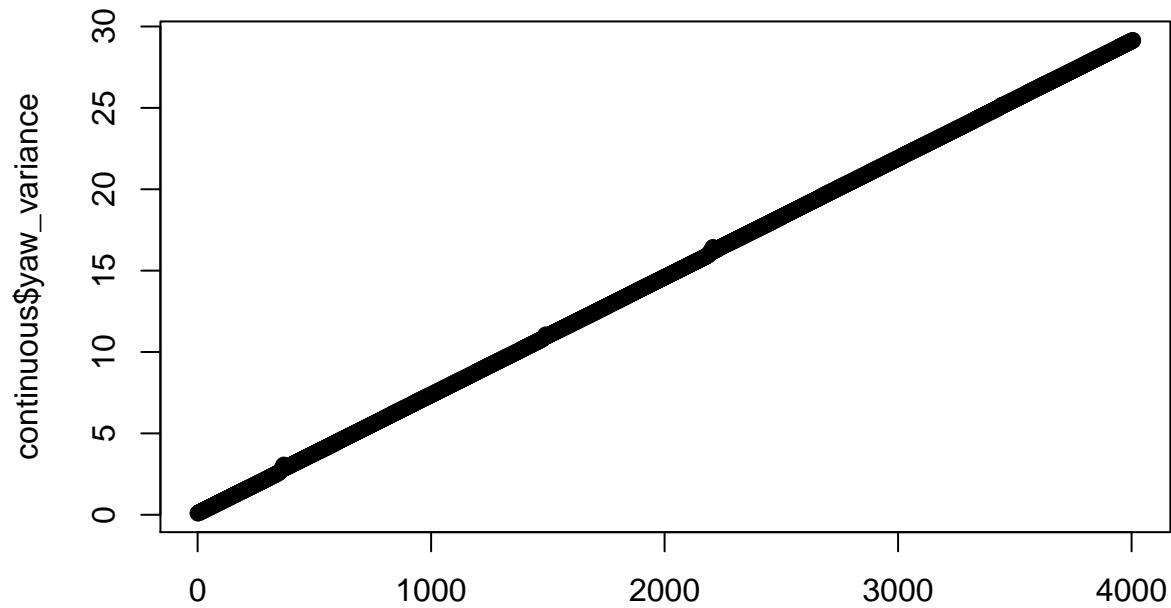
**Continuous Filter X Variance Over Time**



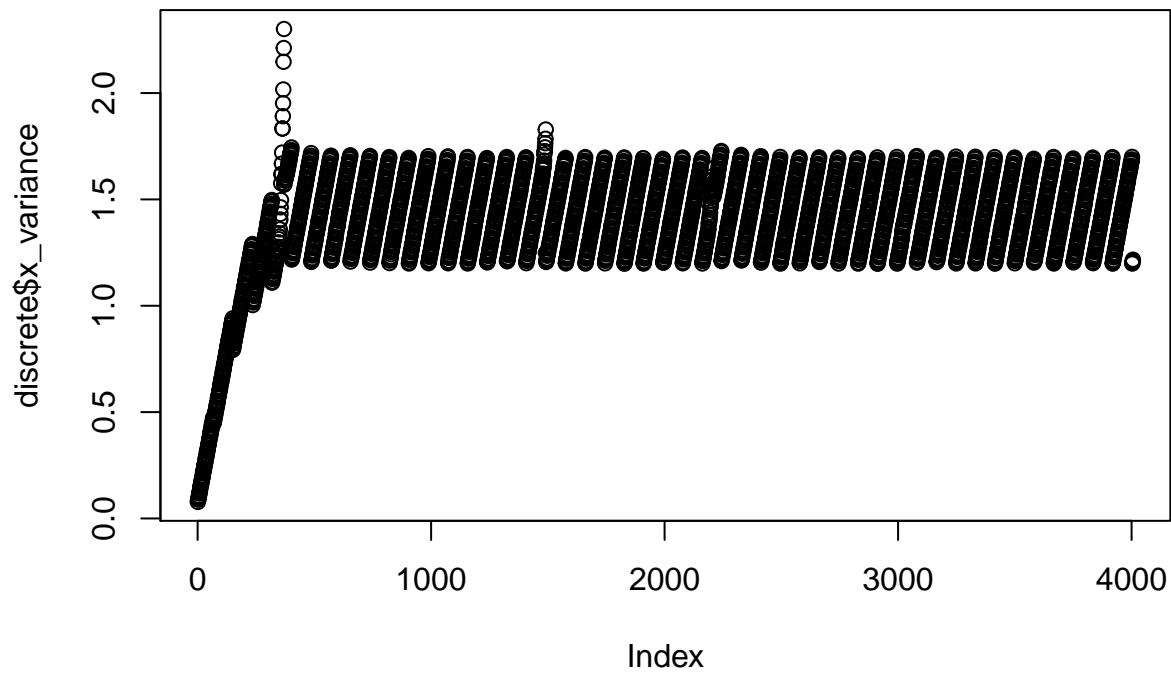
**Continuous Filter Y Variance Over Time**



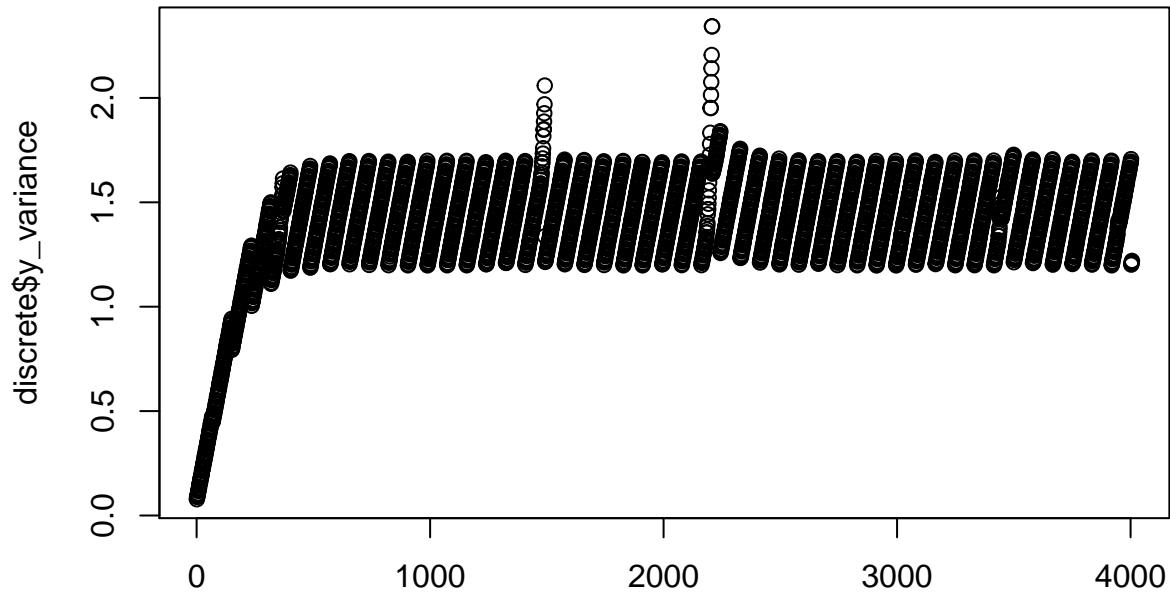
**Continuous Filter Yaw Variance Over Time**



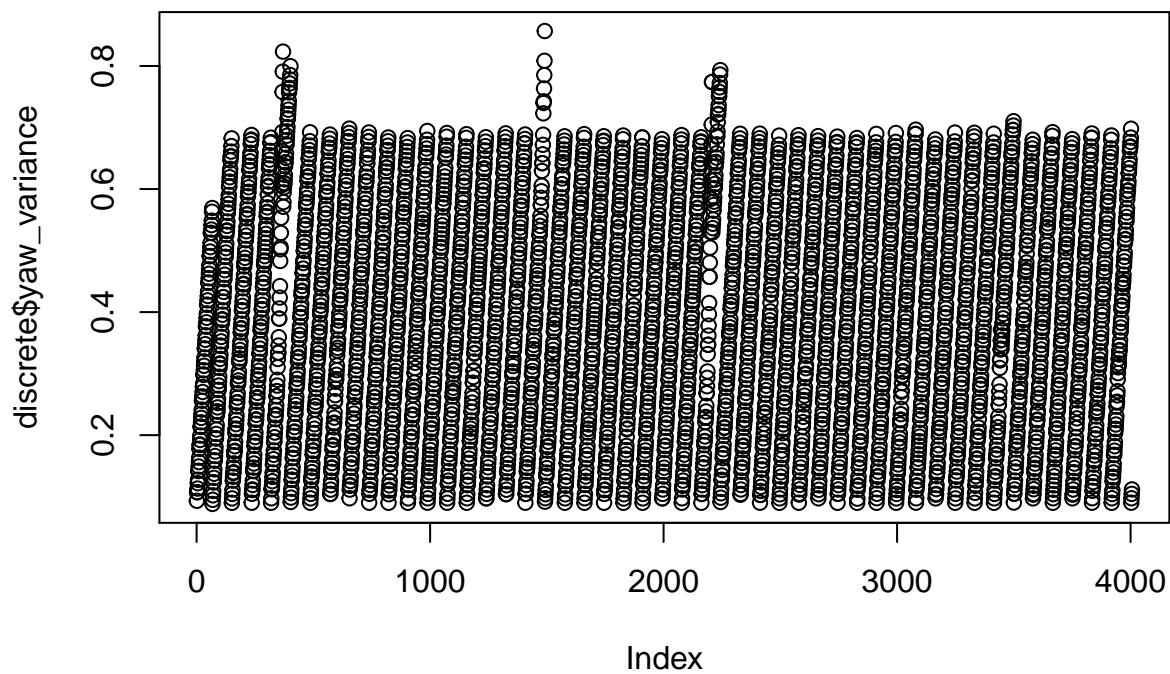
**Discrete Filter X Variance Over Time**



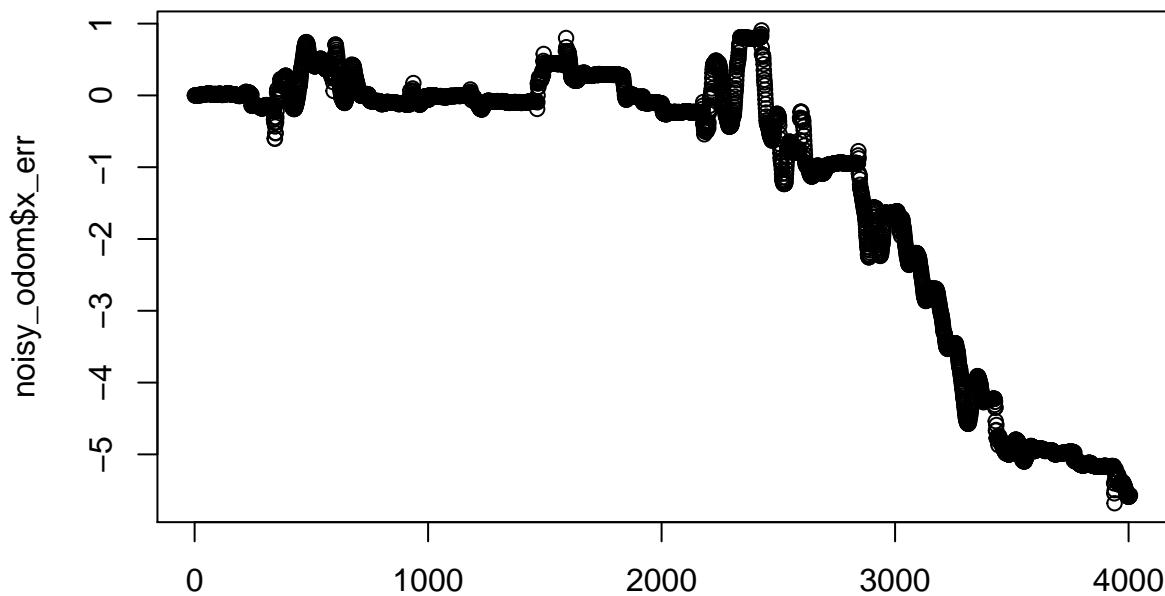
**Discrete Filter Y Variance Over Time**



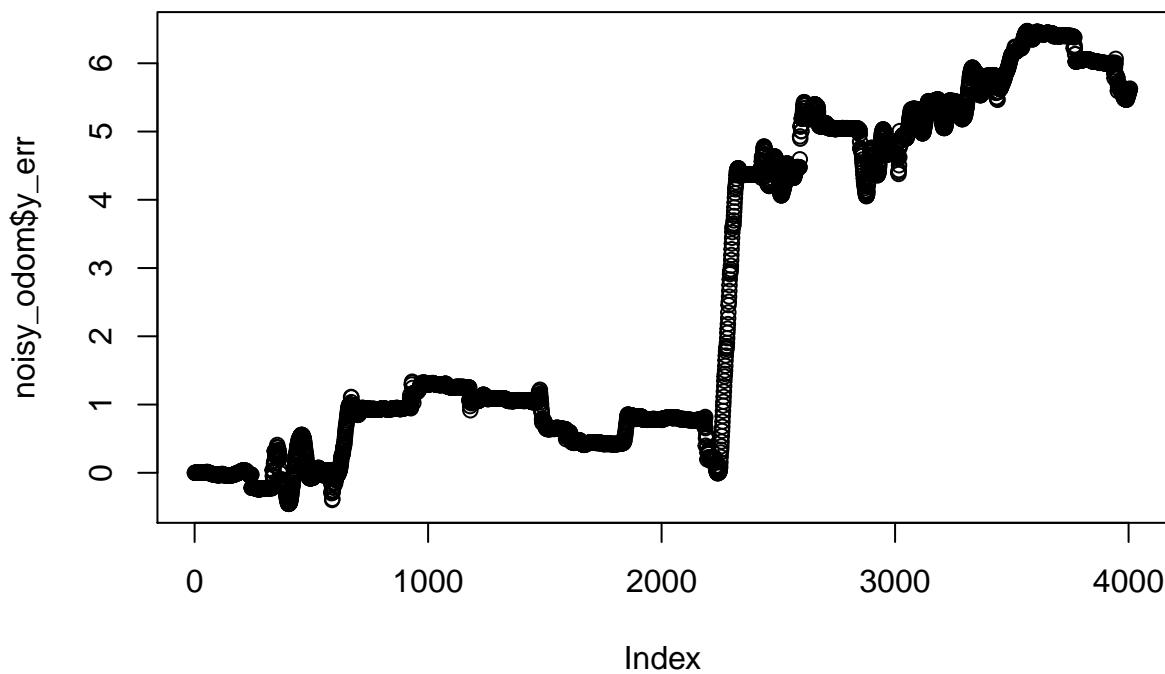
**Discrete Filter Yaw Variance Over Time**



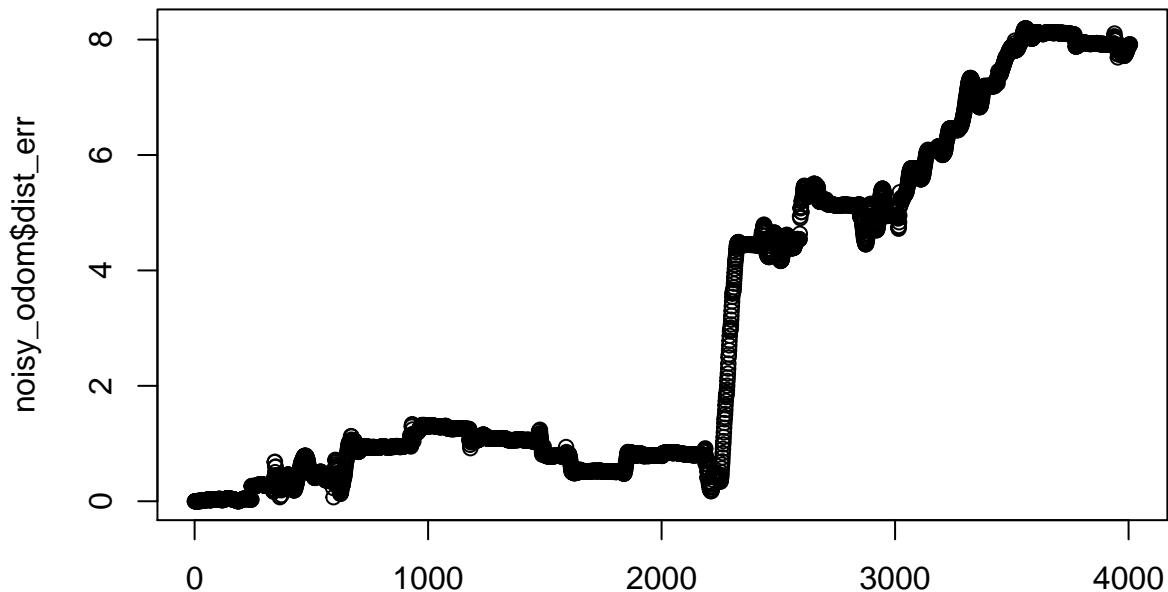
**Noisy Odom X Error Over Time**



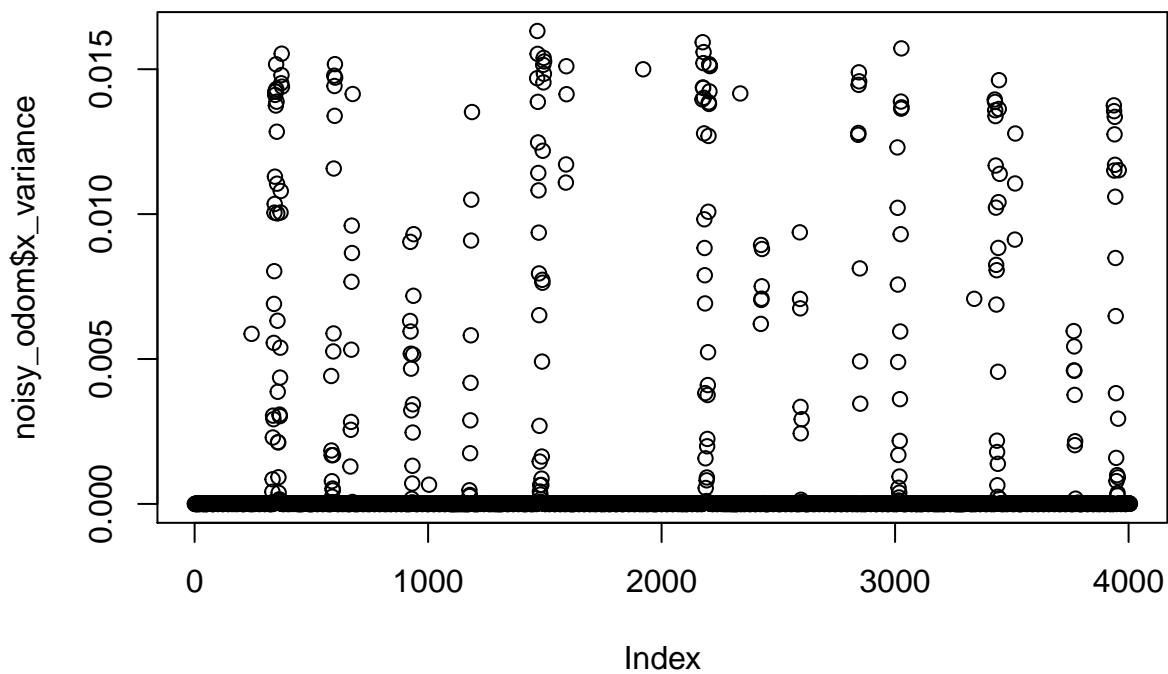
**Noisy Odom Y Error Over Time**



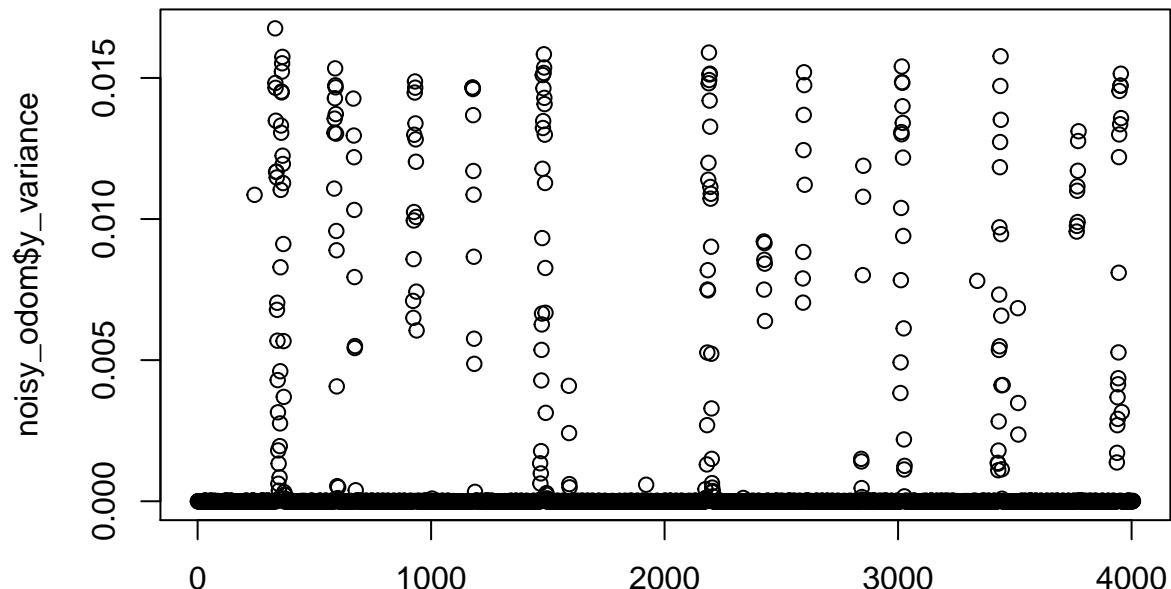
### Noisy Odom Horizontal Distance Error Over Time



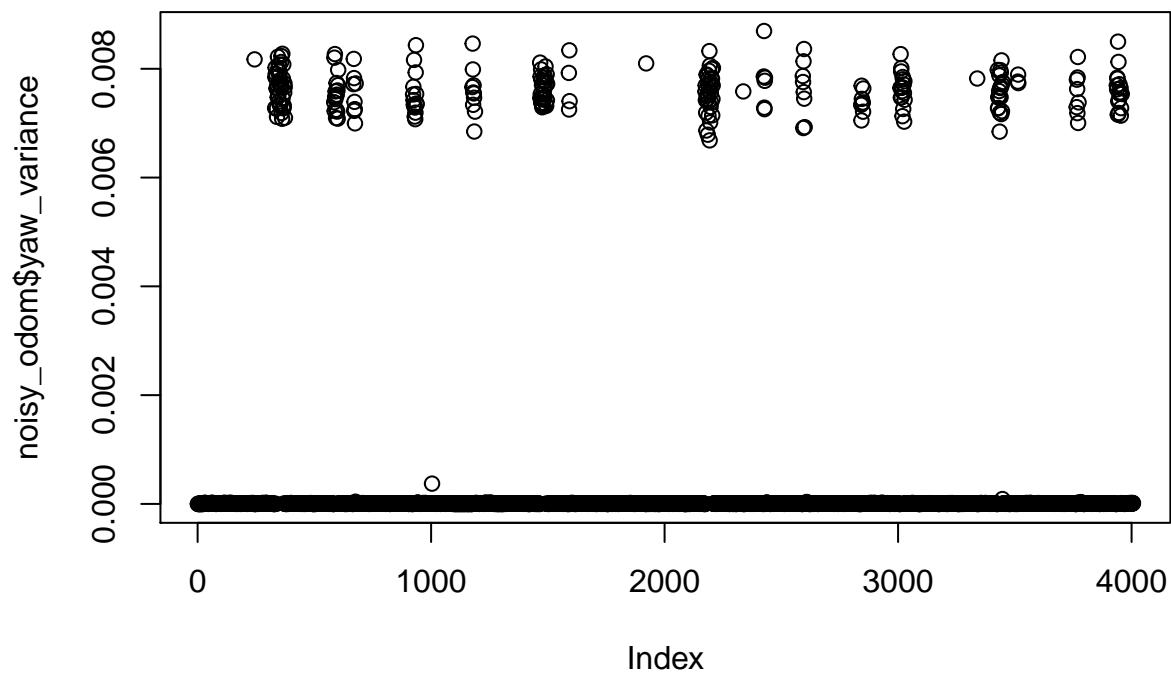
Variance of X Coordinate in Noisy Odometry



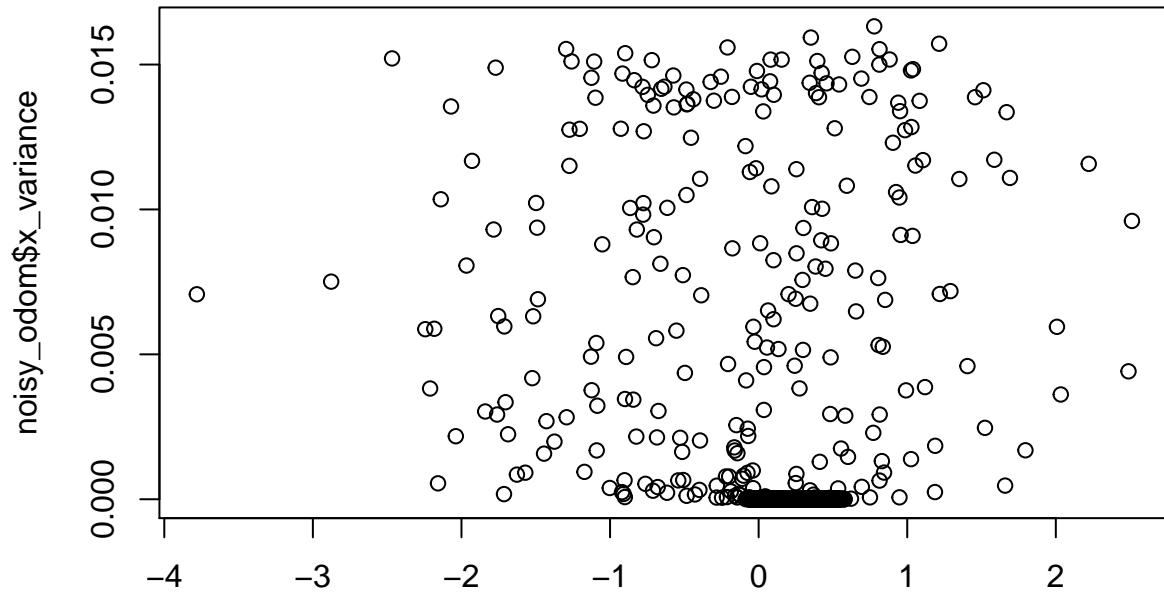
**Variance of Y Coordinate in Noisy Odometry**



**Variance of Yaw Coordinate in Noisy Odometry**



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



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

