

two_mobile_noiseless Turtlebot 2 Report

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This is a summary of the data from the two_mobile_noiseless experiment, Turtlebot #2.

The runtime of this experiment was 0 hours, 6 minutes, and 55.9 seconds.

The total number of external pose measurements received by the robot during this time was 909 which means poses were received at an average of 2.1856215 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.  
## -22.06000 -16.60000 -15.28000 -13.49000 -11.93000  0.03963
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.      Max.  
## -0.7545  1.9800  4.1010  5.3680  7.6190 13.5400
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.      Max.  
## -3.13400 -1.25300  0.03666  0.15380  1.82800  3.14100
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.      Max.  
##  0.000014 12.690000 15.780000 14.730000 17.800000 25.860000
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.      Max.  
## -76.8100 -13.7500 -3.0440 -8.2120 -0.5014 48.3100
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.      Max.  
## -40.6500 -5.3840 -0.3551  0.8305  4.1110 65.8600
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.      Max.  
## -3.13900 -1.29600 -0.17810 -0.33220  0.05245  3.14000
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.      Max.  
##  0.03028 2.79300  8.04600 15.41000 21.95000 81.32000
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.      Max.  
## -1.65700 -0.85700  0.14740  0.08968  0.92470  2.00800
```

```

summary(noisy_odom$y_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -2.03800 0.04257 0.42570 0.37020 0.66190 1.65000

summary(noisy_odom$dist_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.0000118 0.7244000 1.0680000 1.0400000 1.2750000 2.5740000

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

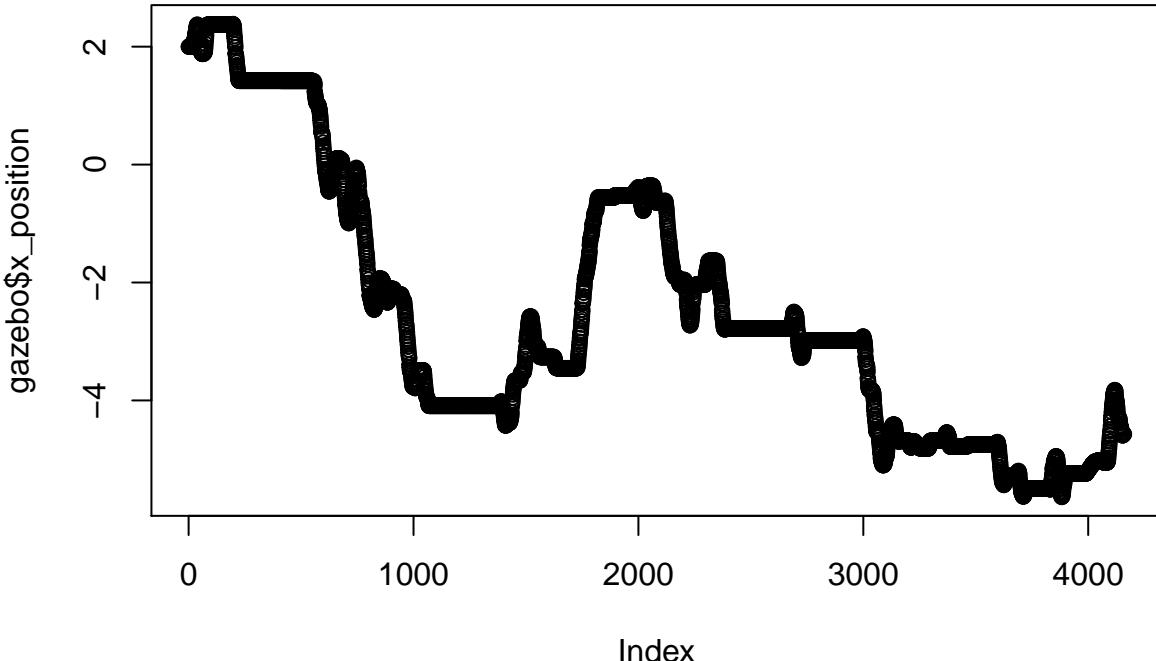
##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.1135 2.5390 4.0220 4.1170 5.2840 7.9840

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

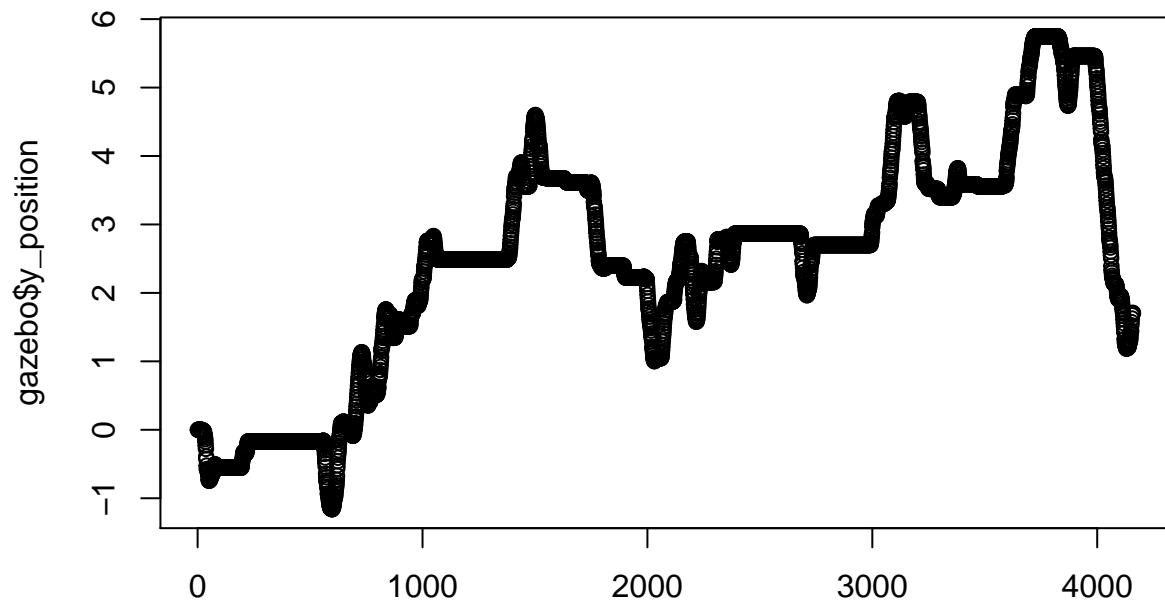
##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.000e+00 3.700e-08 2.389e-06 6.838e-04 5.849e-06 8.974e-03

```

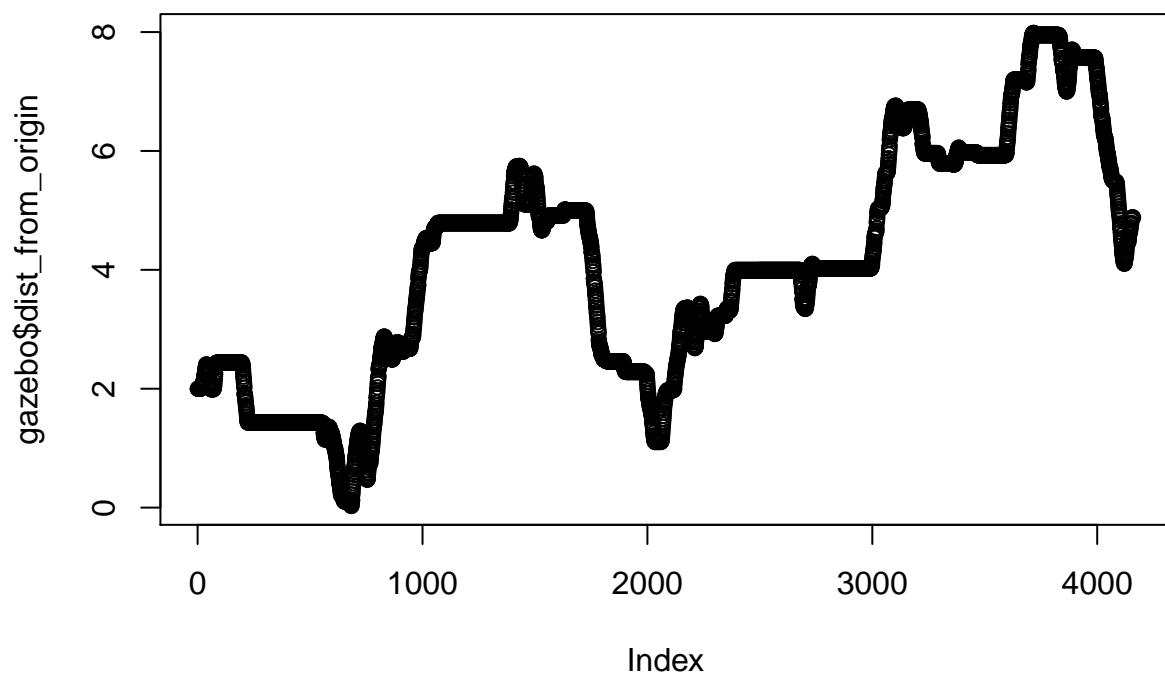
X coordinate of robot over time



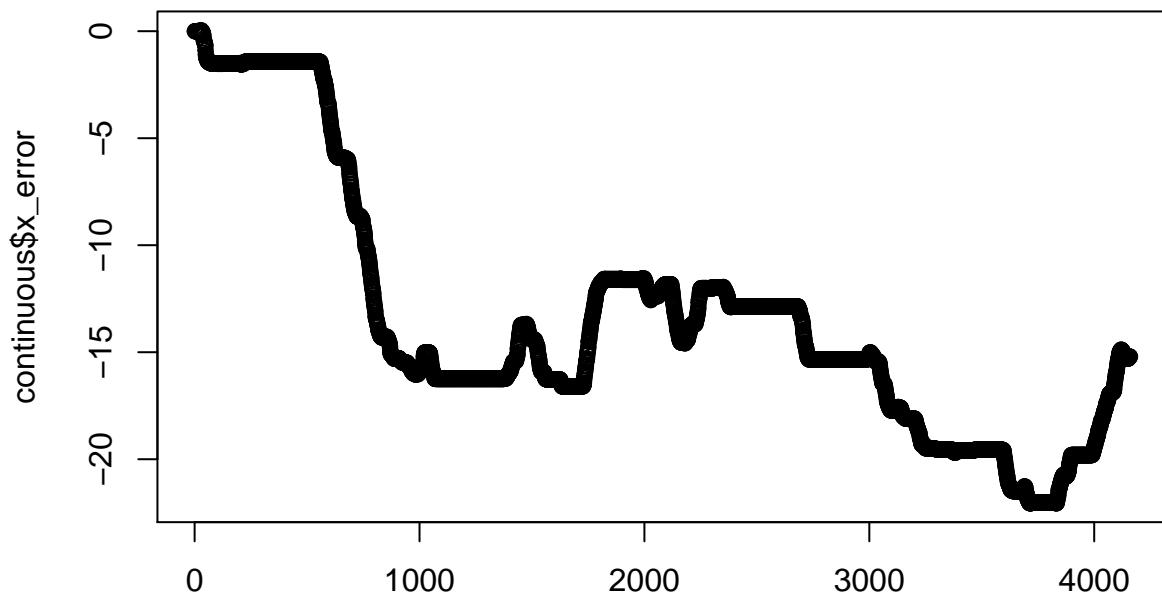
Y coordinate of robot over time



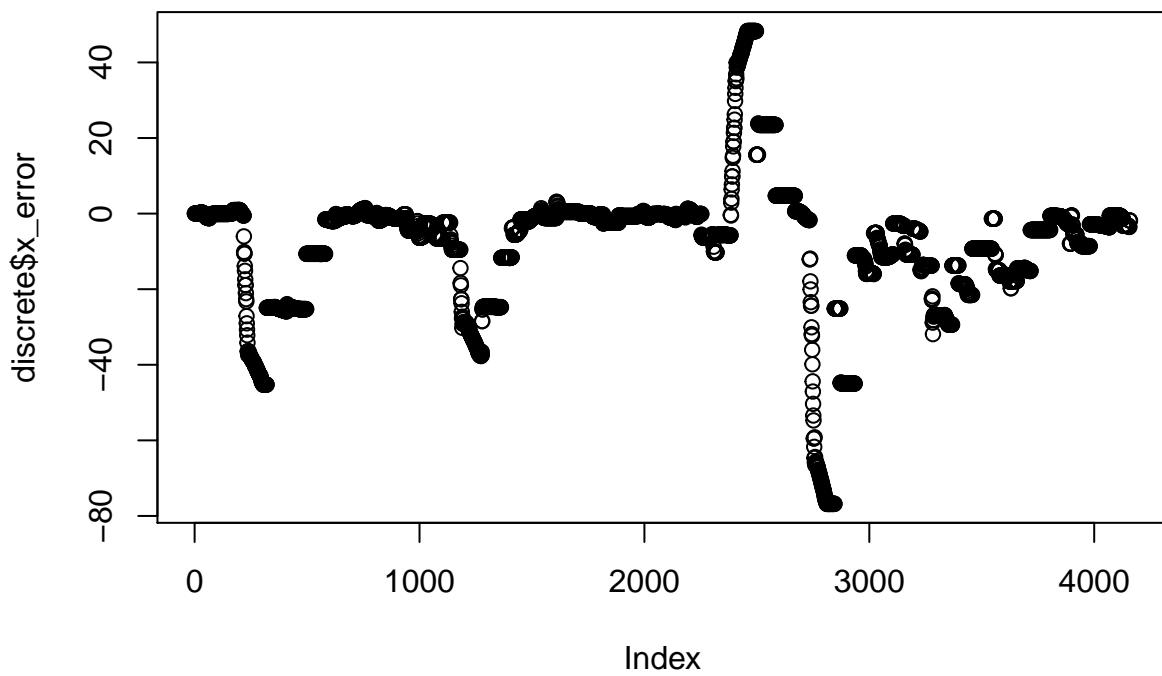
Distance from origin vs. time



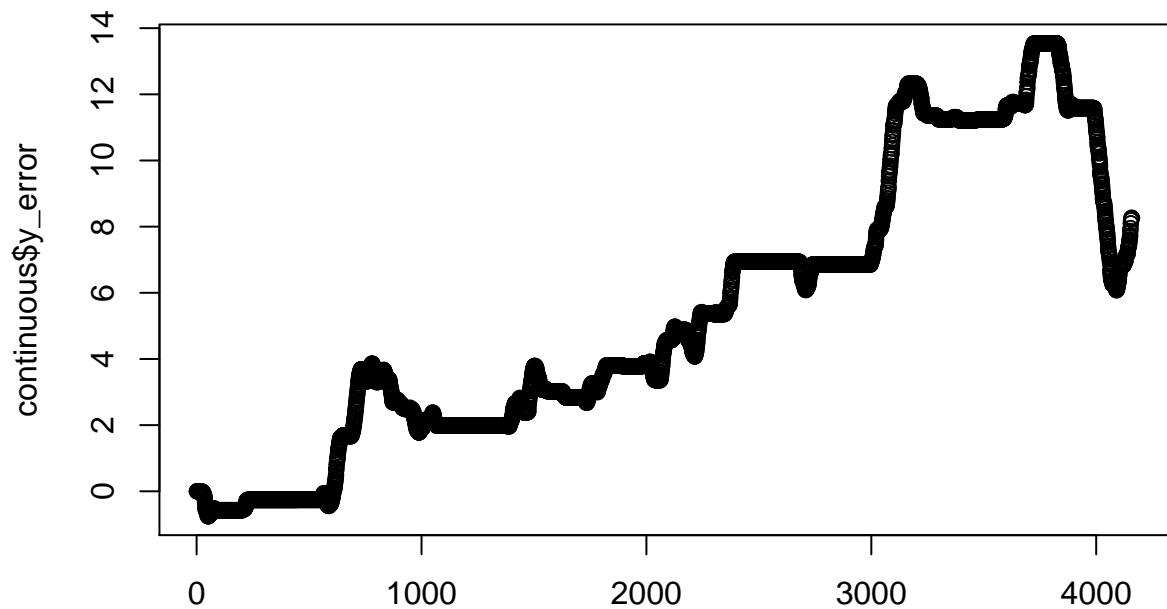
Continuous x_error over time



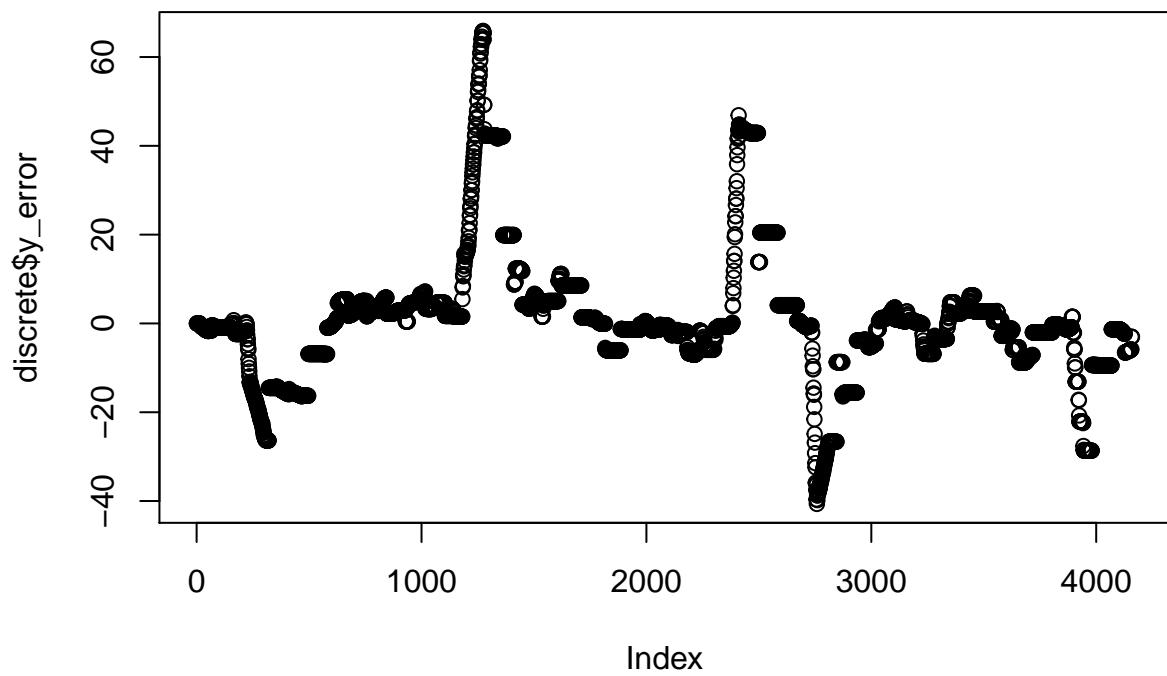
Discrete x_error over time



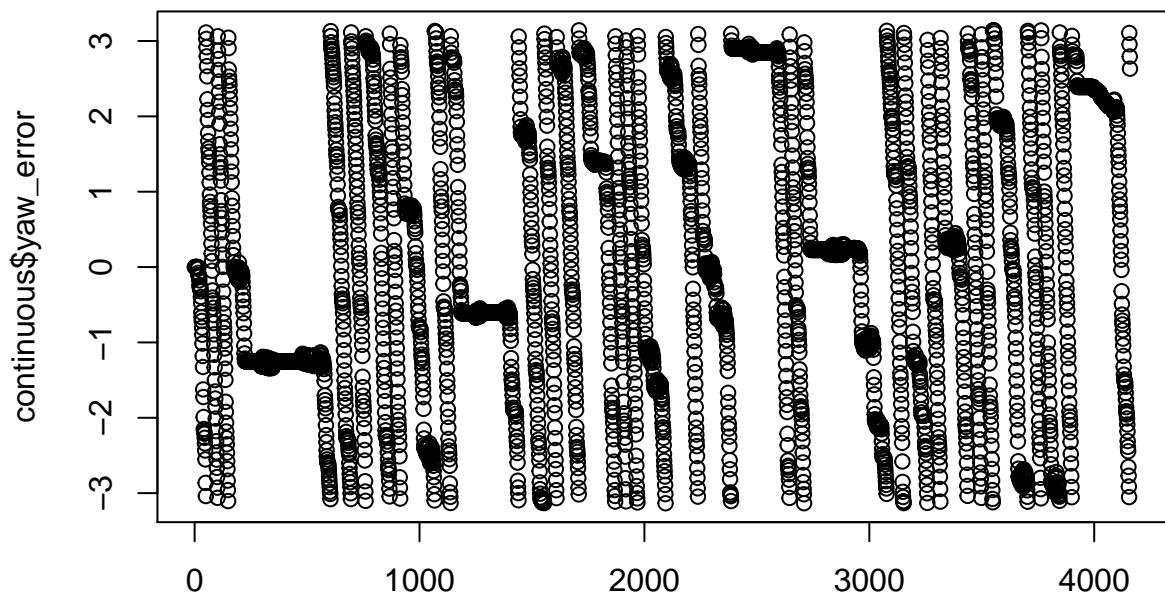
Continuous y_error over time



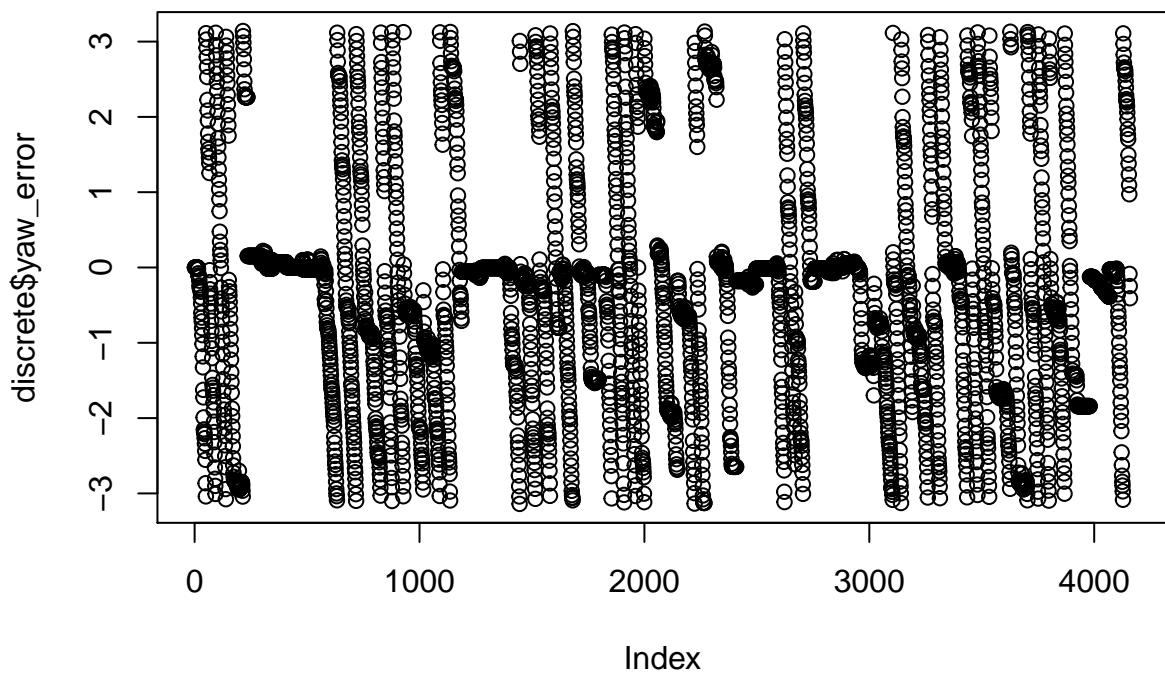
Discrete y_error over time



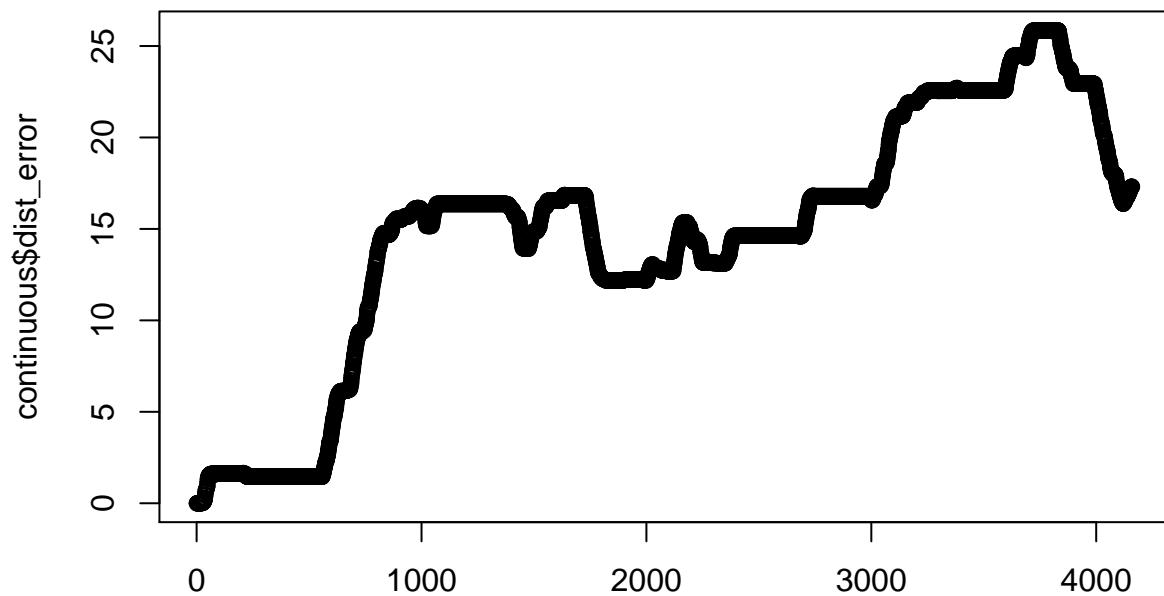
Continuous yaw error over time



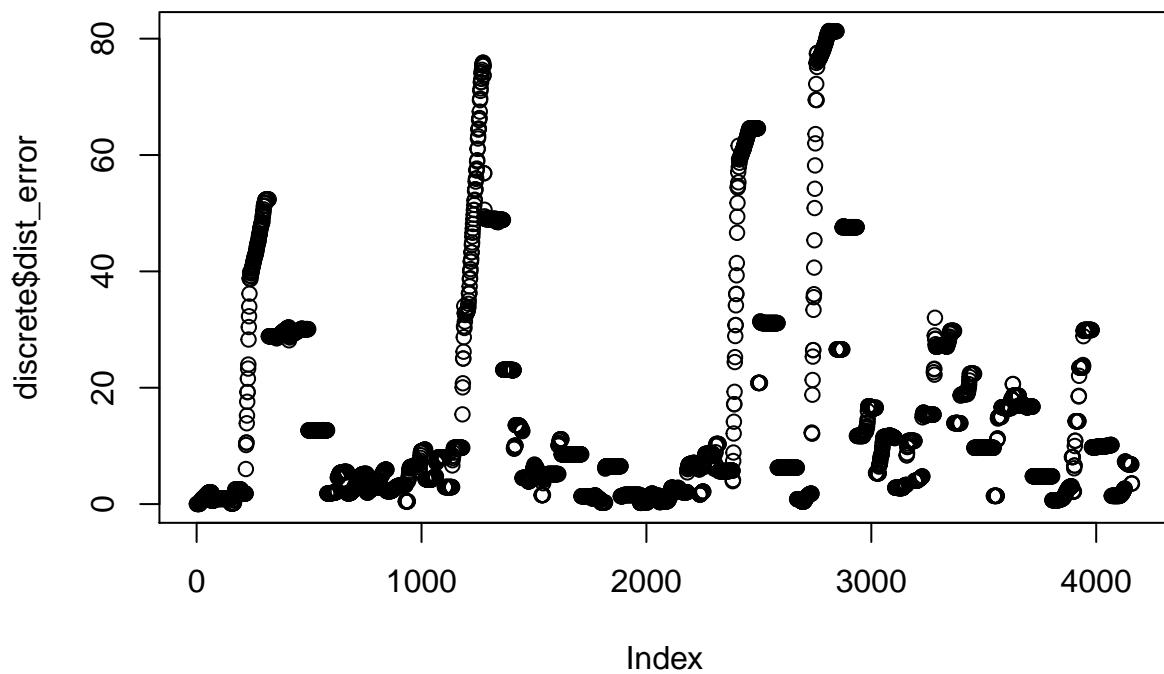
Discrete yaw error over time



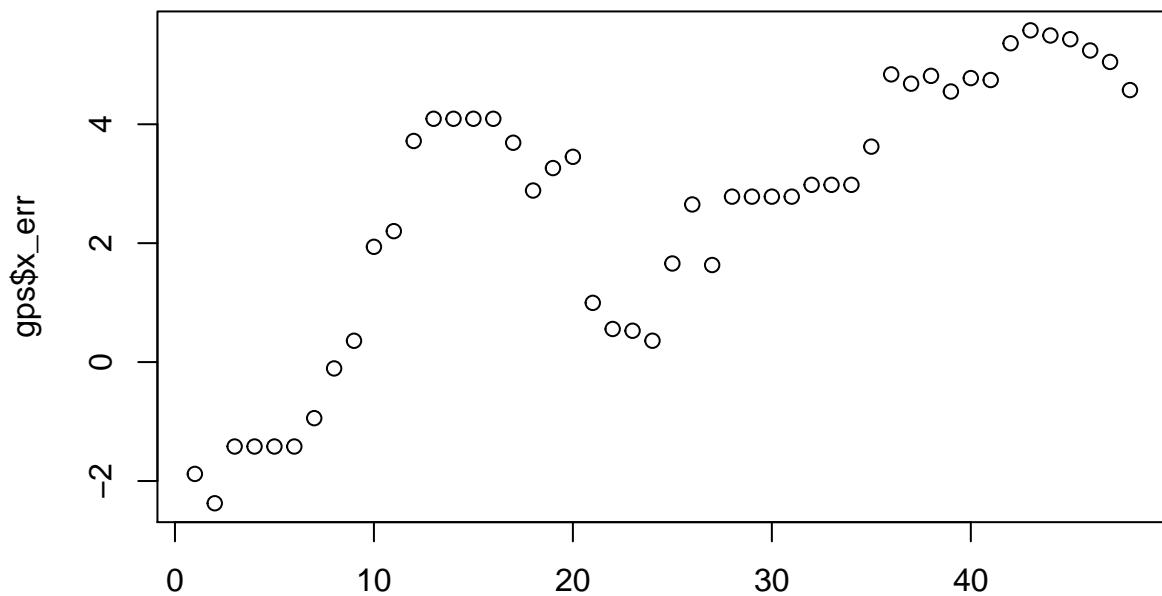
Continuous total distance error over time



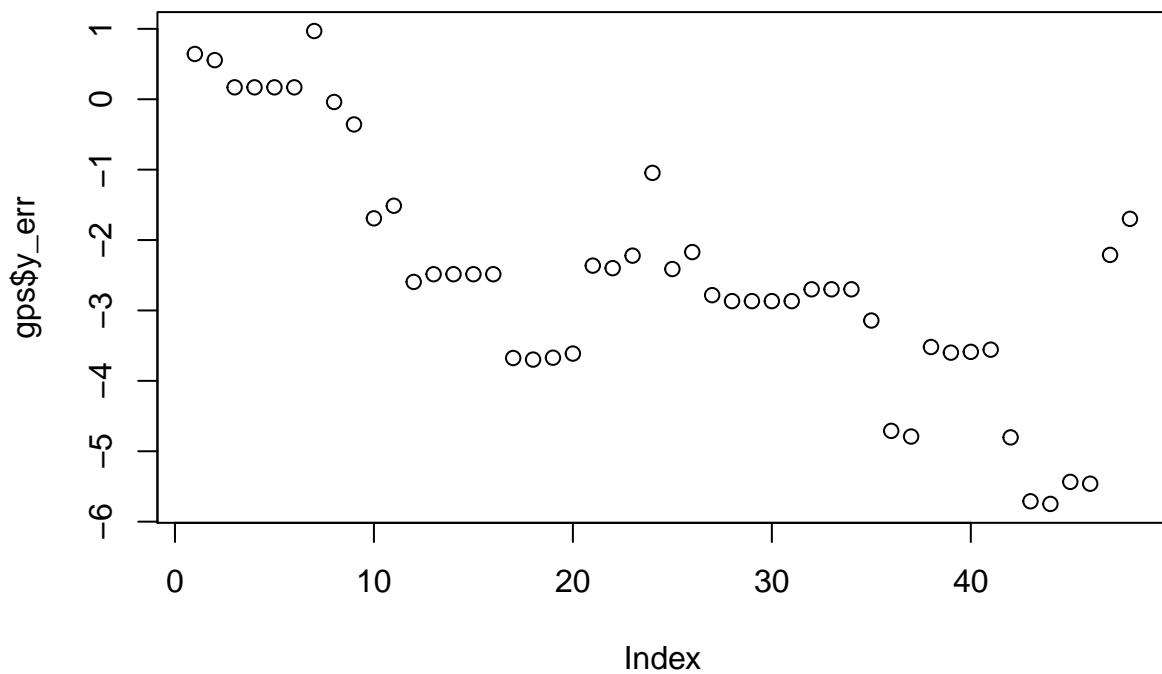
Discrete total distance error over time



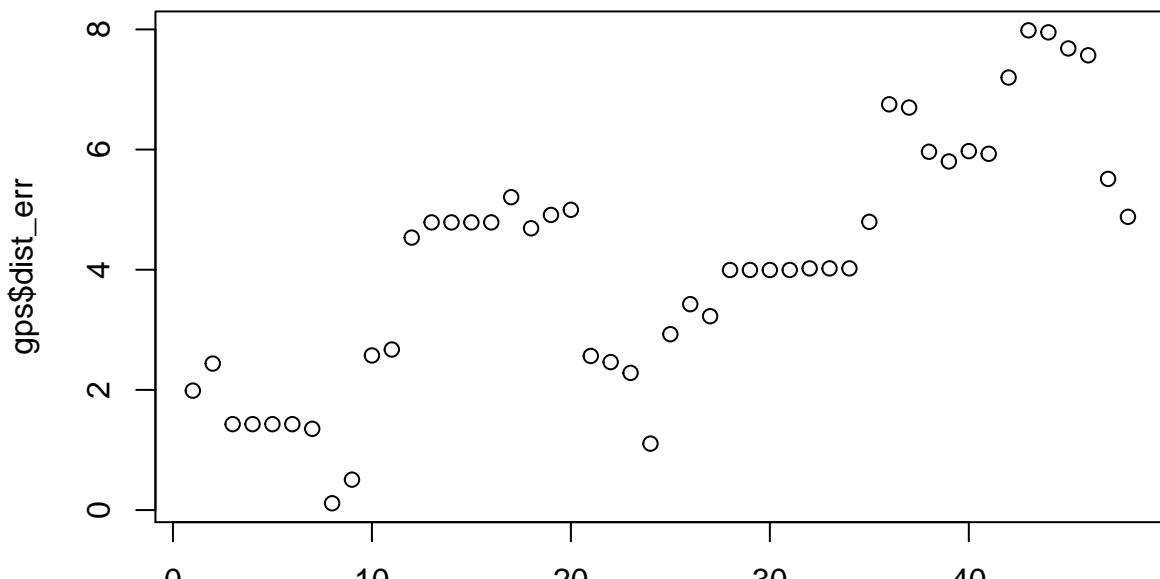
GPS X Error Over Time



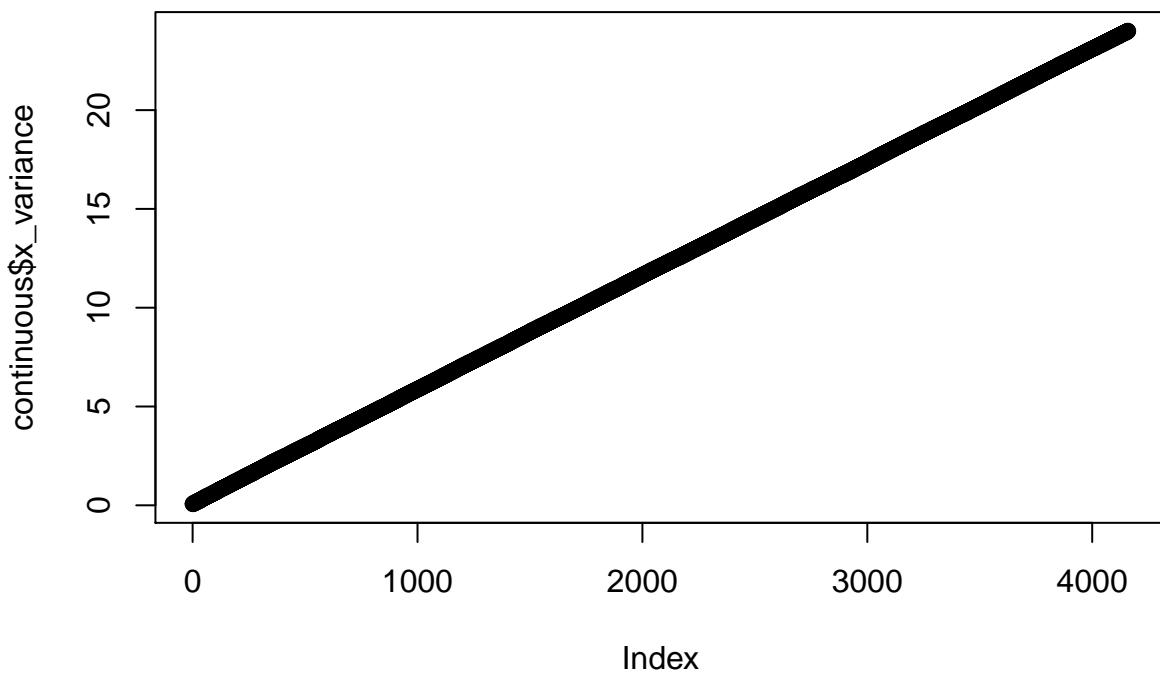
GPS Y Error Over Time



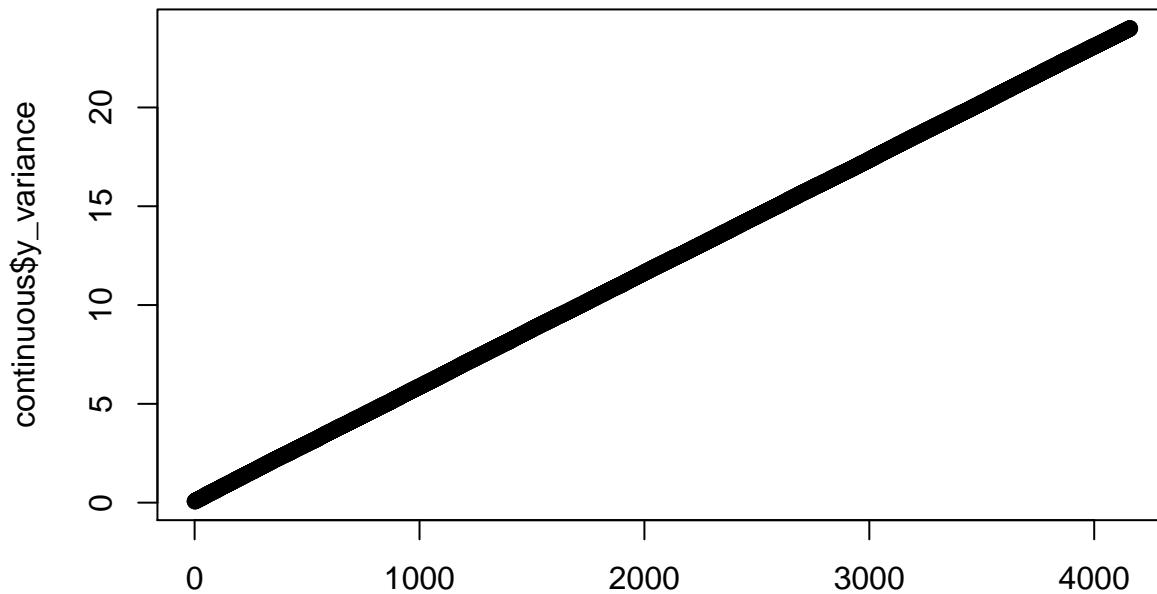
GPS Horizontal Distance Error Over Time



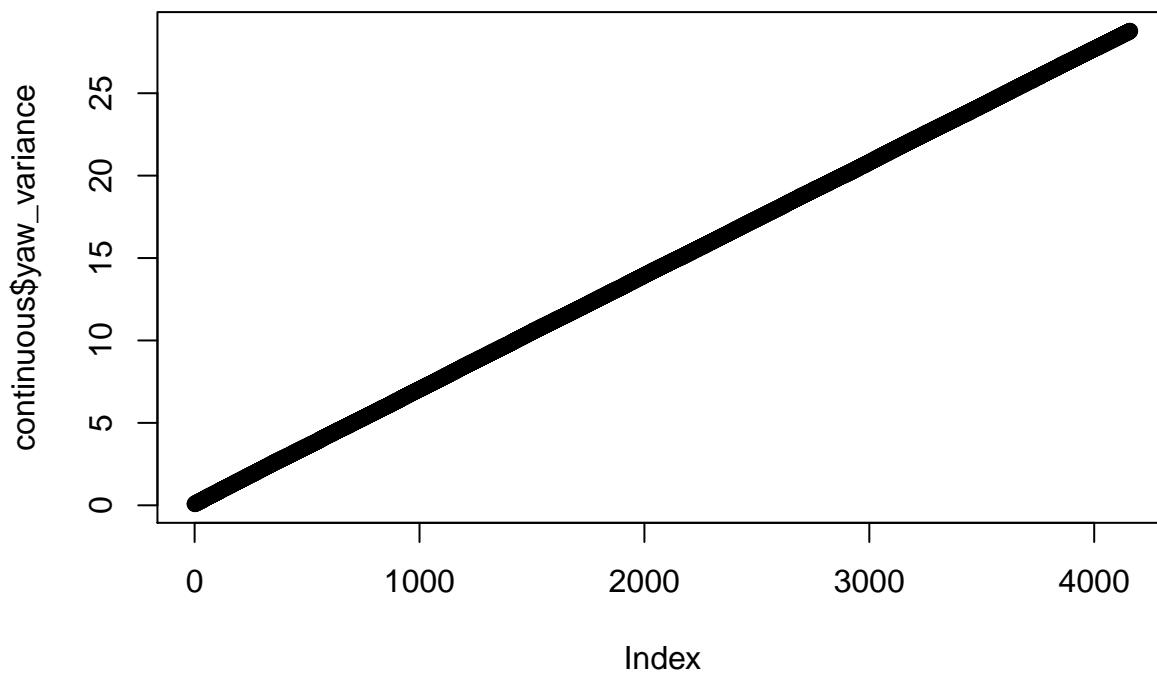
Continuous Filter X Variance Over Time



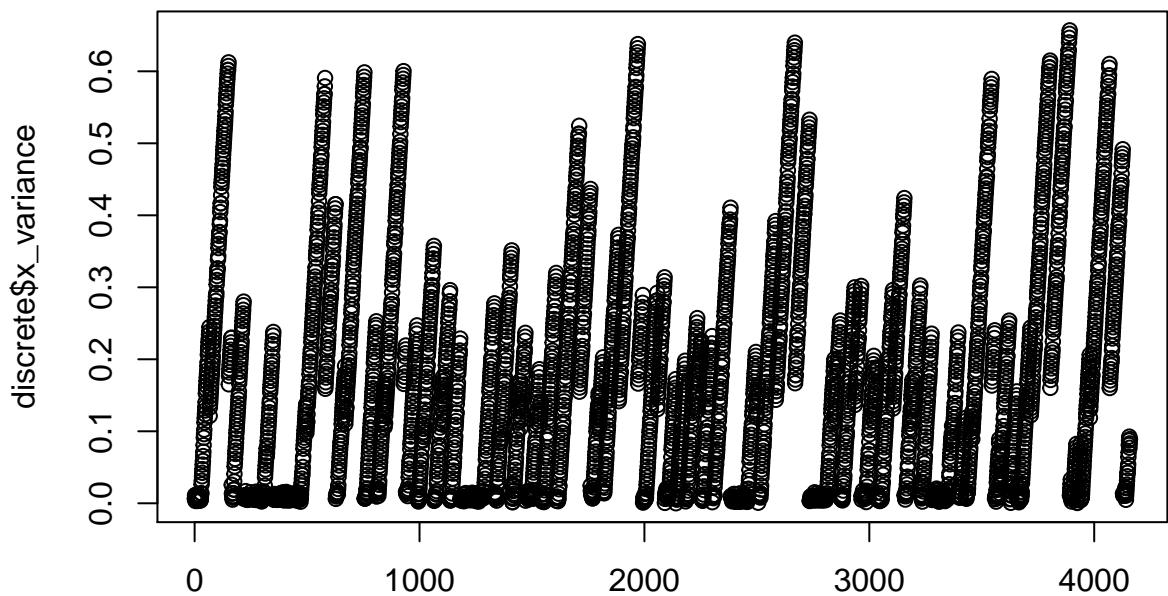
Continuous Filter Y Variance Over Time



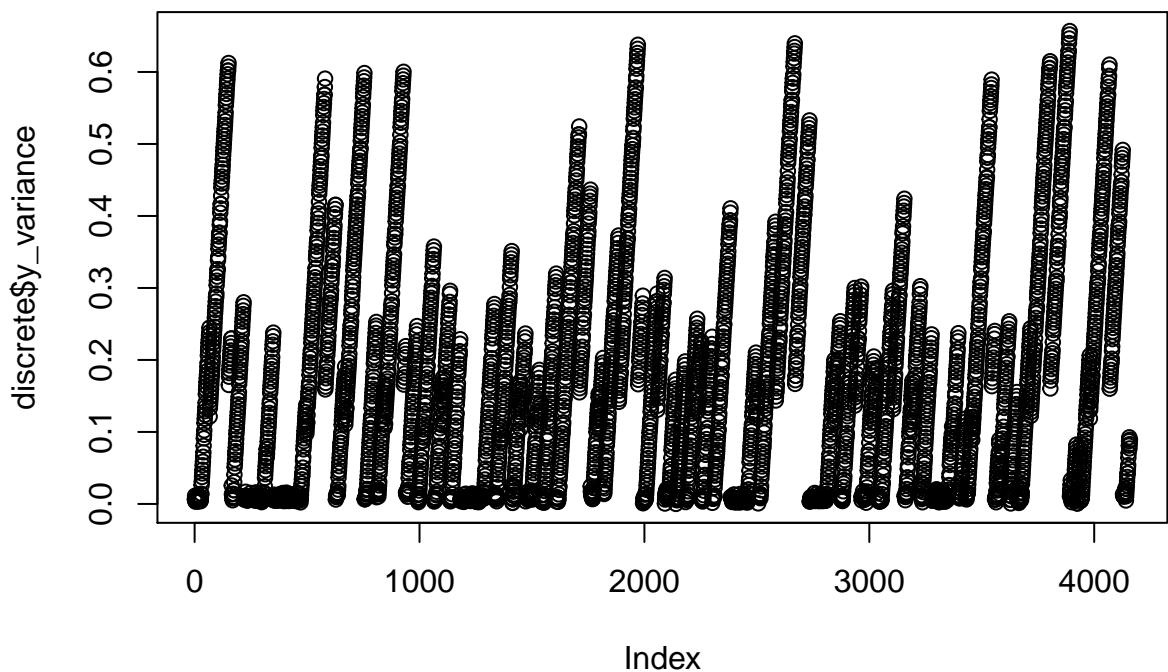
Continuous Filter Yaw Variance Over Time



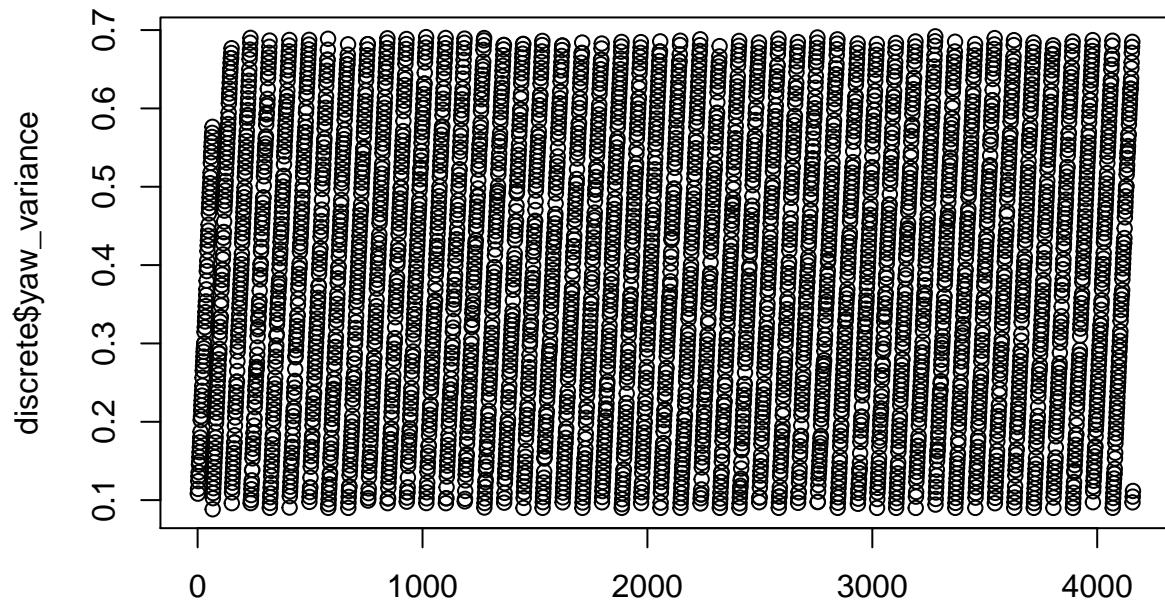
Discrete Filter X Variance Over Time



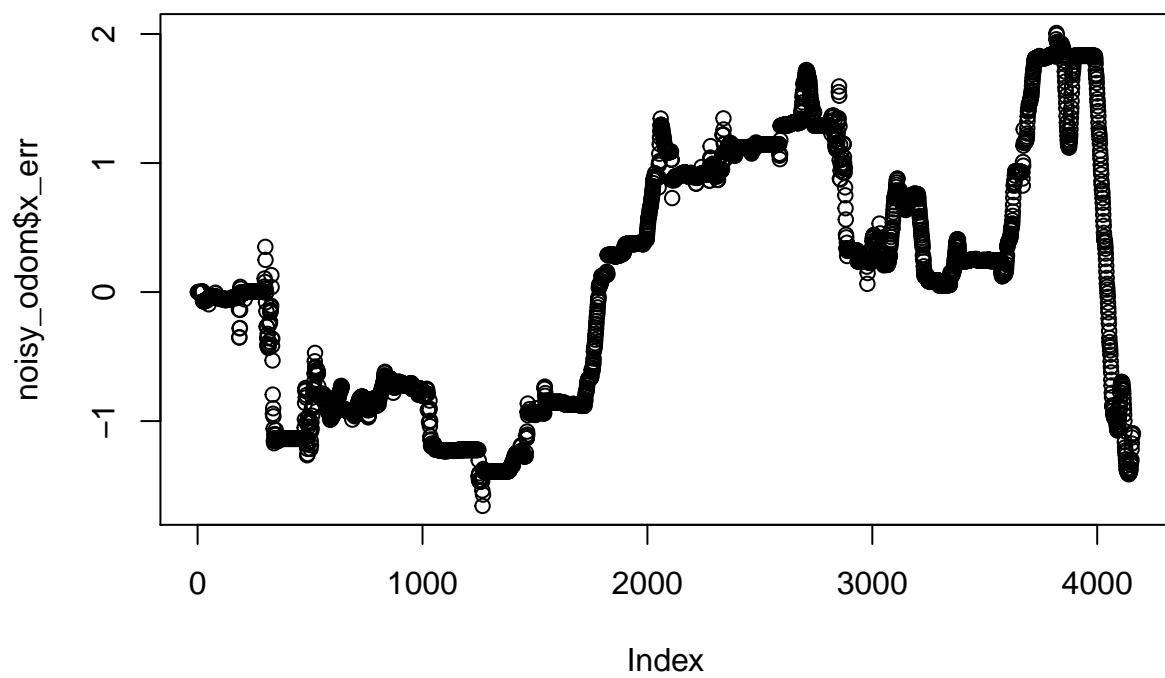
Discrete Filter Y Variance Over Time



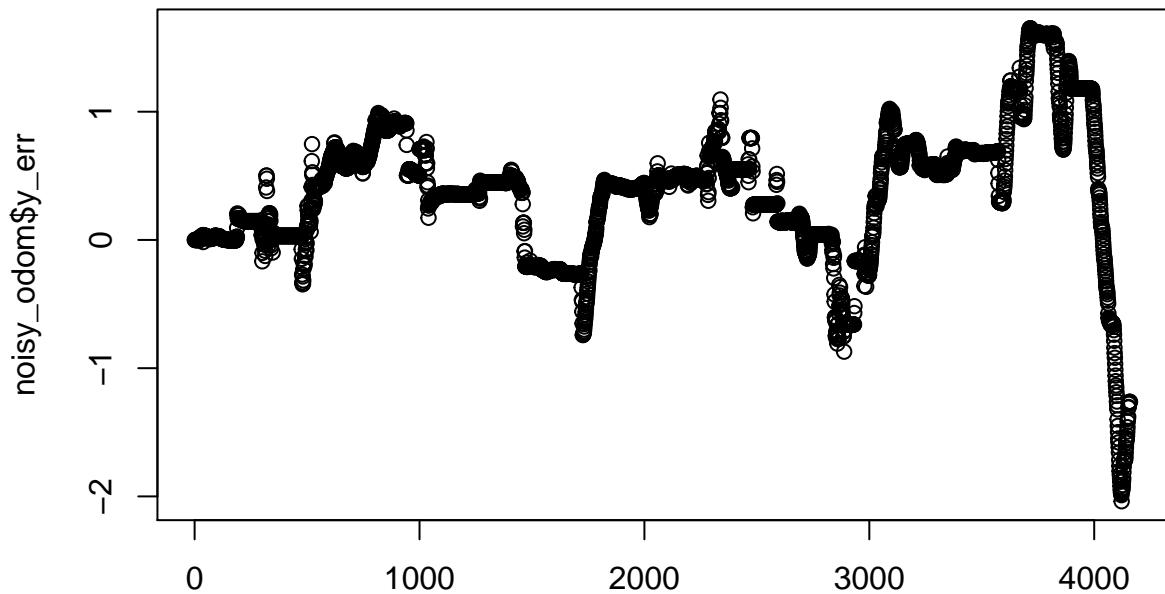
Discrete Filter Yaw Variance Over Time



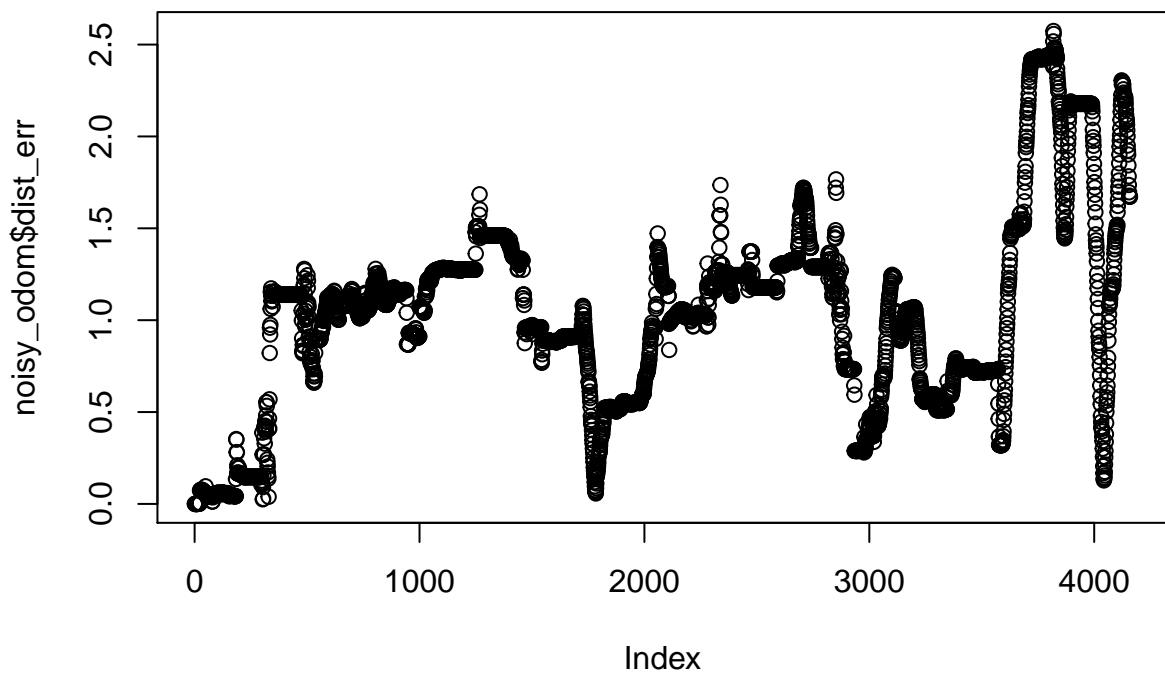
Noisy Odom X Error Over Time



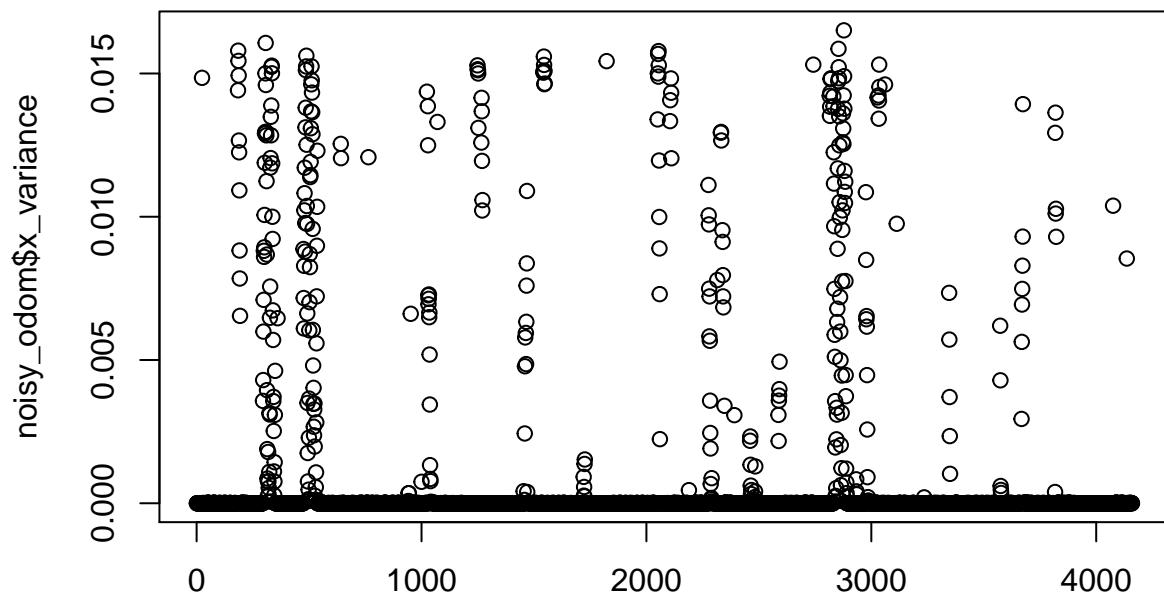
Noisy Odom Y Error Over Time



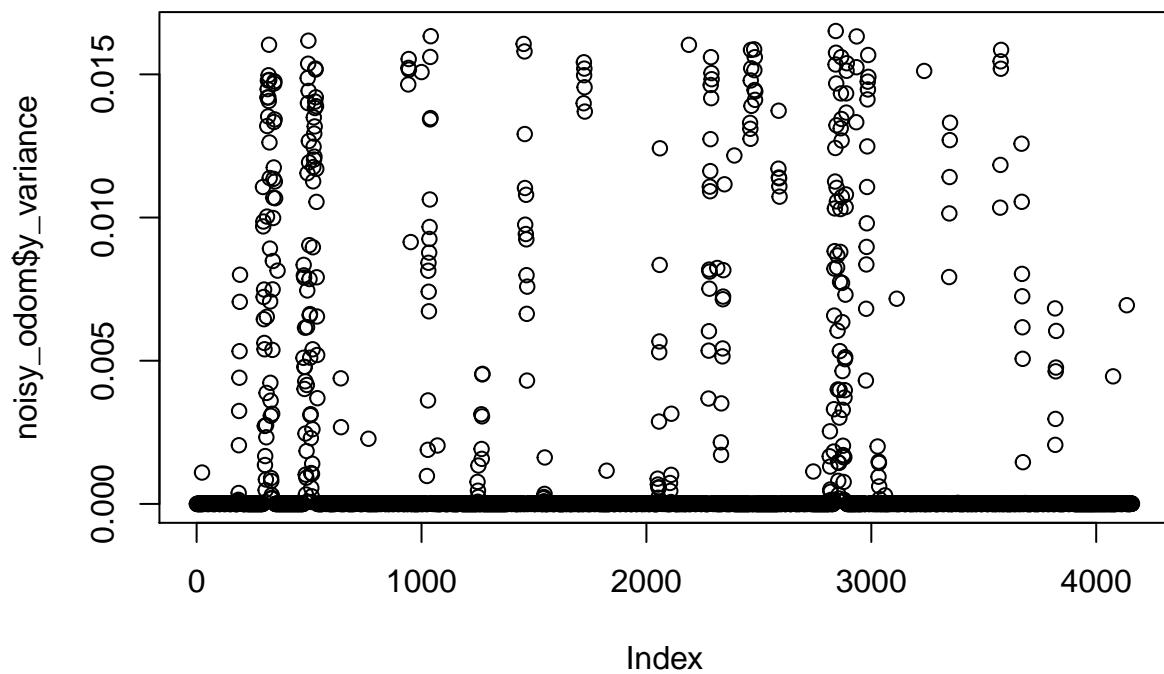
Noisy Odom Horizontal Distance Error Over Time



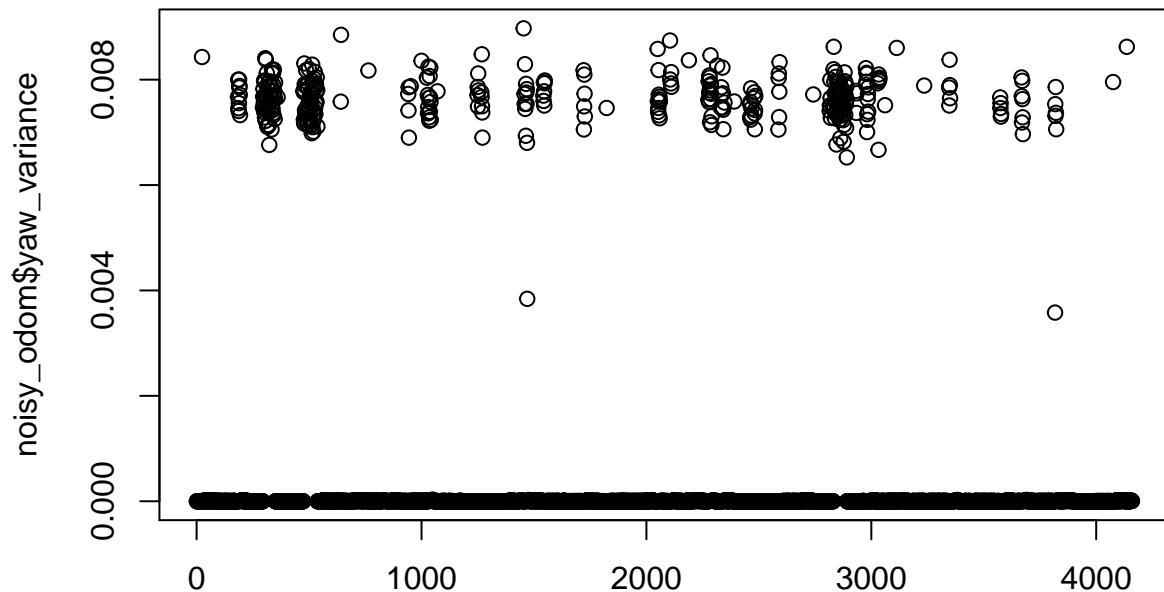
Variance of X Coordinate in Noisy Odometry



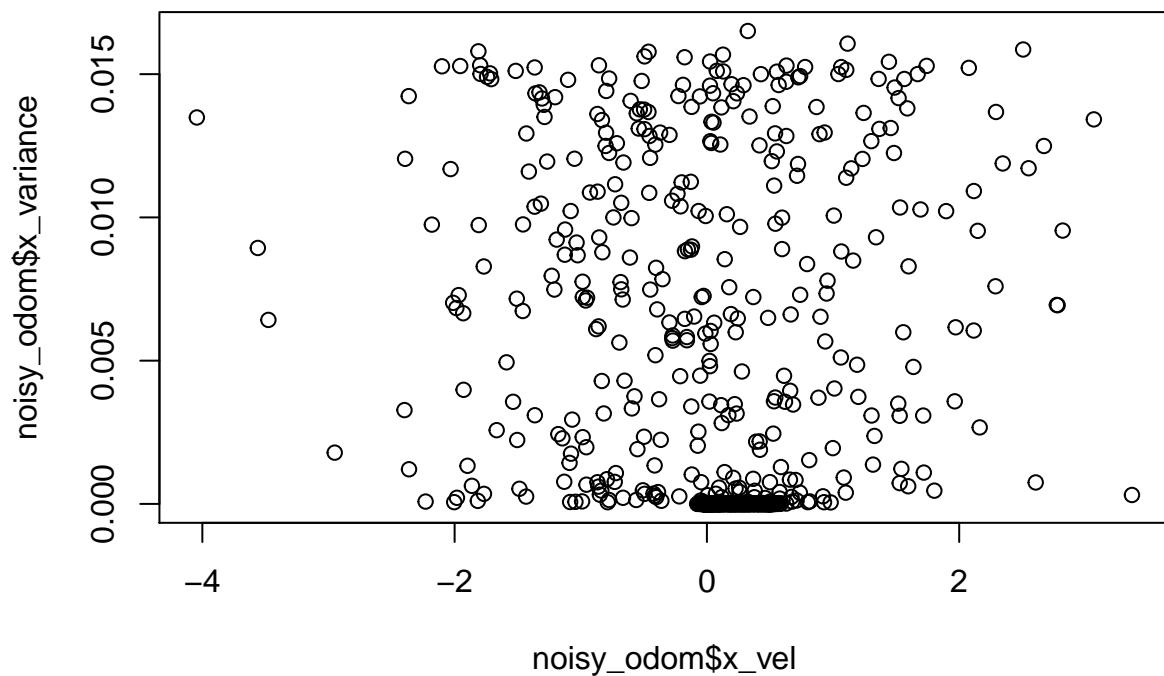
Variance of Y Coordinate in Noisy Odometry



Variance of Yaw Coordinate in Noisy Odometry



Variance vs. Velocity of X in Noisy Odometry



Variance vs. Velocity of Yaw in Noisy Odometry

