

one_mobile_noiseless Turtlebot 1 Report

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This is a summary of the data from the one_mobile_noiseless experiment, Turtlebot #1.

The runtime of this experiment was 0 hours, 6 minutes, and 41.3 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.  
## -16.370 -10.140 -3.215 -5.710 -1.288  1.523
```

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

```
##      Min. 1st Qu. Median   Mean 3rd Qu.   Max.  
## -20.50  -12.82 -10.45 -10.22  -6.70  0.00
```

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

```
##      Min. 1st Qu. Median   Mean 3rd Qu.   Max.  
## -3.1410 -1.7540 -0.2864 -0.1745  1.3860  3.1410
```

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

```
##      Min. 1st Qu. Median   Mean 3rd Qu.   Max.  
## 0.000014  7.086000 10.970000 12.230000 16.350000 25.210000
```

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

```
##      Min. 1st Qu. Median   Mean 3rd Qu.   Max.  
## -2.033000 -0.065590  0.000170  0.006988  0.023260  3.946000
```

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

```
##      Min. 1st Qu. Median   Mean 3rd Qu.   Max.  
## -0.859700 -0.002047  0.002155  0.136700  0.134800  4.513000
```

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

```
##      Min. 1st Qu. Median   Mean 3rd Qu.   Max.  
## -3.1340 -1.2490 -0.1591 -0.1029  0.7936  3.1390
```

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

```
##      Min. 1st Qu. Median   Mean 3rd Qu.   Max.  
## 0.000000  0.003496  0.088290  0.368900  0.389500  4.522000
```

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

```
##      Min. 1st Qu. Median   Mean 3rd Qu.   Max.  
## -2.4790  0.2867  1.5960  1.7030  3.1450  5.4160
```

```

summary(noisy_odom$y_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -10.6400 -8.4090 -3.7910 -4.5870 -0.8620  0.6233

summary(noisy_odom$dist_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.000006 1.212000 5.416000 5.269000 8.559000 10.640000

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

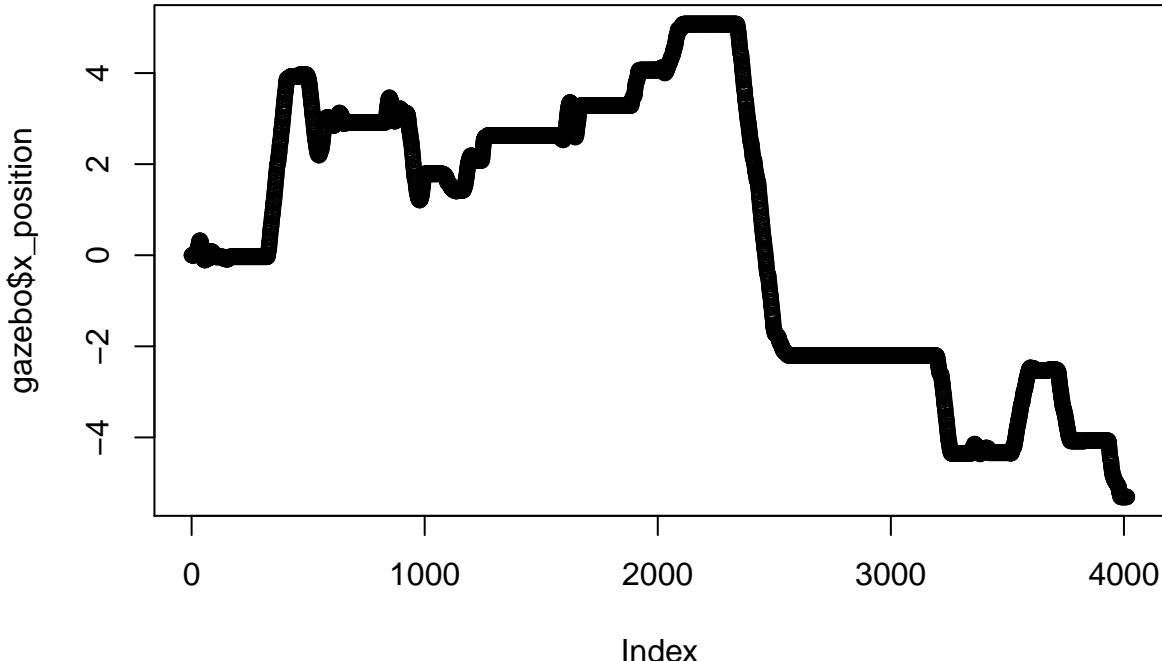
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.5576  2.2210  4.0510  3.6610  4.8380  7.1240

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

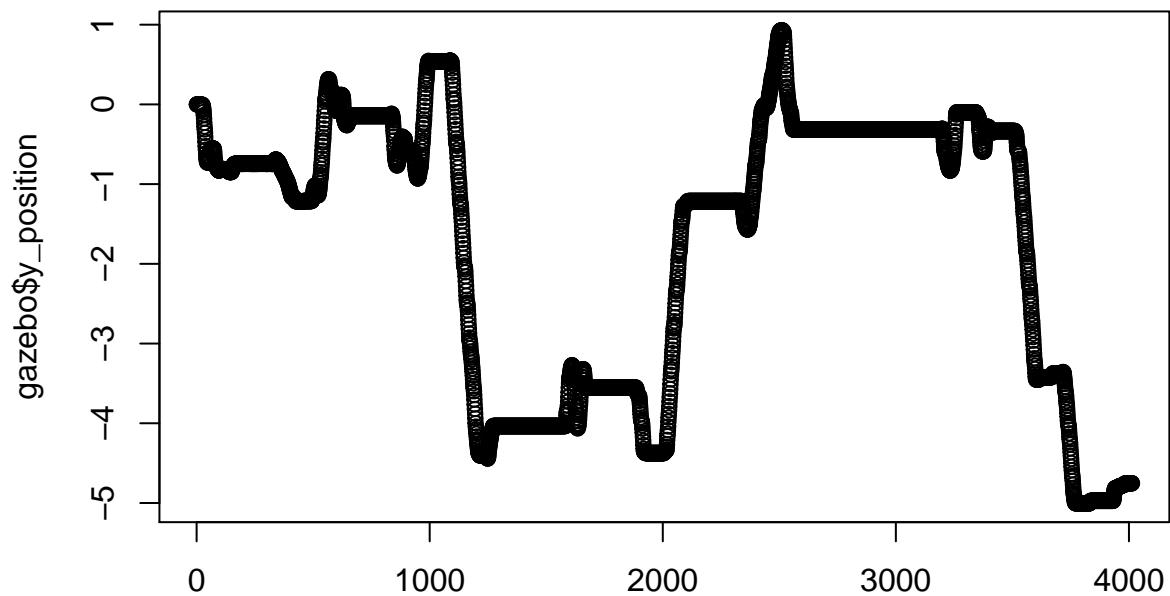
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.000e+00 1.686e-06 4.325e-06 1.960e-03 6.935e-03 8.903e-03

```

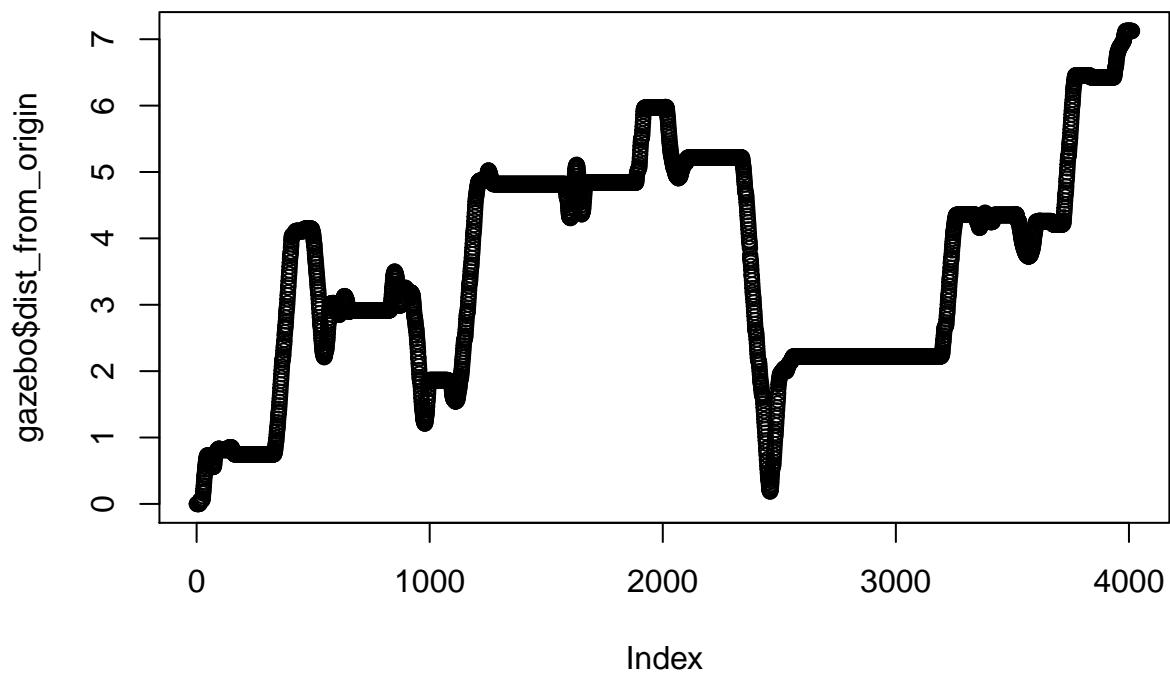
X coordinate of robot over time



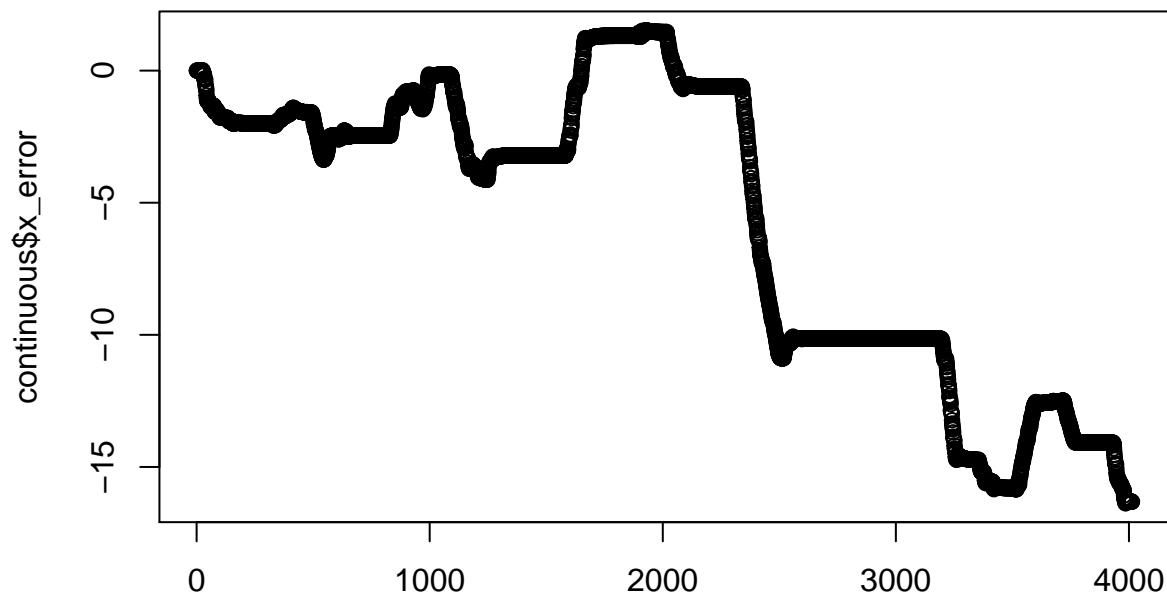
Y coordinate of robot over time



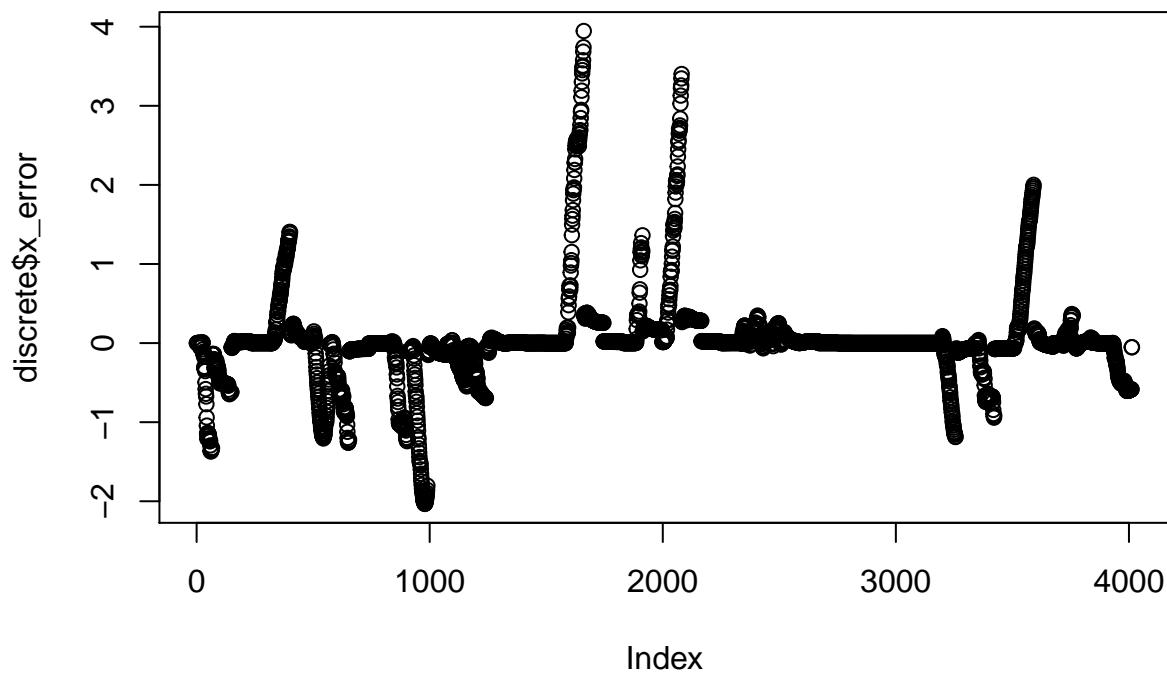
Distance from origin vs. time



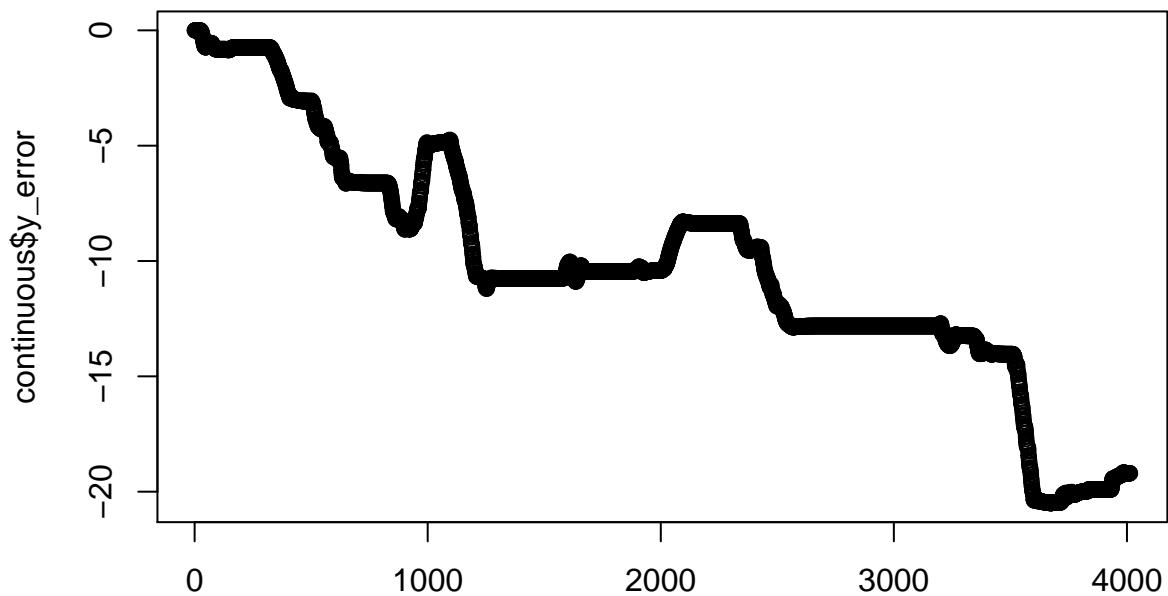
Continuous x_error over time



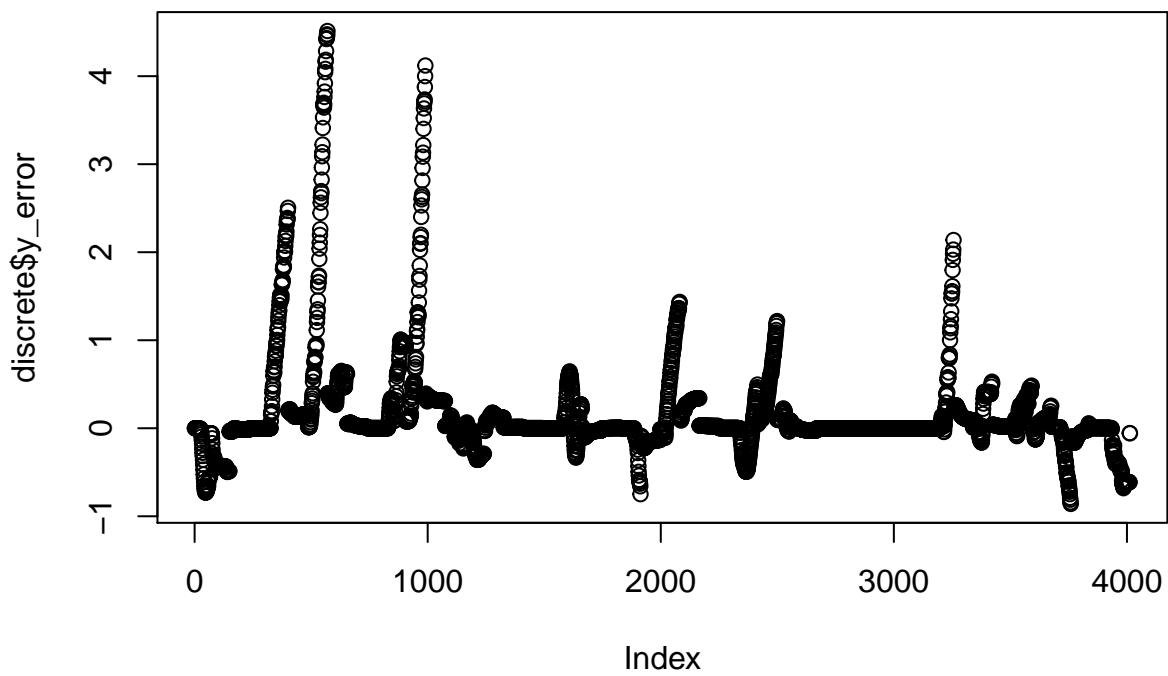
Discrete x_error over time



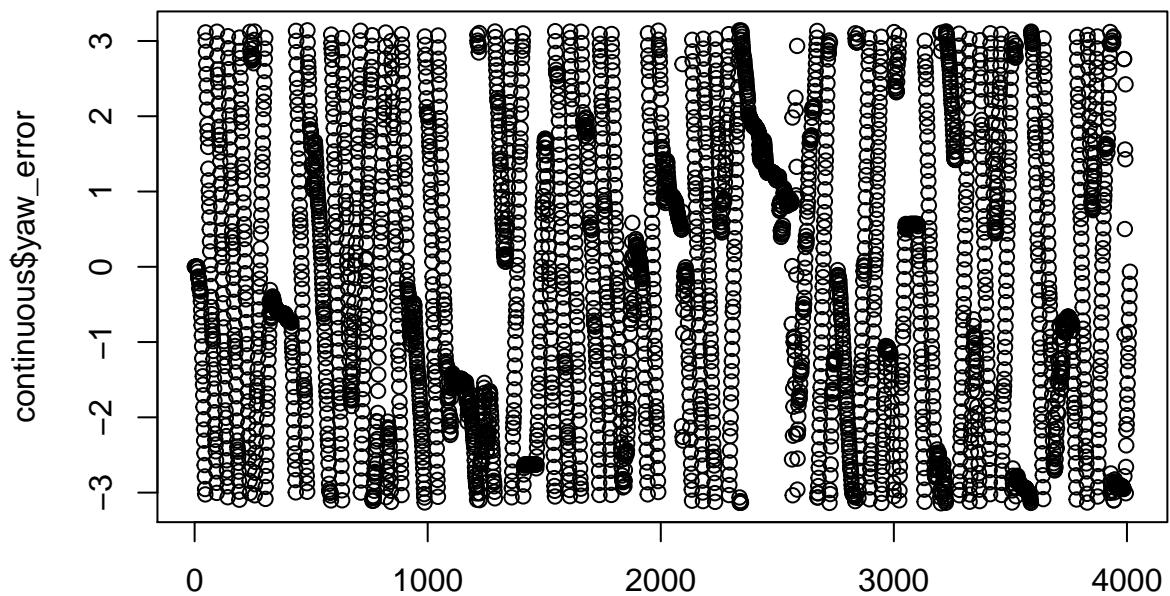
Continuous y_error over time



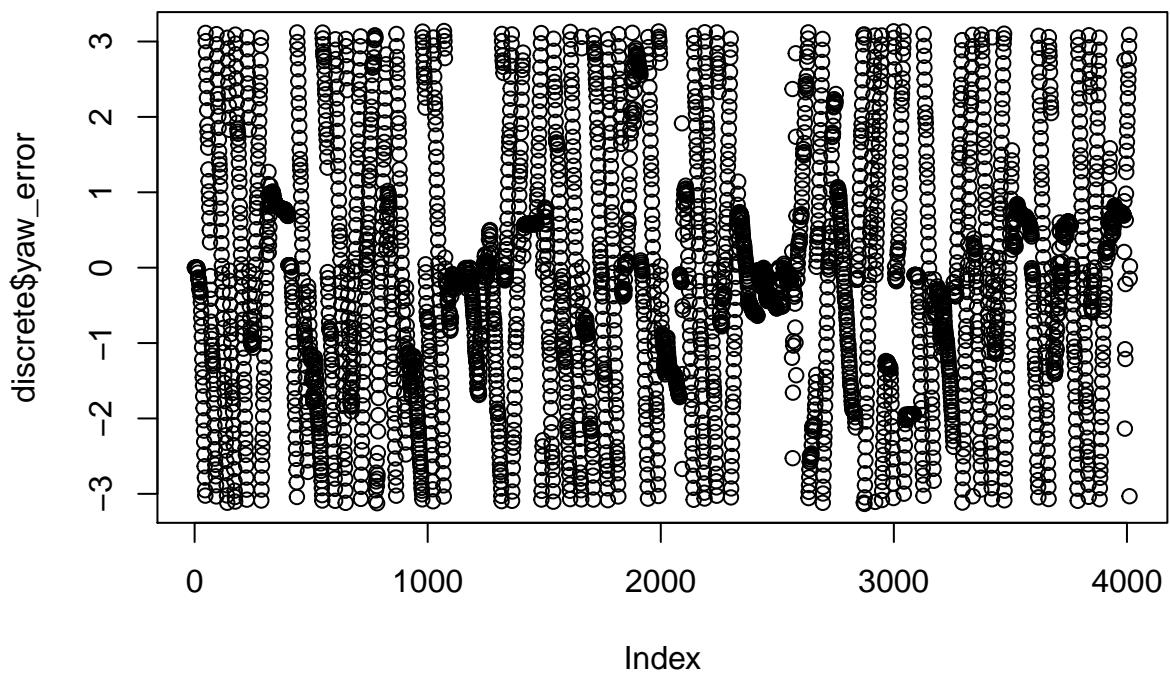
Discrete y_error over time



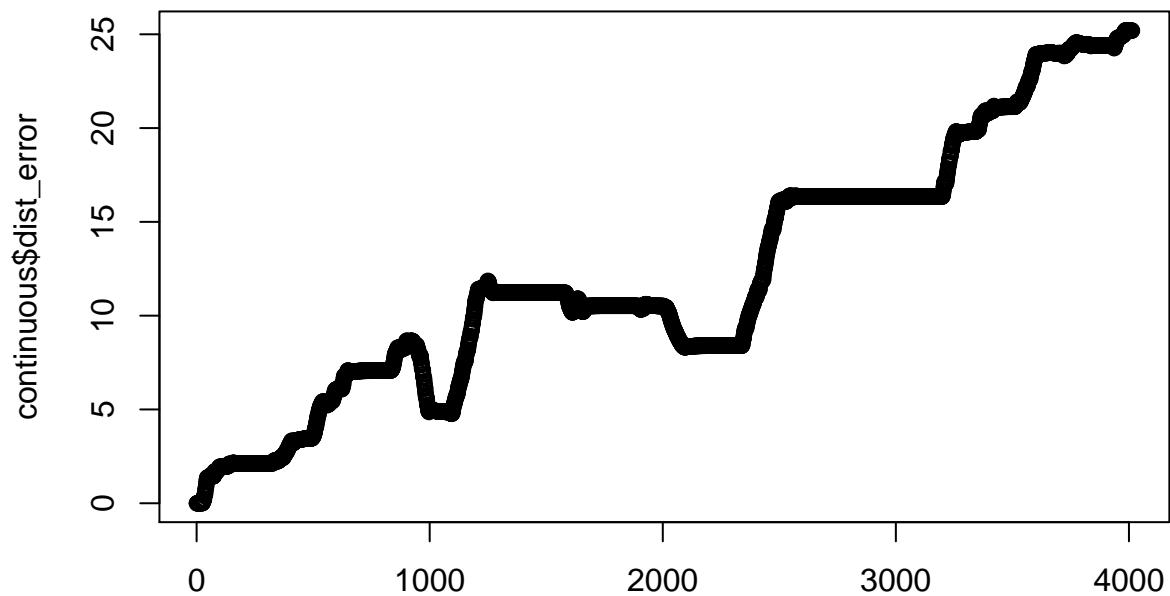
Continuous yaw error over time



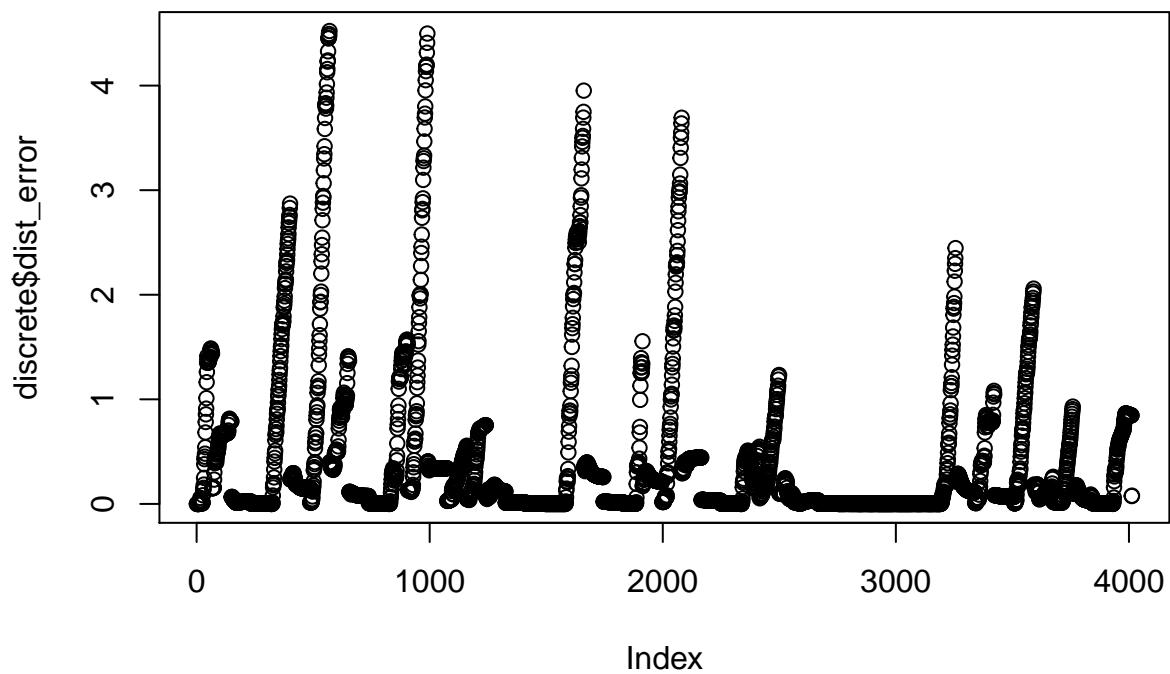
Discrete yaw error over time



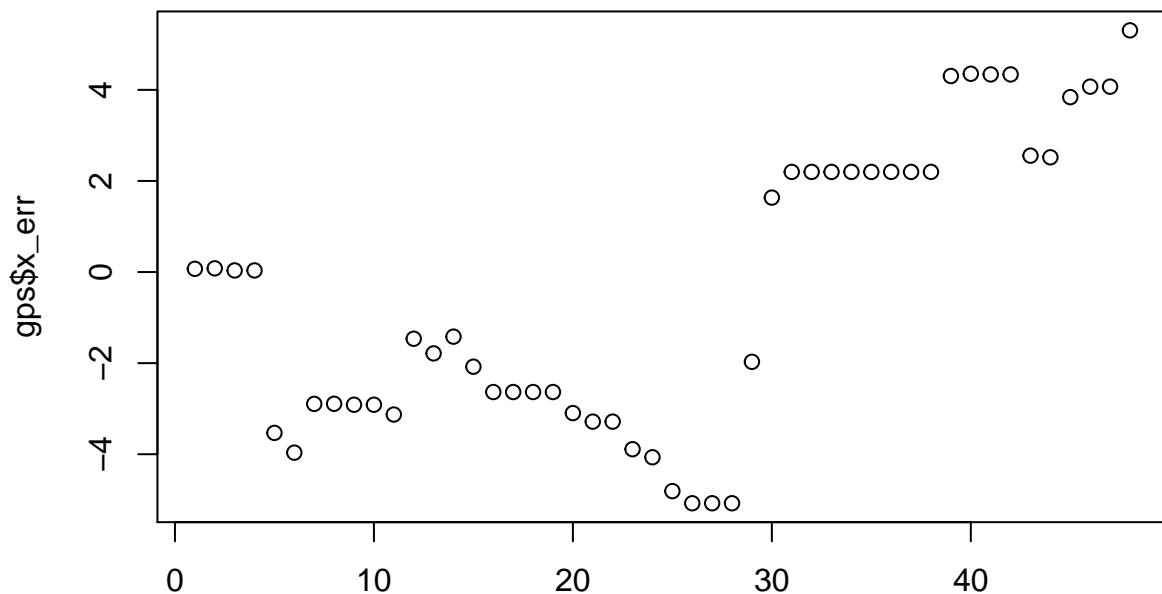
Continuous total distance error over time



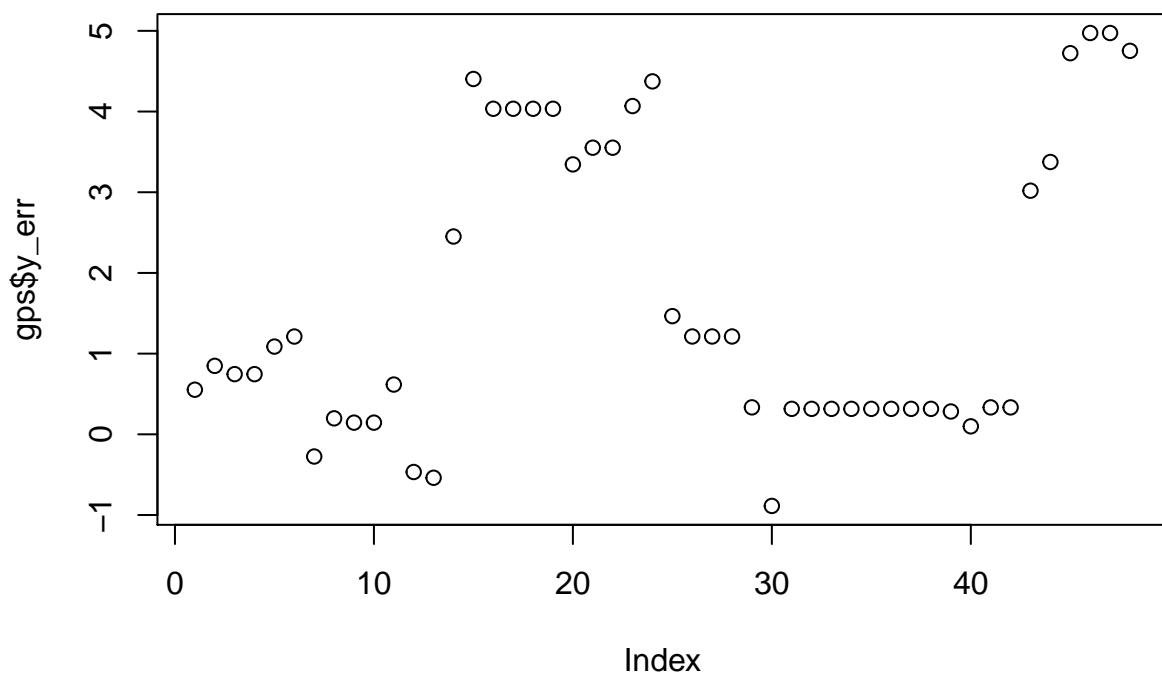
Discrete total distance error over time



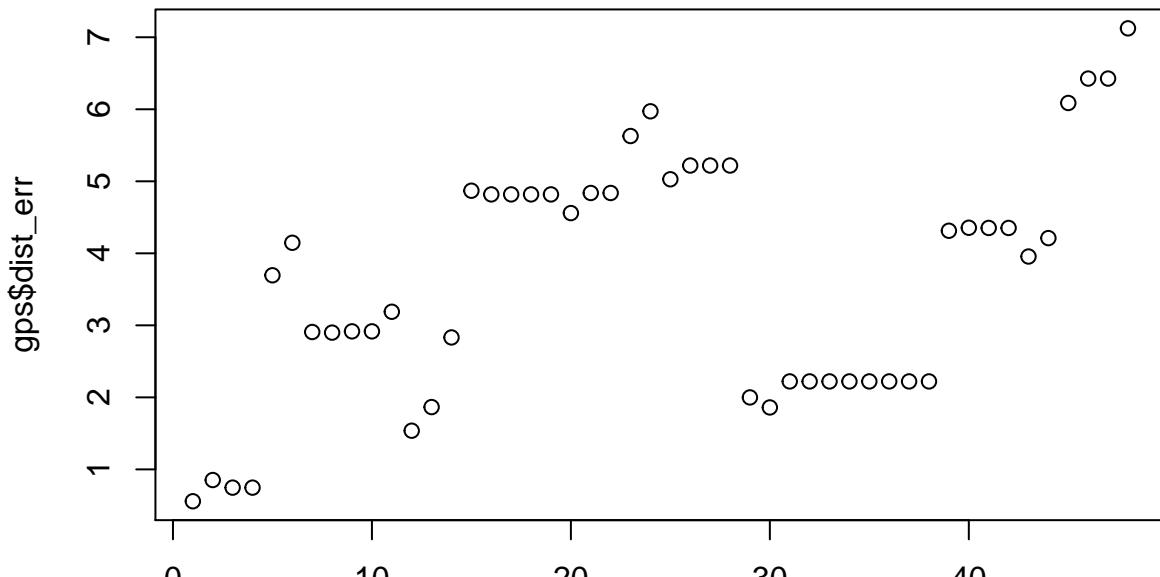
GPS X Error Over Time



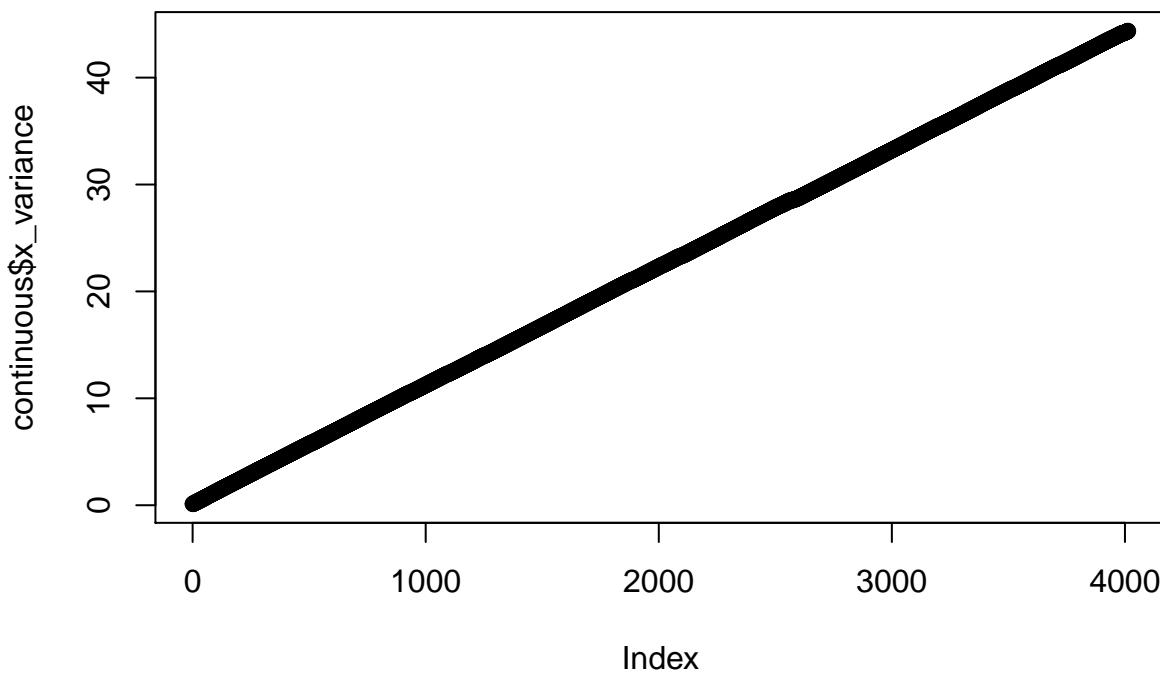
GPS Y Error Over Time



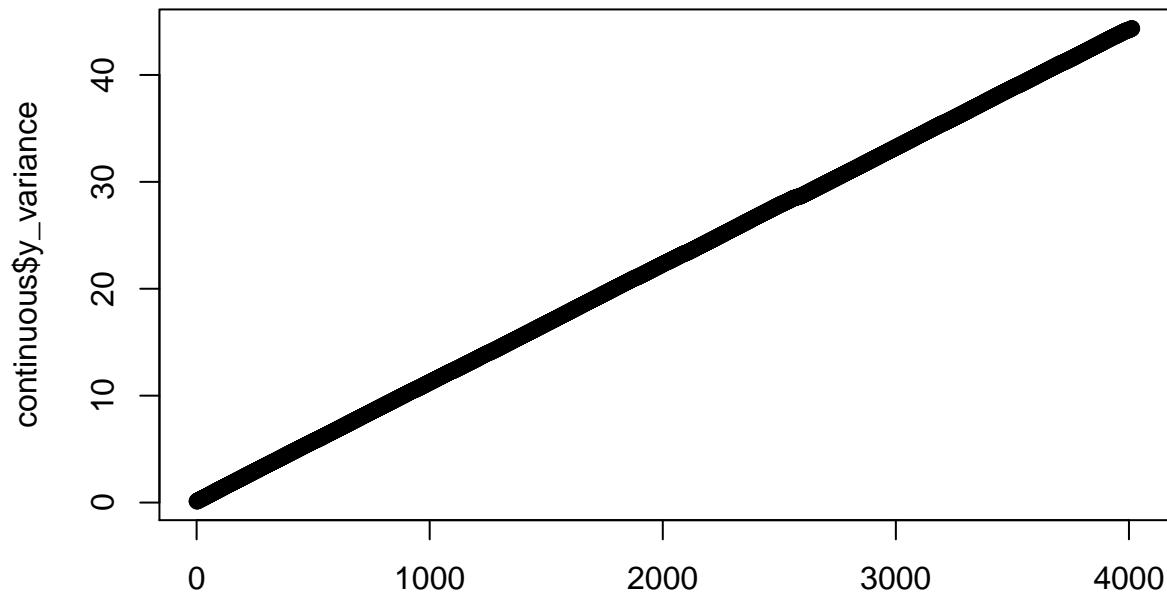
GPS Horizontal Distance Error Over Time



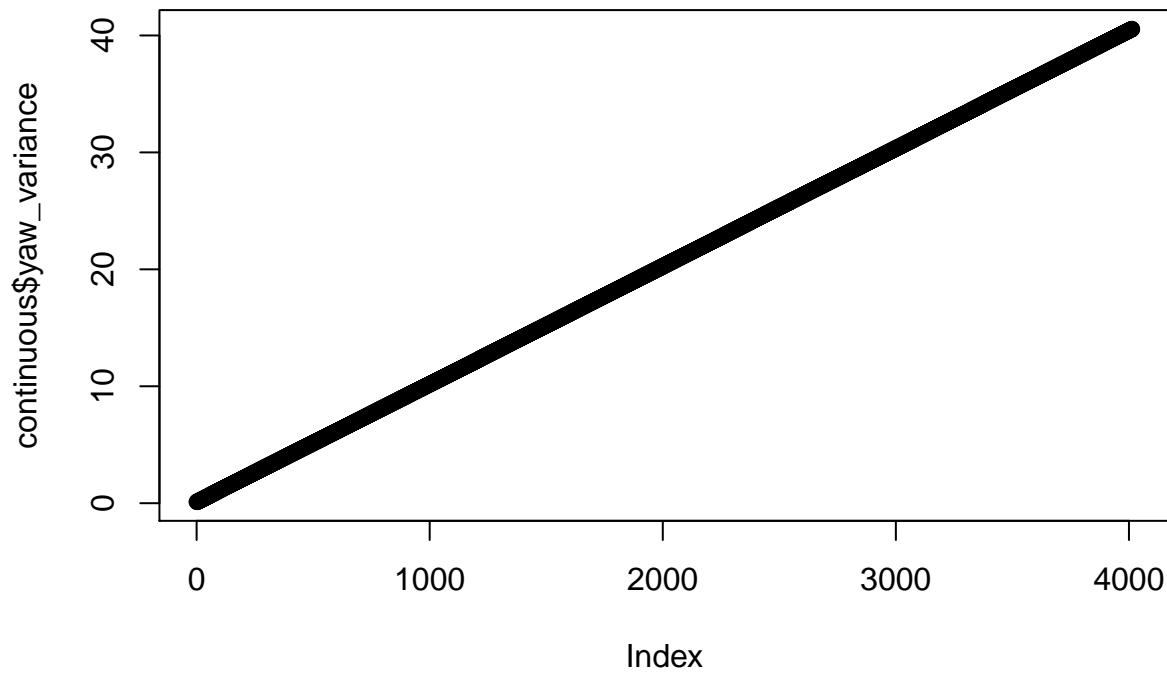
Continuous Filter X Variance Over Time



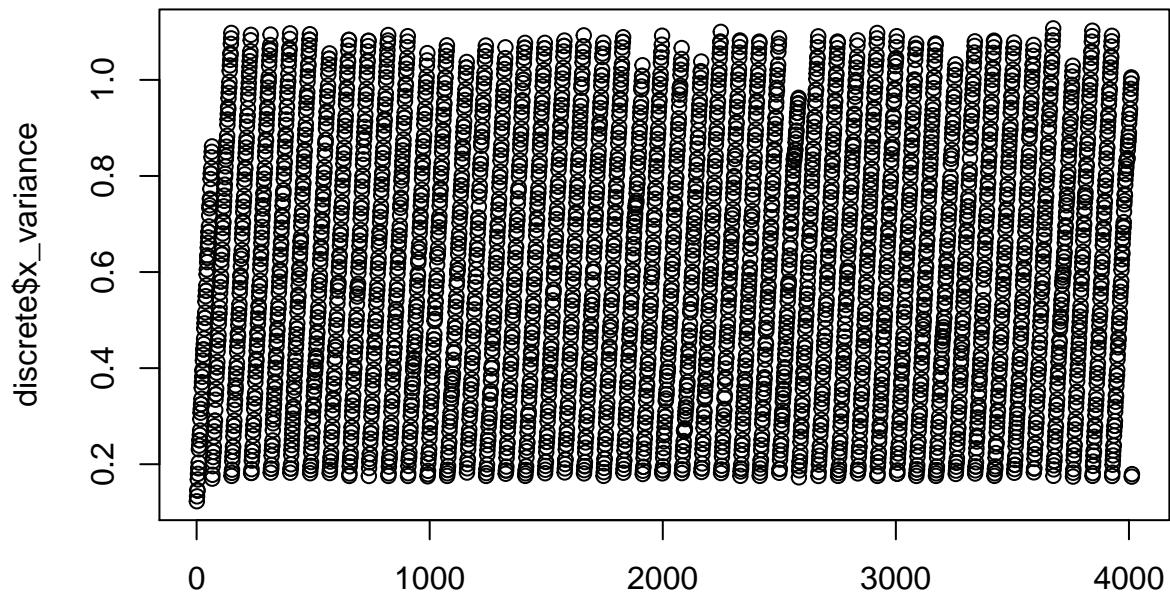
Continuous Filter Y Variance Over Time



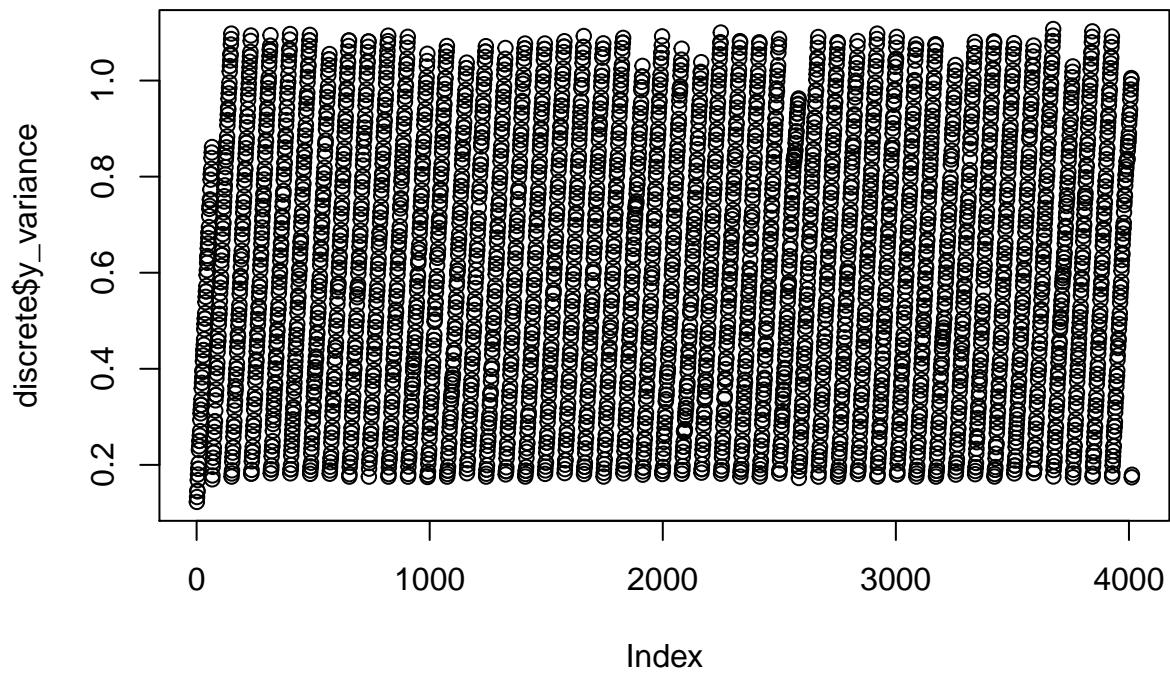
Continuous Filter Yaw Variance Over Time



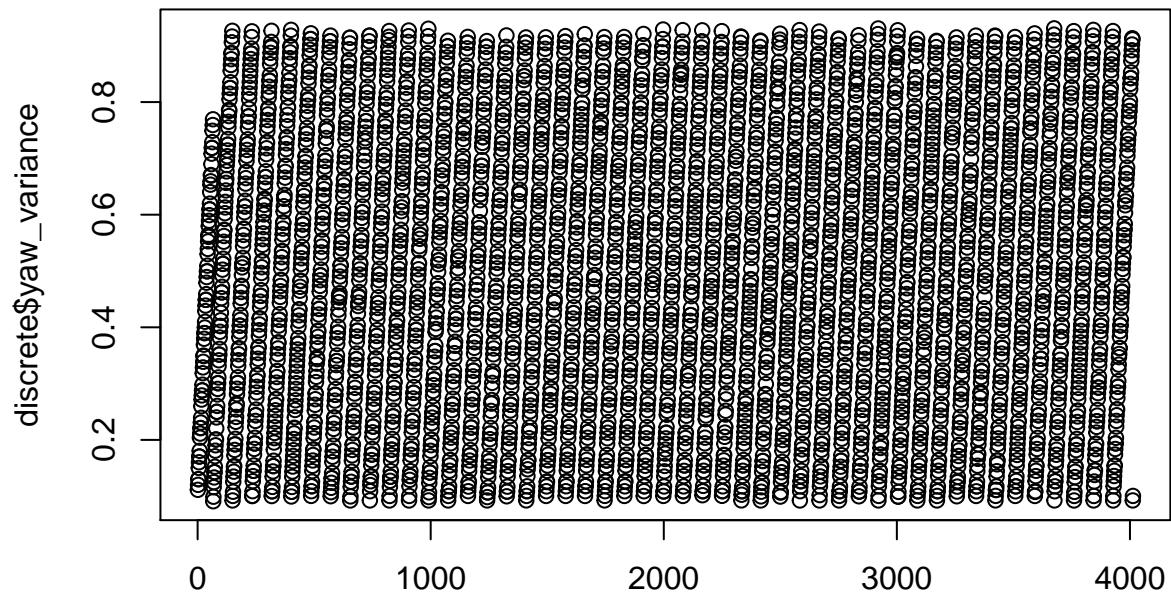
Discrete Filter X Variance Over Time



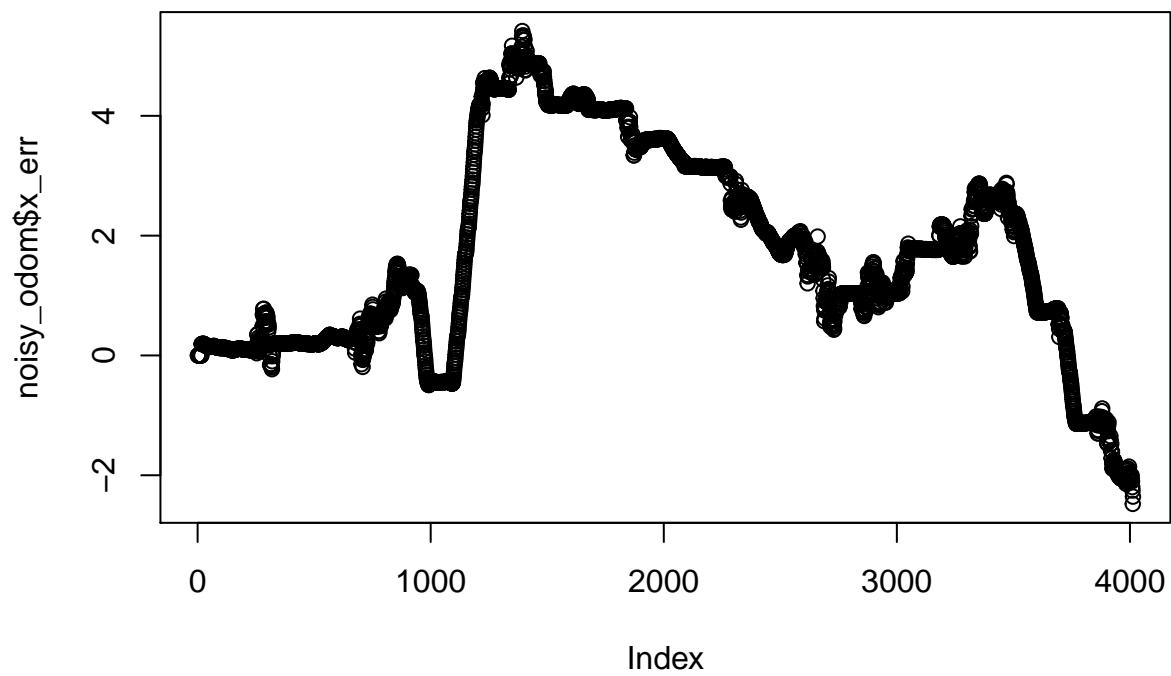
Discrete Filter Y Variance Over Time



Discrete Filter Yaw Variance Over Time



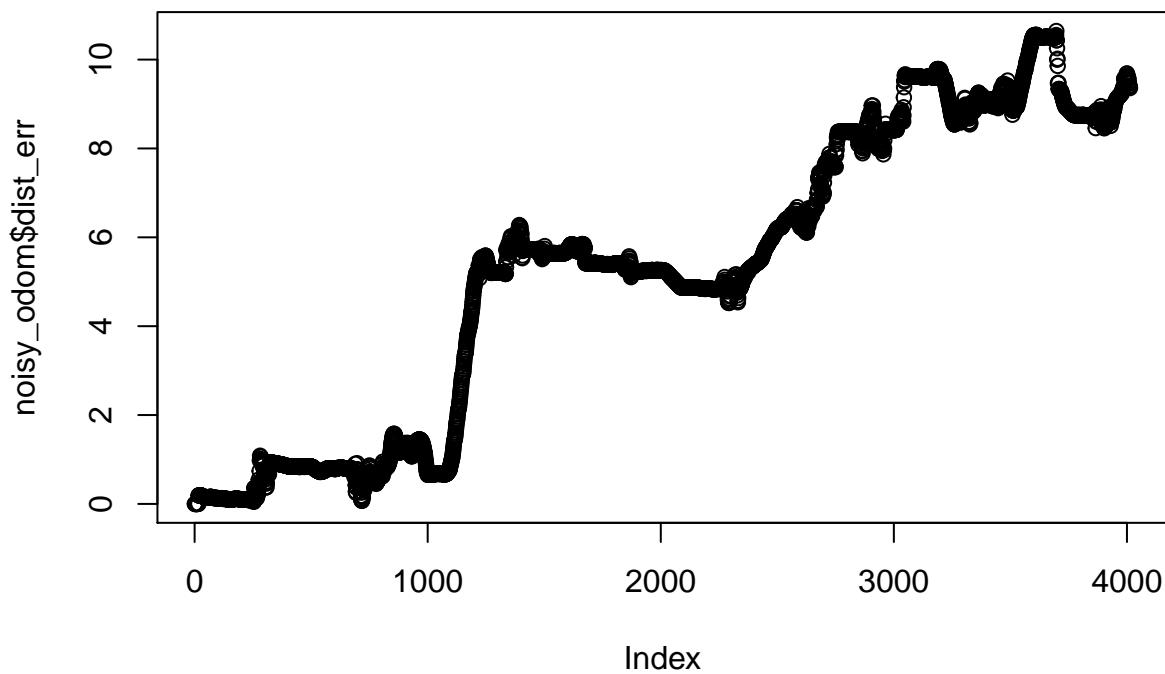
Noisy Odom X Error Over Time



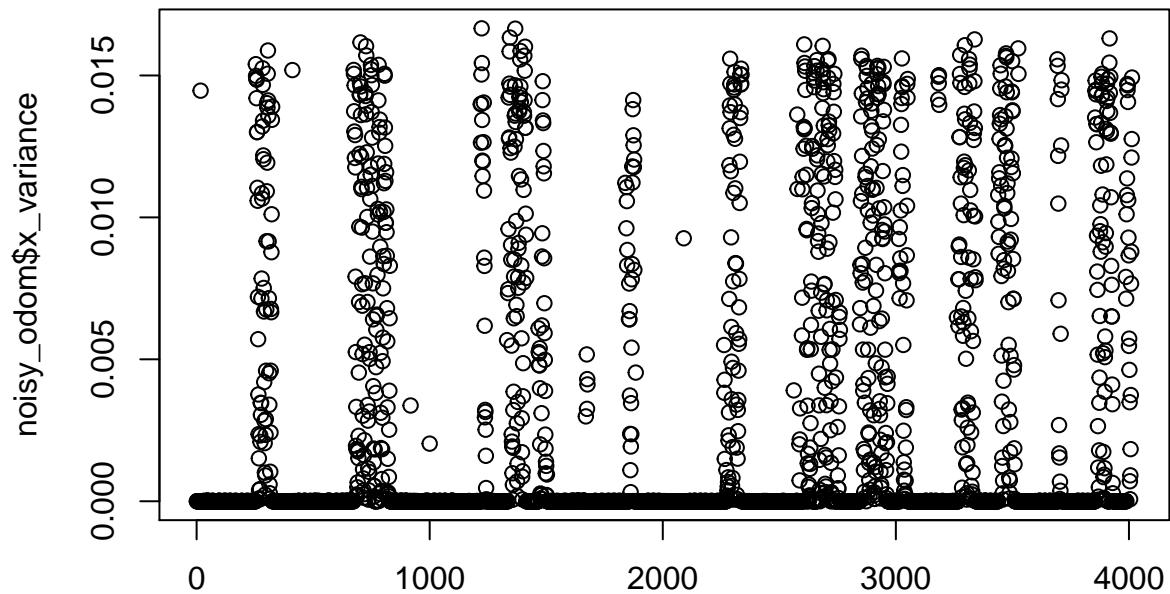
Noisy Odom Y Error Over Time



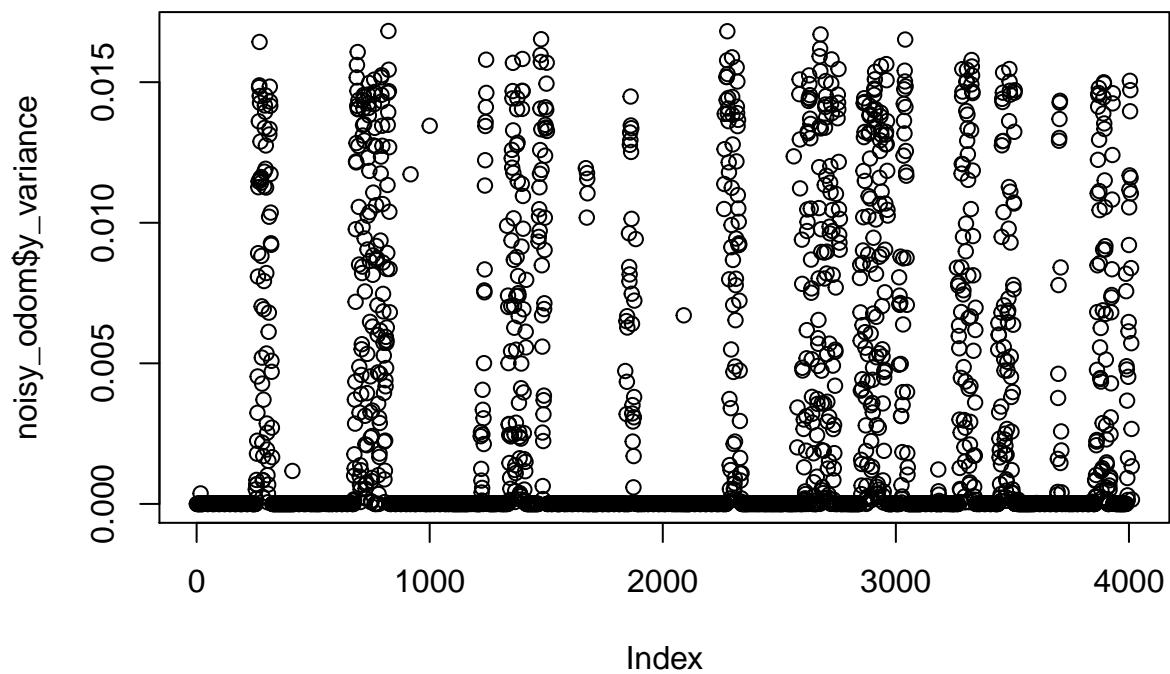
Noisy Odom Horizontal Distance Error Over Time



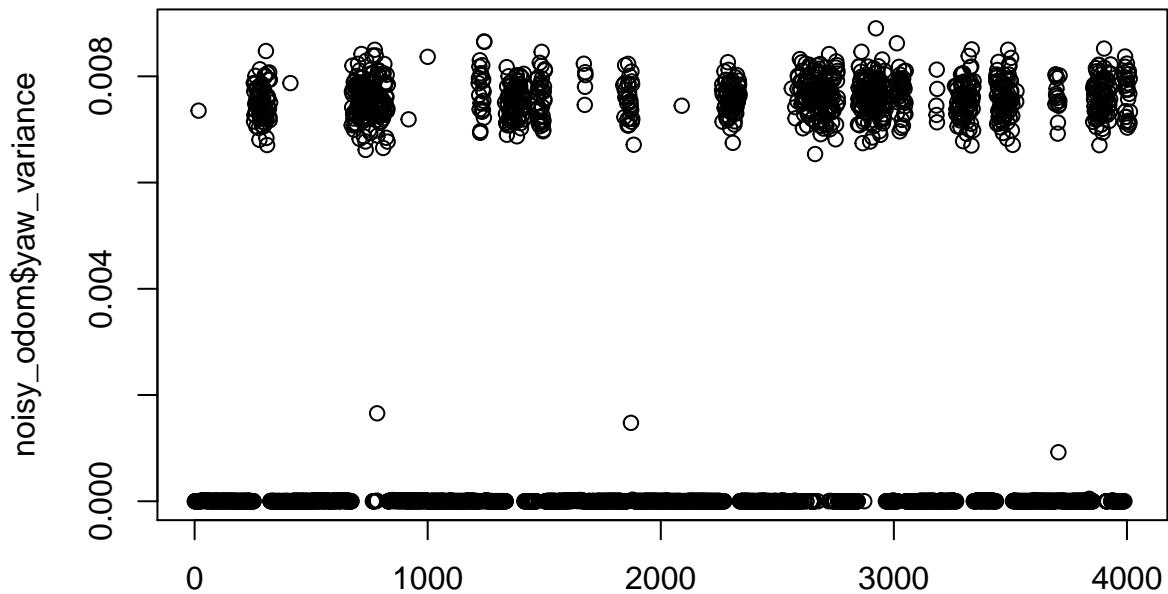
Variance of X Coordinate in Noisy Odometry



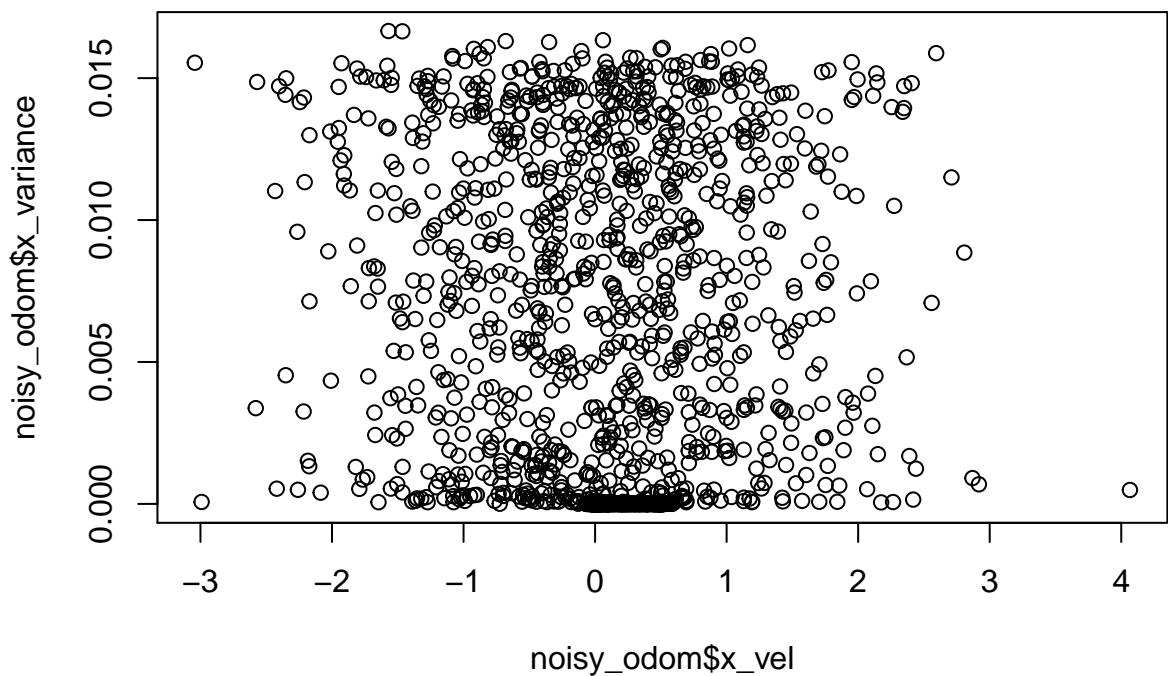
Variance of Y Coordinate in Noisy Odometry



Variance of Yaw Coordinate in Noisy Odometry



Variance vs. Velocity of X in Noisy Odometry



Variance vs. Velocity of Yaw in Noisy Odometry

