

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 42 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.
## -2.8810  0.9434  2.3530  3.8740  8.7800 12.3700
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -6.53500 -2.88700  0.02268  0.31930  3.00100  8.19000
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -3.136000 -1.553000 -0.006657 -0.005929  1.562000  3.141000
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
##  0.000015  2.066000  4.472000  5.545000  9.208000 13.650000
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -2.3710 -0.4020  0.3721  0.2891  0.7757  4.1730
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -3.90600 -0.84700 -0.04572 -0.05091  0.58810  4.12000
```

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

```
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -3.1410 -1.4350 -0.5793 -0.3351  0.5310  3.1400
```

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

```

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.000015 0.788700 1.264000 1.480000 2.072000 4.793000
summary(noisy_odom$x_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -3.44100 -1.97000 -0.58360 -0.93260 -0.01171  1.23900
summary(noisy_odom$y_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## -2.2400 -1.5350 -0.1593 -0.4932  0.1182  1.7120
summary(noisy_odom$dist_err)

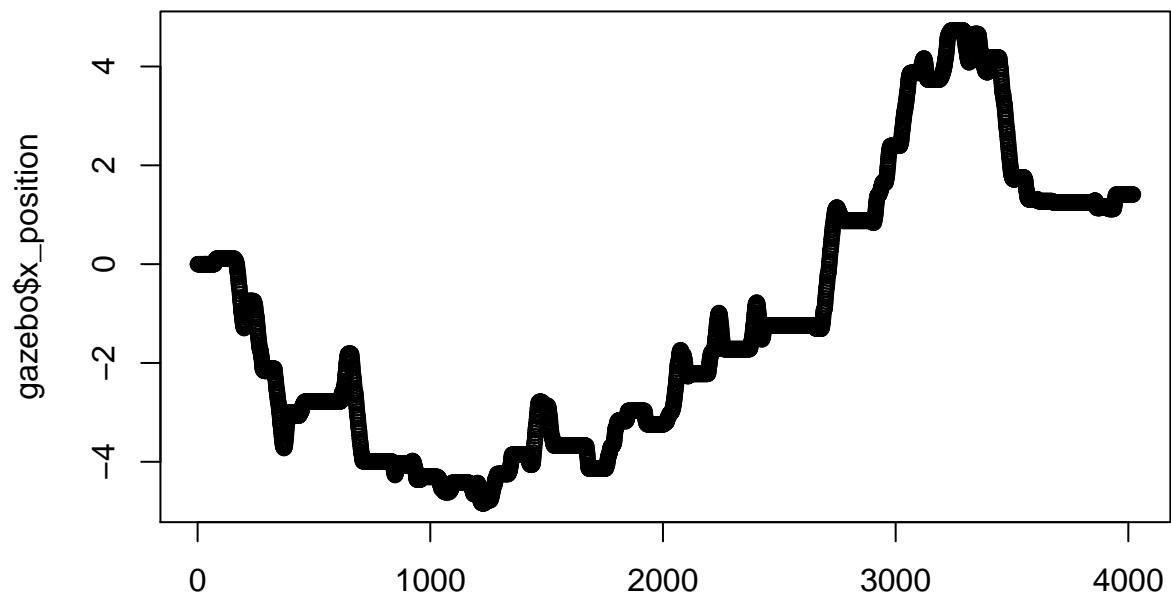
##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.000004 0.971300 1.676000 1.671000 2.262000 3.469000
if (NROW(gps) > 0) {
  summary(gps$x_err)
  summary(gps$y_err)
  summary(gps$dist_err)
}

##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.6166  2.0700  3.3480  3.8650  5.3920  8.7960
if (NROW(noisy_odom) > 0) {
  summary(noisy_odom$x_variance)
  summary(noisy_odom$y_variance)
  summary(noisy_odom$yaw_variance)
}

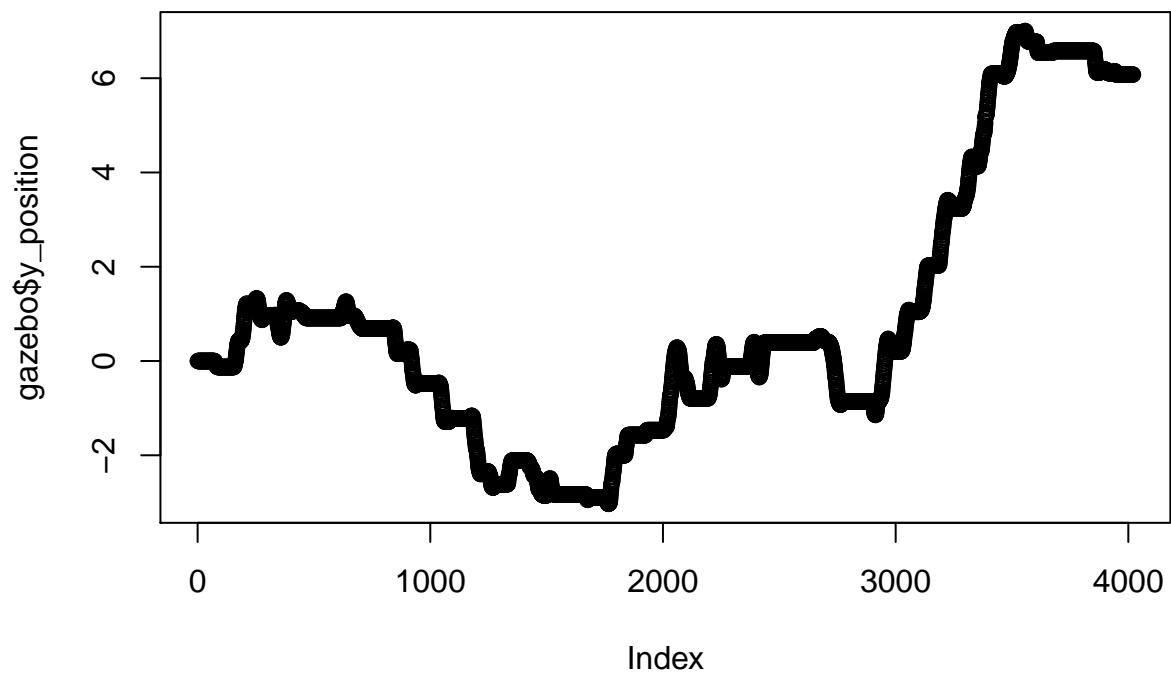
##      Min. 1st Qu. Median     Mean 3rd Qu.     Max.
## 0.000e+00 2.190e-06 4.153e-06 4.710e-04 5.668e-06 8.869e-03

```

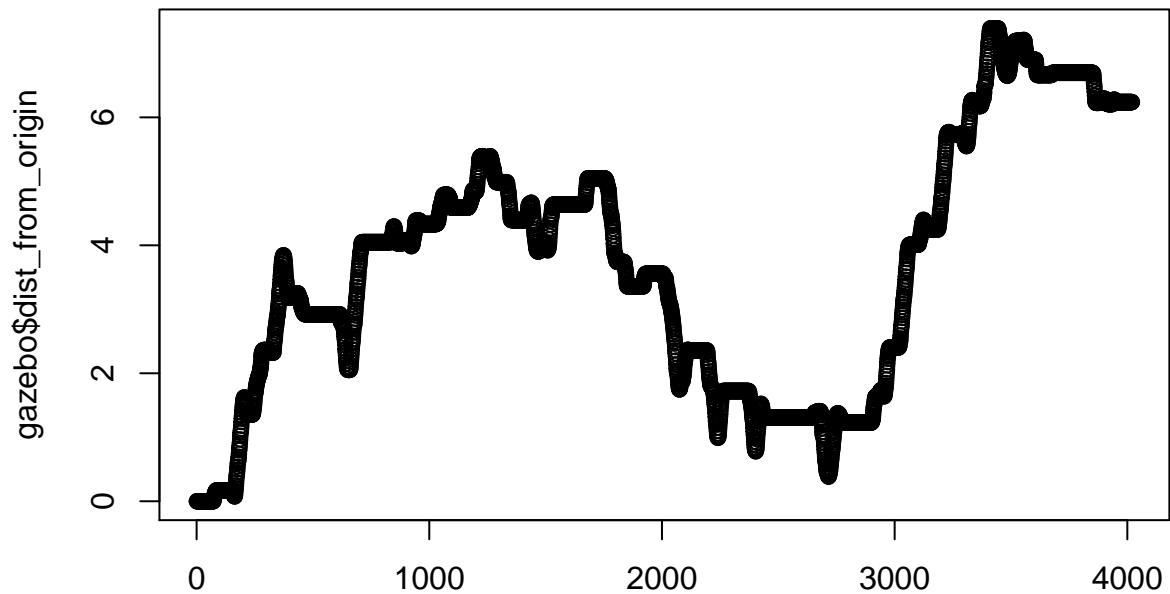
X coordinate of robot over time



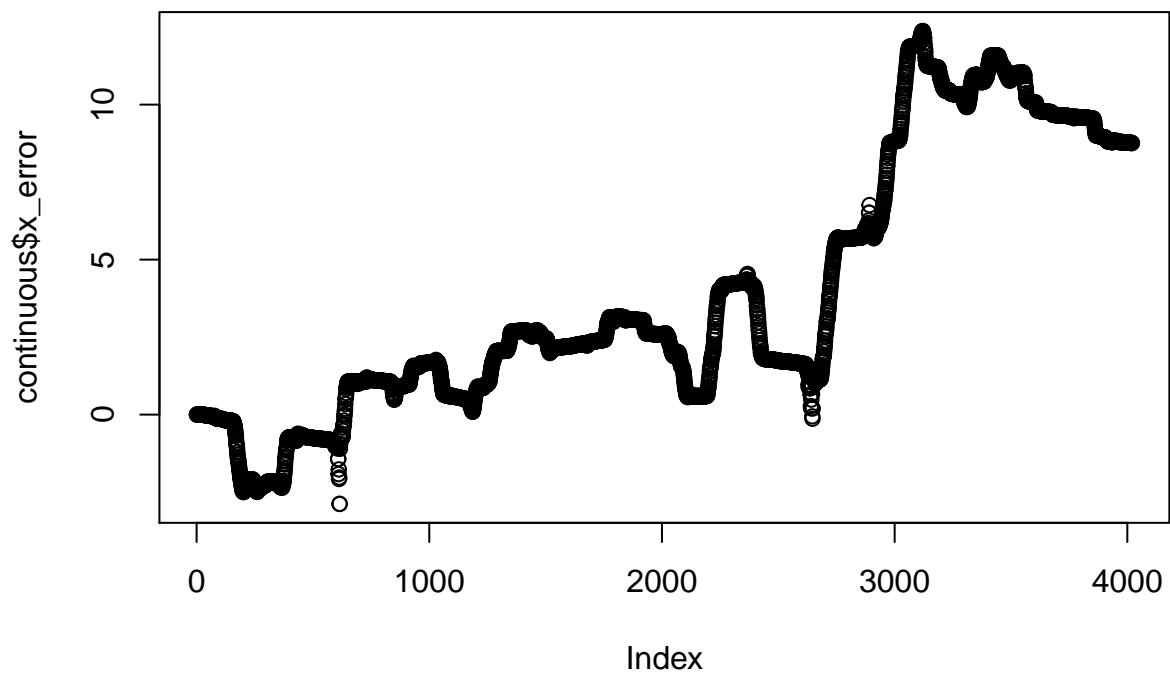
Y coordinate of robot over time



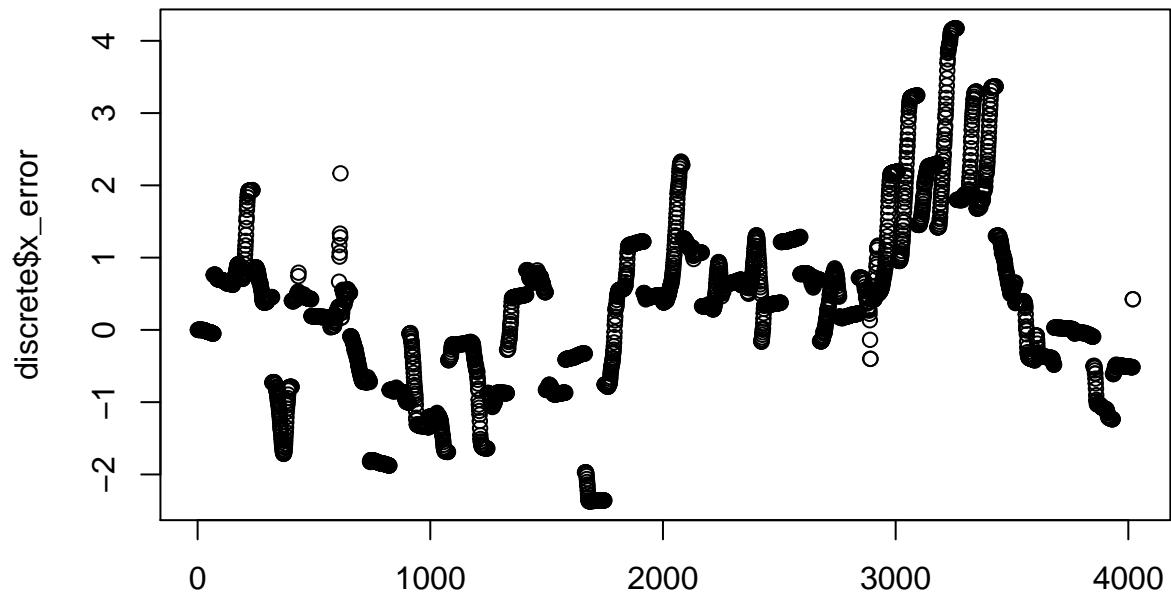
Distance from origin vs. time



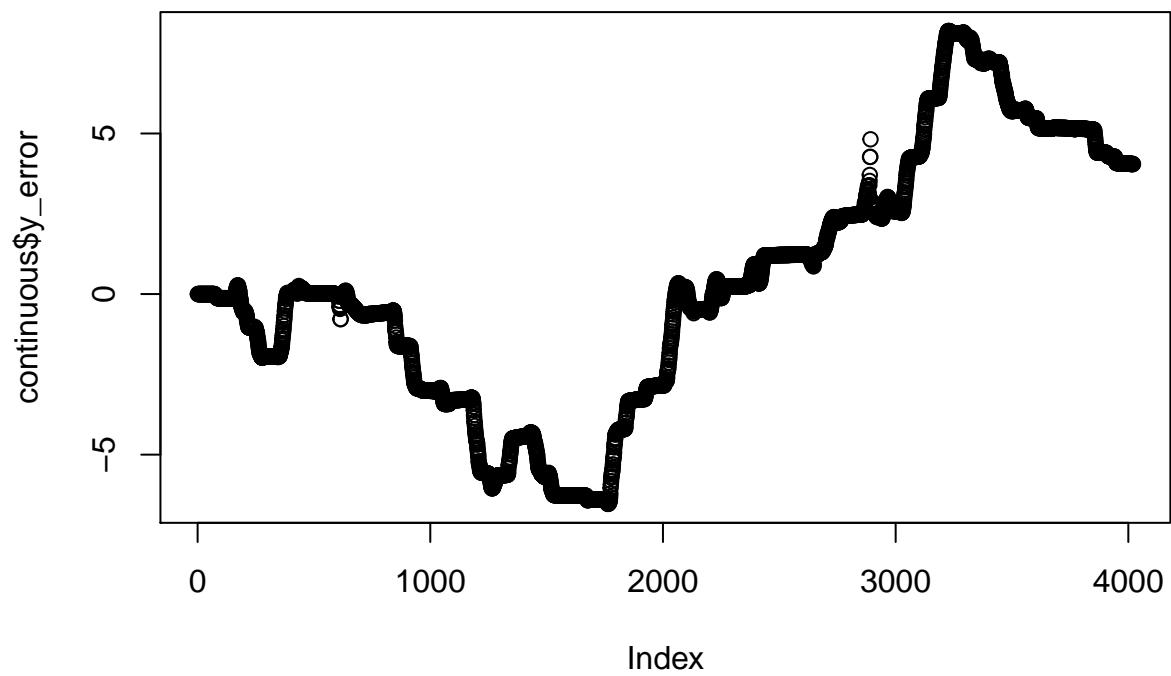
Continuous x_error over time



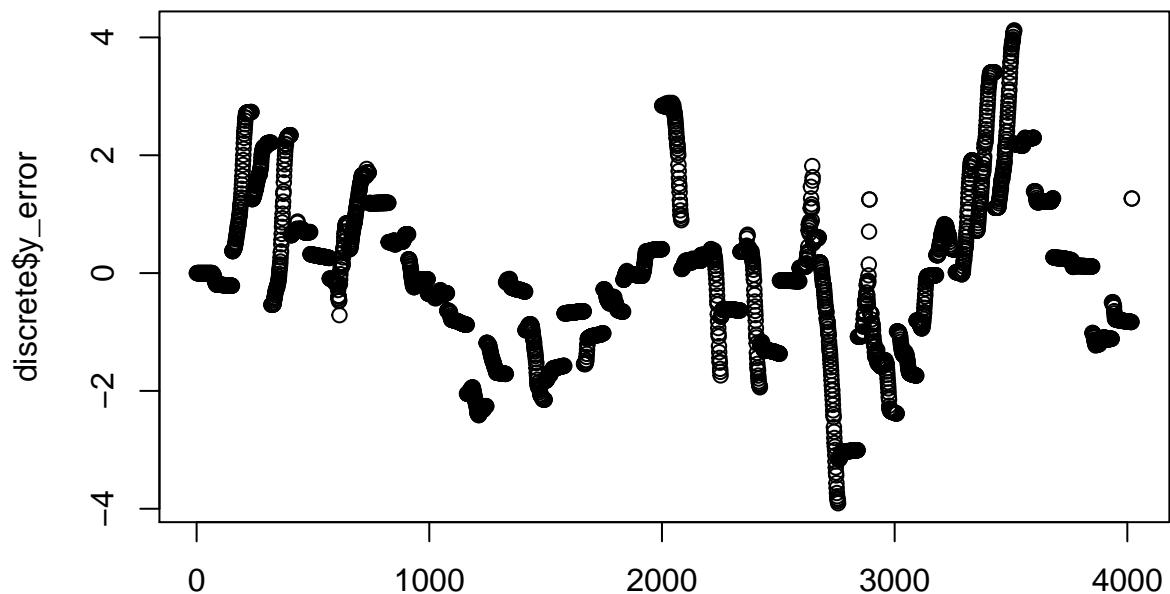
Discrete x_error over time



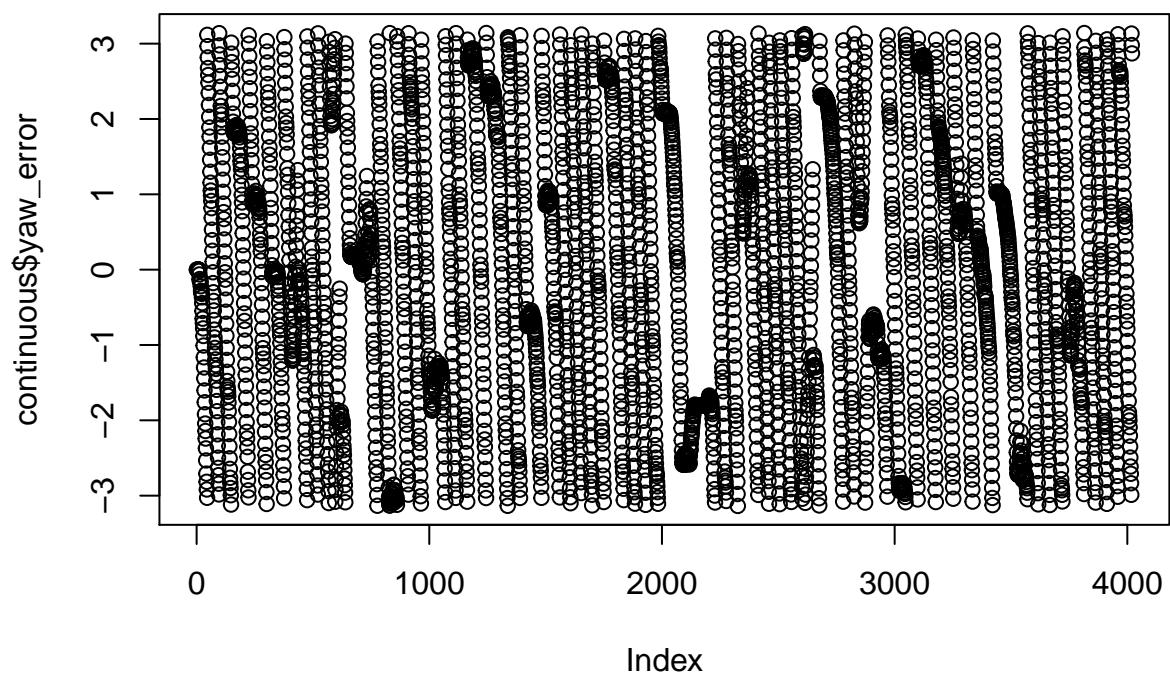
Continuous y_error over time



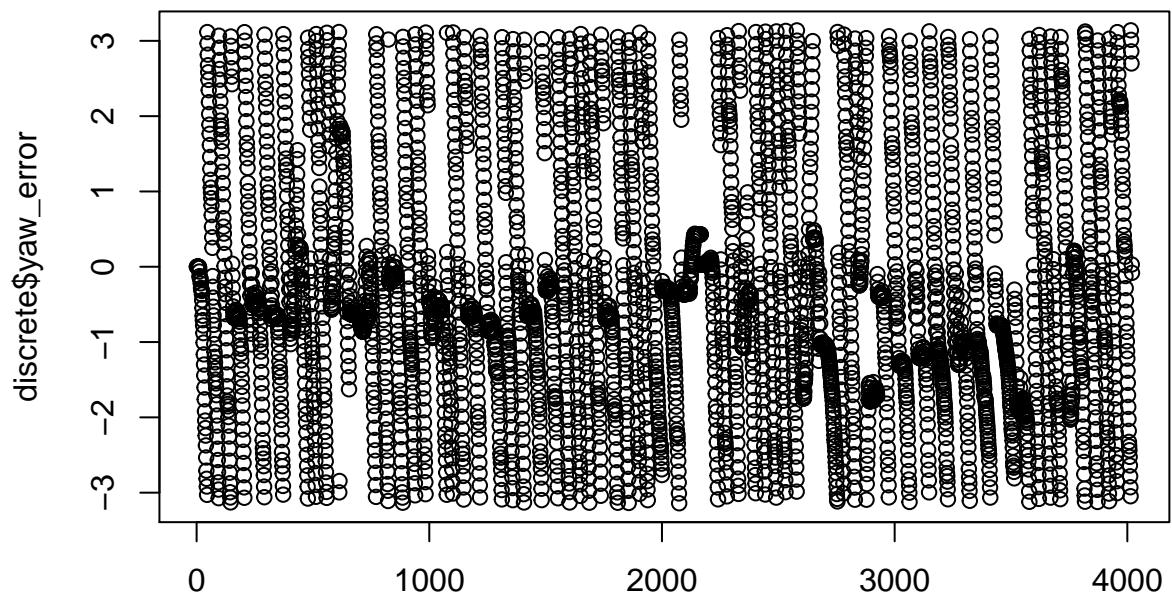
Discrete y_error over time



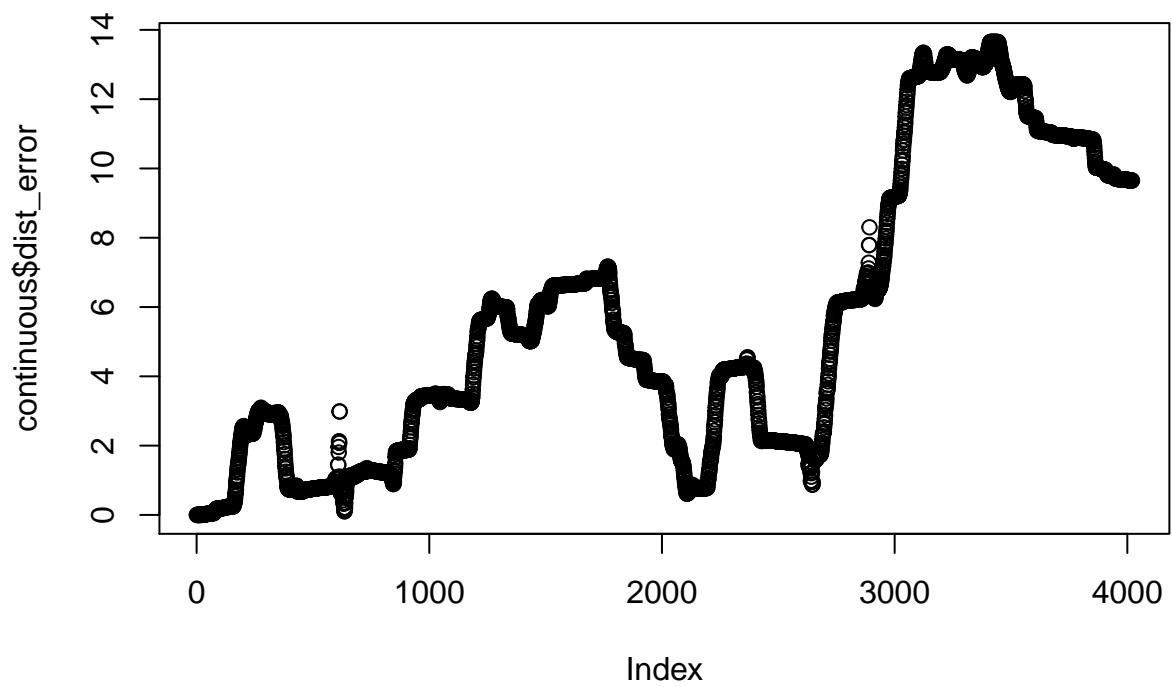
Continuous yaw error over time



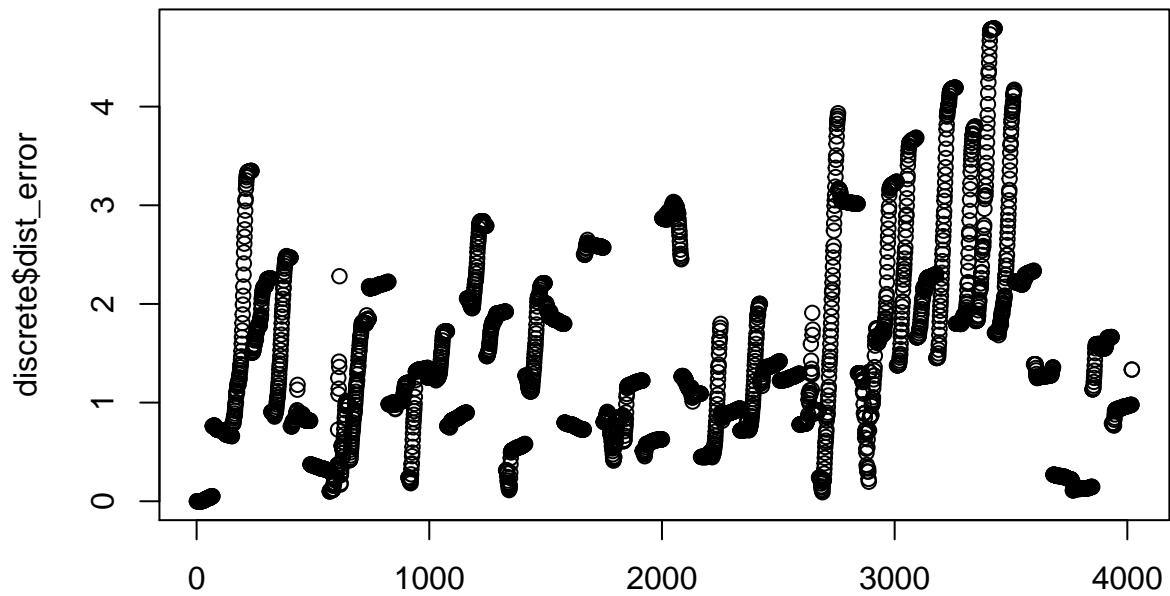
Discrete yaw error over time



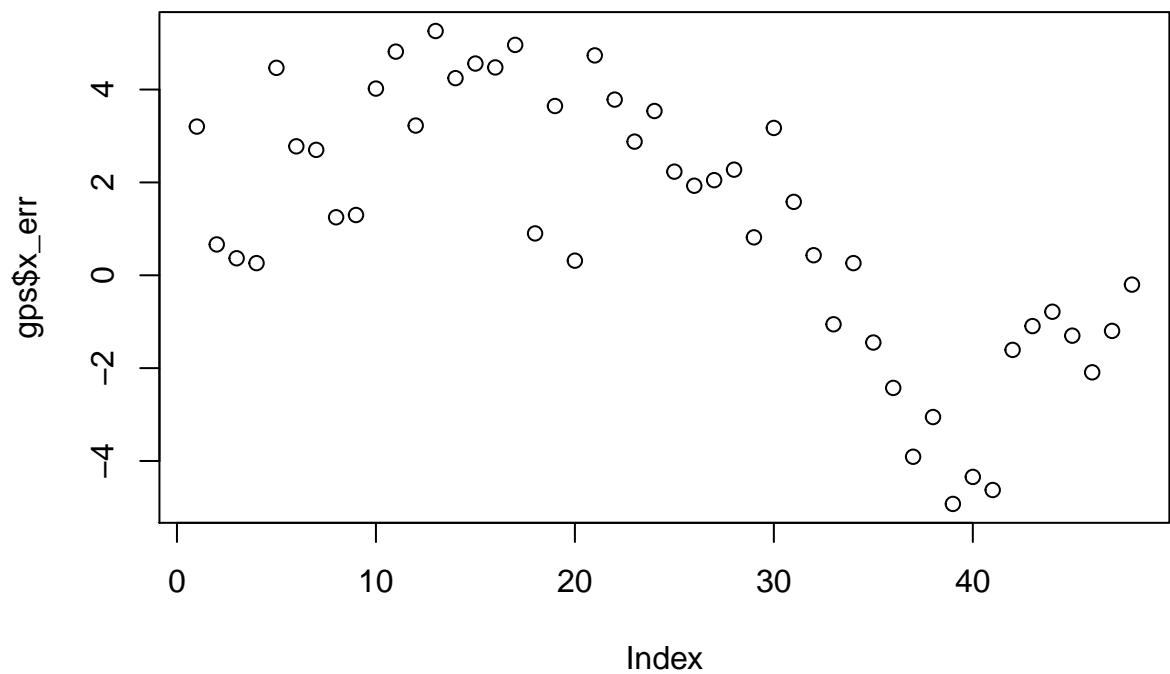
Continuous total distance error over time



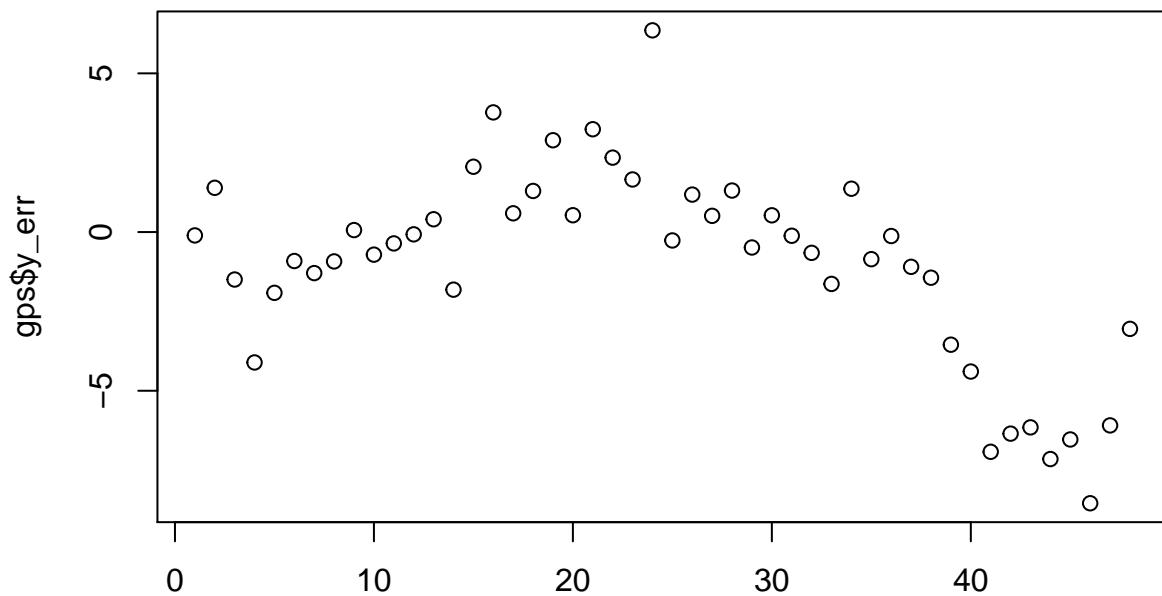
Discrete total distance error over time



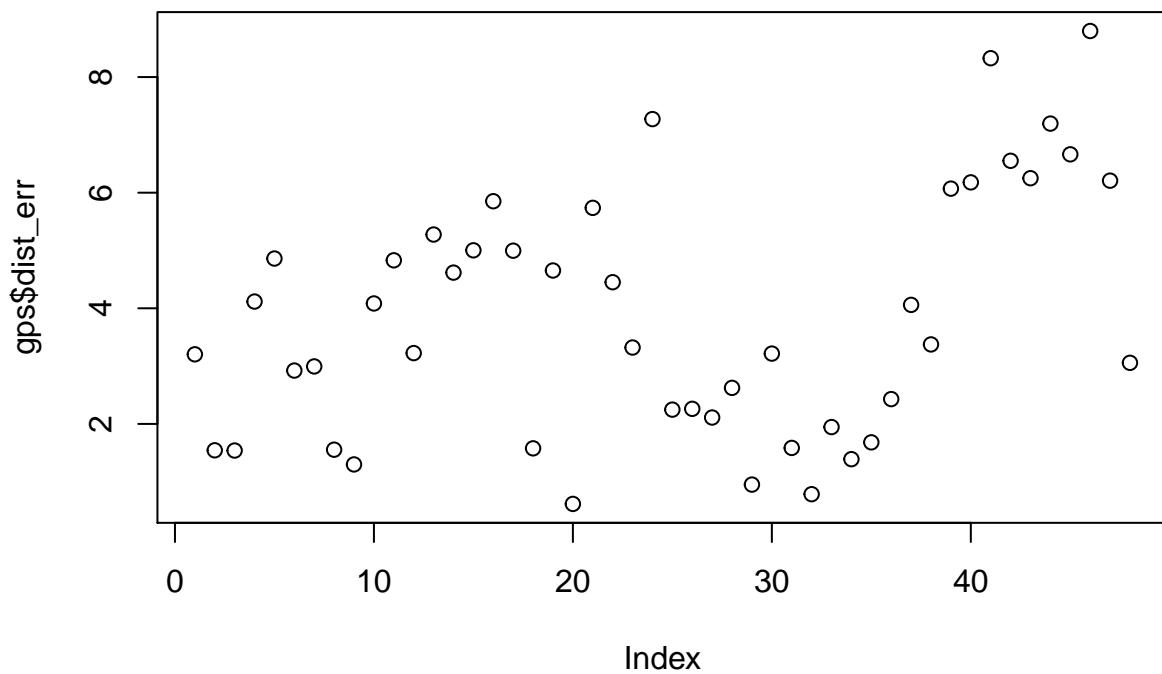
GPS X Error Over Time



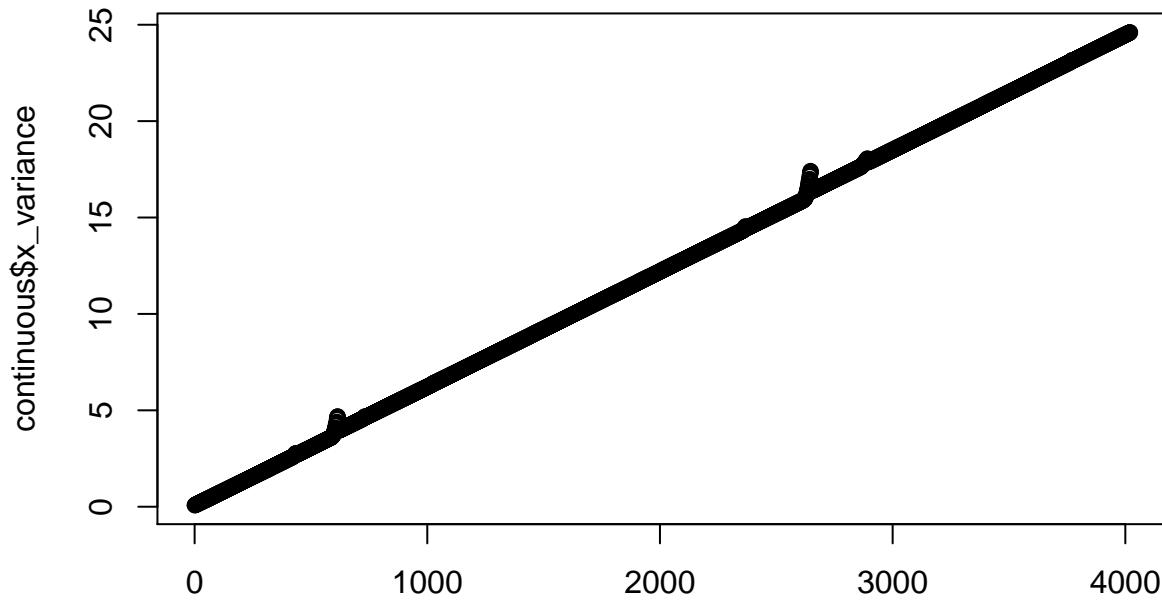
GPS Y Error Over Time



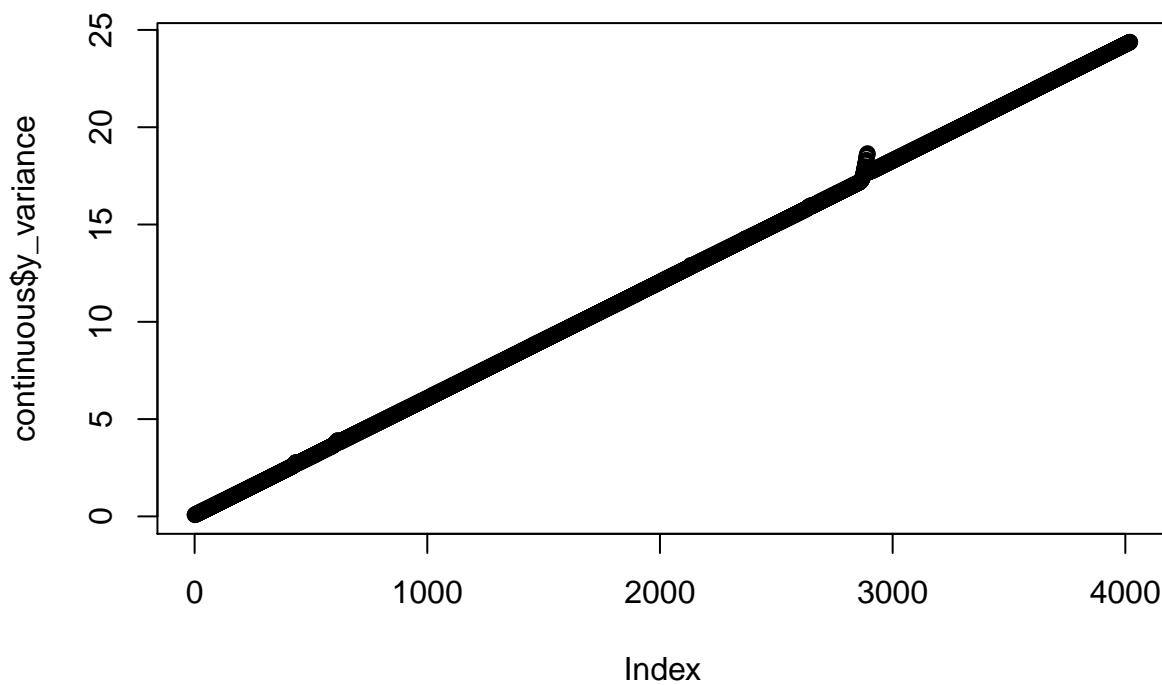
GPS Horizontal Distance Error Over Time



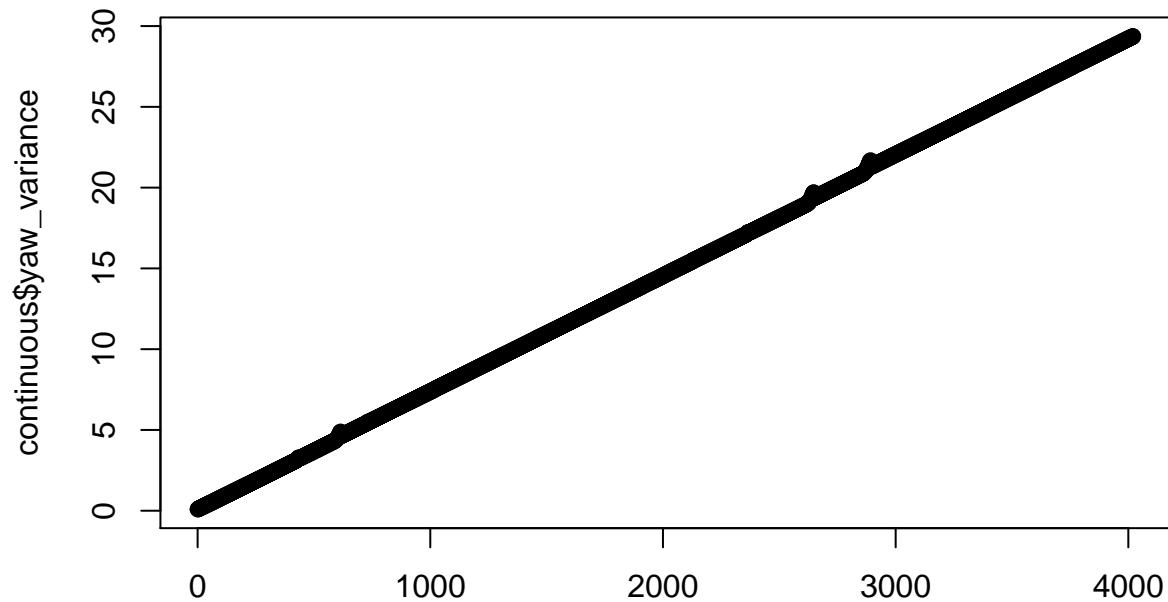
Continuous Filter X Variance Over Time



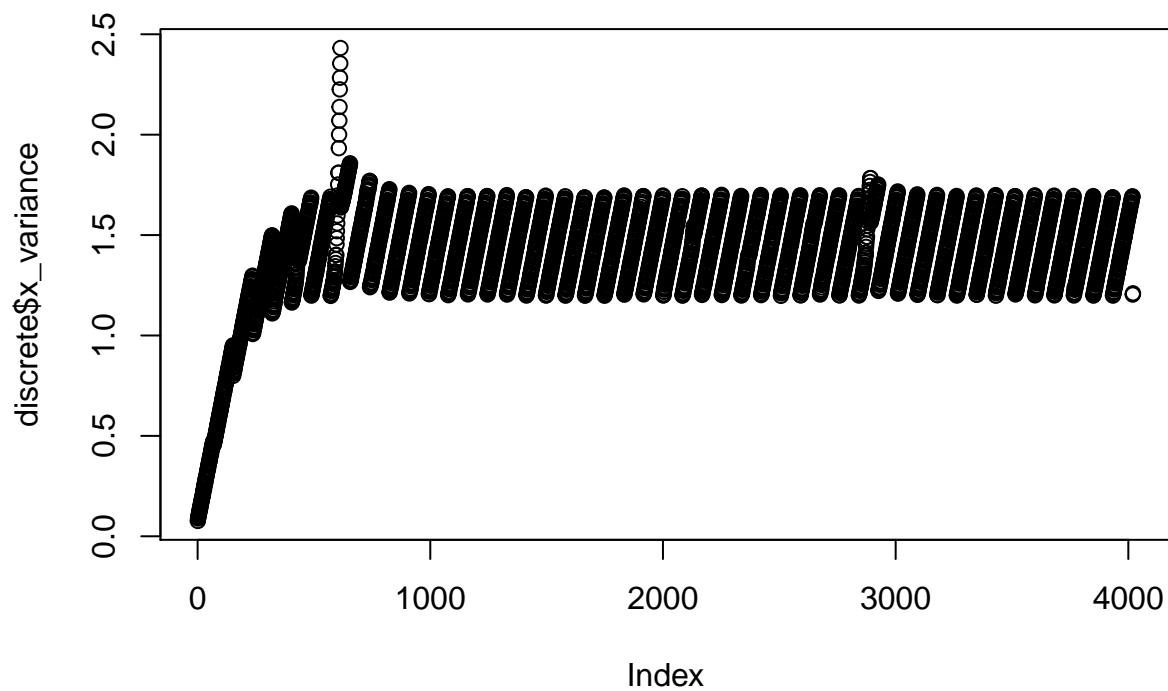
Continuous Filter Y Variance Over Time



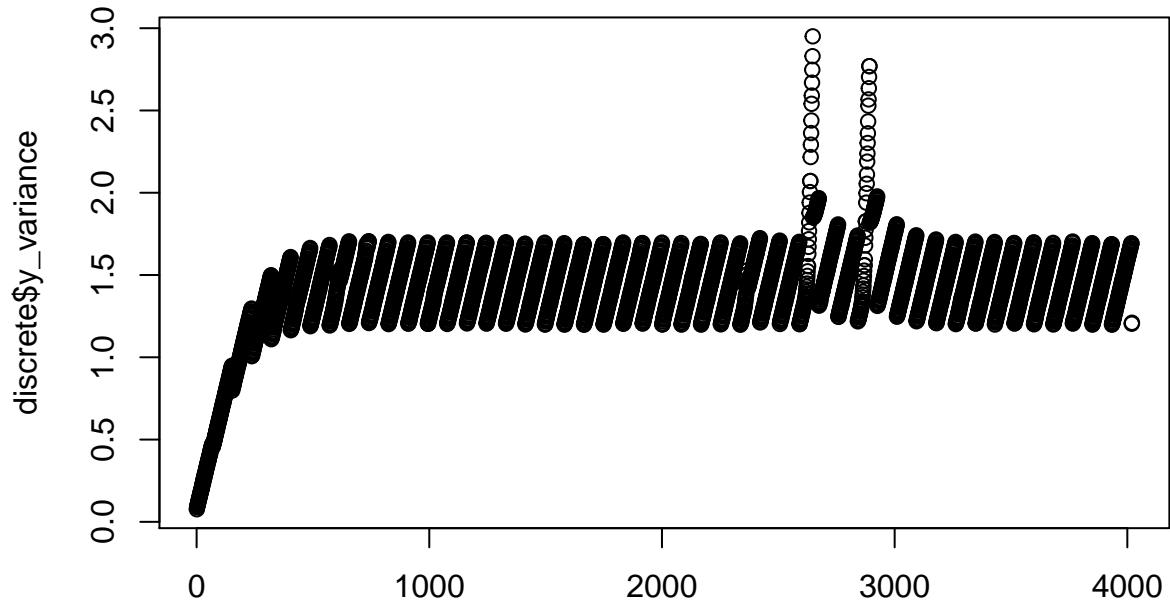
Continuous Filter Yaw Variance Over Time



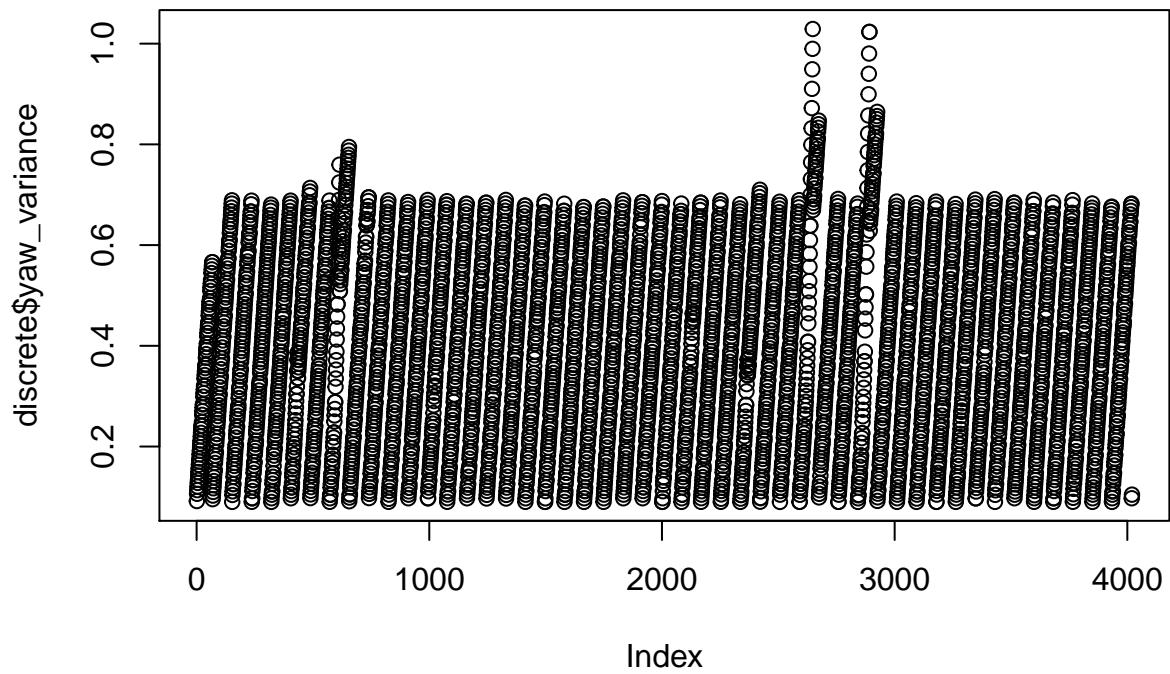
Discrete Filter X Variance Over Time



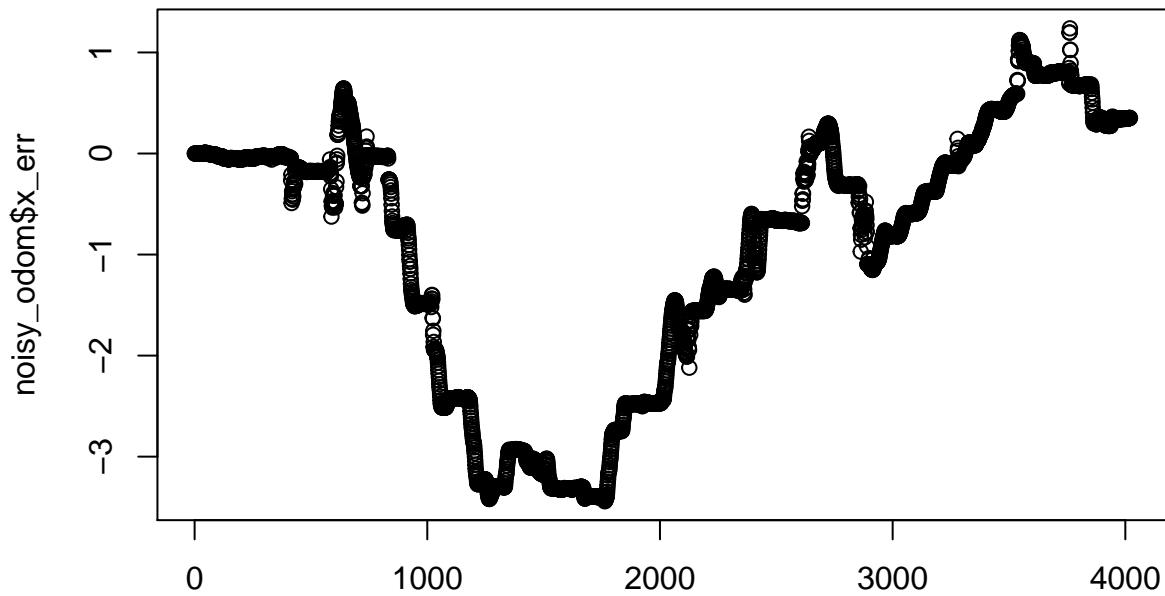
Discrete Filter Y Variance Over Time



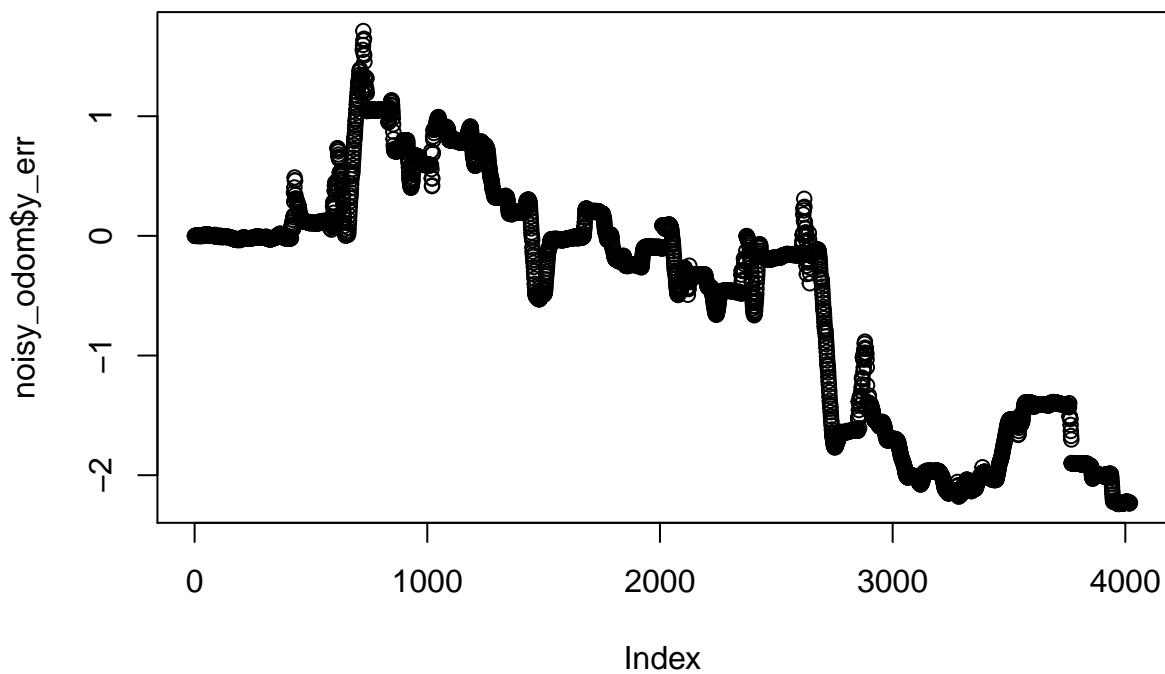
Discrete Filter Yaw Variance Over Time



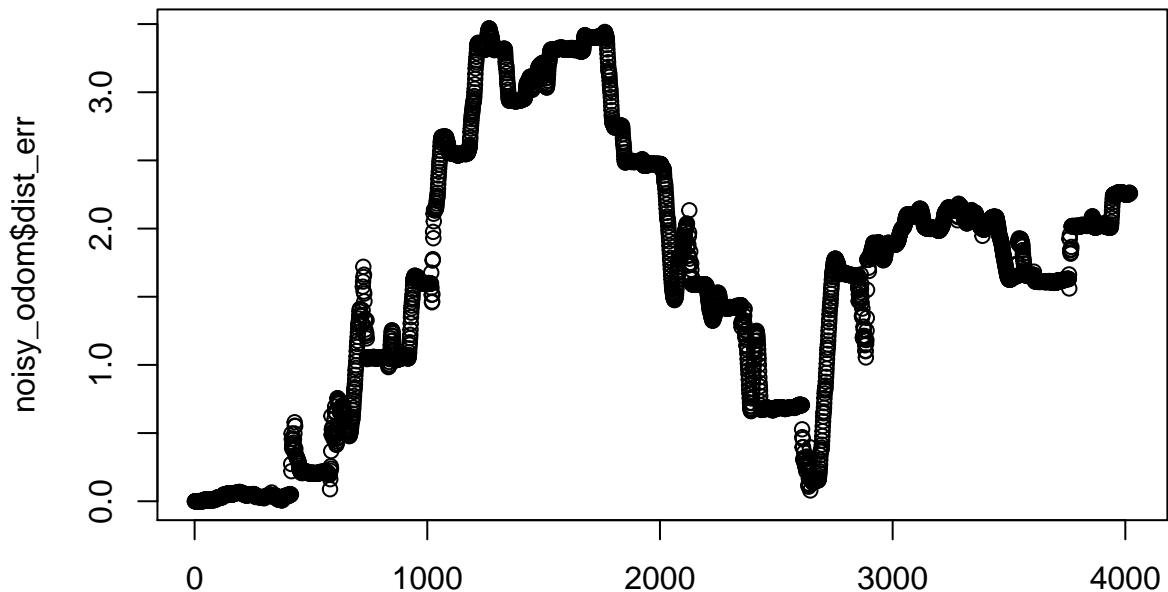
Noisy Odom X Error Over Time



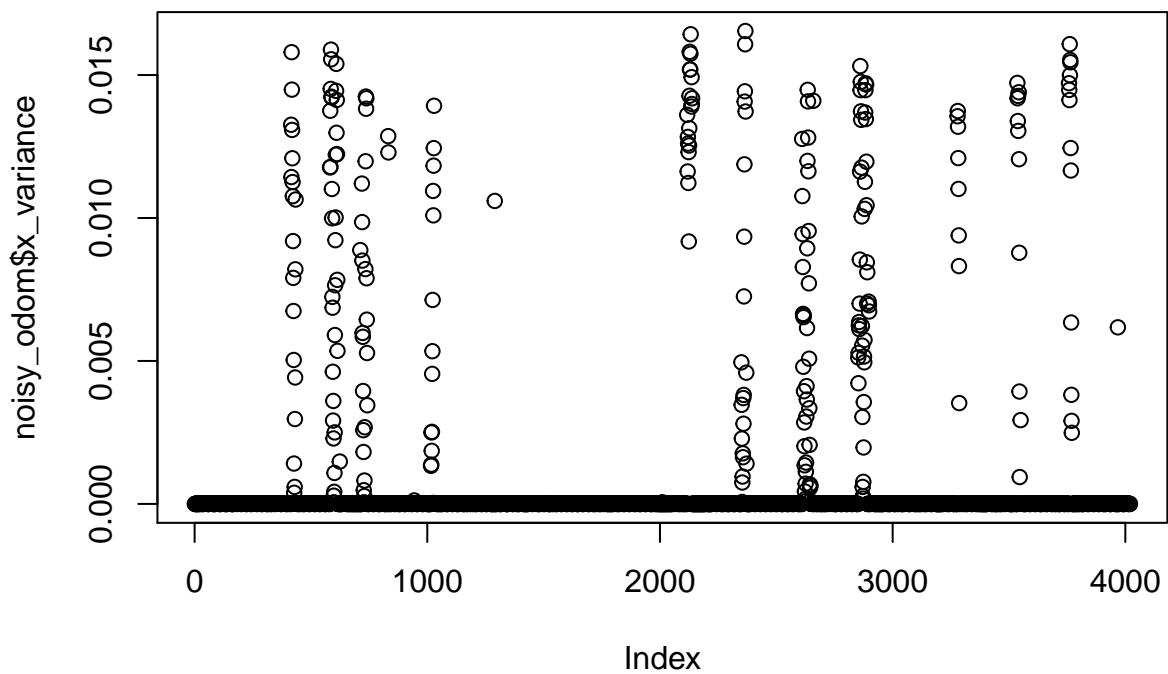
Noisy Odom Y Error Over Time



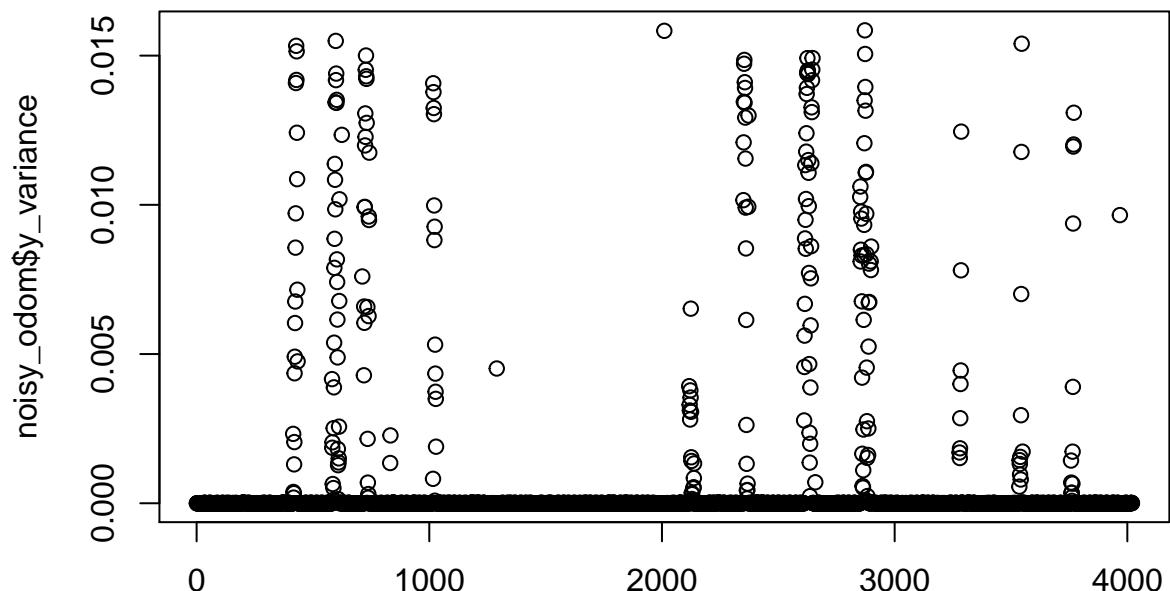
Noisy Odom Horizontal Distance Error Over Time



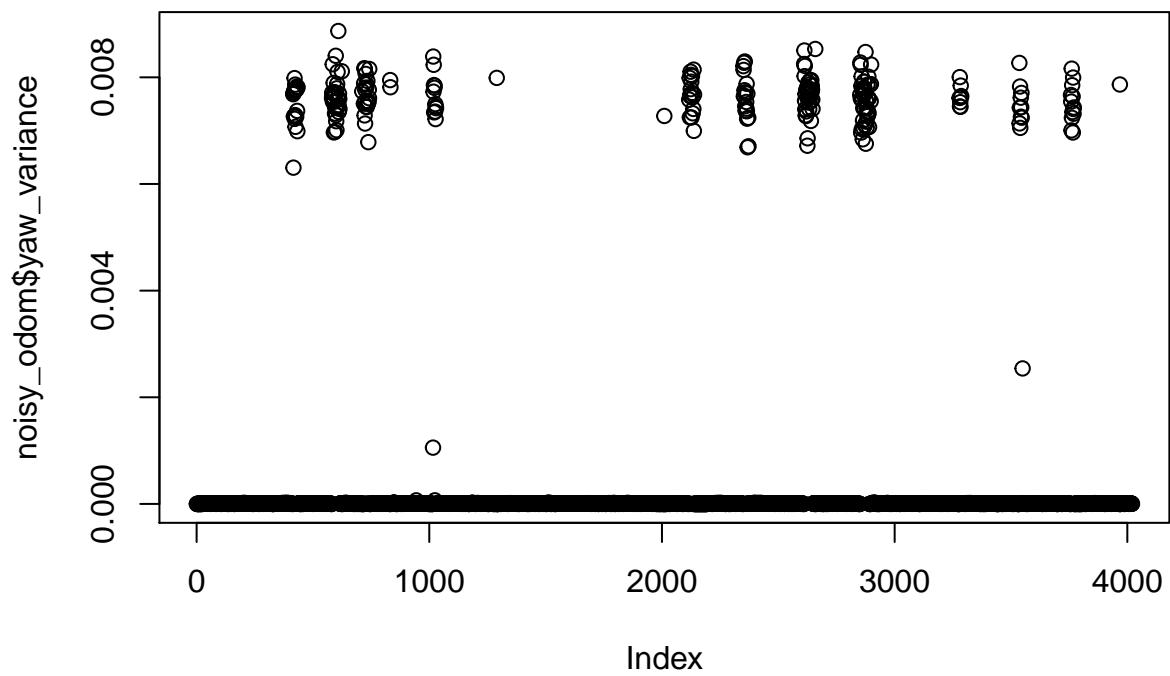
Variance of X Coordinate in Noisy Odometry
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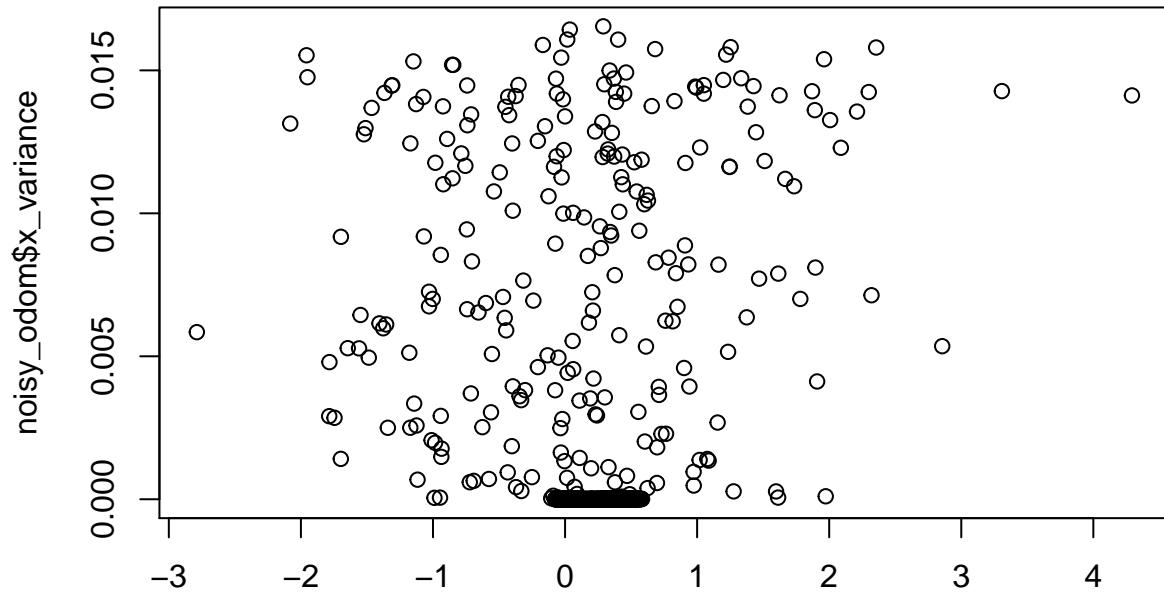
Variance of Y Coordinate in Noisy Odometry



Variance of Yaw Coordinate in Noisy Odometry



Variance vs. Velocity of X in Noisy Odometry



Variance vs. Velocity of Yaw in Noisy Odometry

