

two_mobile Turtlebot 1 Report

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

The runtime of this experiment was 0 hours, 6 minutes, and 46.9 seconds.

The total number of external pose measurements received by the robot during this time was 200 which means poses were received at an average of 0.4915213 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.
## -4.4360  0.1865  4.4950  4.1250  8.8660 11.8300

summary(continuous$y_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
##  0.000   3.068   4.255   5.296   7.151  12.650

summary(continuous$yaw_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -3.14100 -1.50500  0.08541  0.09347  1.67100  3.14000

summary(continuous$dist_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
##  0.000013  5.611000  8.793000  8.121000 10.370000 13.250000

summary(discrete$x_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -16.2700 -4.1920 -0.5982 -0.3862  0.9468 28.6200

summary(discrete$y_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -2.970   1.736   3.359   5.501   8.000  26.860

summary(discrete$yaw_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -3.1410 -1.2090 -0.3305 -0.2075  0.8290  3.1370

summary(discrete$dist_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
##  0.000013  2.405000  5.028000  8.215000 11.410000 31.060000

summary(noisy_odom$x_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -6.2910 -2.0910 -0.2310 -0.5373  1.5520  3.6470
```

```

summary(noisy_odom$y_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -0.4609  3.6430  6.5550  5.8340  8.9830 10.8400

summary(noisy_odom$dist_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
##  0.000   5.250   7.065   6.423   9.147  11.070

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

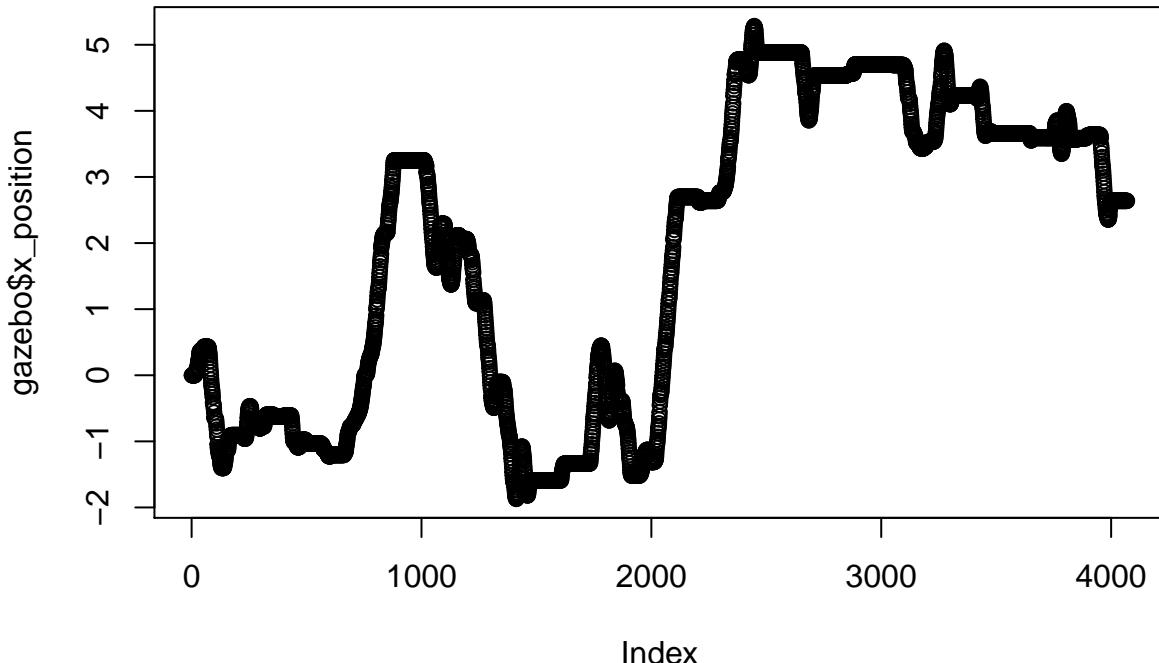
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
##  1.076   5.084   6.461   6.080   7.839   8.933

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

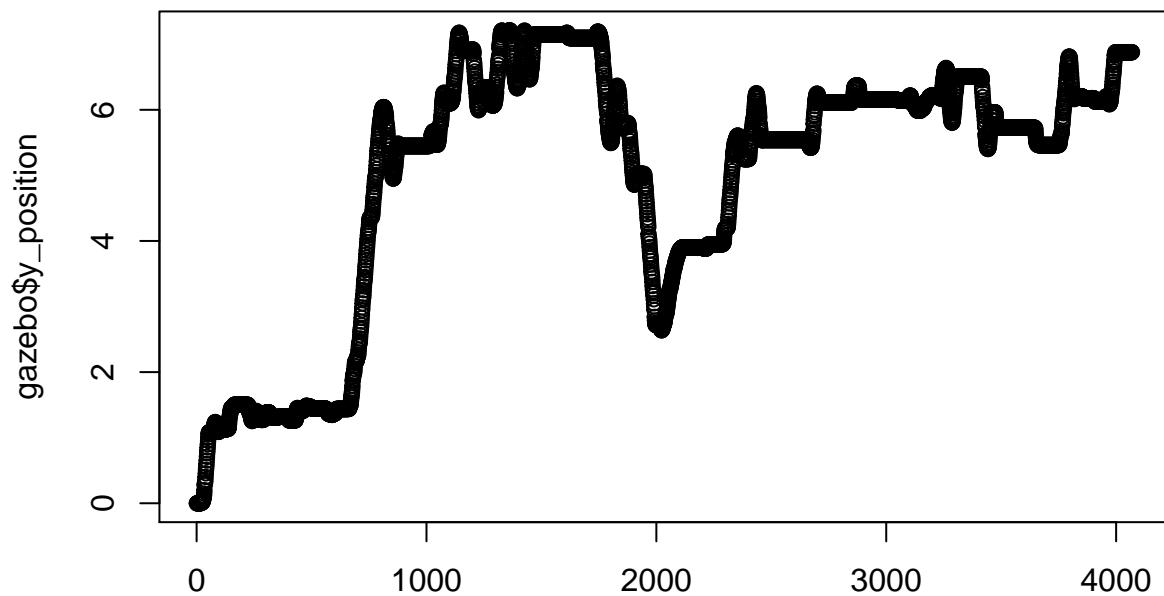
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.000e+00 1.613e-06 3.699e-06 6.537e-04 6.014e-06 8.534e-03

```

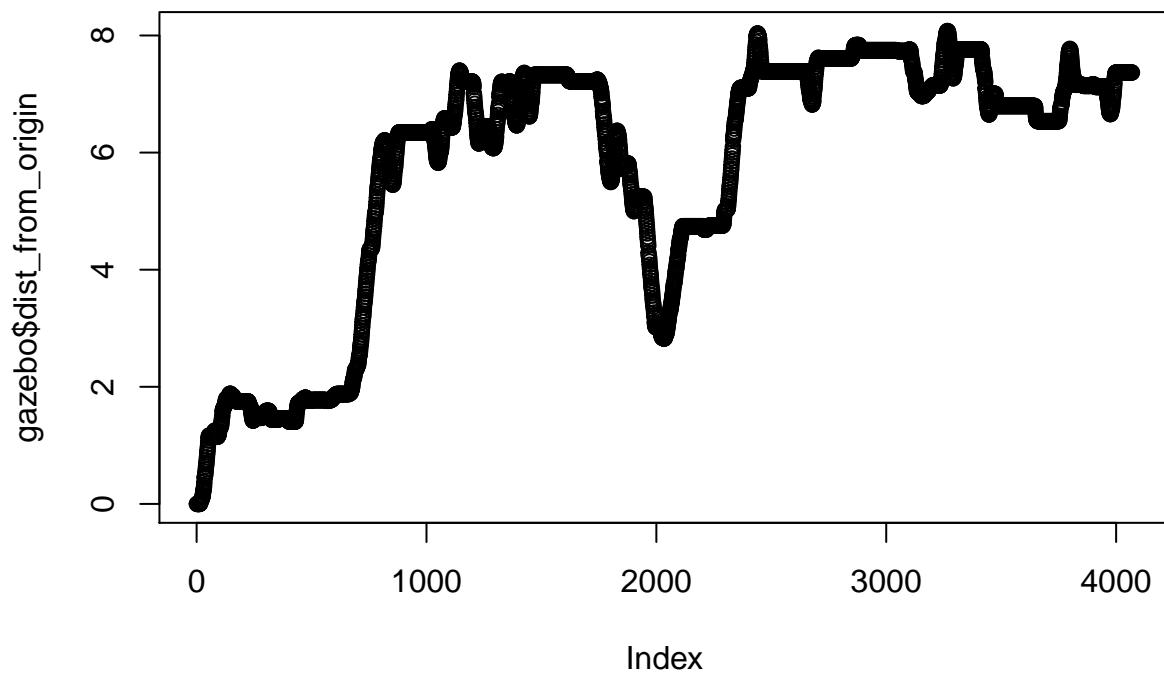
X coordinate of robot over time



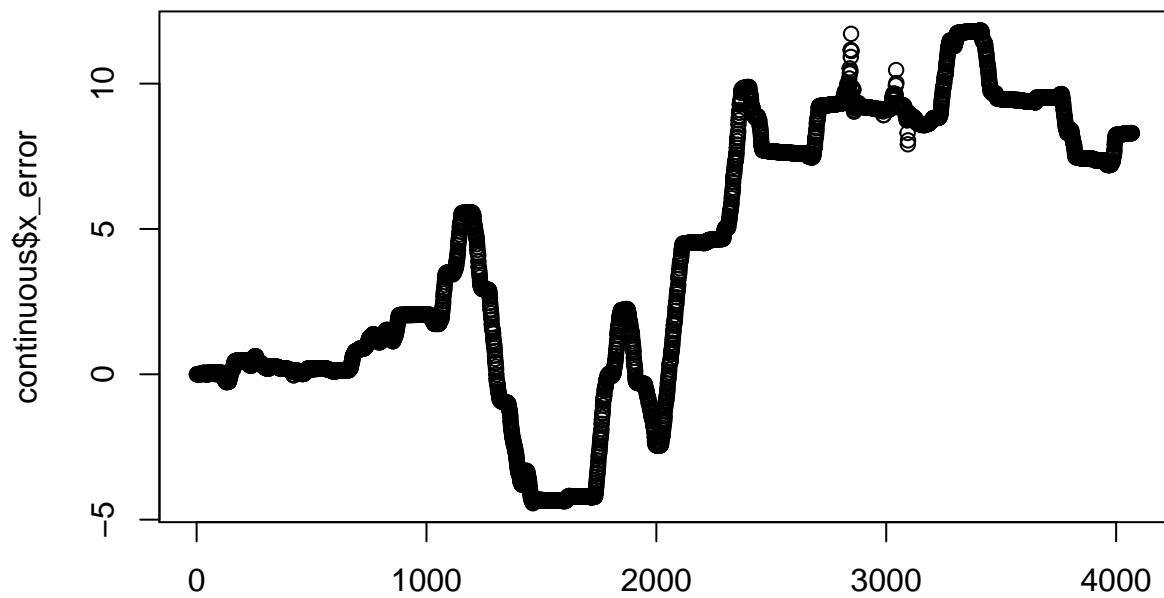
Y coordinate of robot over time



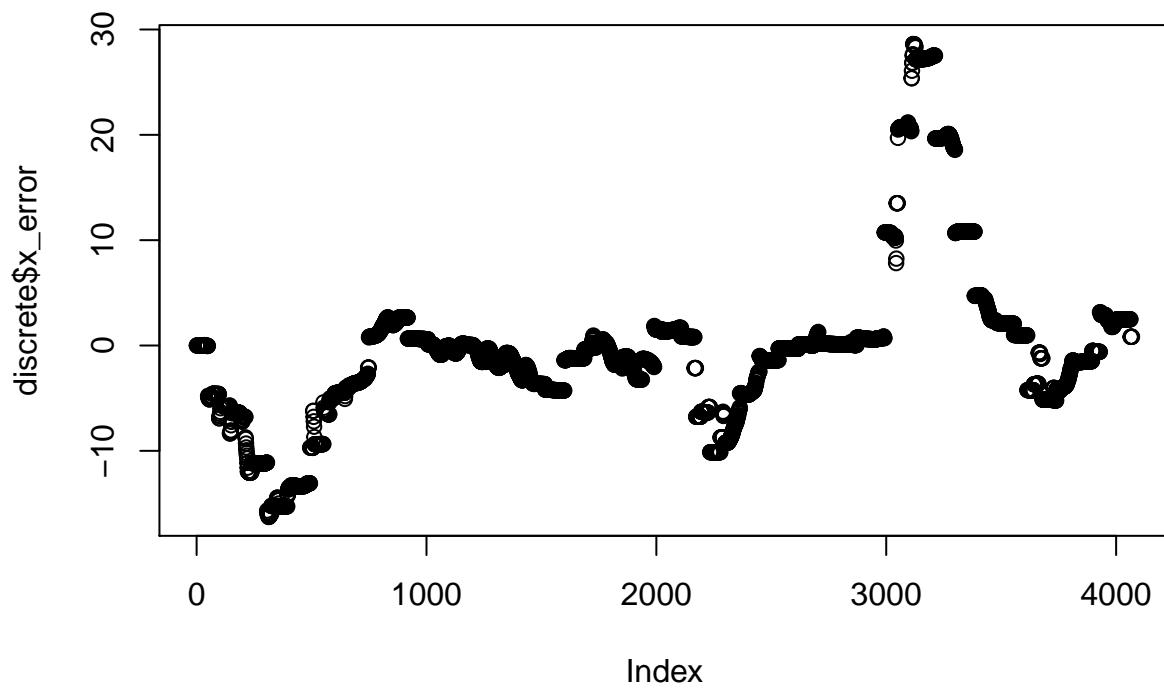
Distance from origin vs. time^{Index}



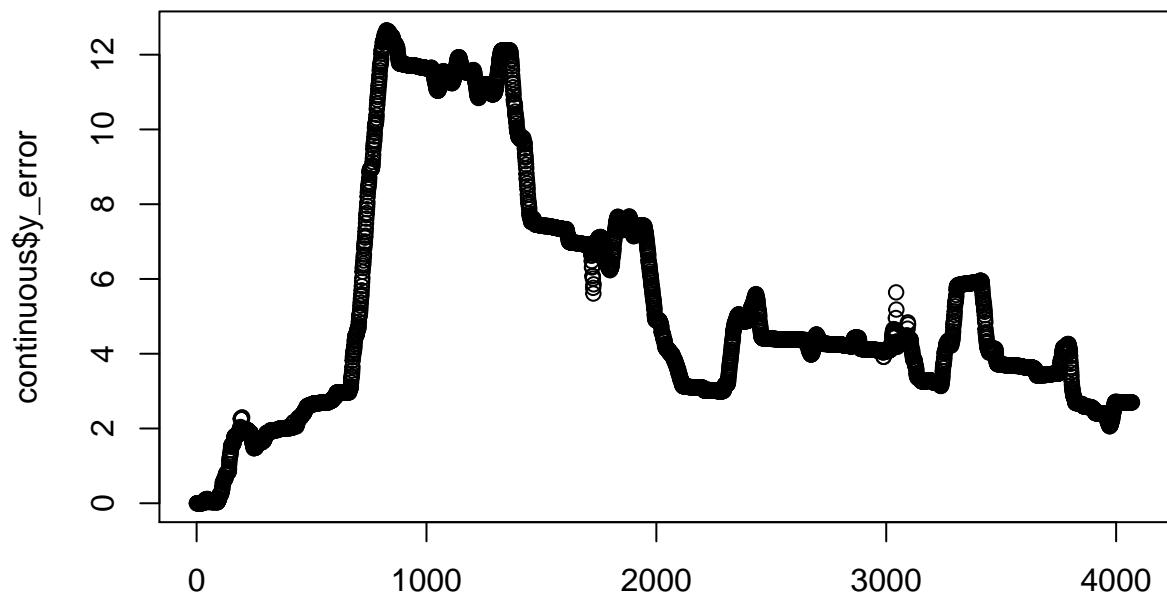
Continuous x_error over time



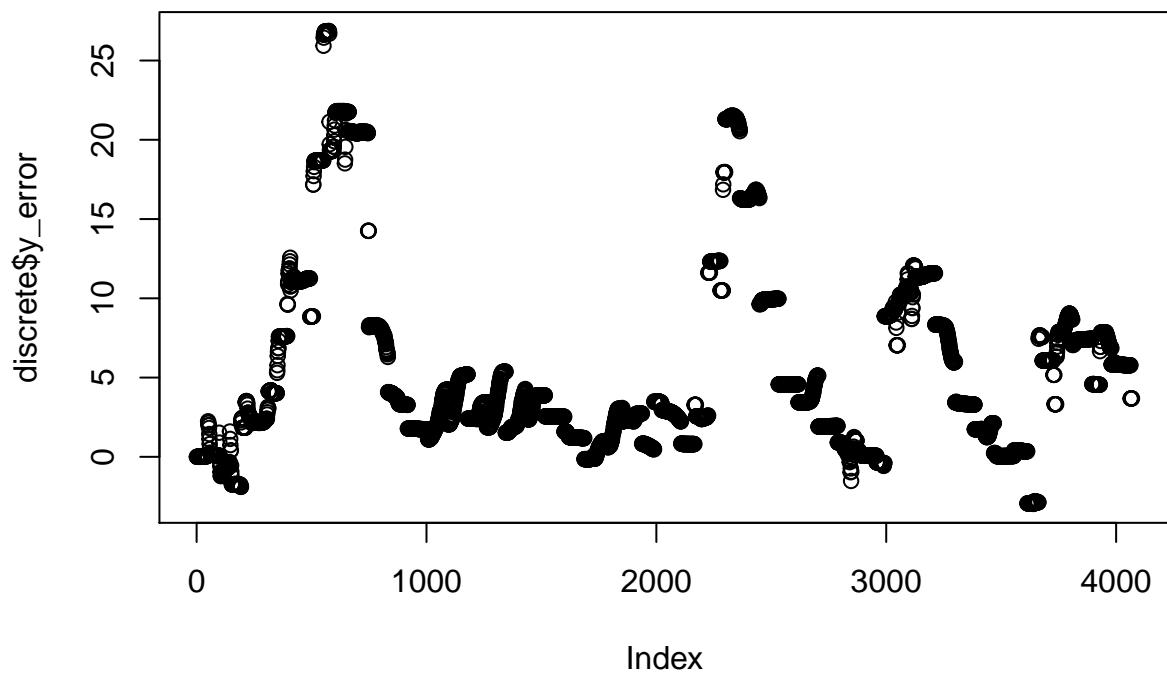
Discrete x_error over time



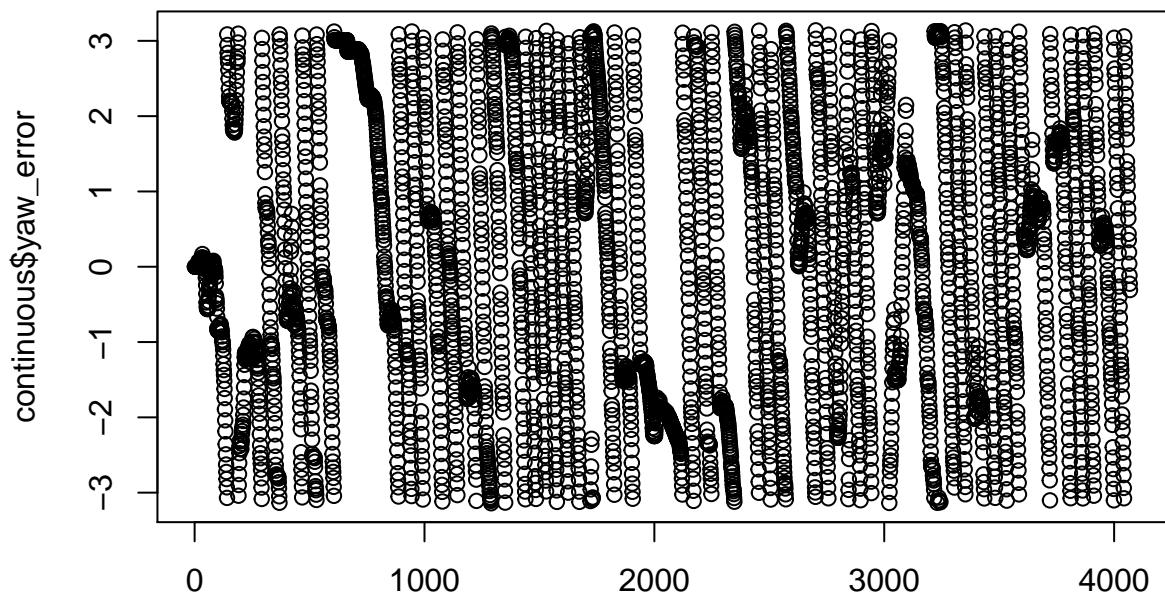
Continuous y_error over time



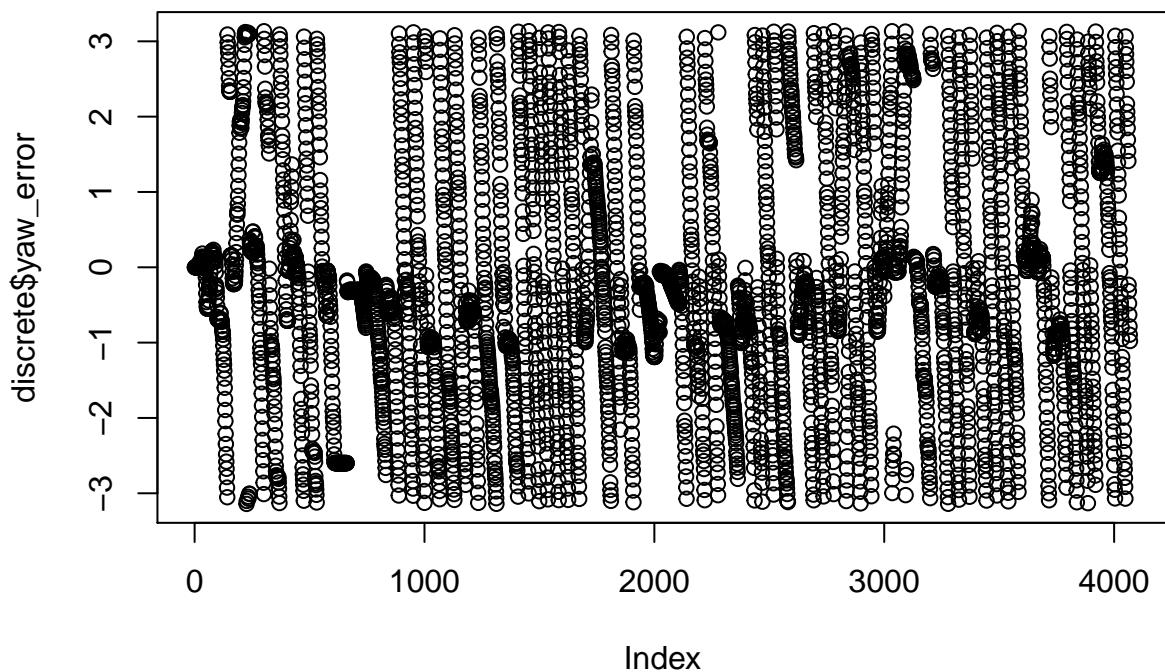
Discrete y_error over time



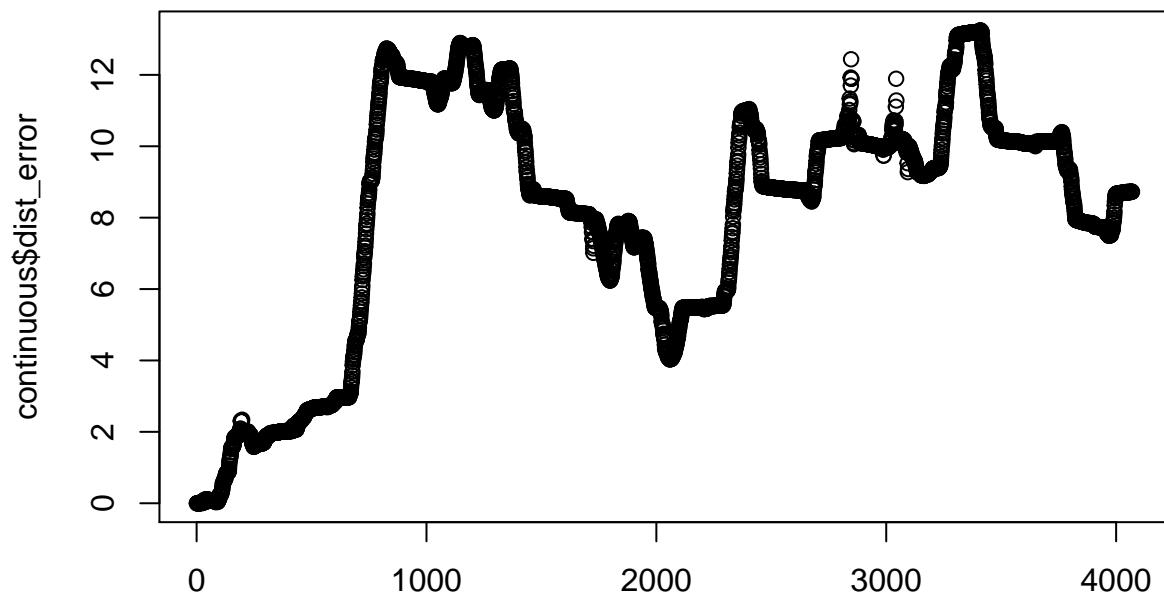
Continuous yaw error over time



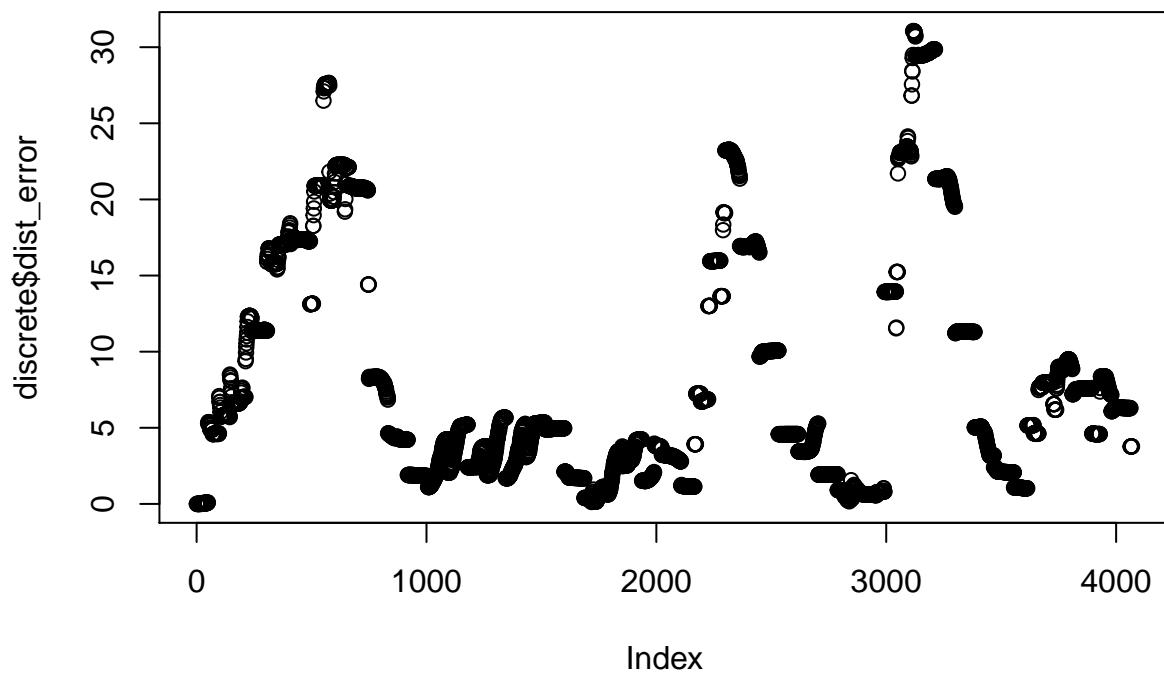
Discrete yaw error over time



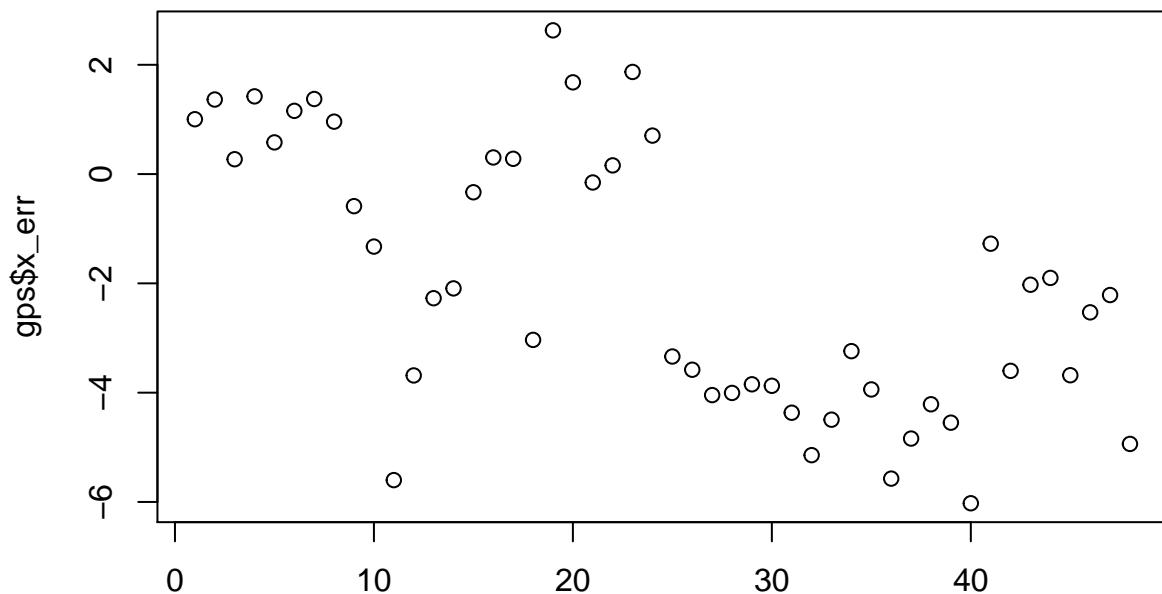
Continuous total distance error over time



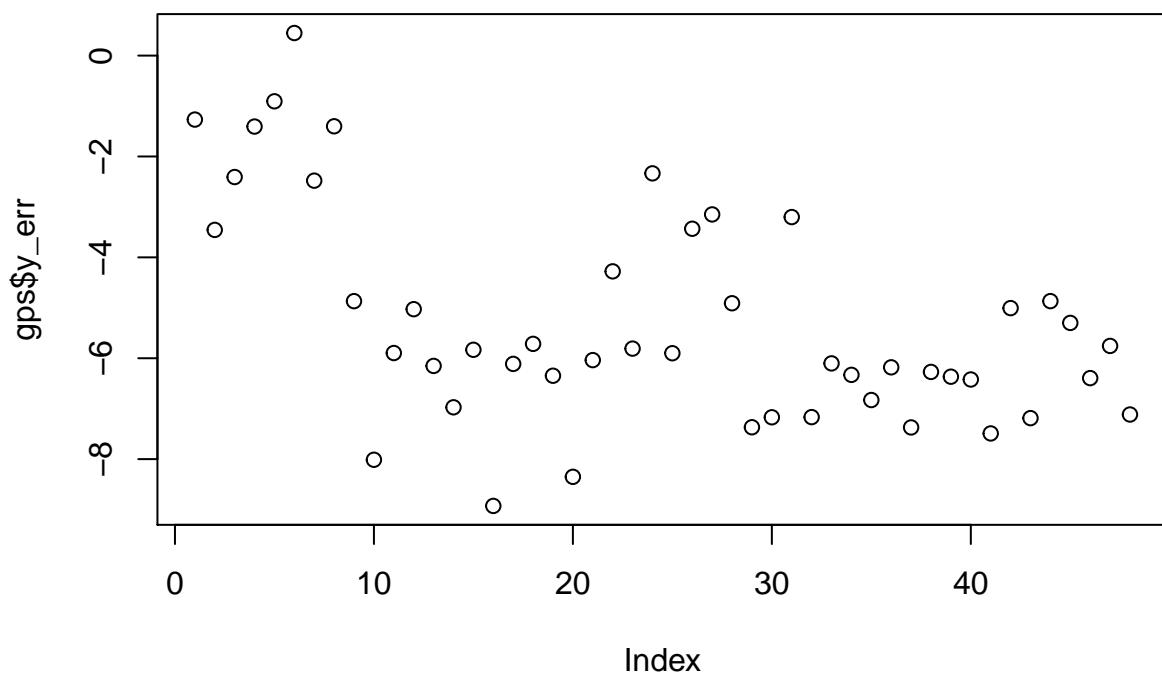
Discrete total distance error over time



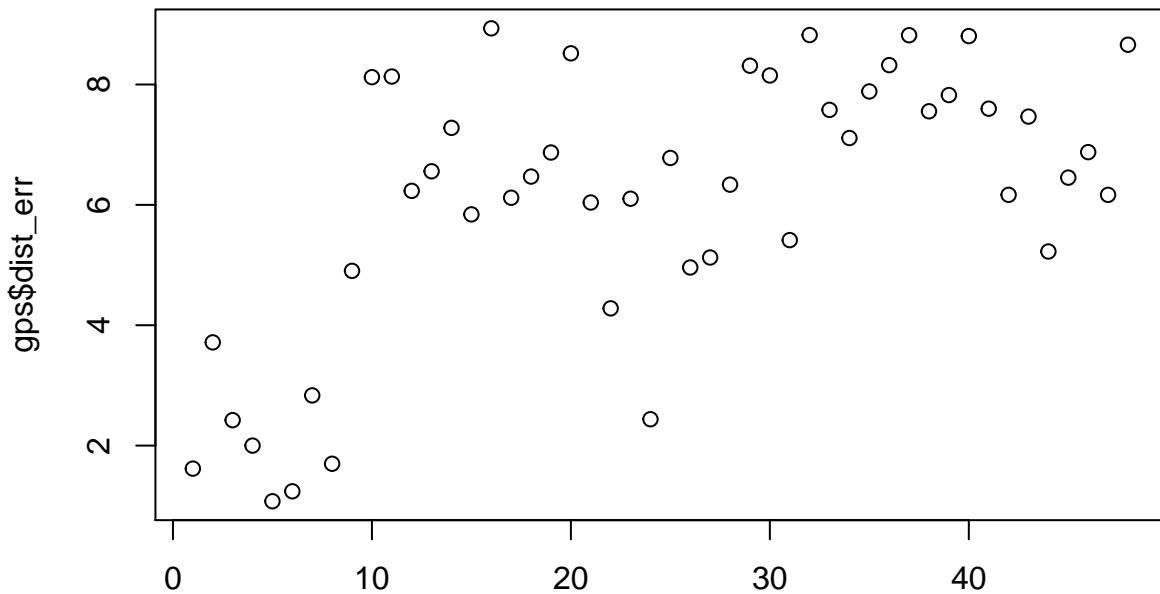
GPS X Error Over Time



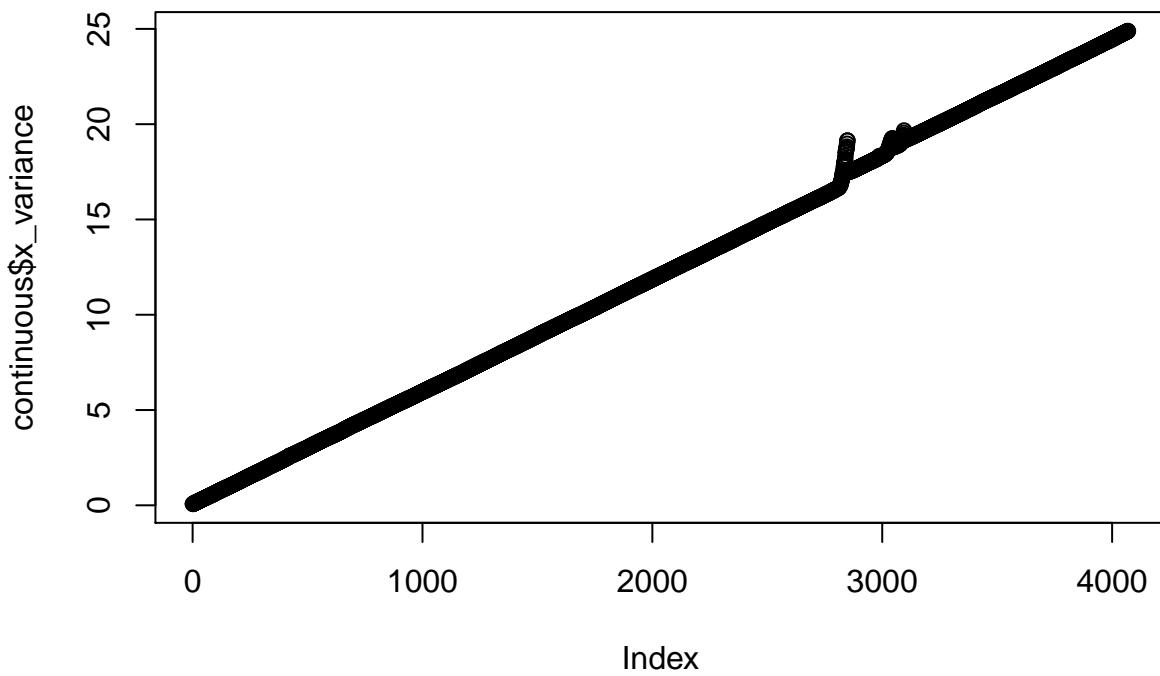
GPS Y Error Over Time



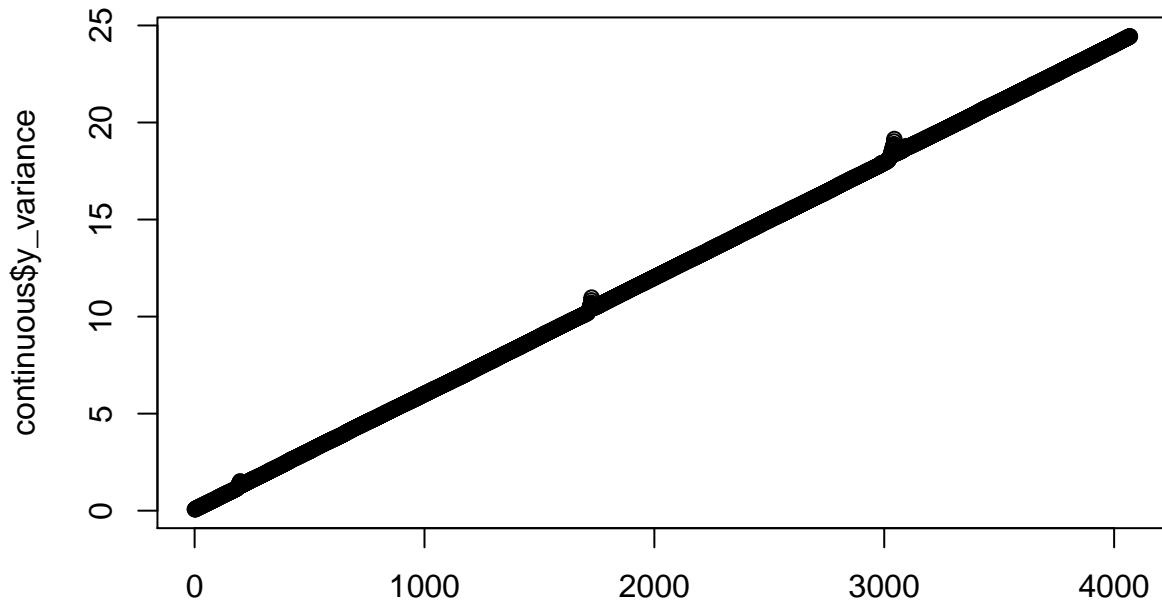
GPS Horizontal Distance Error Over Time



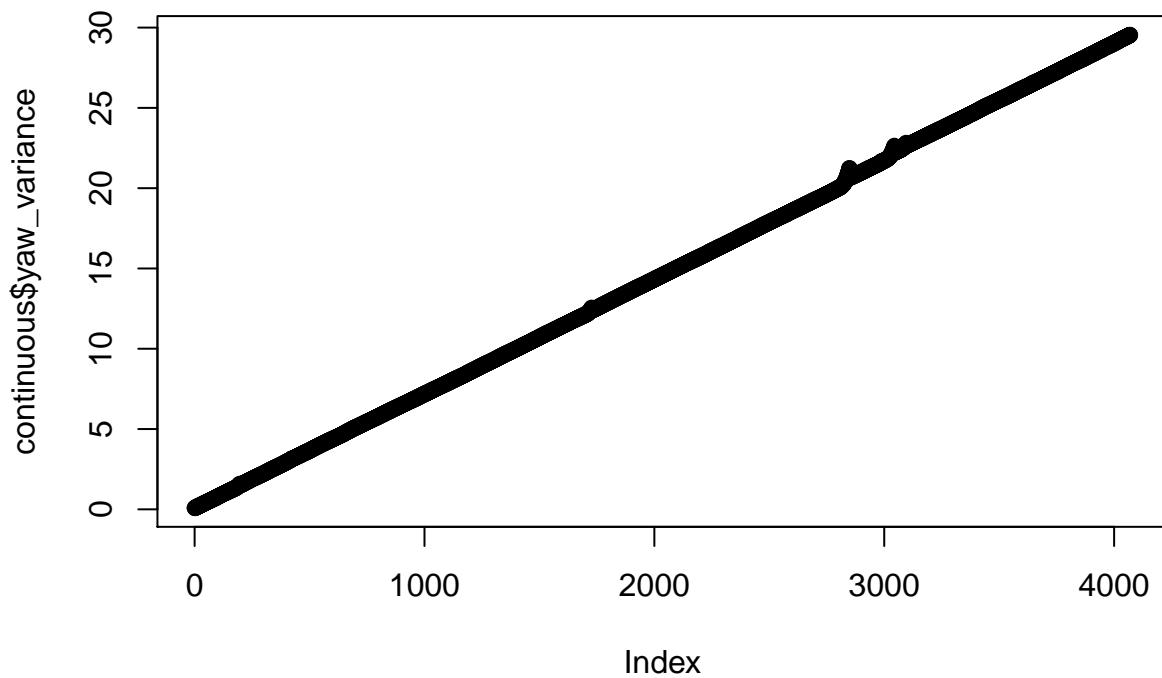
Continuous Filter X Variance Over Time



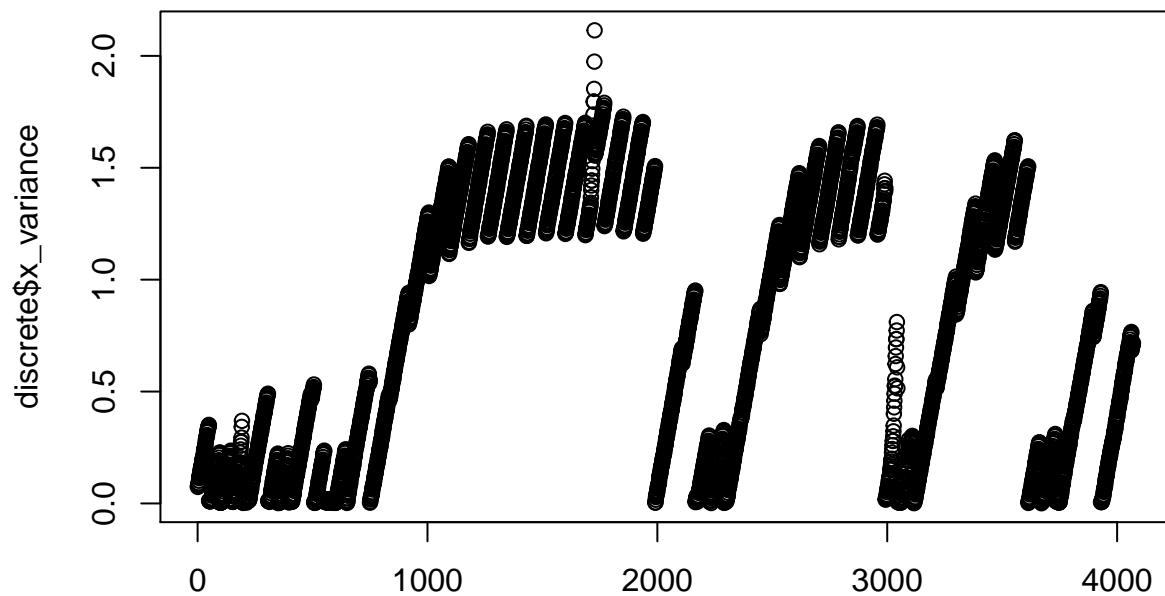
Continuous Filter Y Variance Over Time



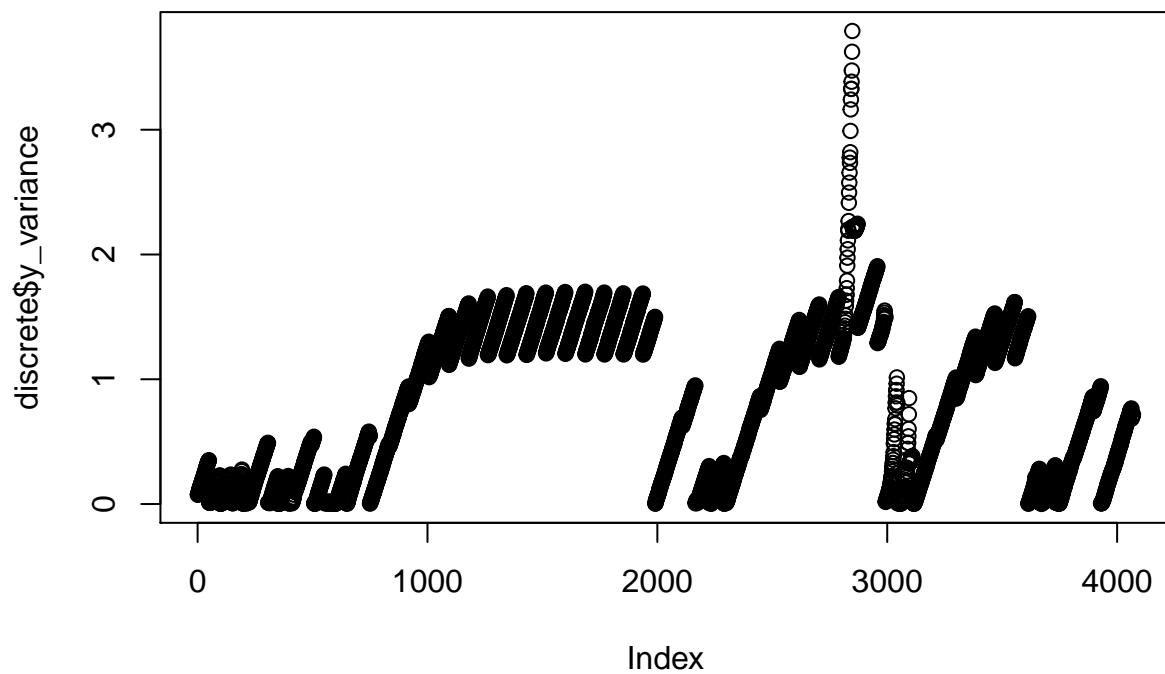
Continuous Filter Yaw Variance Over Time



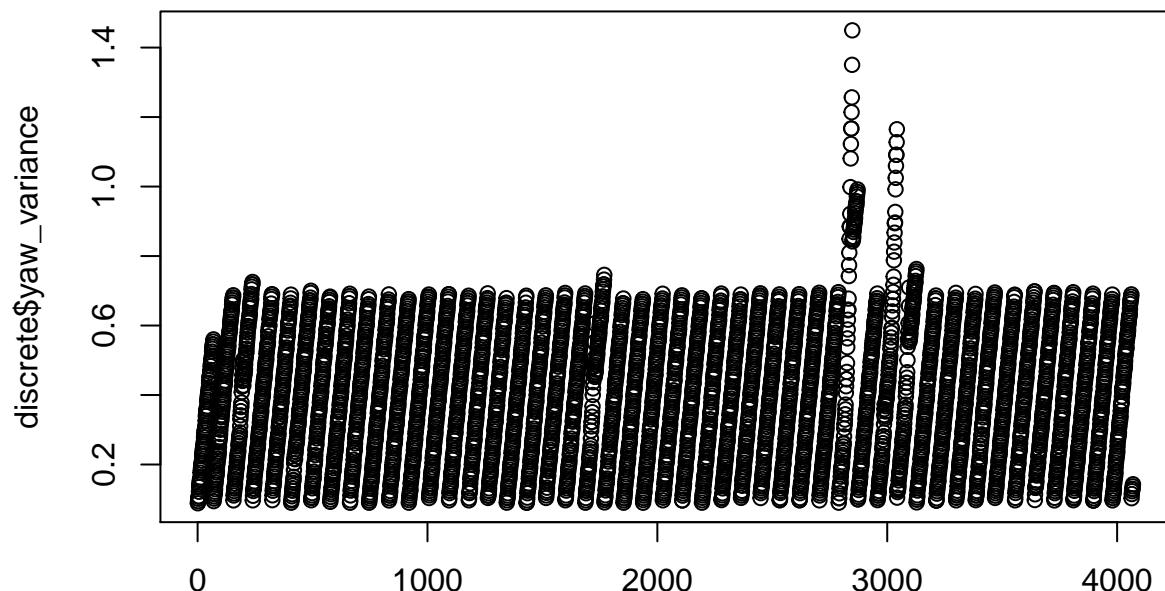
Discrete Filter X Variance Over Time



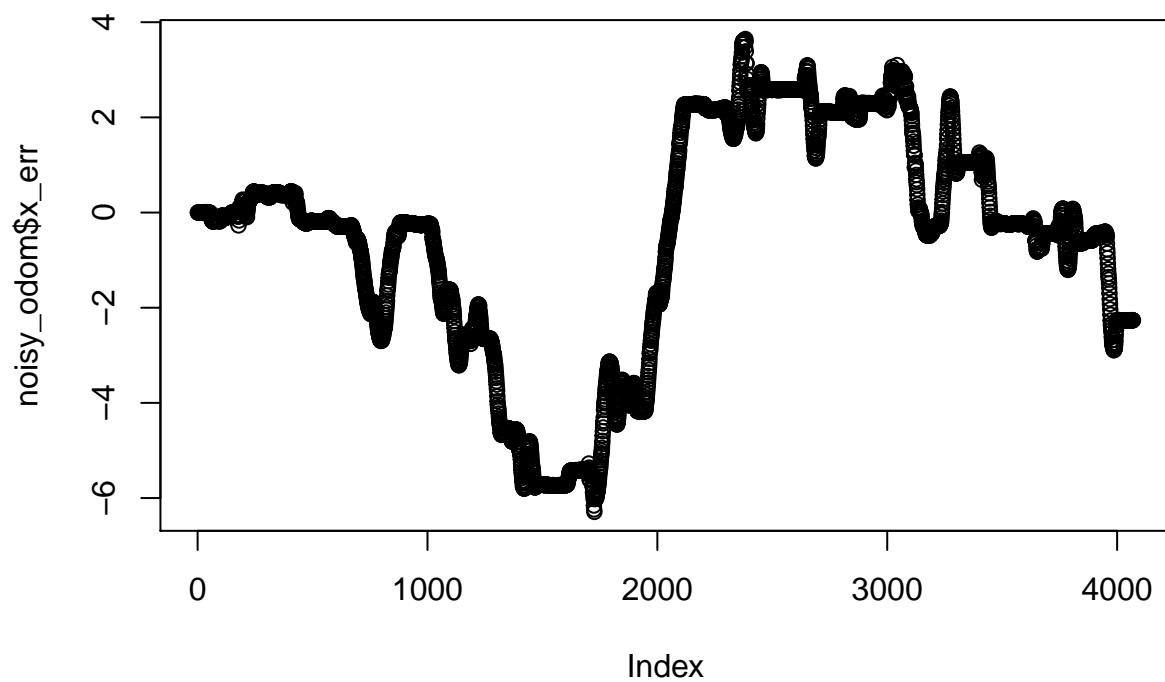
Discrete Filter Y Variance Over Time



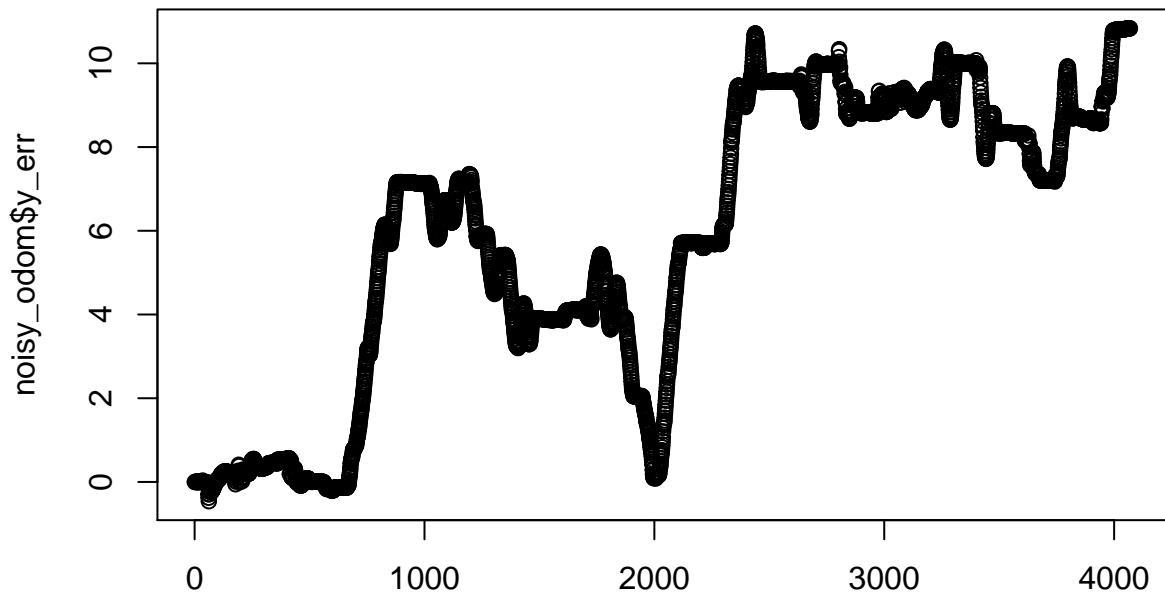
Discrete Filter Yaw Variance Over Time



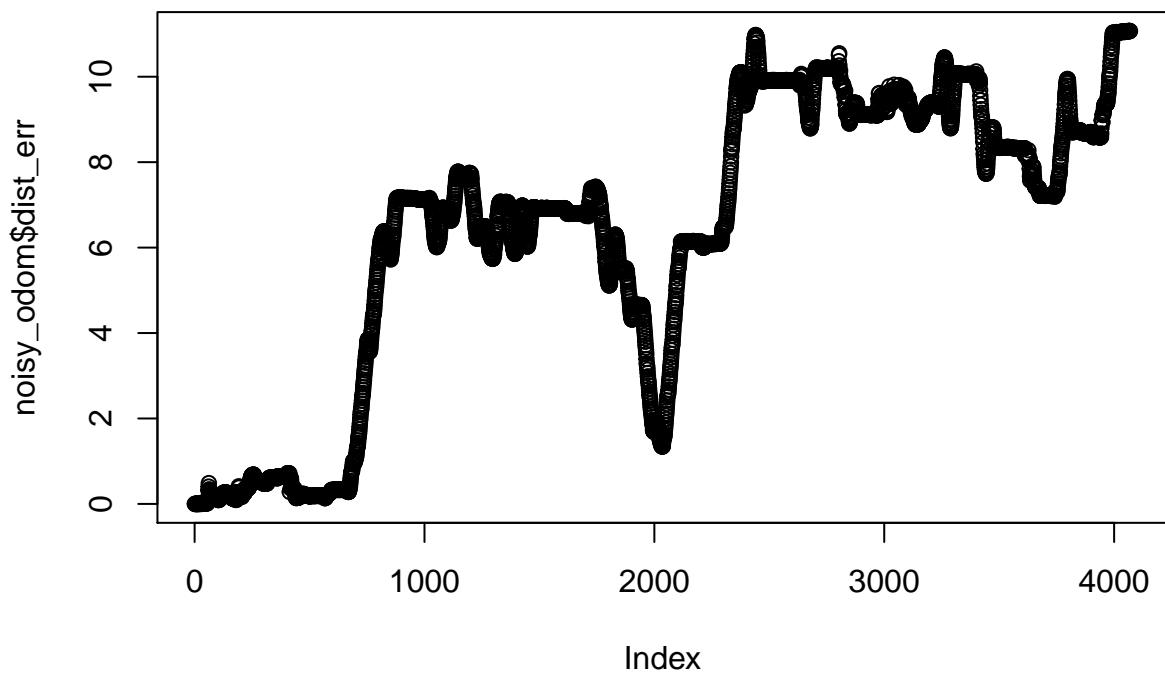
Noisy Odom X Error Over Time



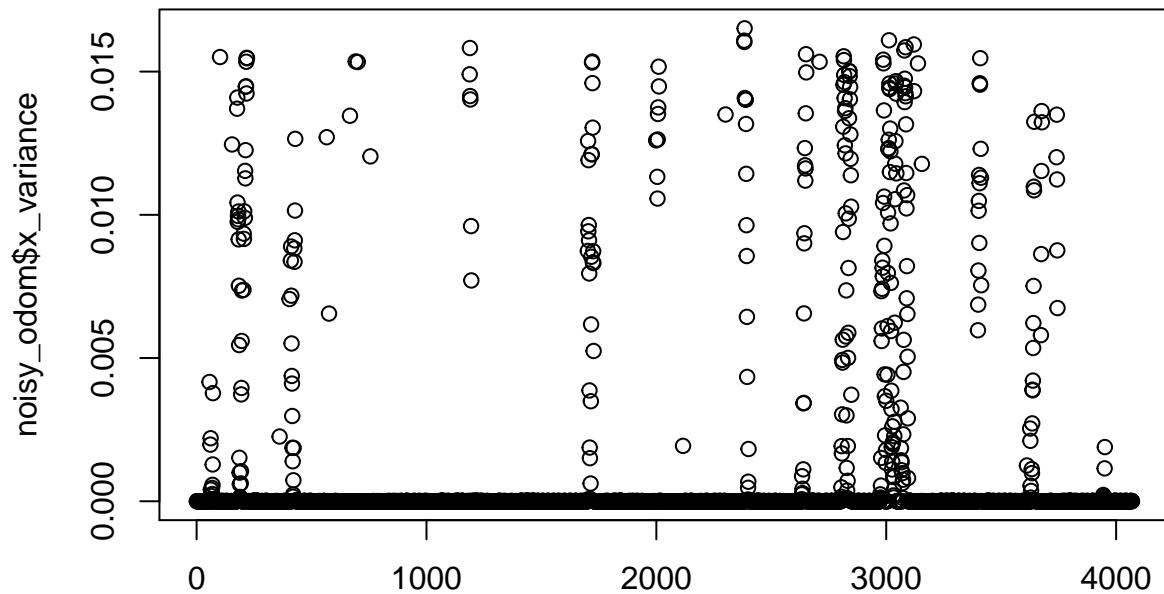
Noisy Odom Y Error Over Time



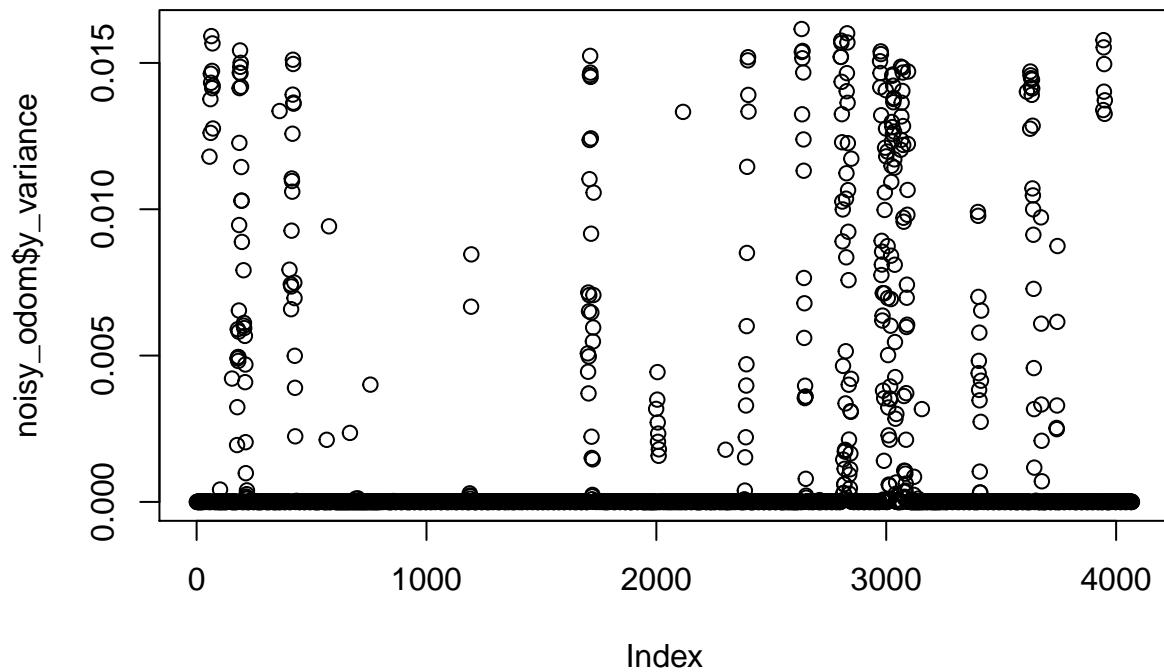
Noisy Odom Horizontal Distance Error Over Time



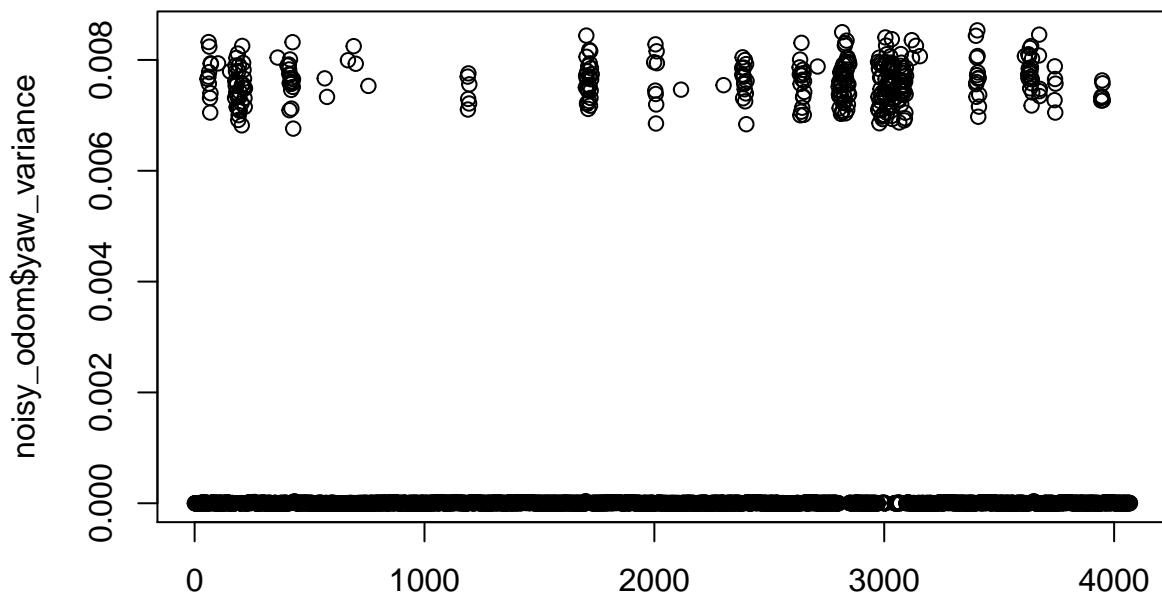
Variance of X Coordinate in Noisy Odometry



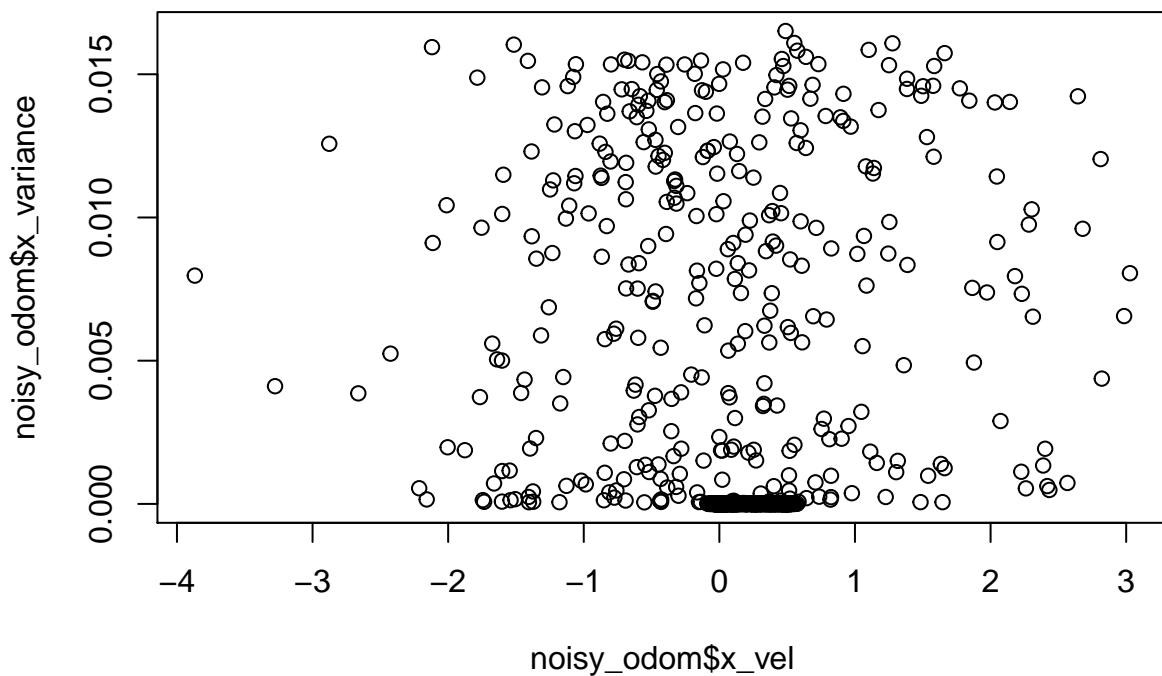
Variance of Y Coordinate in Noisy Odometry



Variance of Yaw Coordinate in Noisy Odometry



Variance vs. Velocity of X in Noisy Odometry



Variance vs. Velocity of Yaw in Noisy Odometry

