

two_mobile Turtlebot 2 Report

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August 10, 2016

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

The runtime of this experiment was 0 hours, 6 minutes, and 49.3 seconds.

The total number of external pose measurements received by the robot during this time was 552 which means poses were received at an average of 1.348644 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.
## -8.8250 -0.5404  2.3730 10.7300 18.8700 53.6600

summary(continuous$y_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -0.1434  4.6630 11.7200 11.0000 15.1200 30.9400

summary(continuous$yaw_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -3.139000 -1.441000 -0.121300  0.007259  1.674000 3.141000

summary(continuous$dist_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.000001  6.694000 13.46000 18.34000 21.64000 61.94000

summary(discrete$x_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -100.400 -41.370 -1.712 -18.950   1.227  16.220

summary(discrete$y_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -116.0000 -18.2400 -9.1720 -12.6700 -0.1051 18.0300

summary(discrete$yaw_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -3.14000 -1.30900 -0.25060 -0.09876  1.24700 3.14100

summary(discrete$dist_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.03028  3.95500 14.85000 28.46000 46.38000 152.50000

summary(noisy_odom$x_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -9.7730 -3.5310  0.4353 -1.2920  0.8522  3.6470
```

```

summary(noisy_odom$y_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -5.3360 -2.2000 -0.9169 -1.1860  0.1452  1.4890

summary(noisy_odom$dist_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.000001 1.23200 2.53600 3.21600 5.04100 9.79400

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

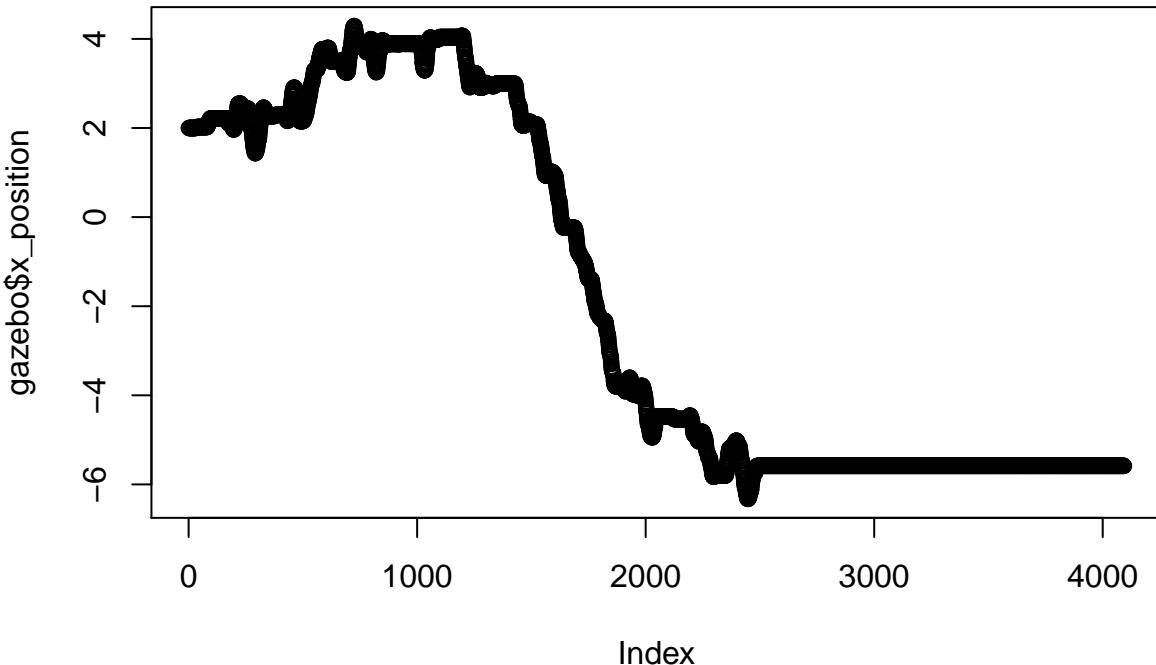
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 1.910   4.155   5.580   5.686   7.655   8.771

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

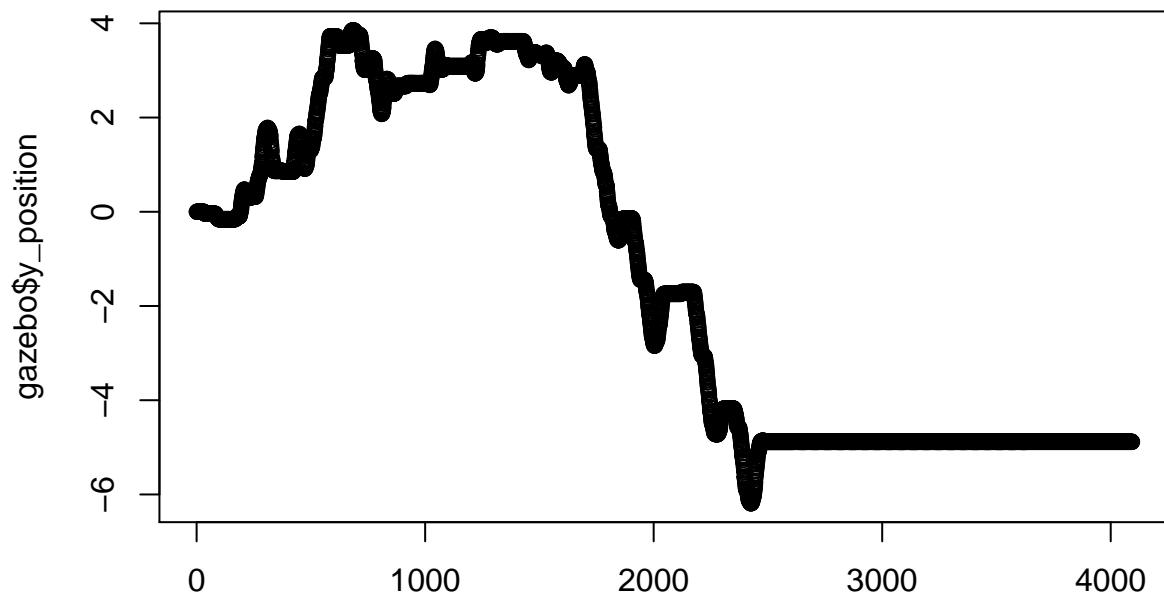
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.000e+00 2.198e-06 6.207e-06 2.872e-03 7.471e-03 8.892e-03

```

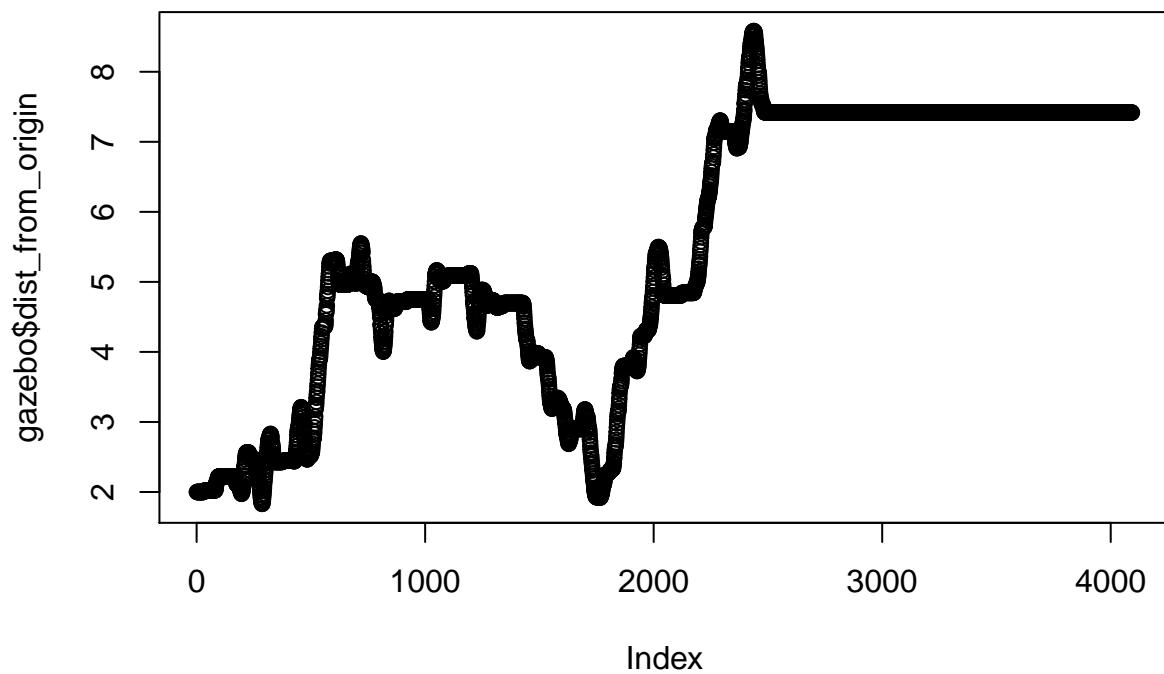
X coordinate of robot over time



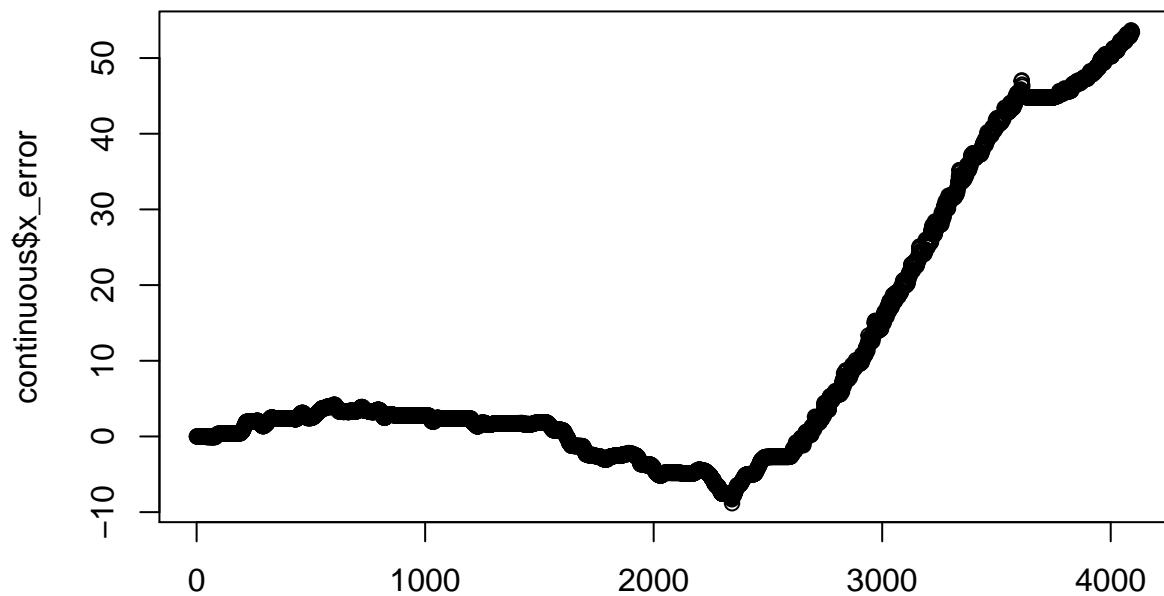
Y coordinate of robot over time



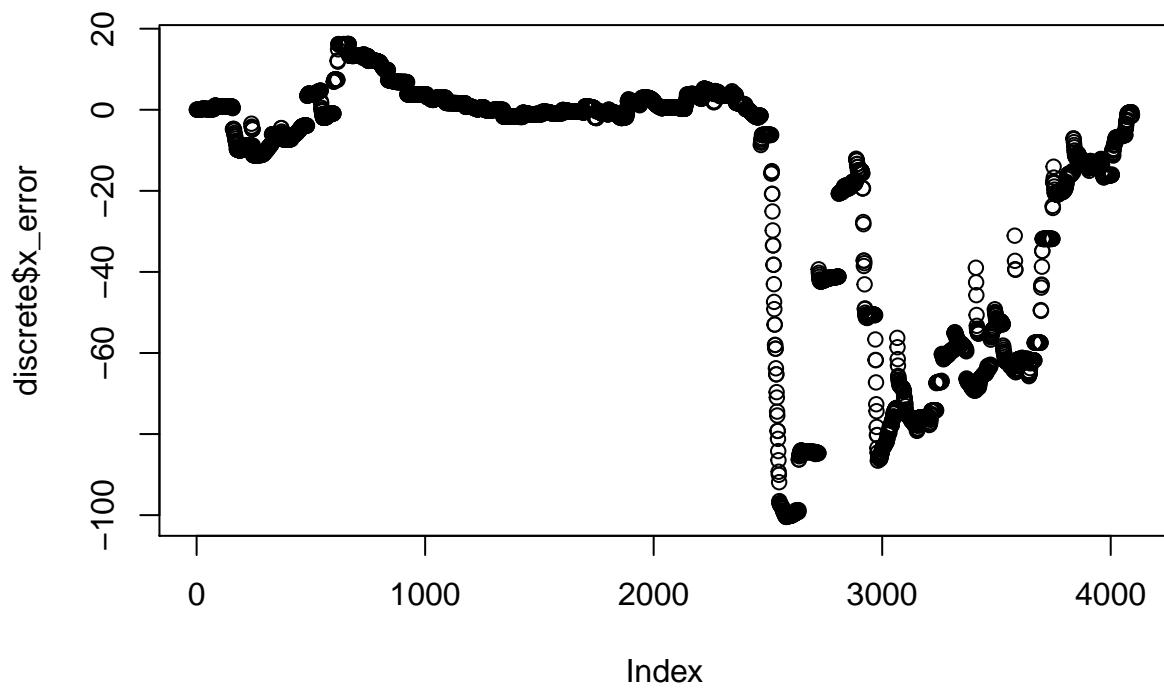
Distance from origin vs. time^{Index}



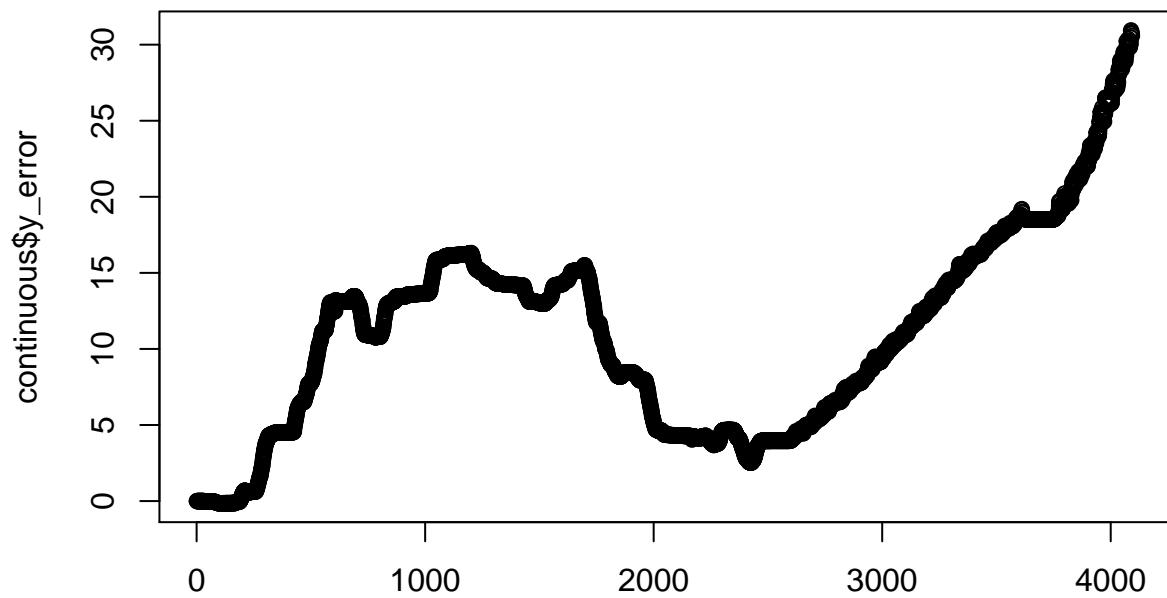
Continuous x_error over time



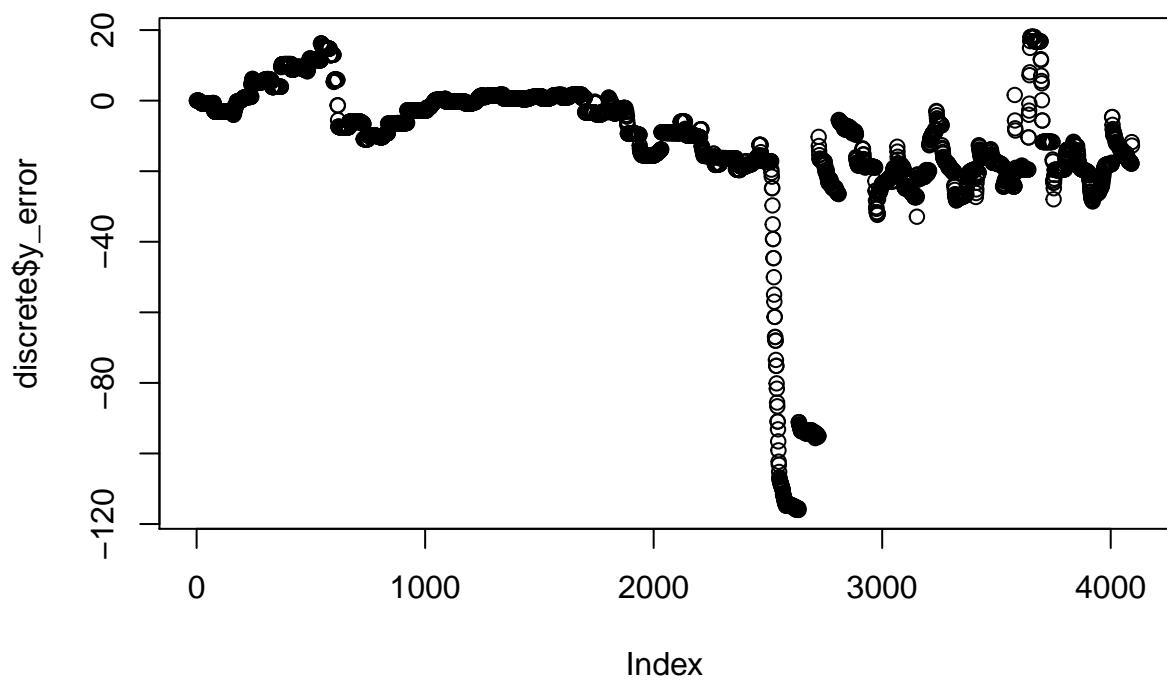
Discrete x_error over time



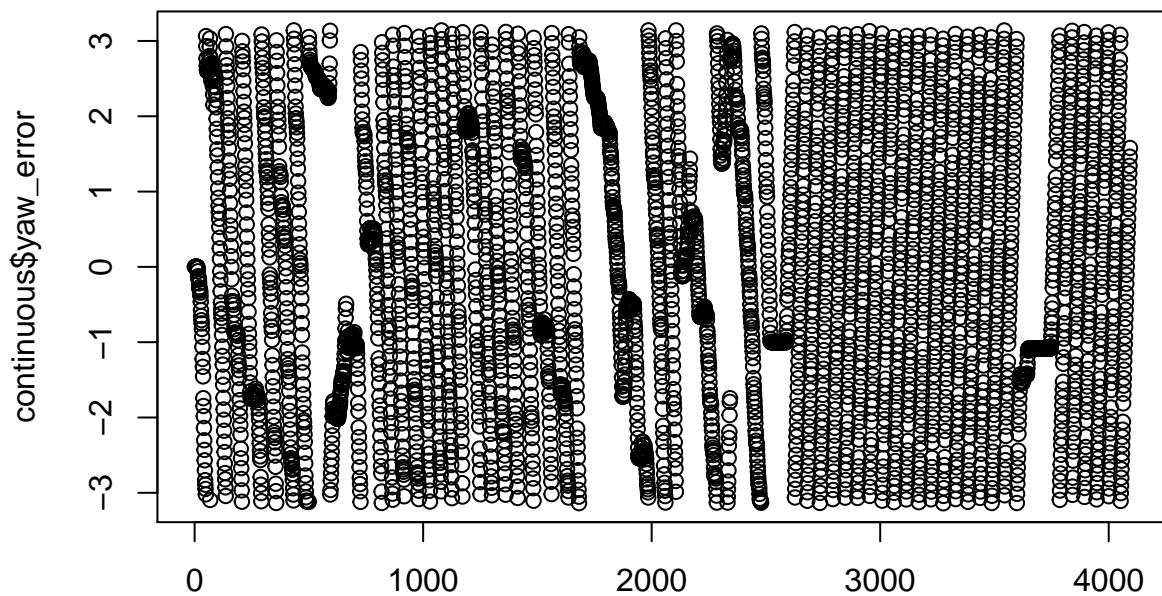
Continuous y_error over time



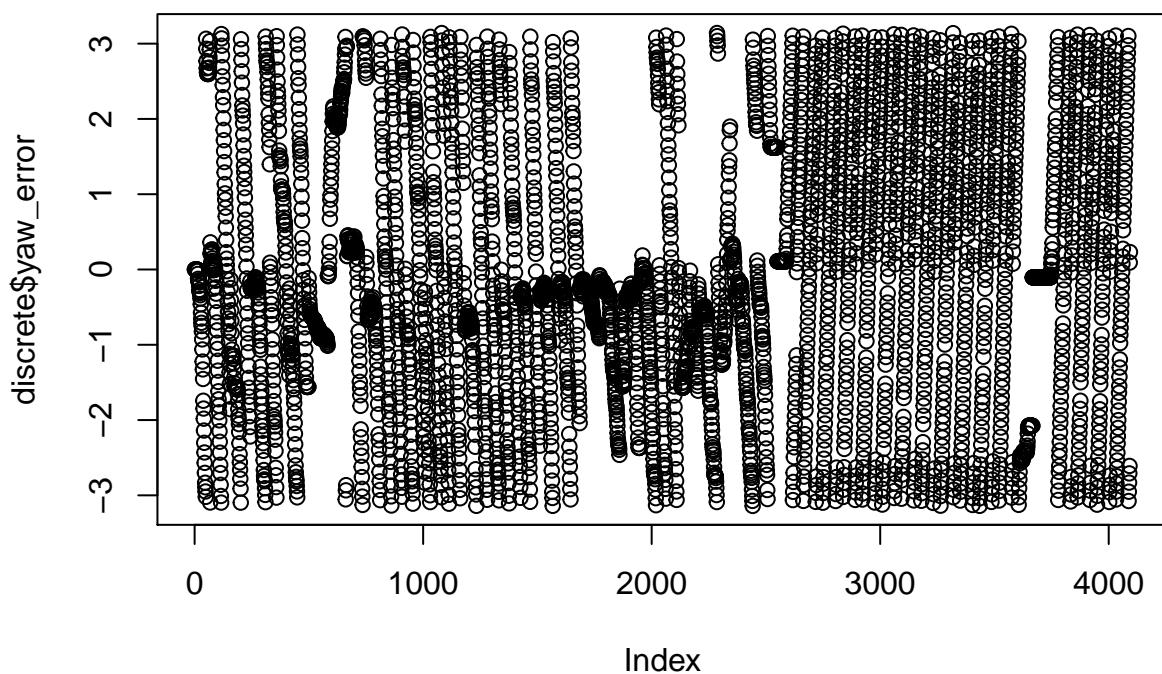
Discrete y_error over time



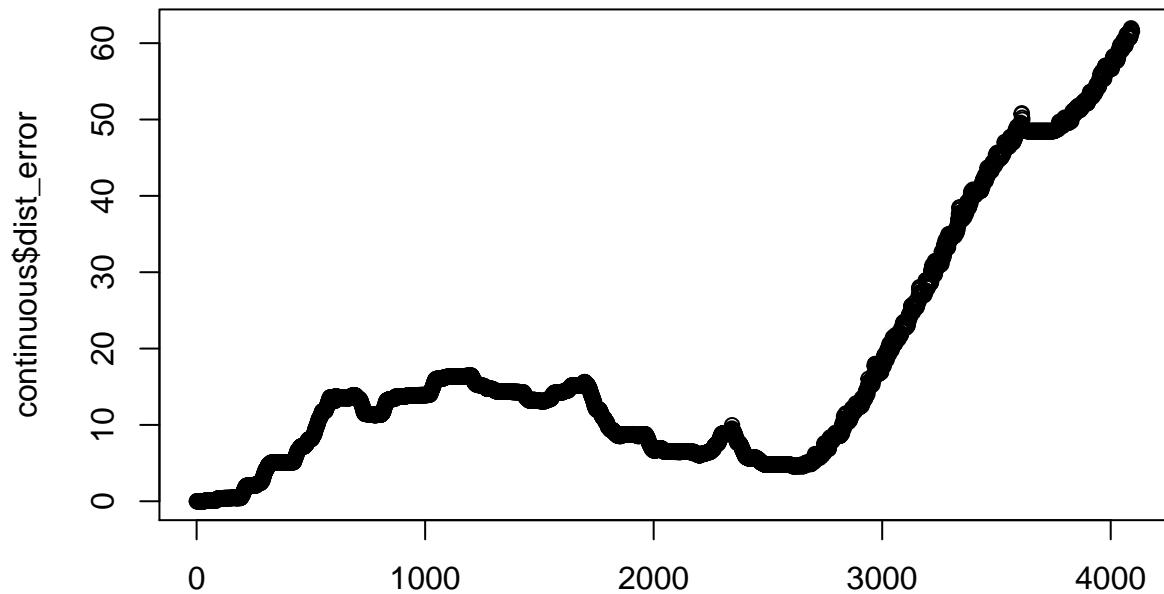
Continuous yaw error over time



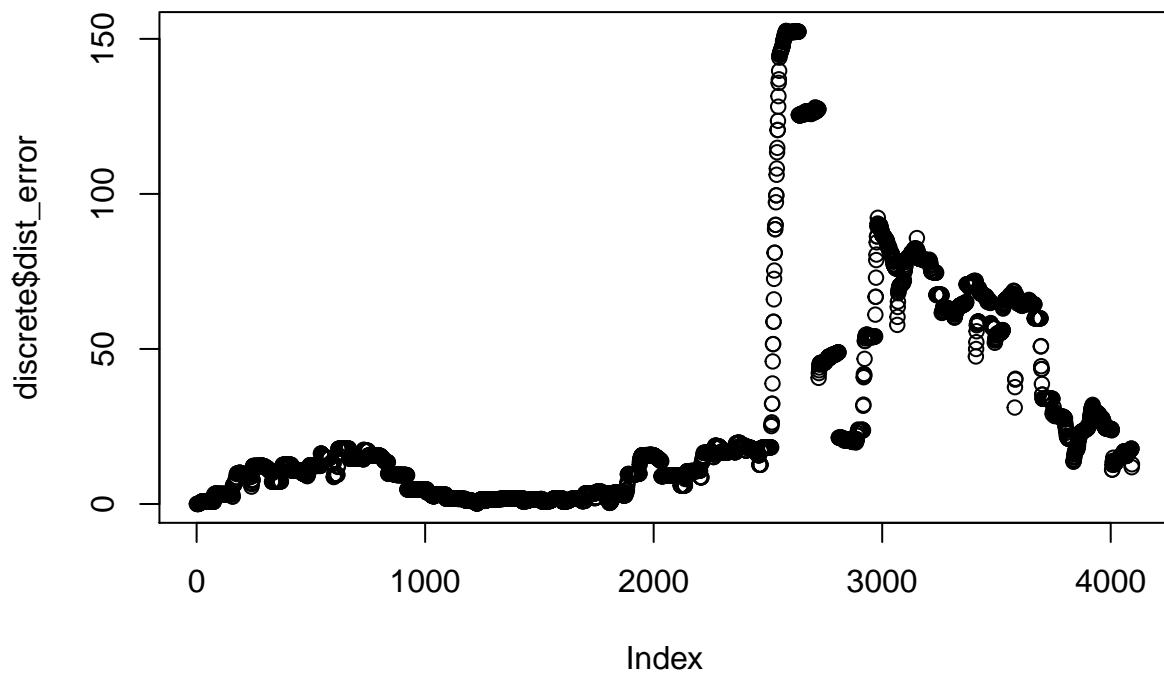
Discrete yaw error over time



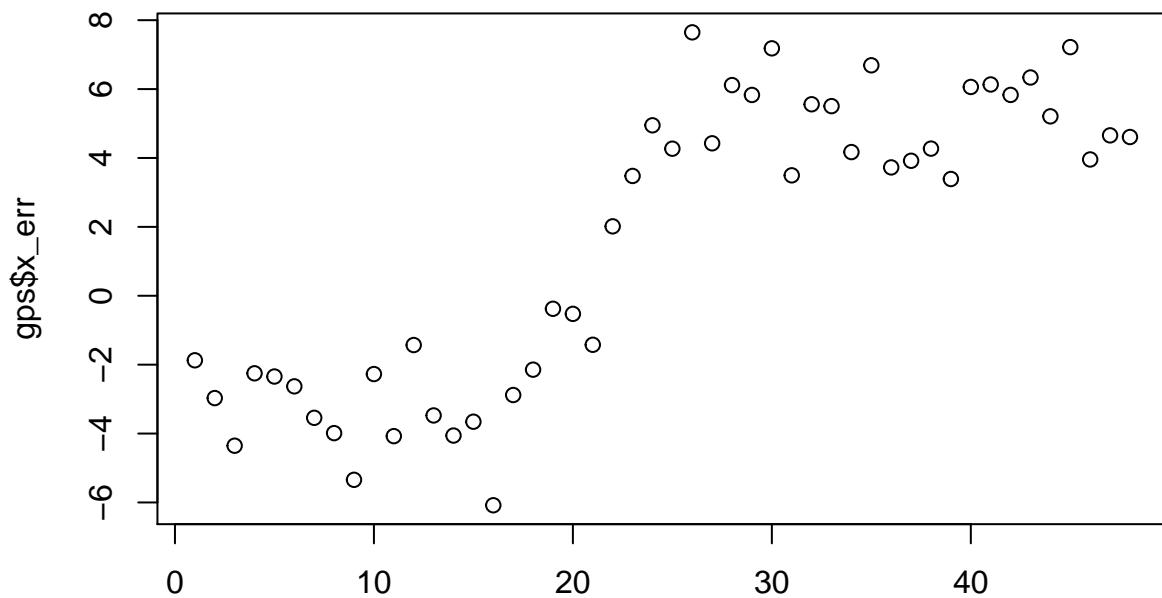
Continuous total distance error over time



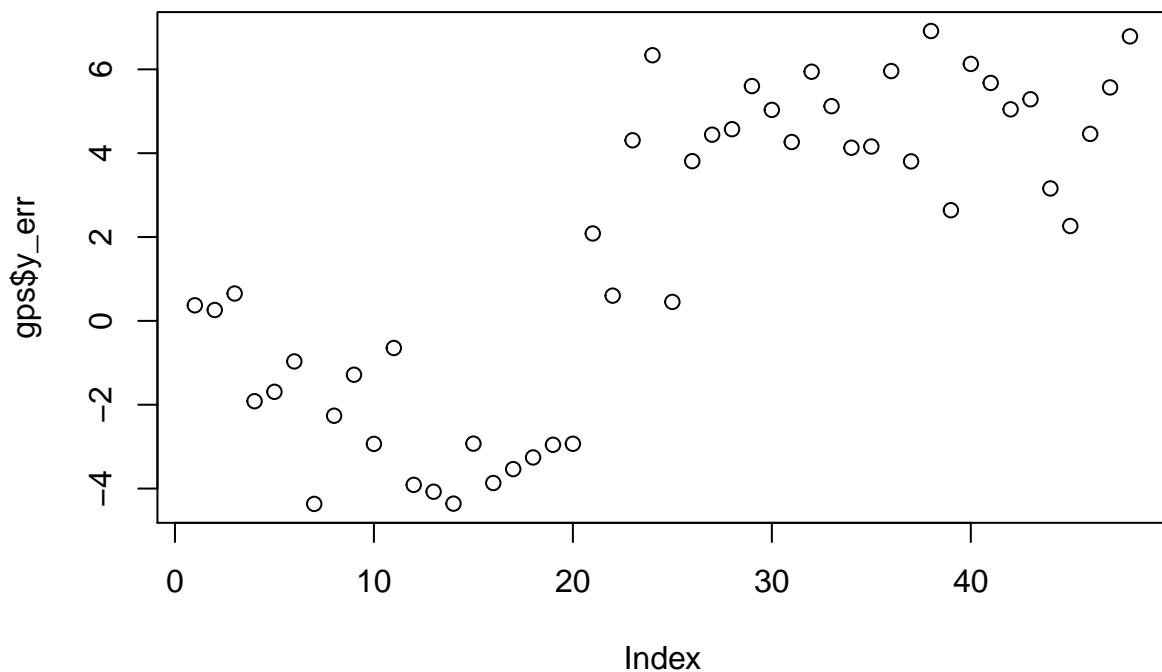
Discrete total distance error over time



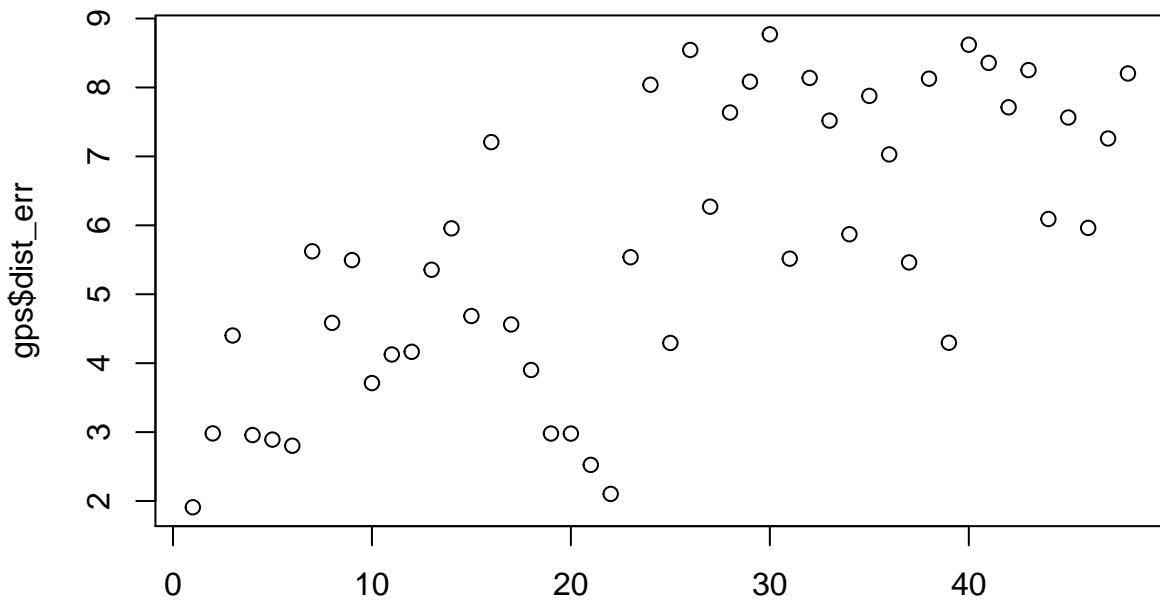
GPS X Error Over Time



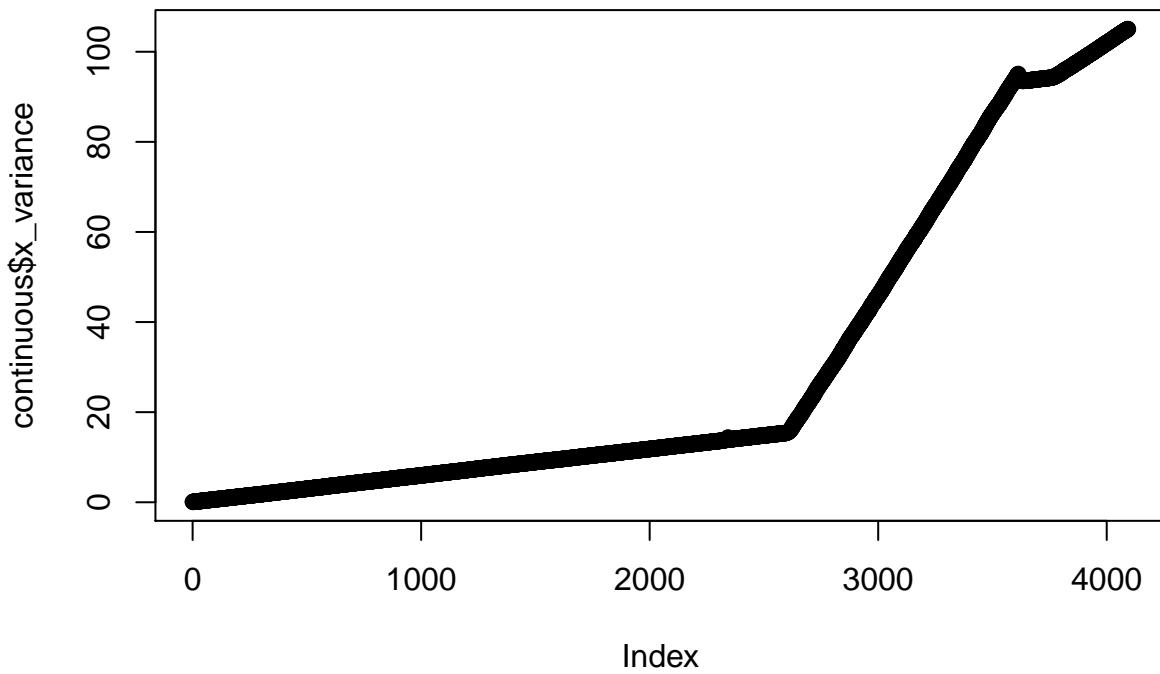
GPS Y Error Over Time



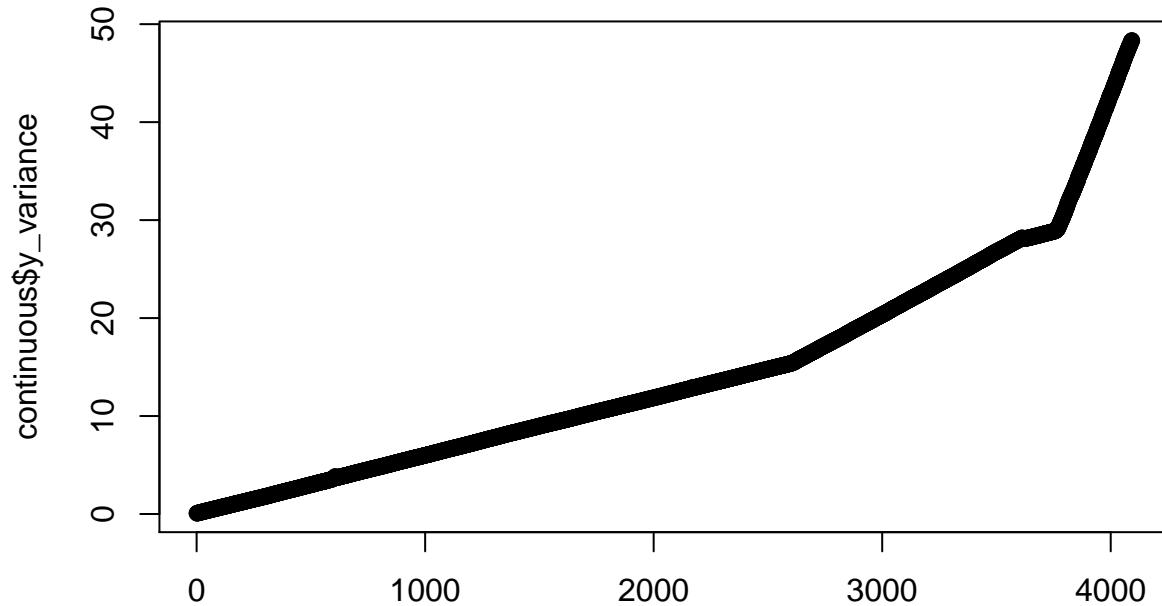
GPS Horizontal Distance Error Over Time



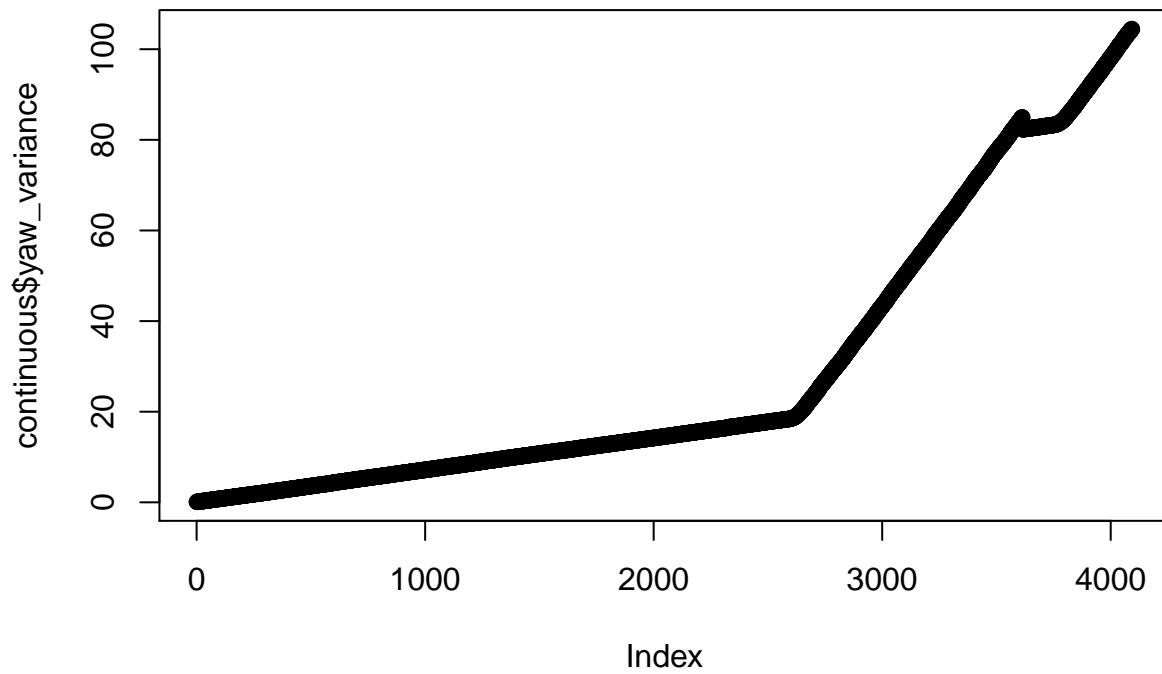
Continuous Filter X Variance Over Time



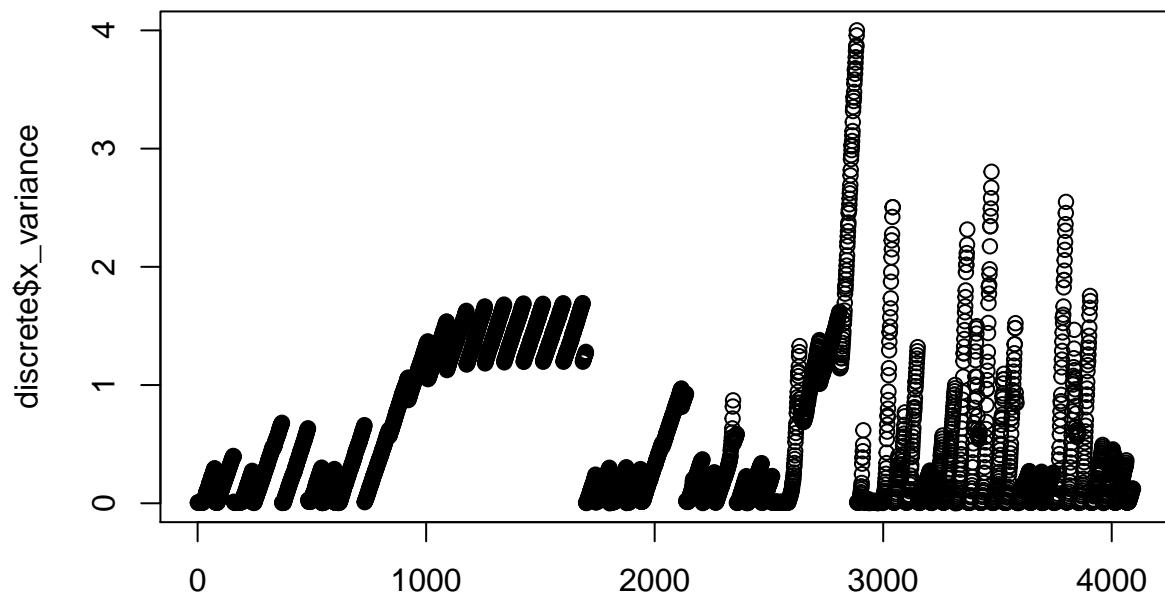
Continuous Filter Y Variance Over Time



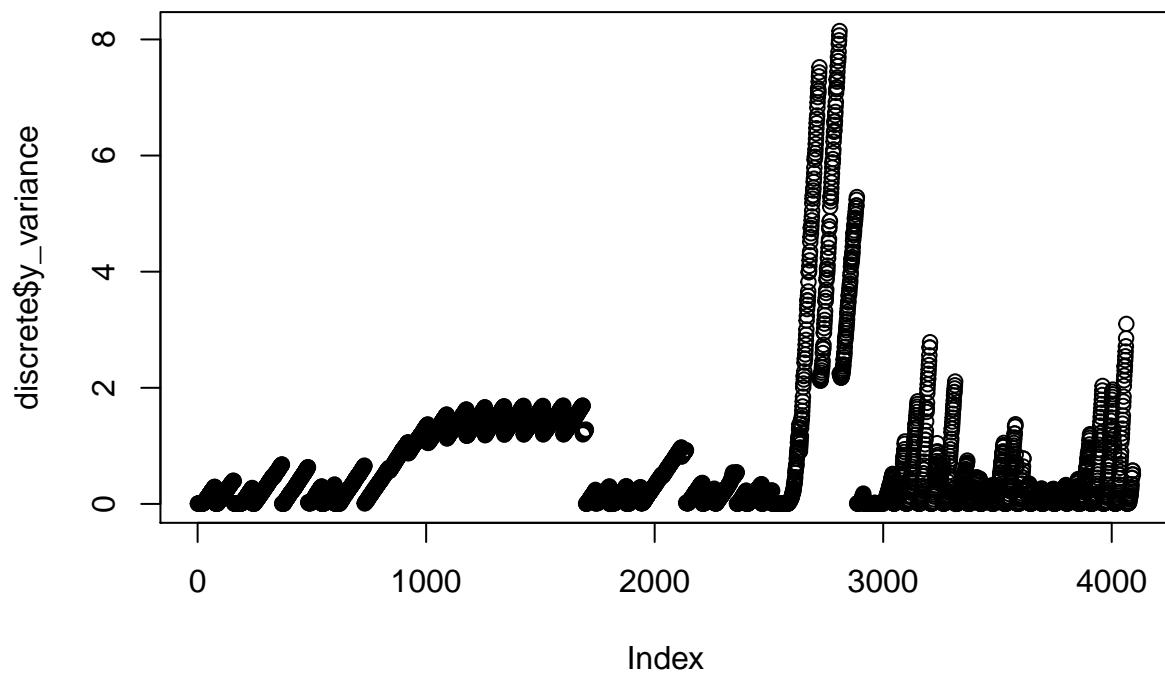
Continuous Filter Yaw Variance Over Time



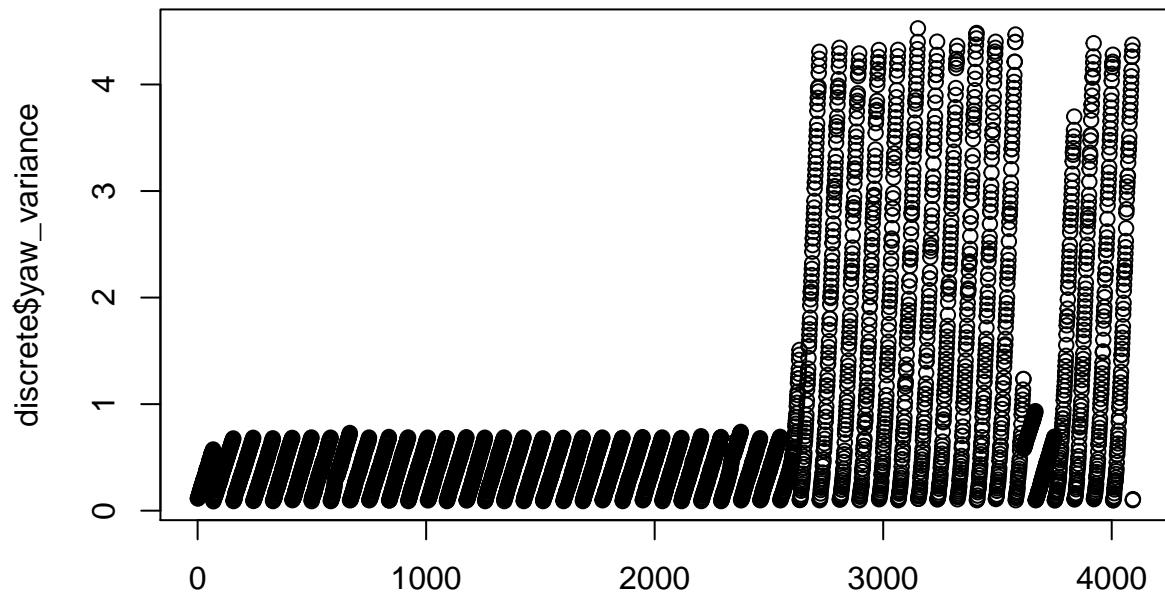
Discrete Filter X Variance Over Time



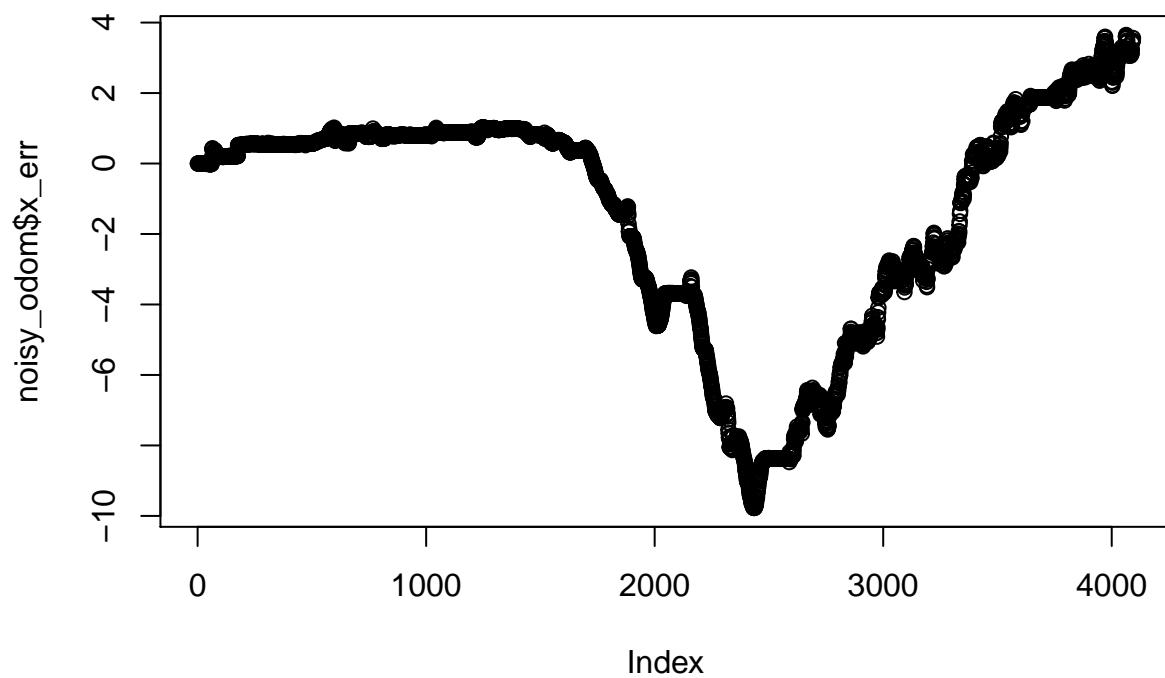
Discrete Filter Y Variance Over Time



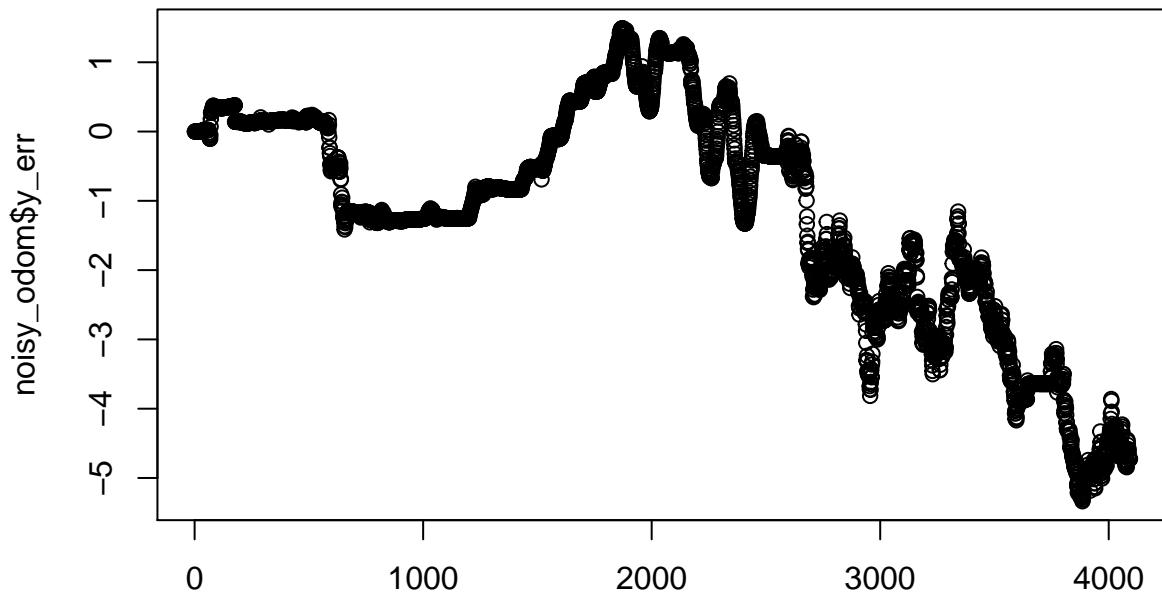
Discrete Filter Yaw Variance Over Time



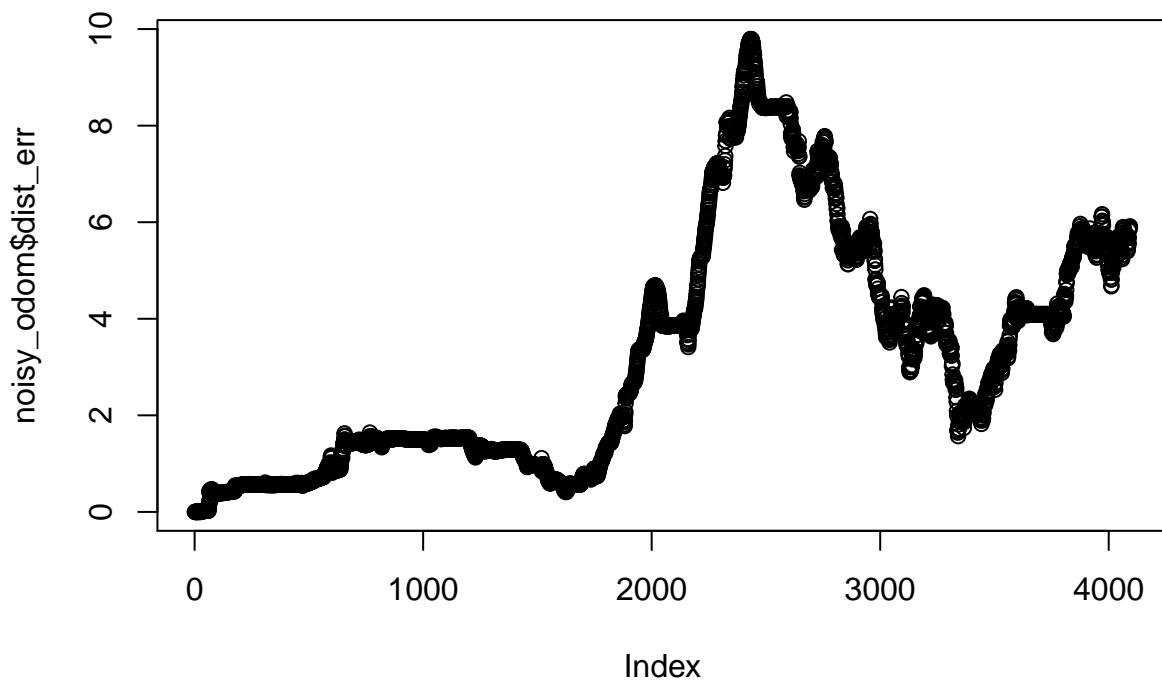
Noisy Odom X Error Over Time



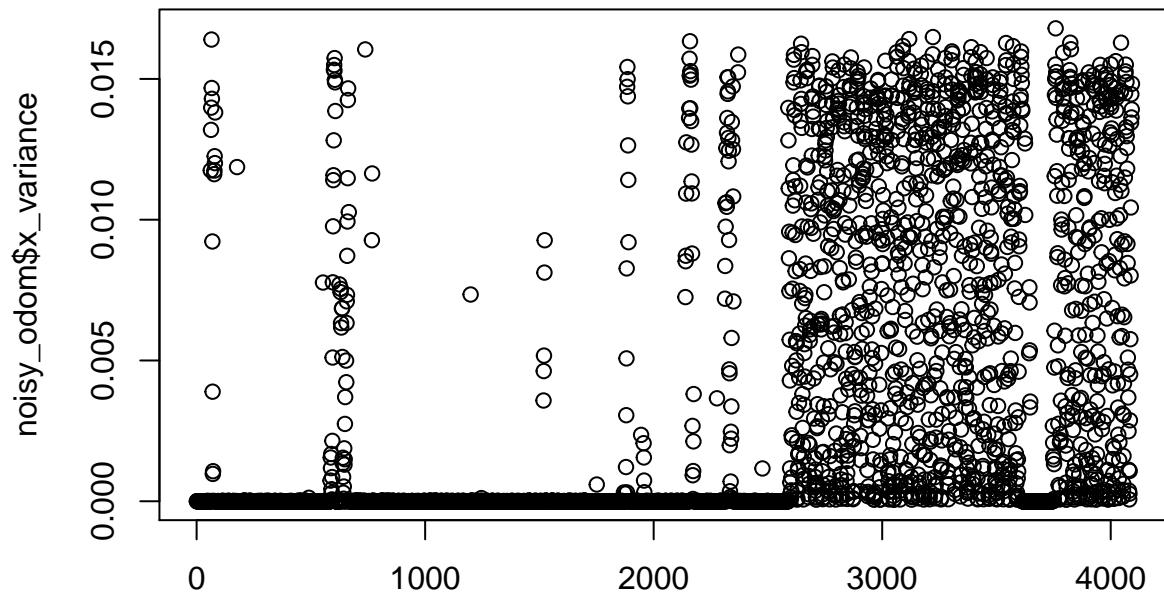
Noisy Odom Y Error Over Time



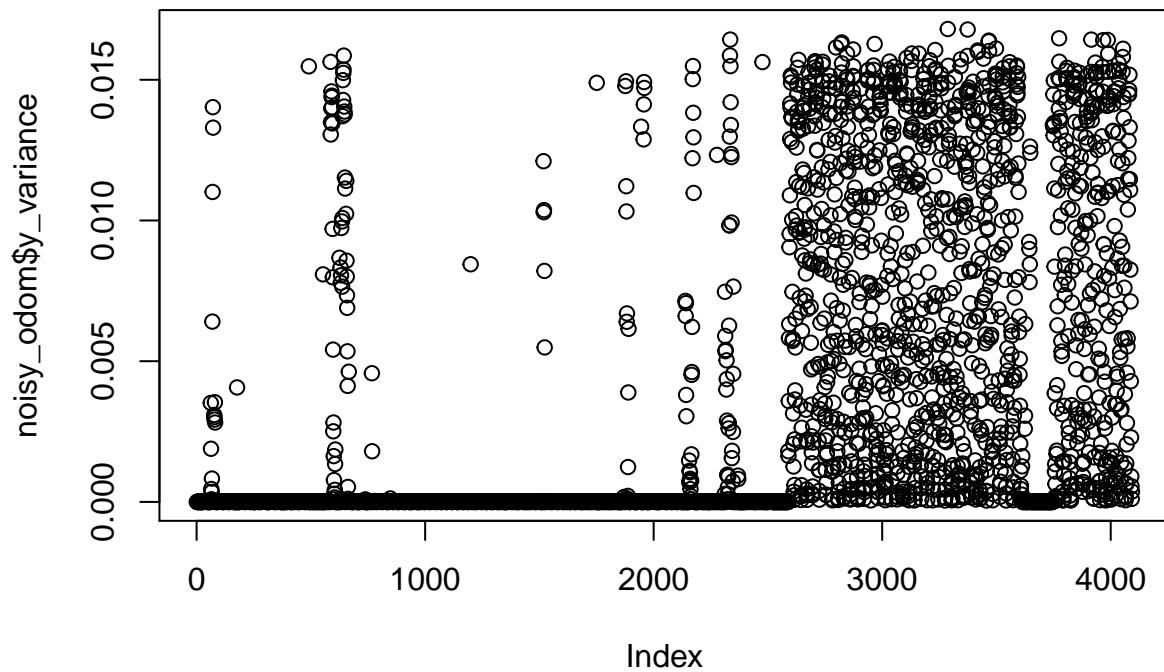
Noisy Odom Horizontal Distance Error Over Time



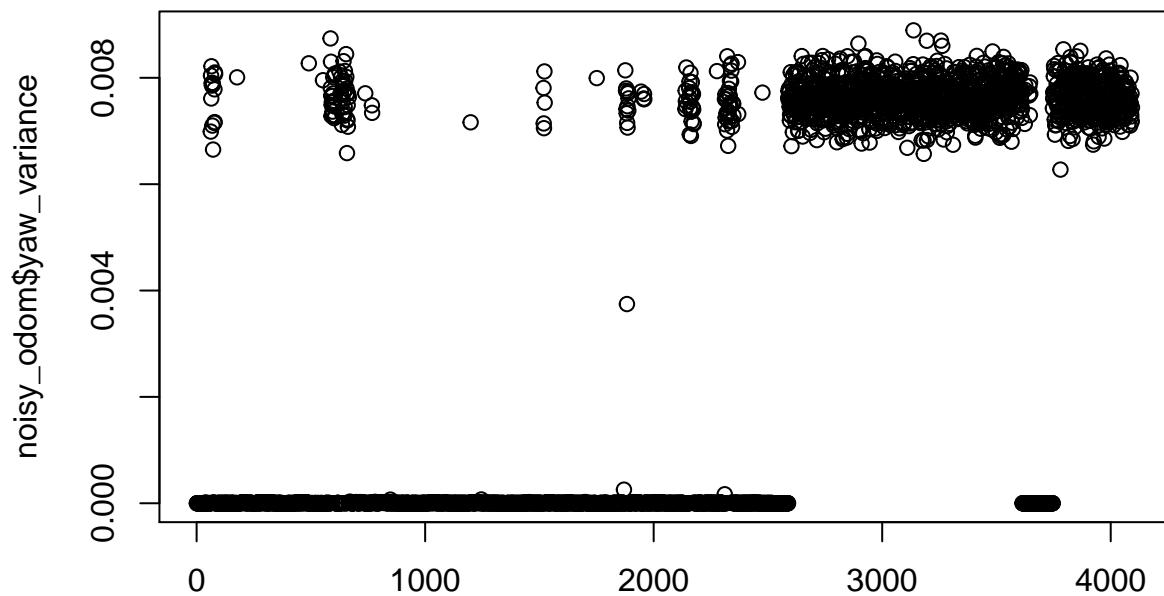
Variance of X Coordinate in Noisy Odometry



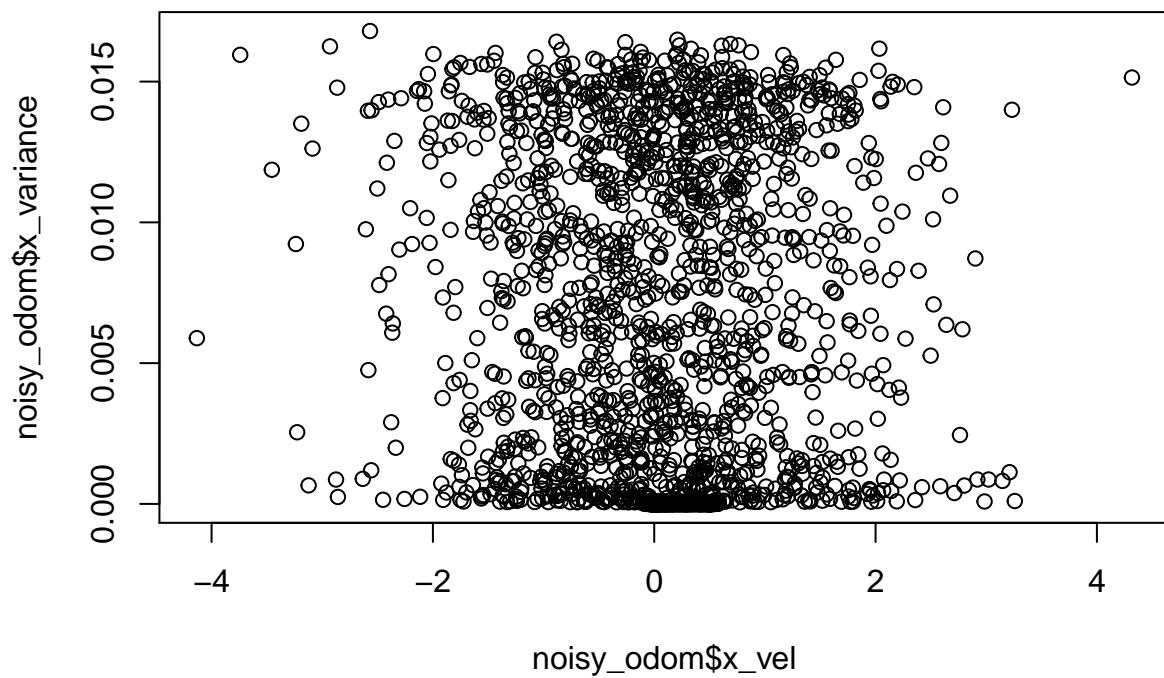
Variance of Y Coordinate in Noisy Odometry



Variance of Yaw Coordinate in Noisy Odometry



Variance vs. Velocity of X in Noisy Odometry



Variance vs. Velocity of Yaw in Noisy Odometry

