

two_stationary Turtlebot 1 Report

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August 15, 2016

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

The runtime of this experiment was 0 hours, 13 minutes, and 25.8 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.
## 1.421e-05 2.070e-03 4.113e-03 4.118e-03 6.168e-03 8.216e-03

summary(continuous$y_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 9.210e-10 1.302e-06 5.241e-06 6.857e-06 1.162e-05 2.008e-05

summary(continuous$yaw_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 8.536e-05 1.275e-03 2.637e-03 2.449e-03 3.547e-03 4.751e-03

summary(continuous$dist_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 1.421e-05 2.070e-03 4.113e-03 4.118e-03 6.168e-03 8.216e-03

summary(discrete$x_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## -1.84500 -0.45490 -0.04831 -0.06069  0.19390  1.31000

summary(discrete$y_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## -1.80700 -0.30020  0.00000  0.01486  0.38090  1.75900

summary(discrete$yaw_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## -7.803e-05 6.350e-06 2.438e-05 2.924e-05 4.856e-05 1.593e-04

summary(discrete$dist_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 0.0000142 0.3244000 0.6360000 0.7208000 1.0870000 2.5830000

summary(noisy_odom$x_err)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 6.224e-07 8.791e-06 1.132e-05 1.097e-05 1.394e-05 2.043e-05
```

```

summary(noisy_odom$y_err)

##      Min.   1st Qu.    Median     Mean   3rd Qu.   Max.
## -1.879e-08 -3.979e-09  7.800e-09  7.021e-09  1.617e-08  3.461e-08

summary(noisy_odom$dist_err)

##      Min.   1st Qu.    Median     Mean   3rd Qu.   Max.
## 6.227e-07 8.791e-06 1.132e-05 1.097e-05 1.394e-05 2.043e-05

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

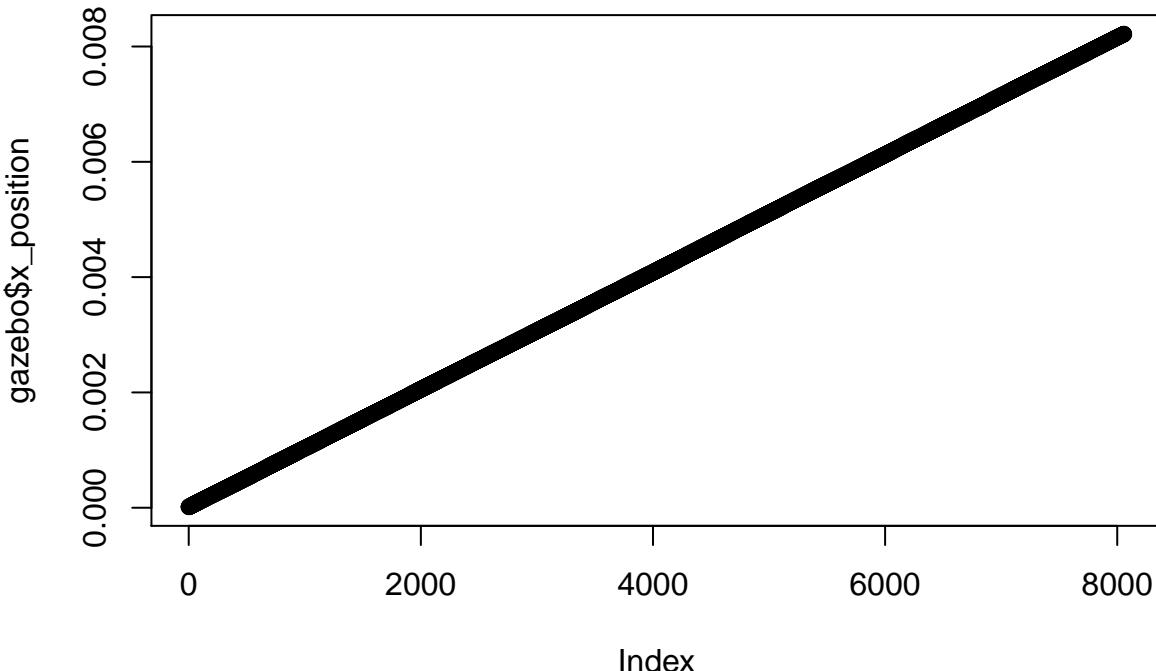
##      Min.   1st Qu.   Median   Mean 3rd Qu.   Max.
## 0.01306 0.42370 0.99510 1.23400 1.83500 4.64500

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

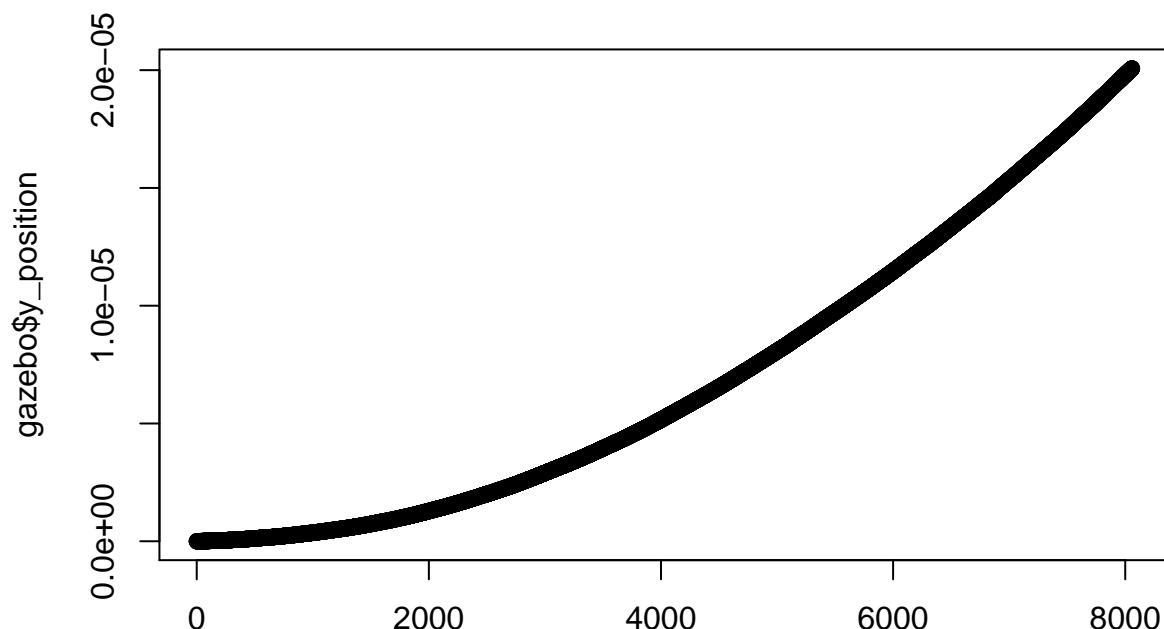
##      Min.   1st Qu.   Median   Mean 3rd Qu.   Max.
## 5.730e-16 8.694e-15 1.837e-14 2.441e-14 3.316e-14 5.656e-13

```

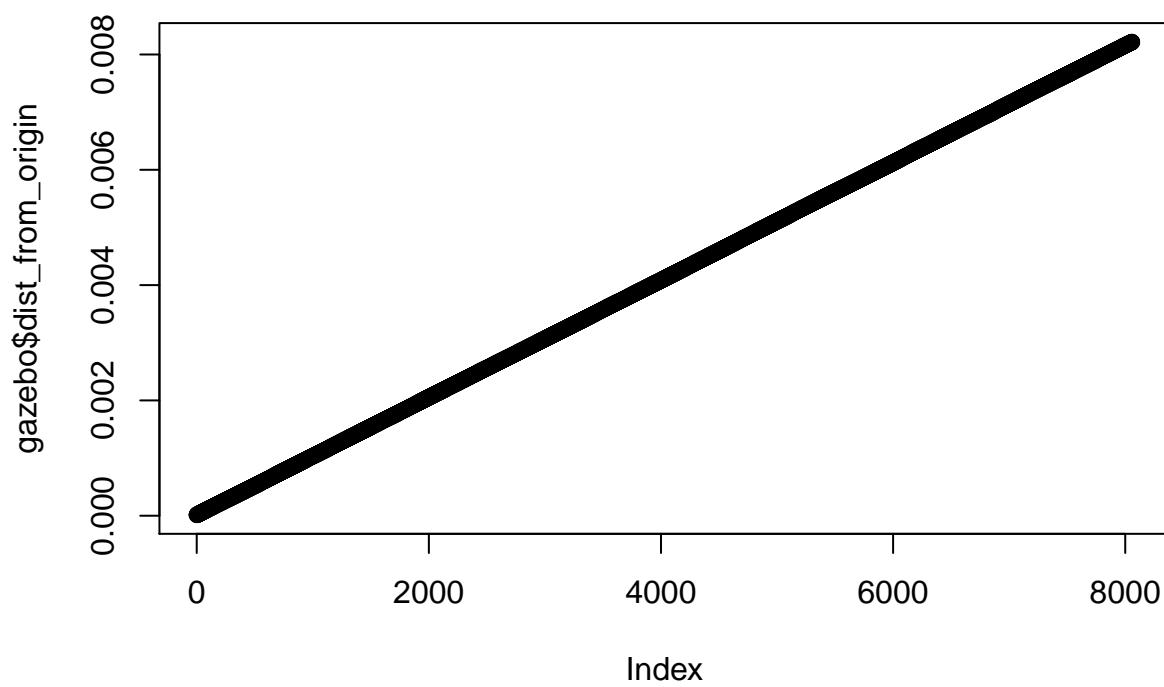
X coordinate of robot over time



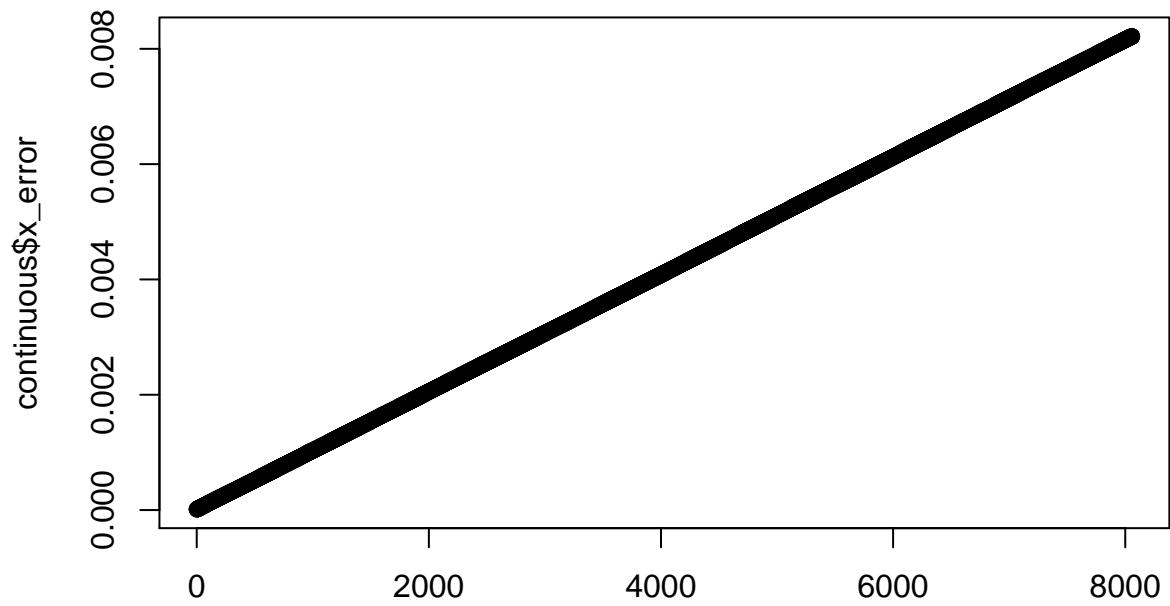
Y coordinate of robot over time



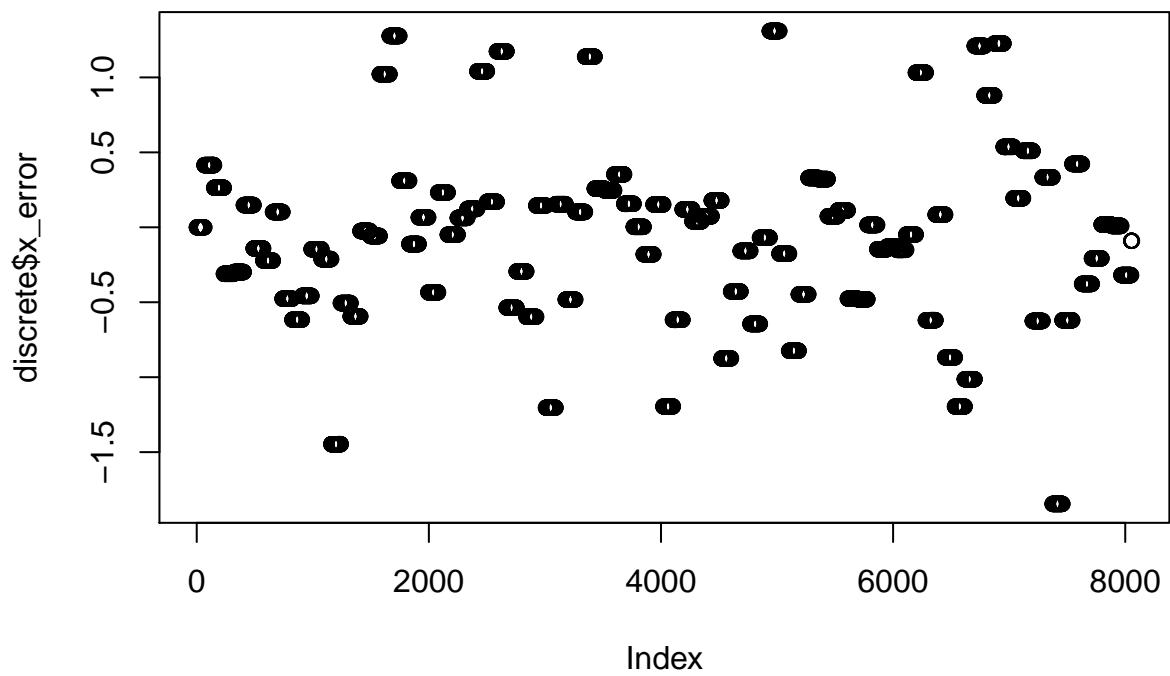
Distance from origin vs. time^{Index}



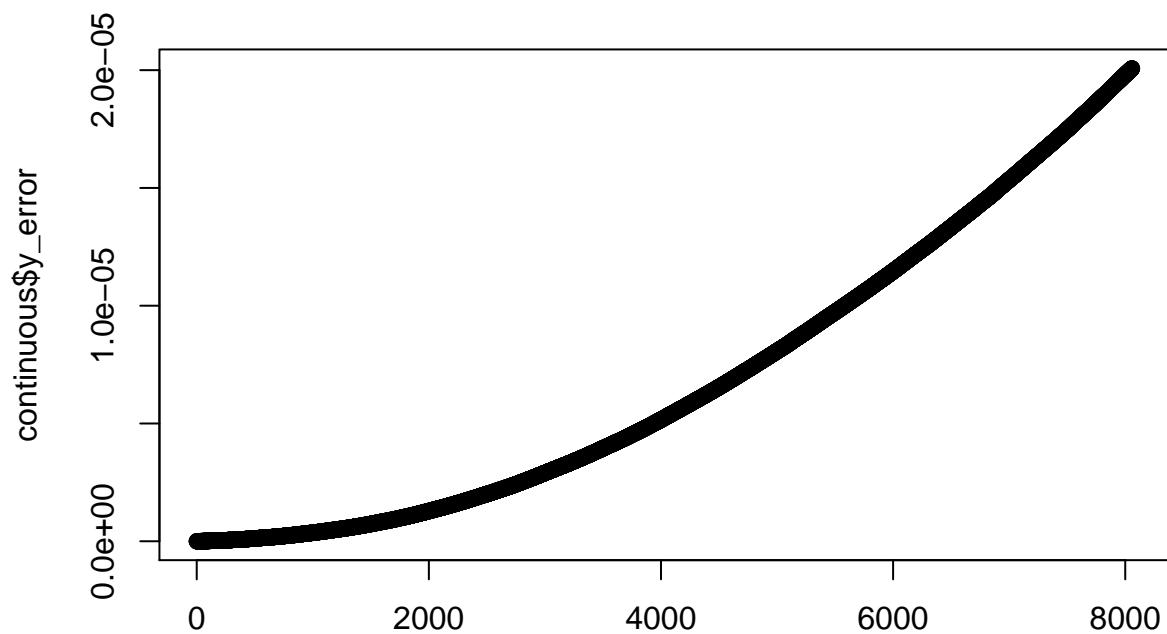
Continuous x_error over time



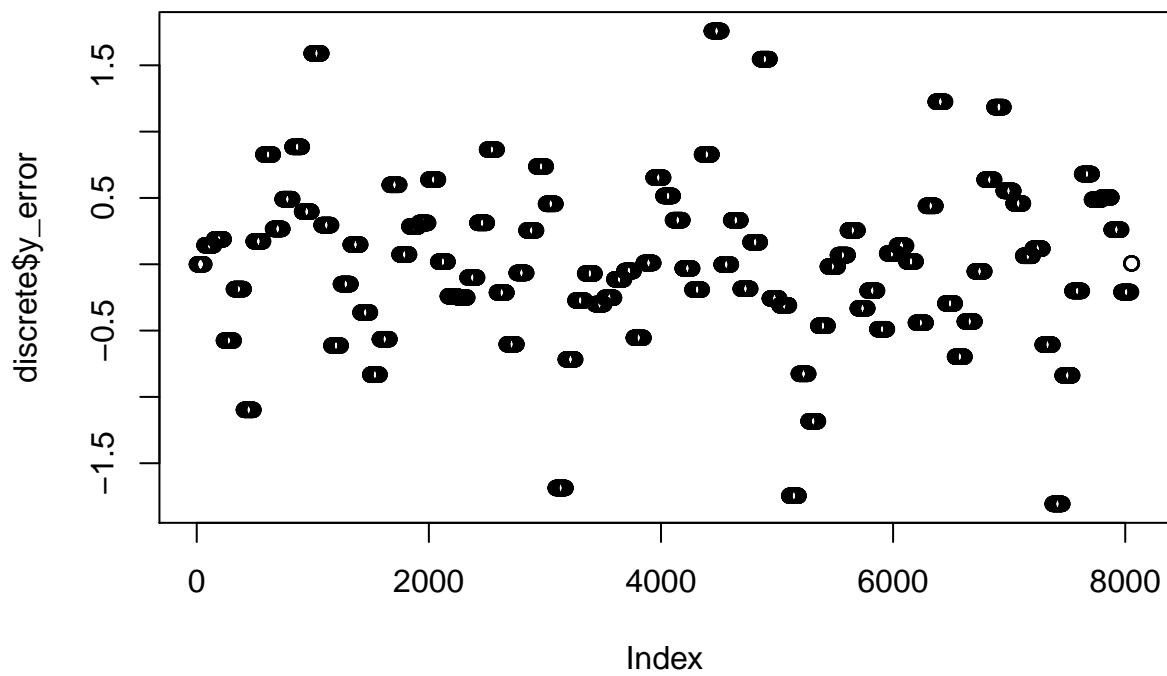
Discrete x_error over time



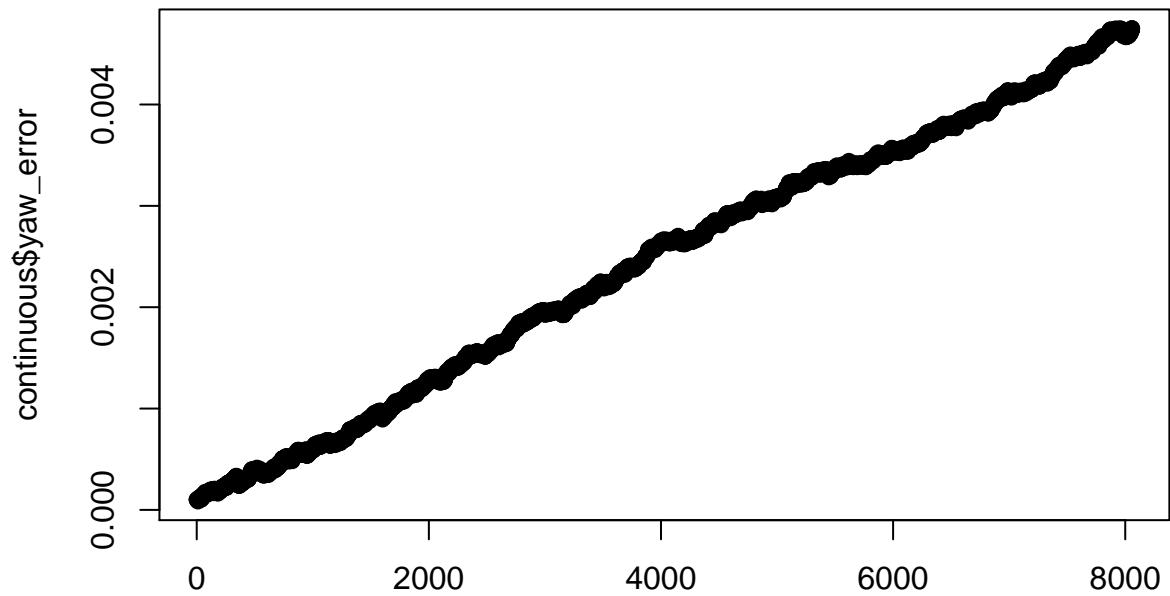
Continuous y_error over time



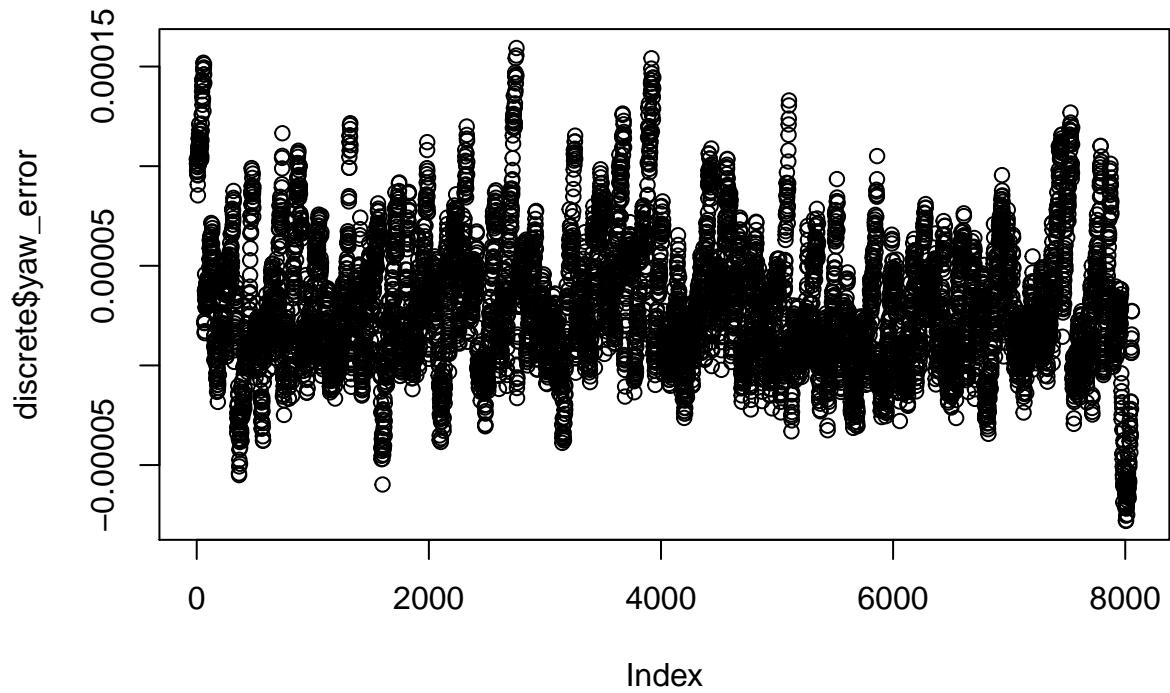
Discrete y_error over time



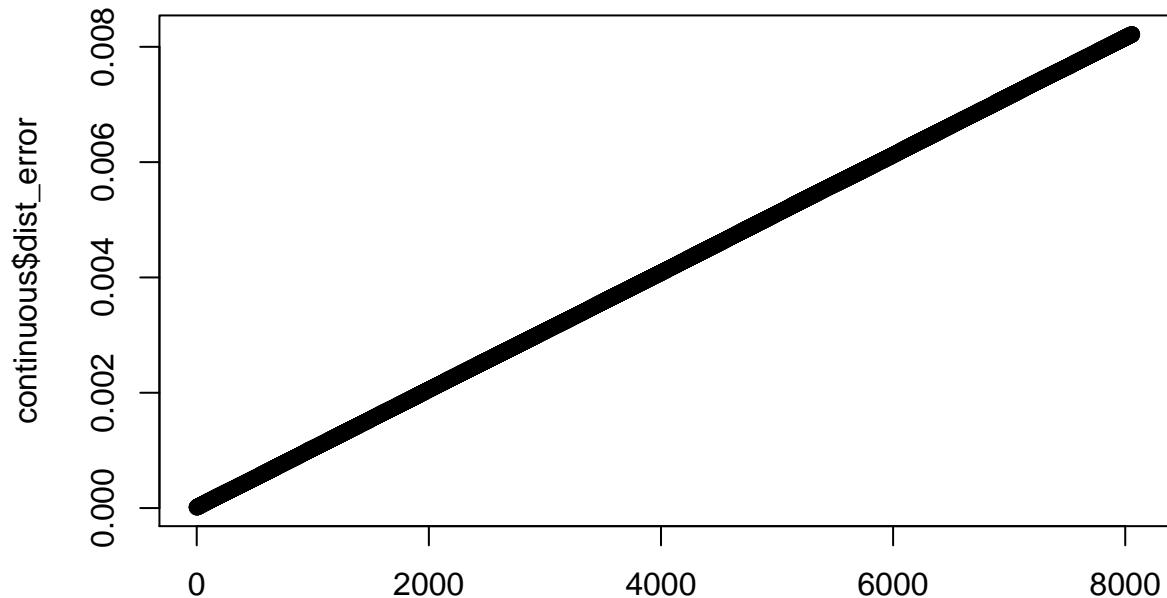
Continuous yaw error over time



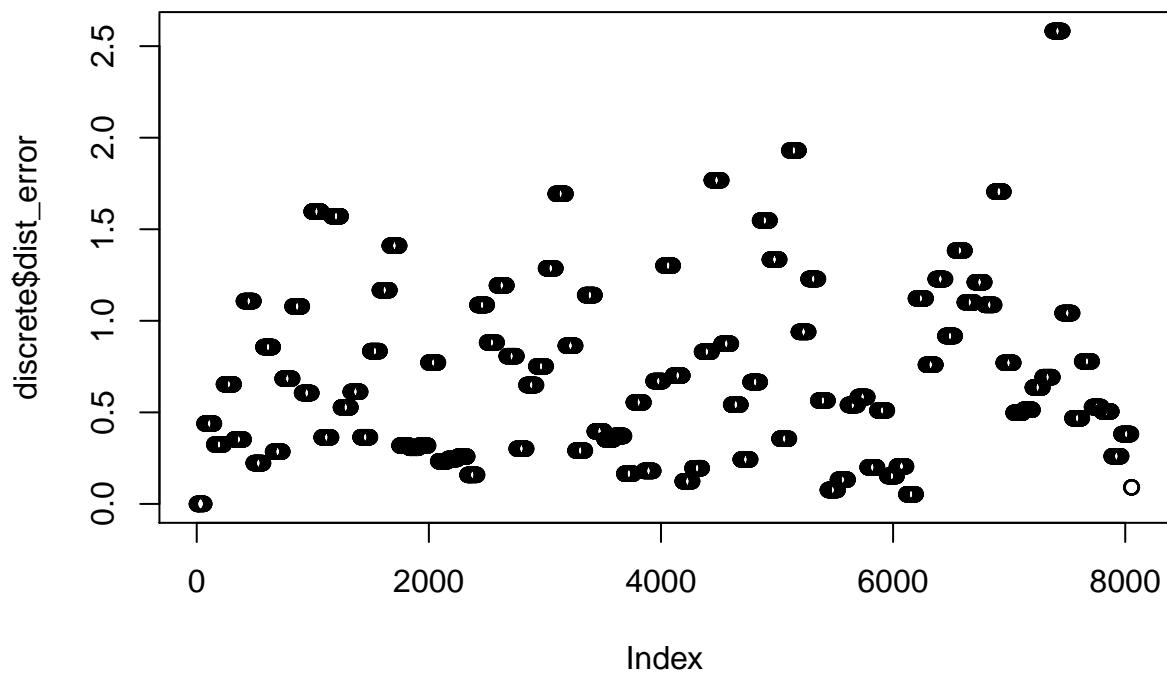
Discrete yaw error over time



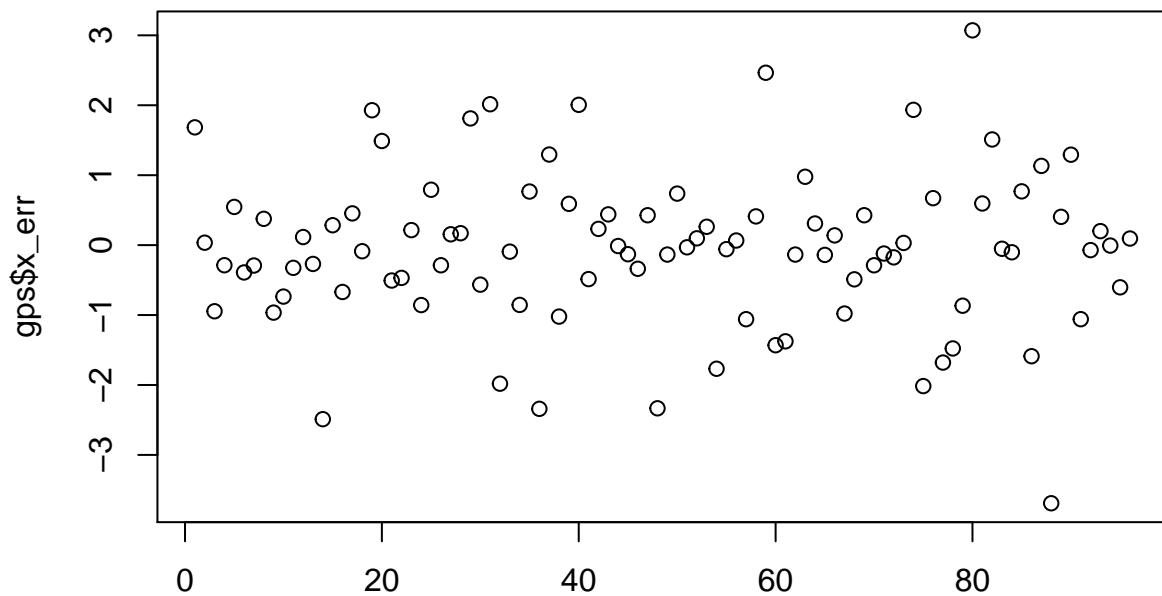
Continuous total distance error over time



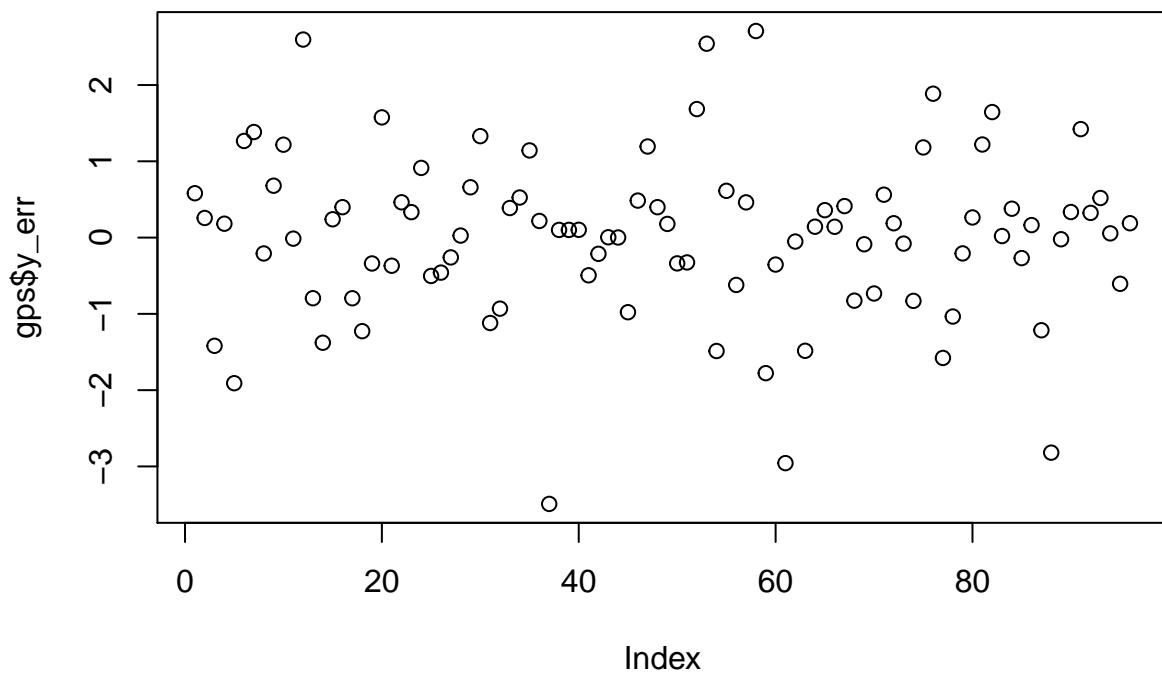
Discrete total distance error over time



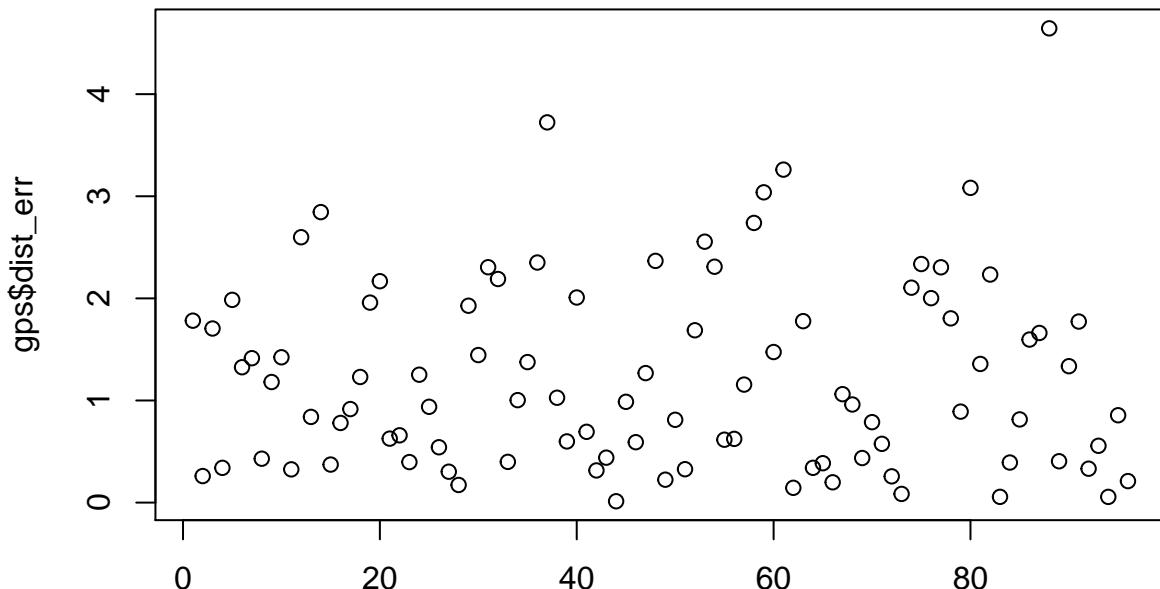
GPS X Error Over Time



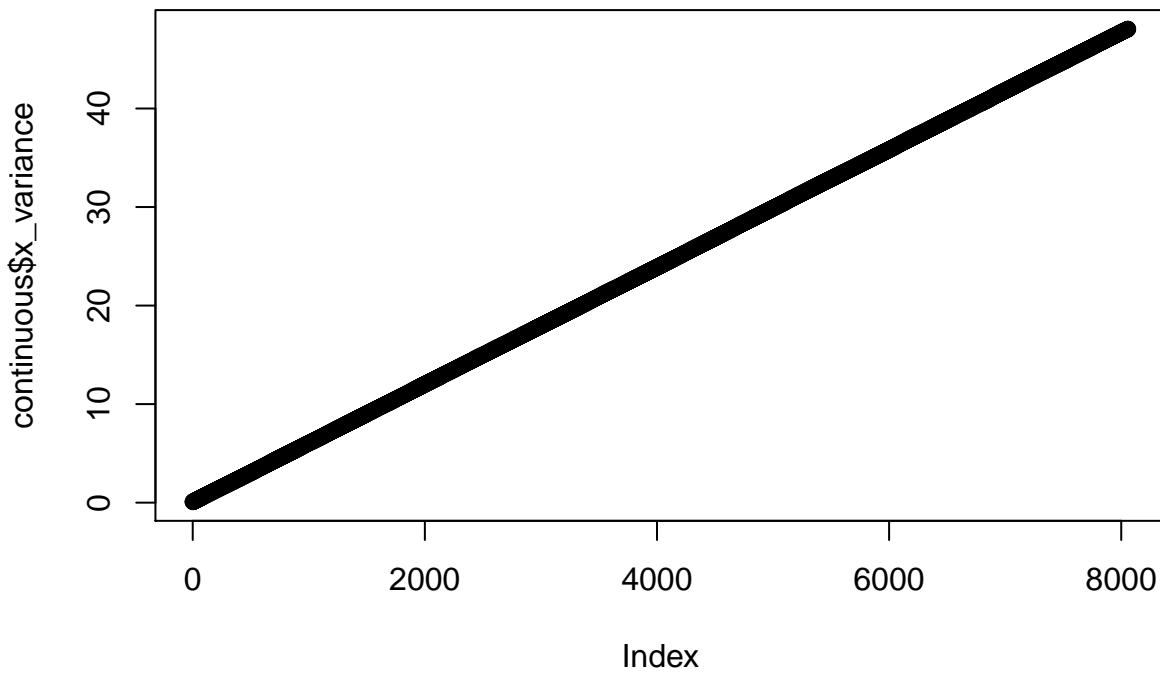
GPS Y Error Over Time



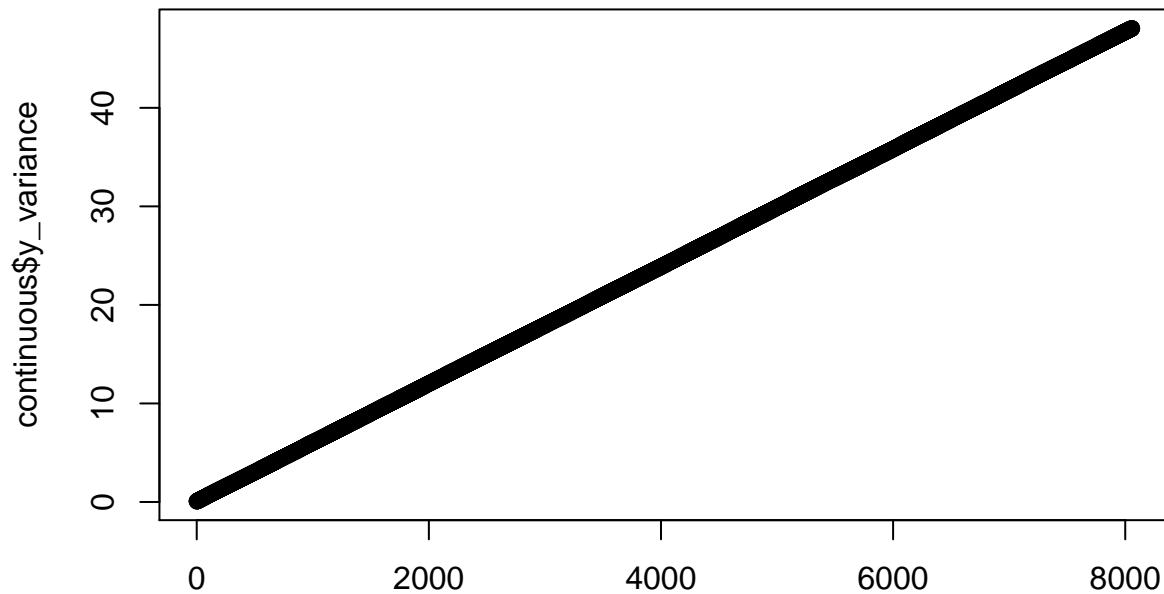
GPS Horizontal Distance Error Over Time



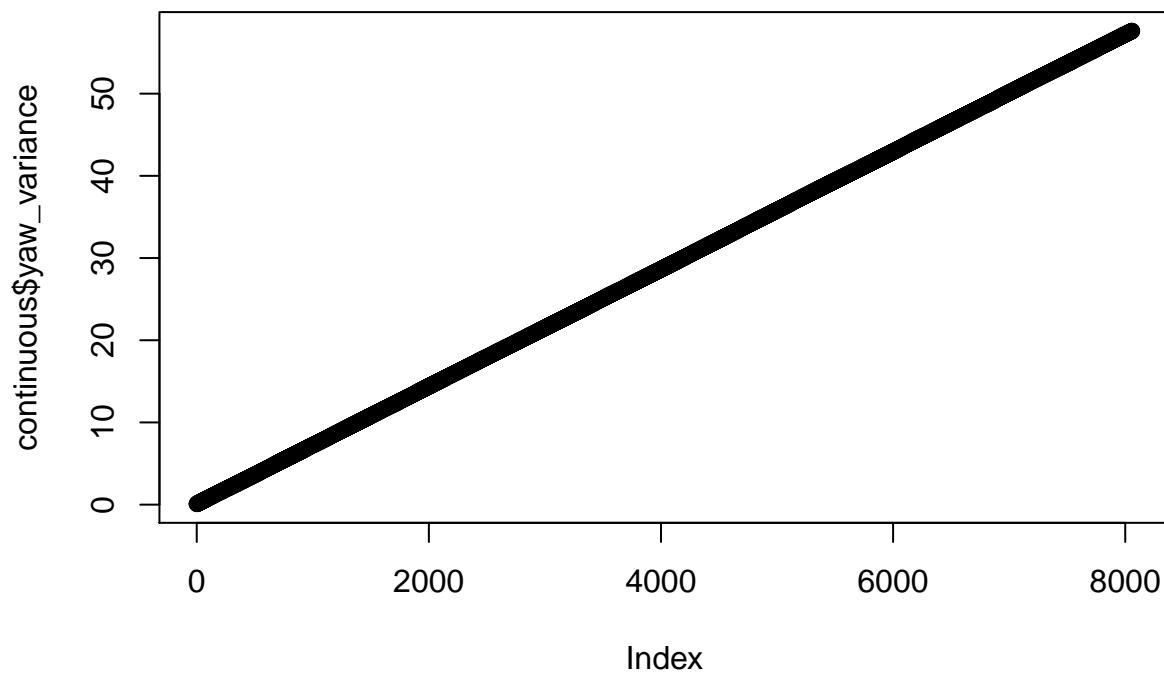
Continuous Filter X Variance Over Time



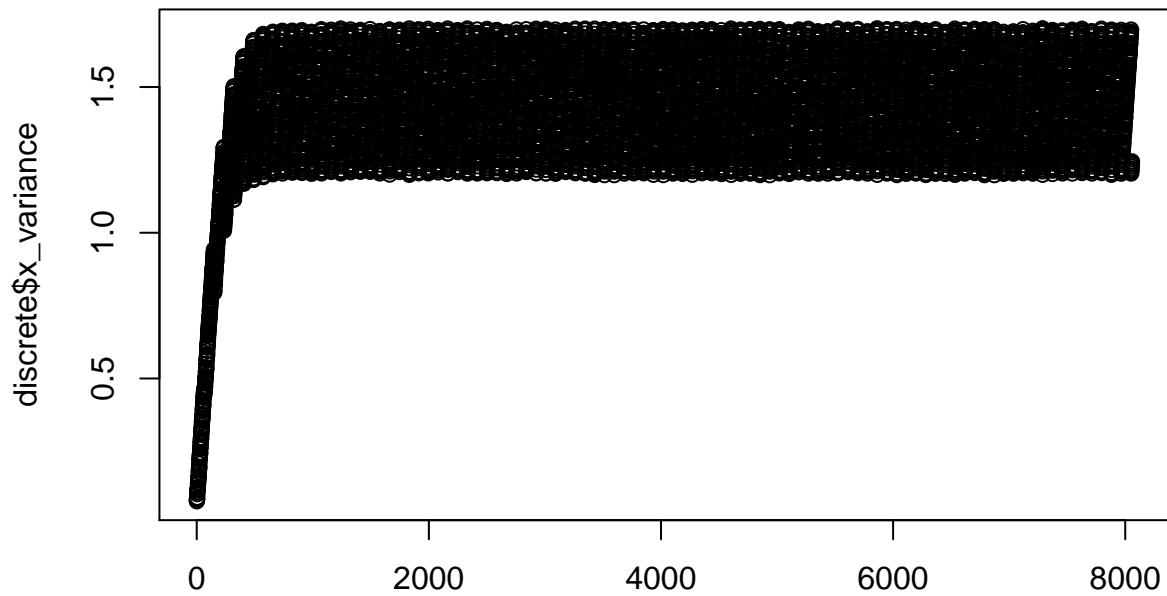
Continuous Filter Y Variance Over Time



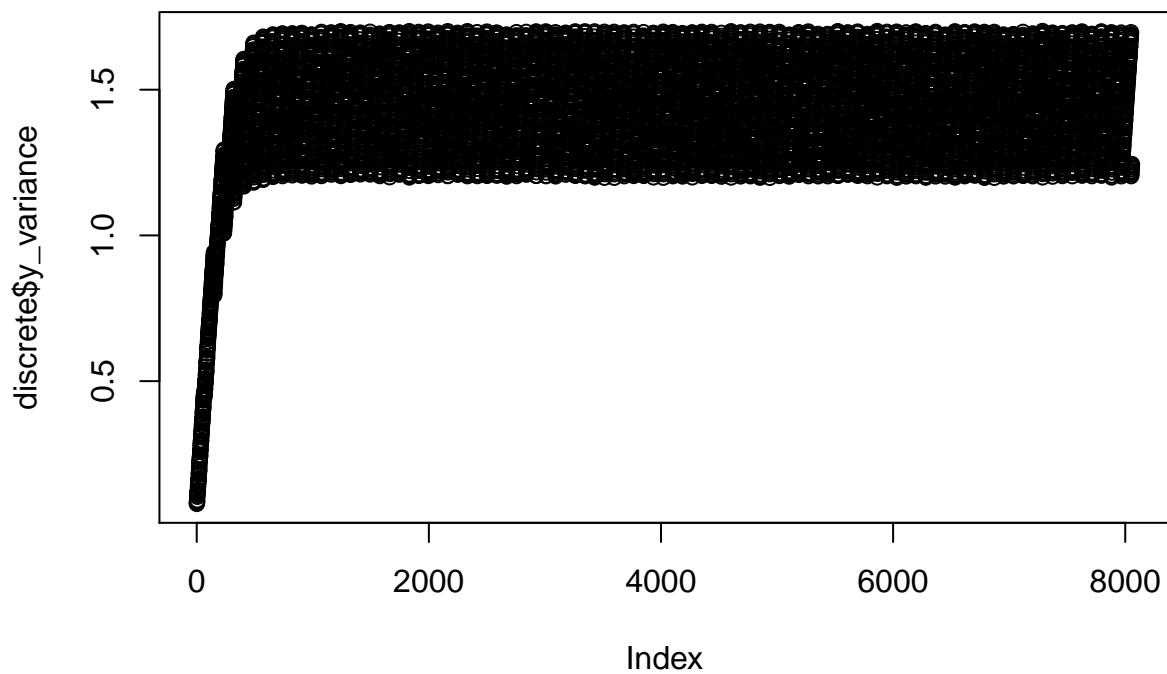
Continuous Filter Yaw Variance Over Time



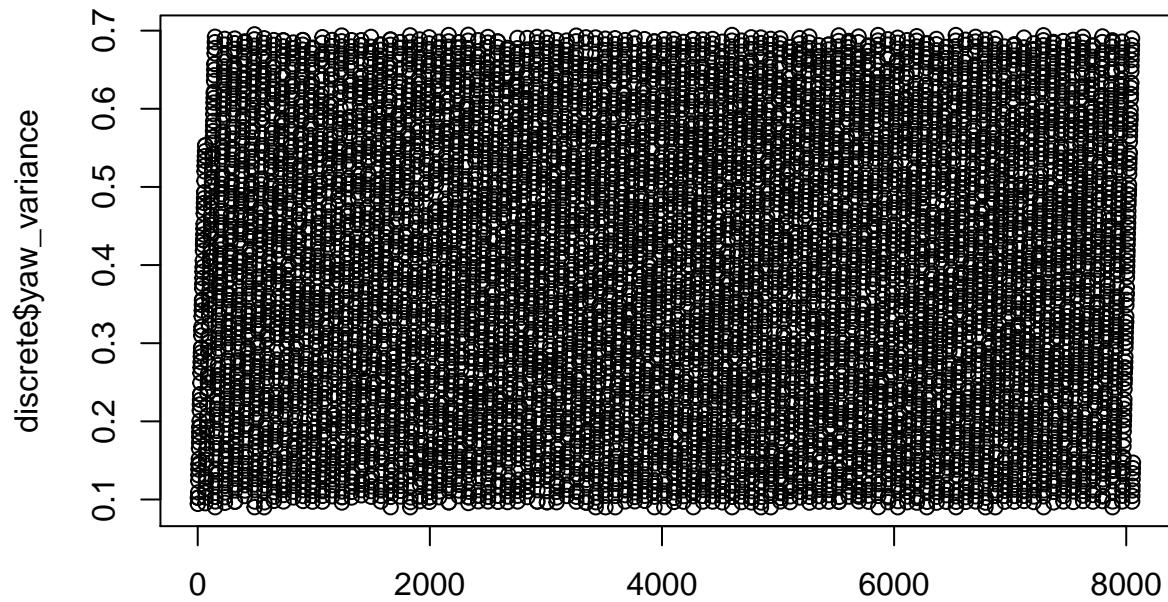
Discrete Filter X Variance Over Time



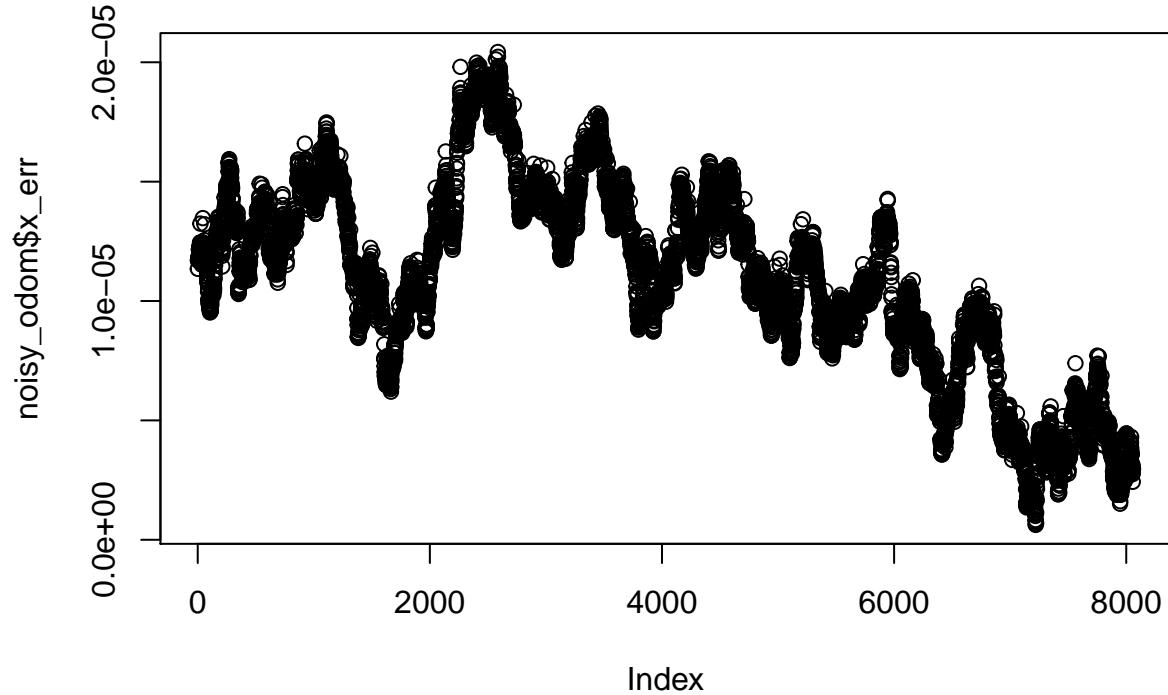
Discrete Filter Y Variance Over Time



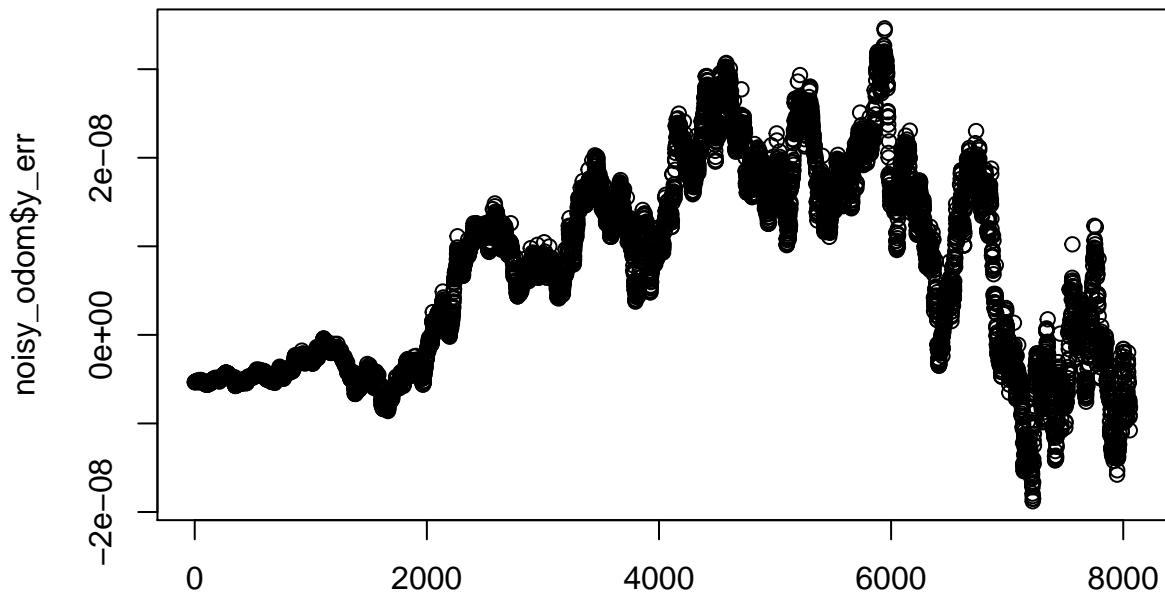
Discrete Filter Yaw Variance Over Time



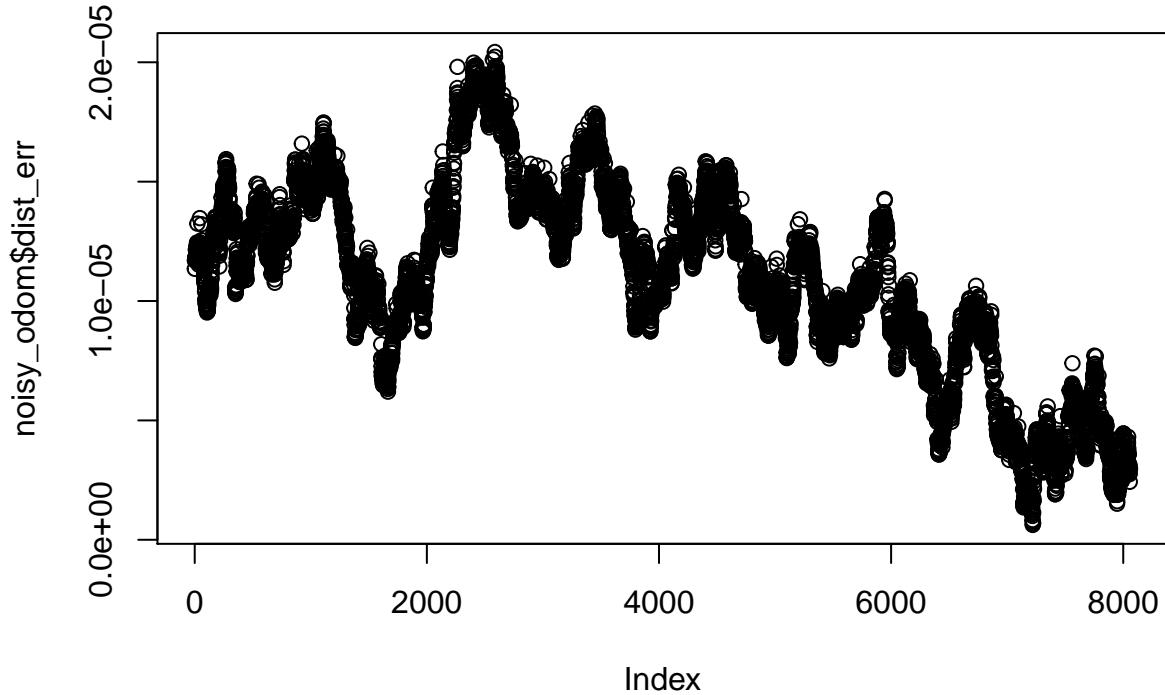
Noisy Odom X Error Over Time



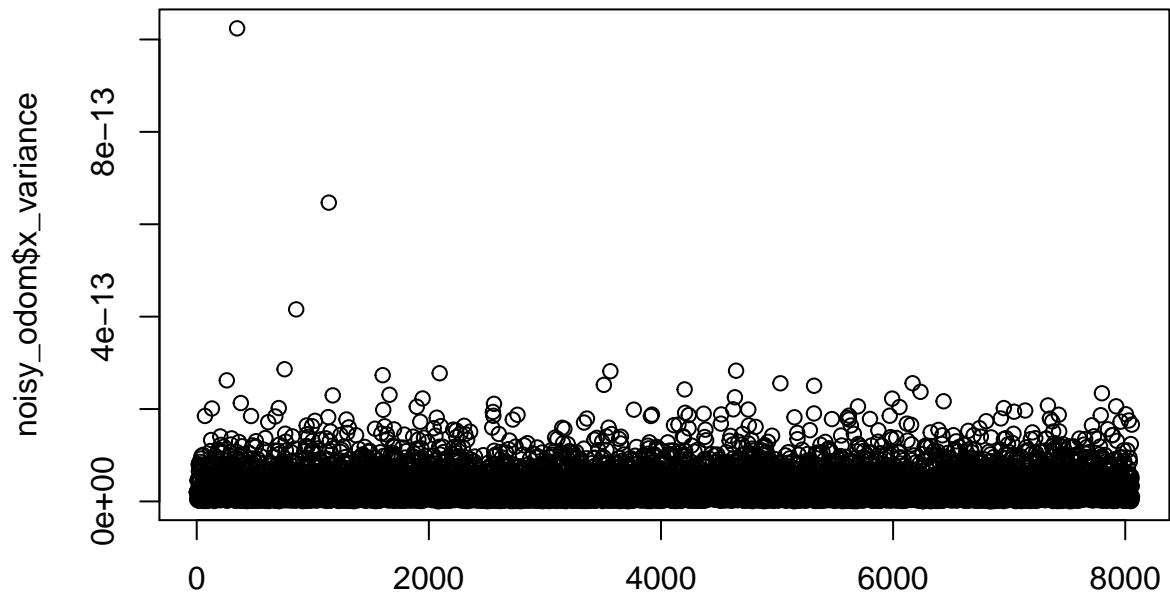
Noisy Odom Y Error Over Time



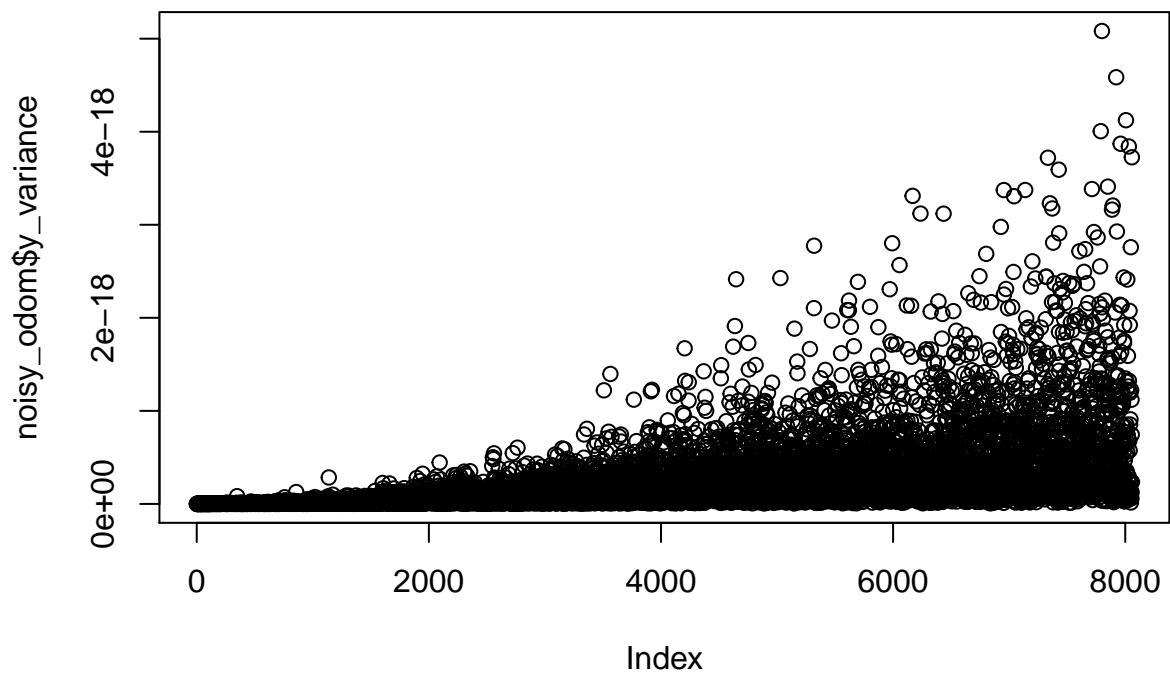
Noisy Odom Horizontal Distance Error Over Time



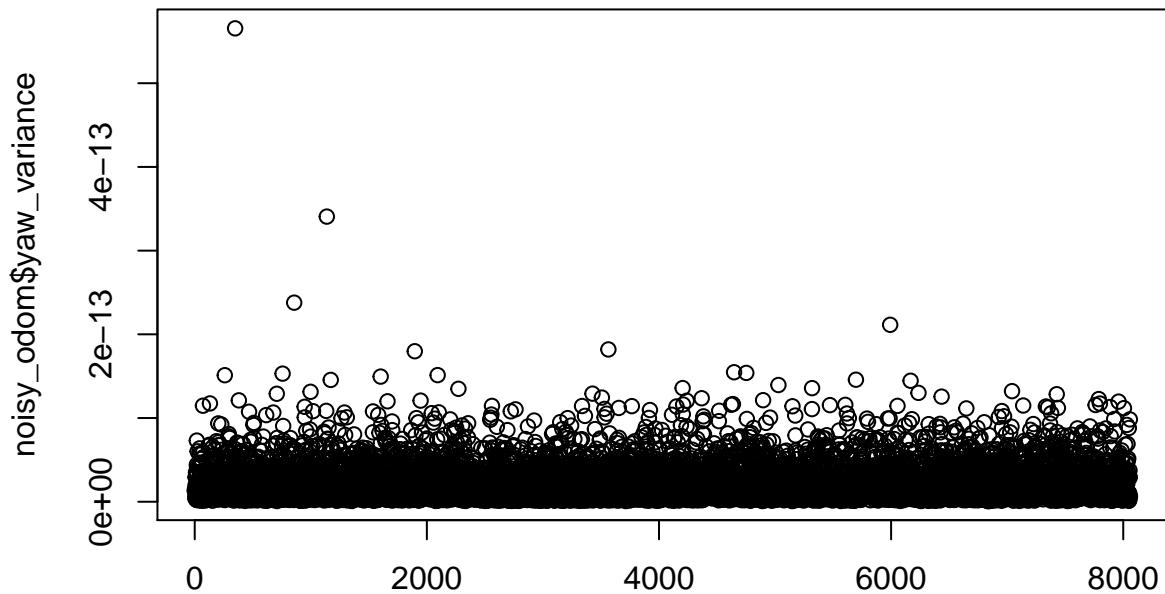
Variance of X Coordinate in Noisy Odometry



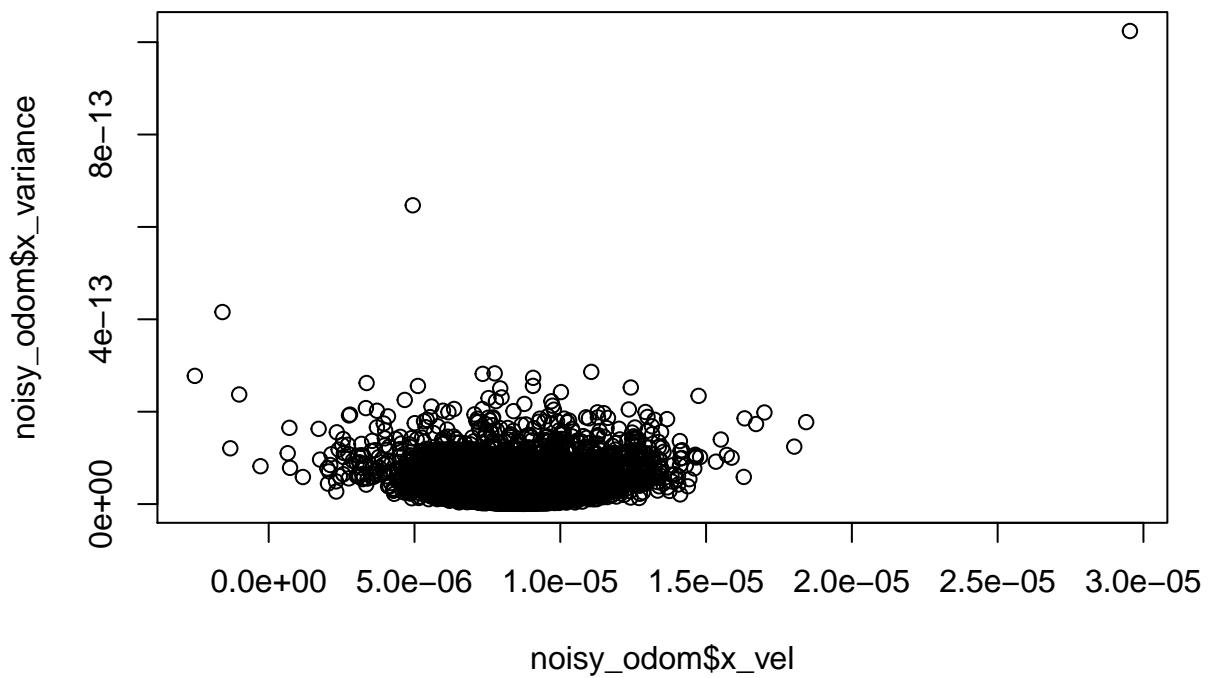
Variance of Y Coordinate in Noisy Odometry



Variance of Yaw Coordinate in Noisy Odometry



Variance vs. Velocity of X in Noisy Odometry



Variance vs. Velocity of Yaw in Noisy Odometry

