

two_stationary_no_gps Turtlebot 2 Report

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

The runtime of this experiment was 0 hours, 13 minutes, and 24.3 seconds.

The total number of external pose measurements received by the robot during this time was 7867 which means poses were received at an average of 9.7811762 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.
## 0.0000125 0.0020610 0.0041110 0.0041100 0.0061570 0.0082080

summary(continuous$y_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 6.740e-10 1.433e-06 5.550e-06 7.701e-06 1.302e-05 2.336e-05

summary(continuous$yaw_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 6.518e-05 1.300e-03 2.821e-03 2.849e-03 4.392e-03 5.540e-03

summary(continuous$dist_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 0.0000125 0.0020610 0.0041110 0.0041100 0.0061570 0.0082090

summary(discrete$x_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 0.03016 0.03228 0.03428 0.03430 0.03638 0.03845

summary(discrete$y_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## -0.008171 -0.006002 -0.004853 -0.005054 -0.004011 -0.002765

summary(discrete$yaw_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 6.518e-05 1.300e-03 2.821e-03 2.849e-03 4.392e-03 5.540e-03

summary(discrete$dist_error)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 0.03029 0.03251 0.03464 0.03469 0.03684 0.03930

summary(noisy_odom$x_err)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## -1.669e-05 -8.055e-06 -7.338e-07 2.195e-06 1.062e-05 2.903e-05
```

```

summary(noisy_odom$y_err)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 3.458e-09 2.184e-08 5.612e-08 6.717e-08 9.613e-08 1.890e-07

summary(noisy_odom$dist_err)

##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 5.997e-08 6.482e-06 9.093e-06 1.045e-05 1.363e-05 2.903e-05

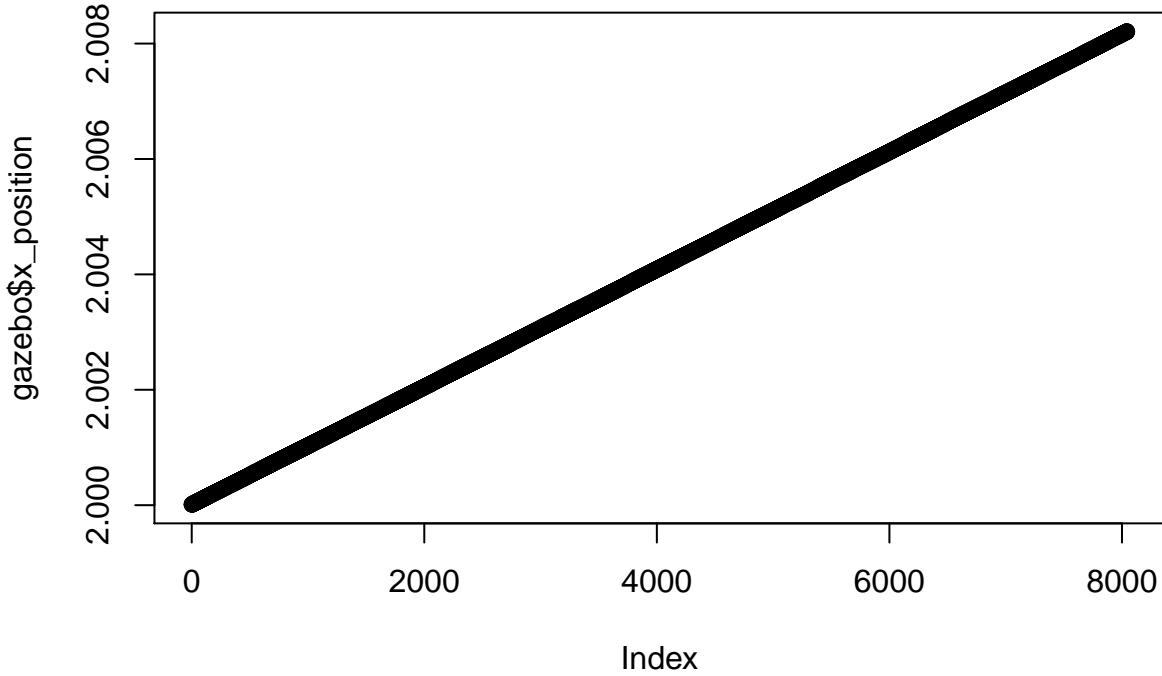
if (NROW(gps) > 0) {
  summary(gps$x_err)
  summary(gps$y_err)
  summary(gps$dist_err)
}

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

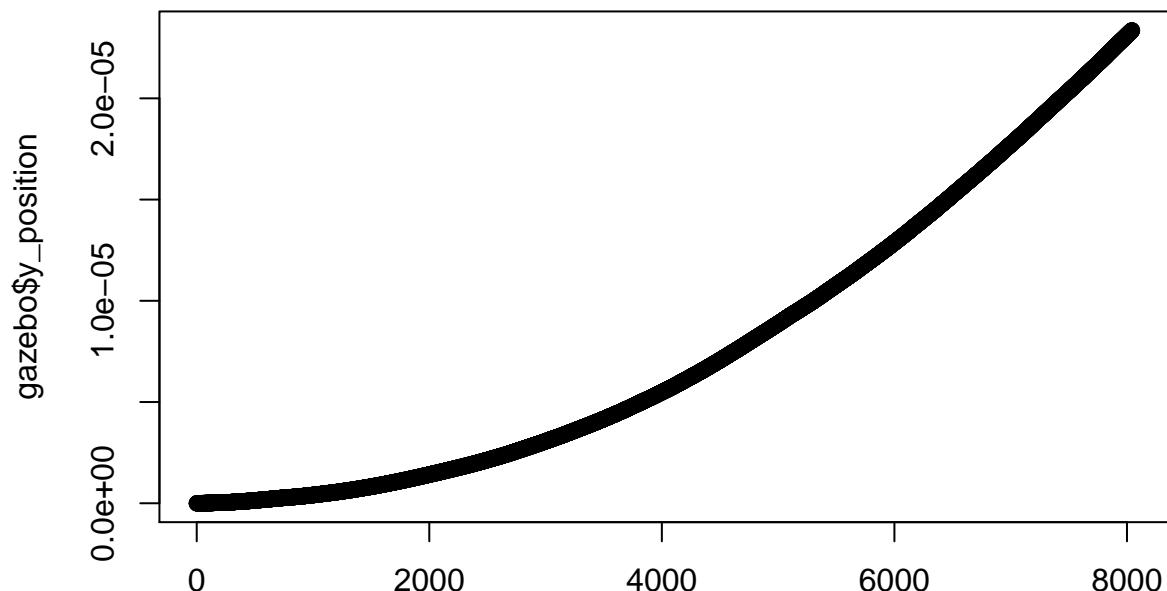
##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max.
## 6.509e-16 8.705e-15 1.804e-14 2.392e-14 3.262e-14 2.143e-13

```

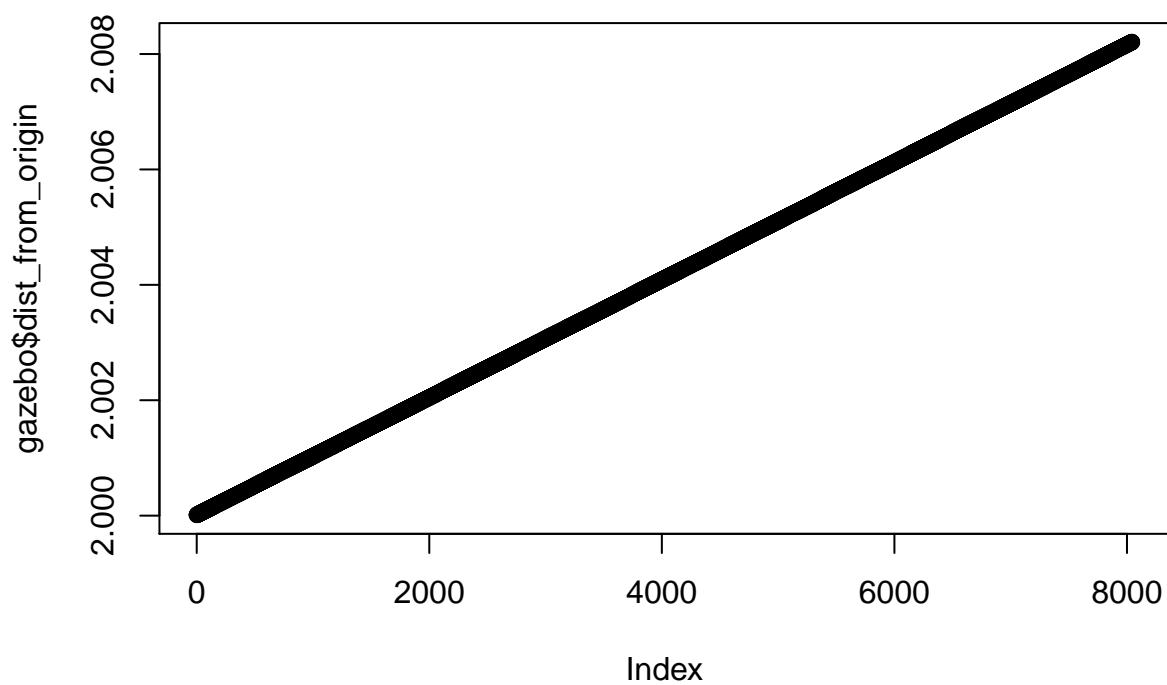
X coordinate of robot over time



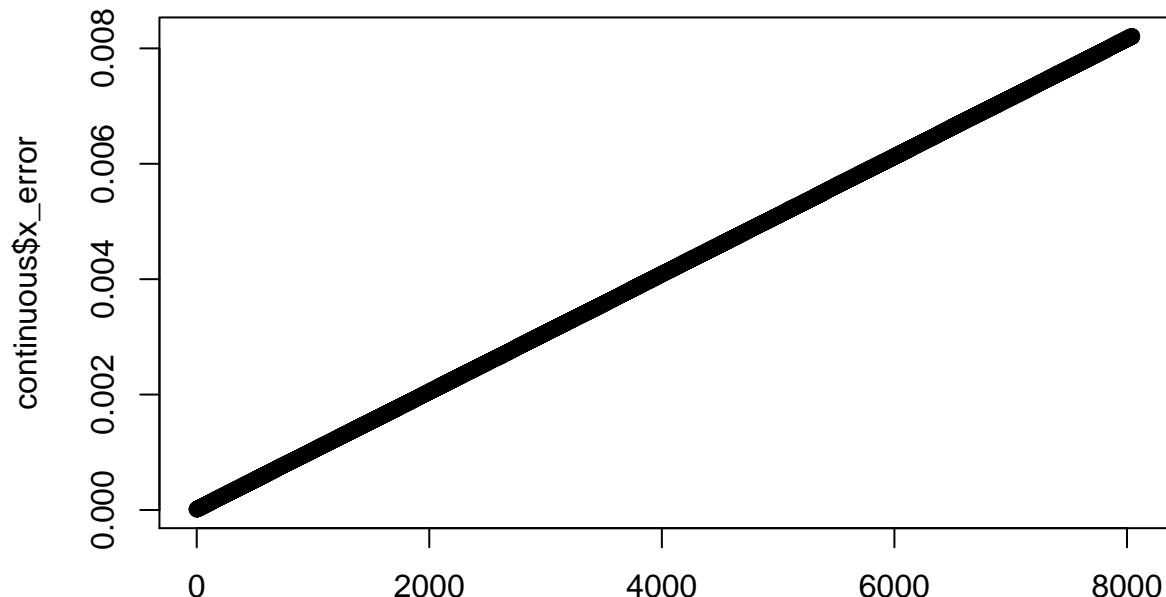
Y coordinate of robot over time



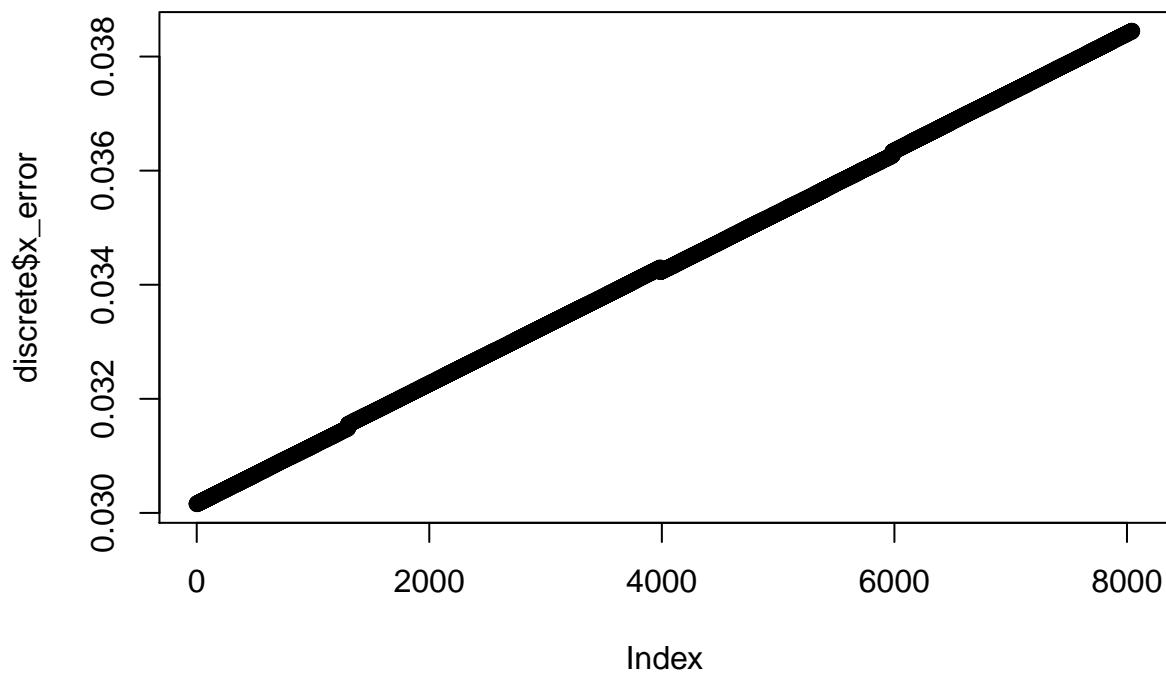
Distance from origin vs. time



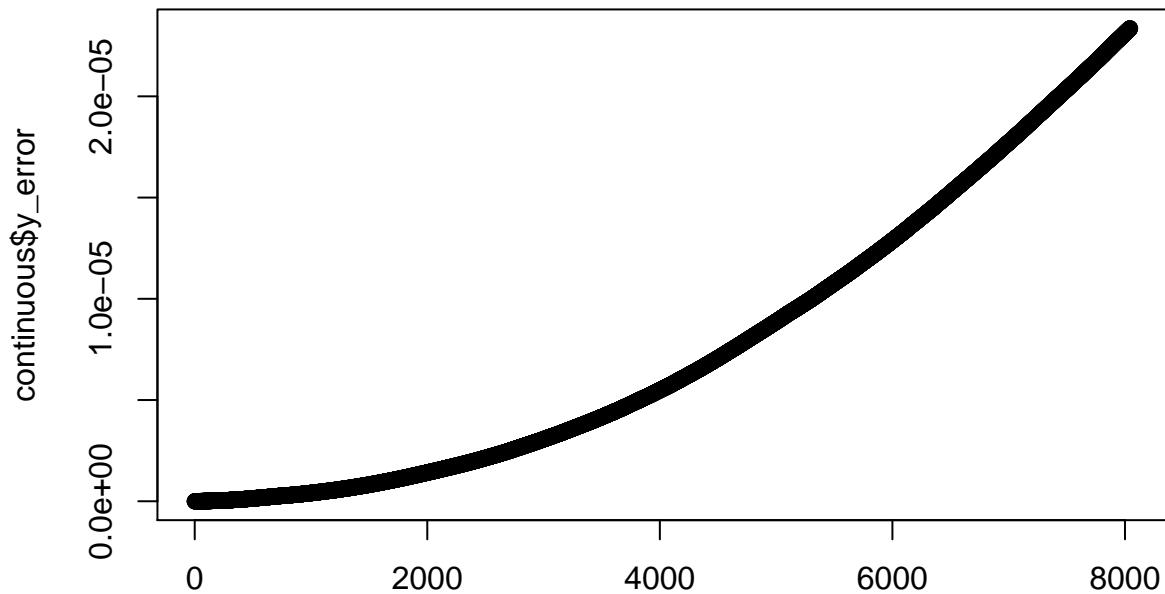
Continuous x_error over time



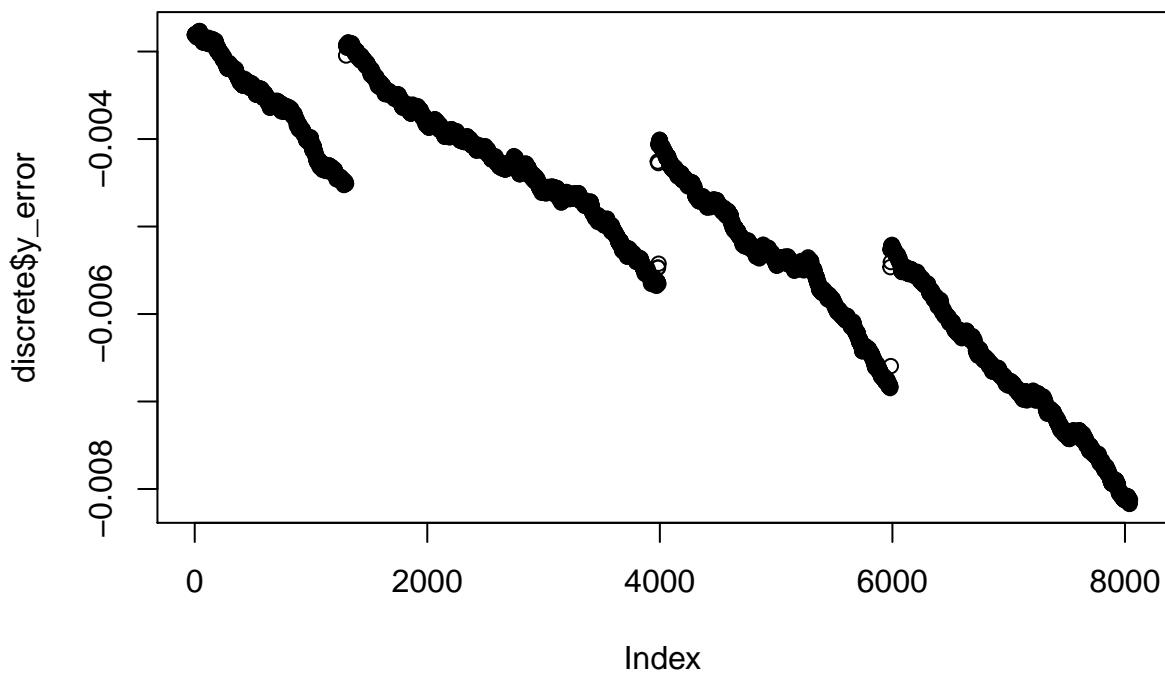
Discrete x_error over time



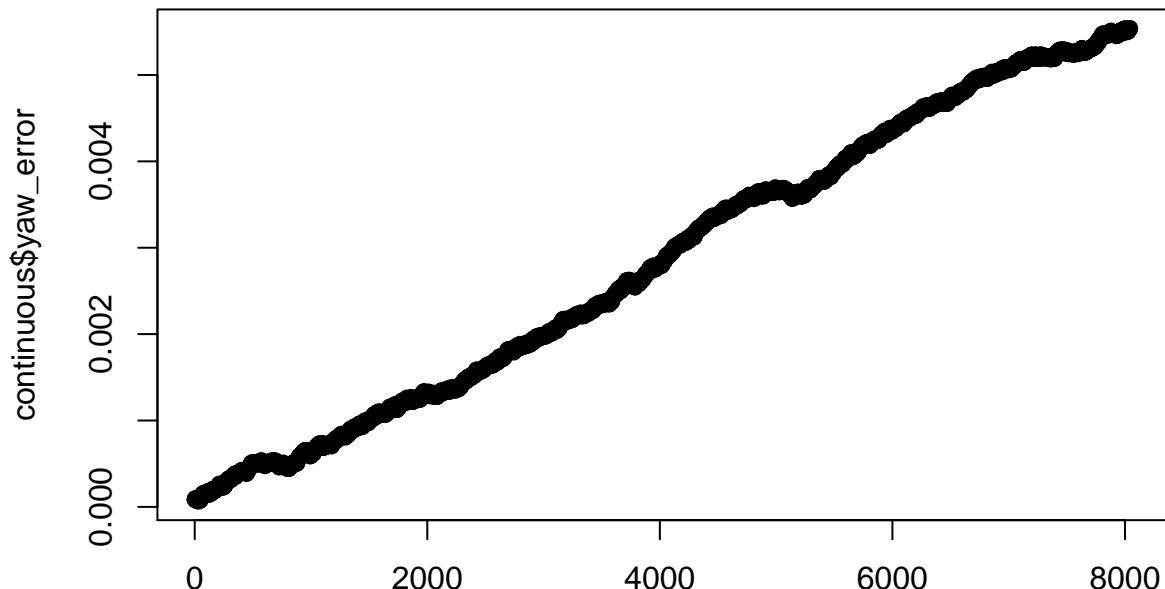
Continuous y_error over time



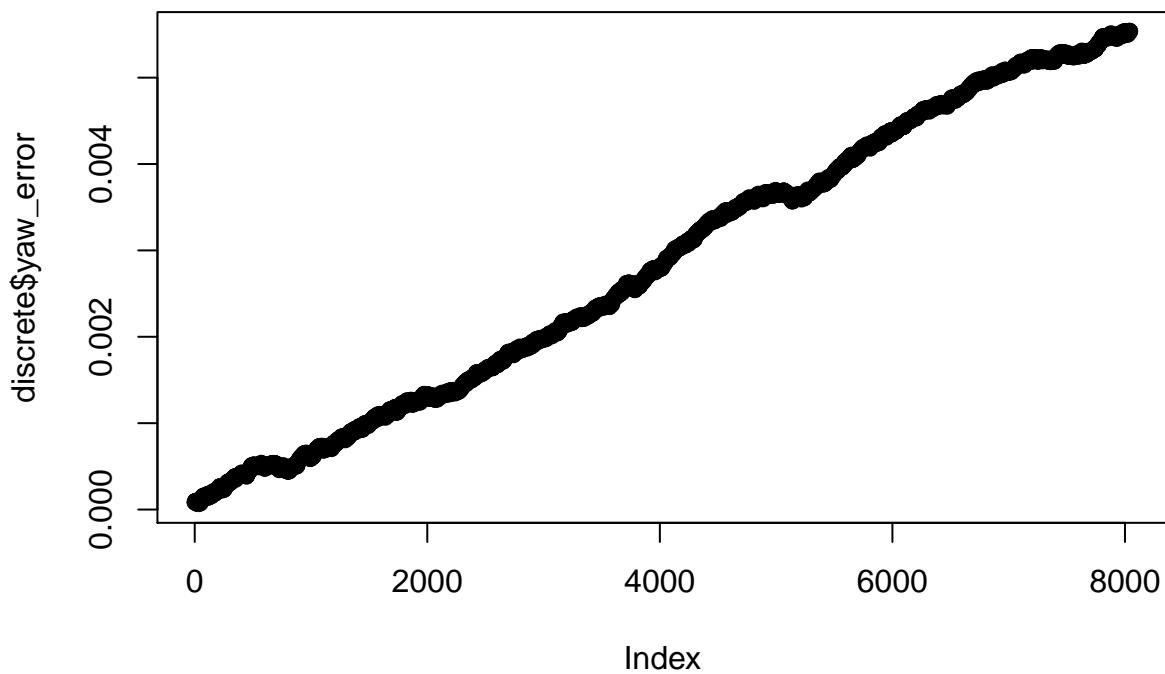
Discrete y_error over time



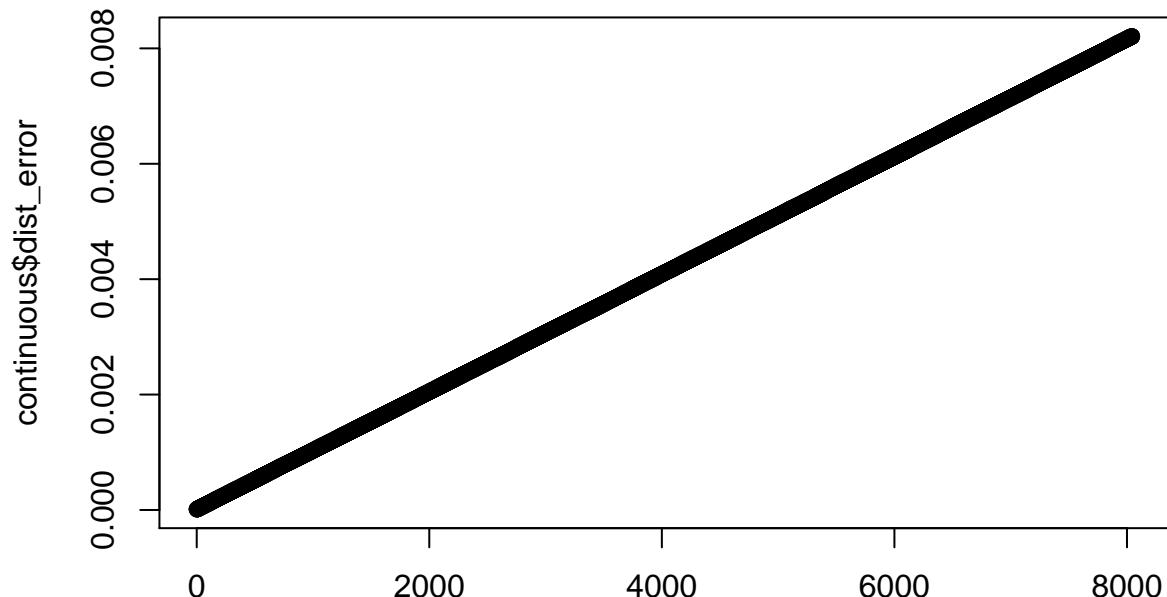
Continuous yaw error over time



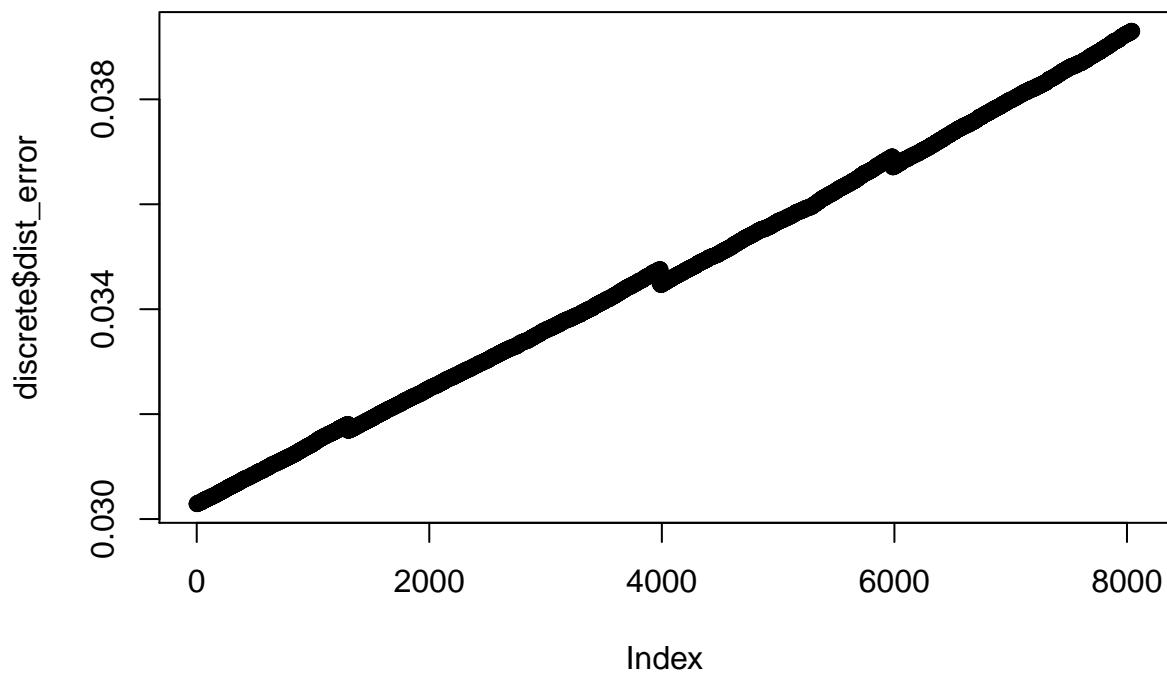
Discrete yaw error over time



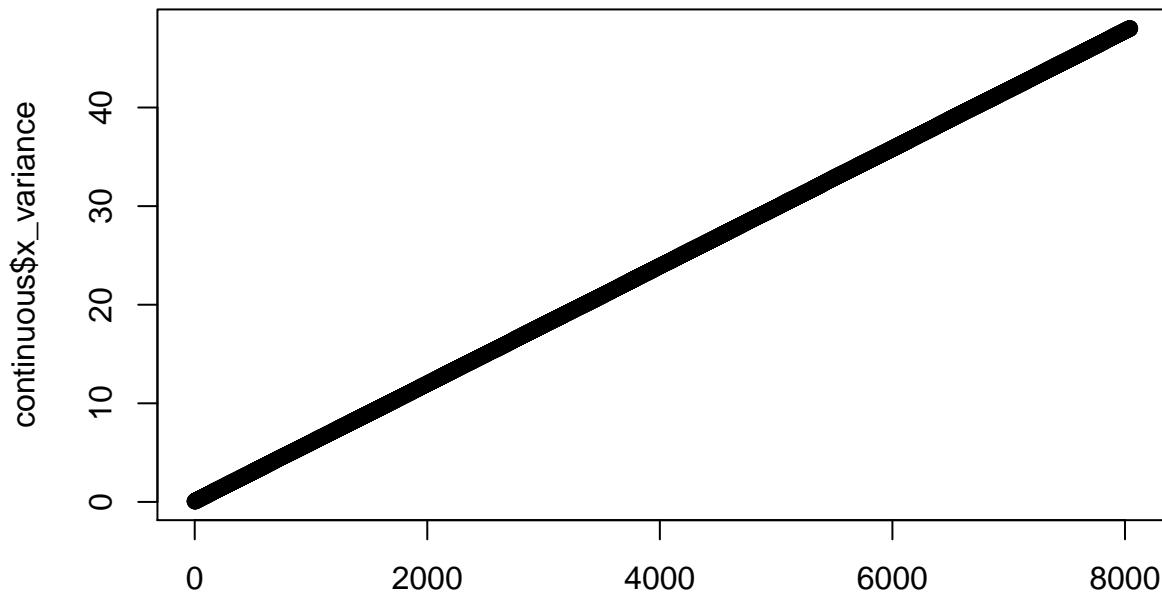
Continuous total distance error over time



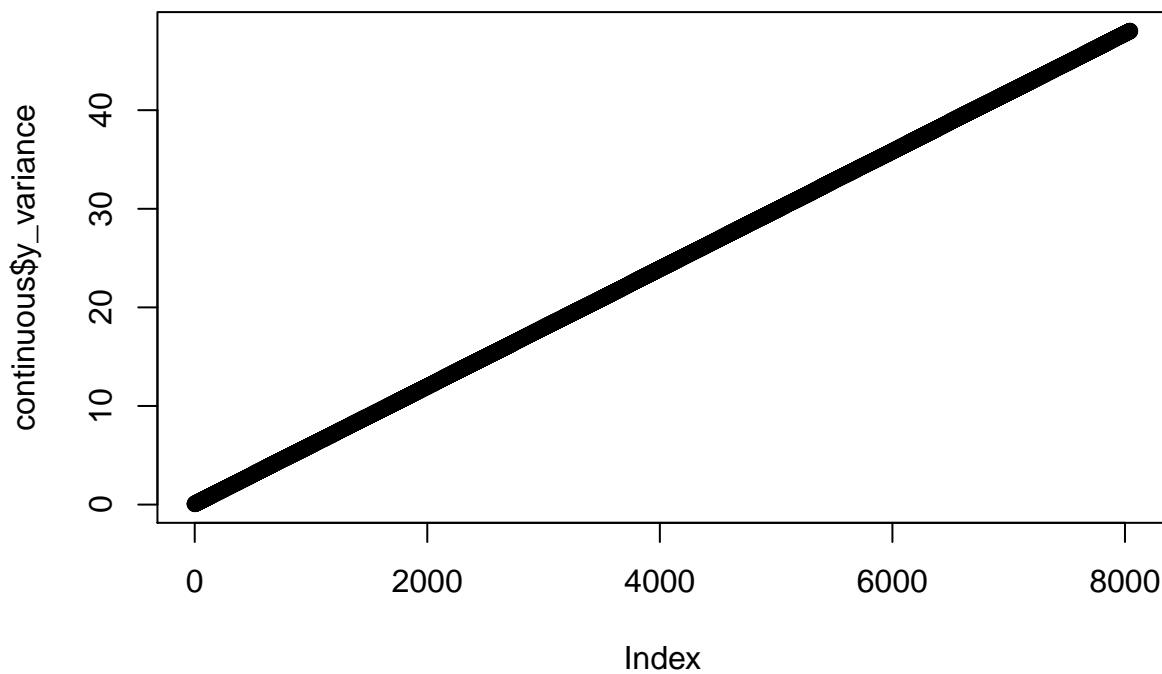
Discrete total distance error over time



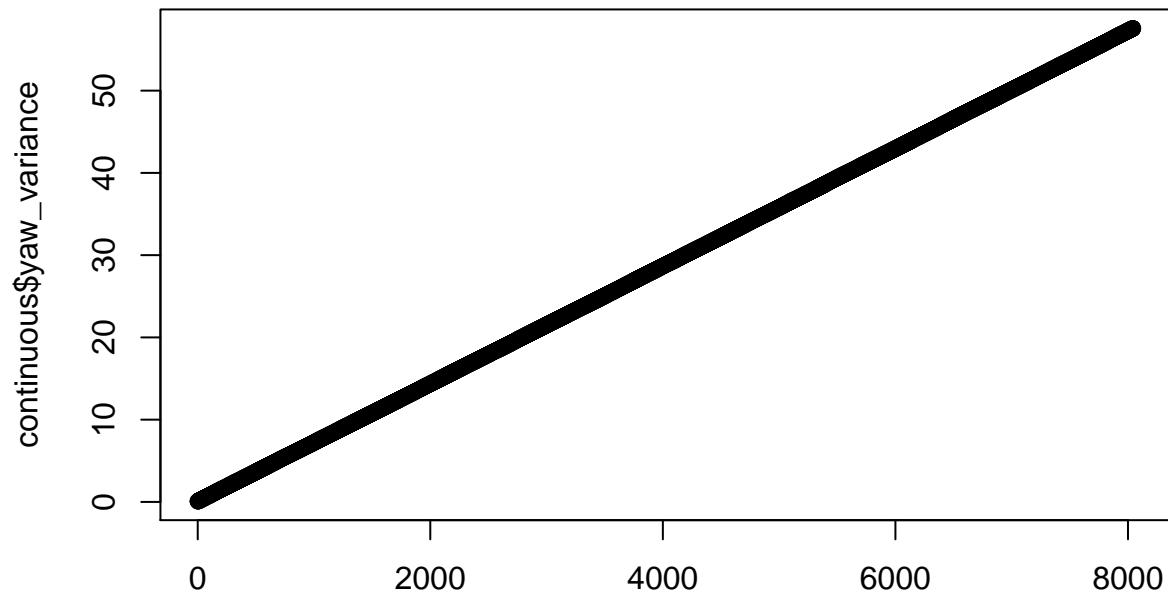
Continuous Filter X Variance Over Time



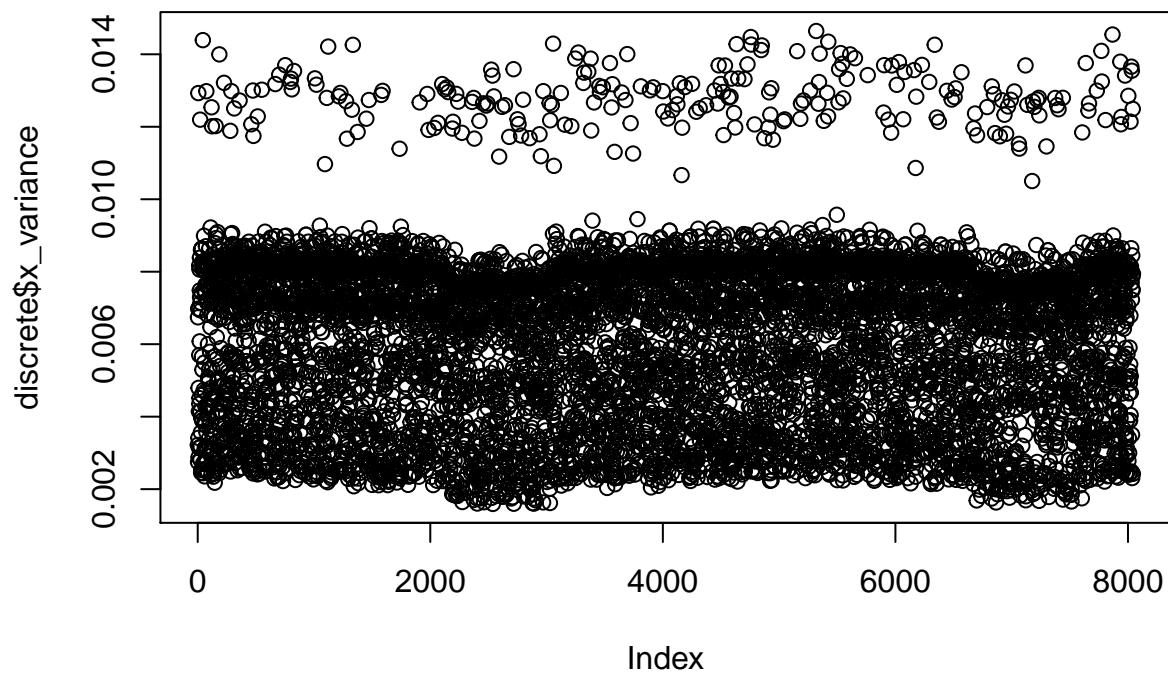
Continuous Filter Y Variance Over Time



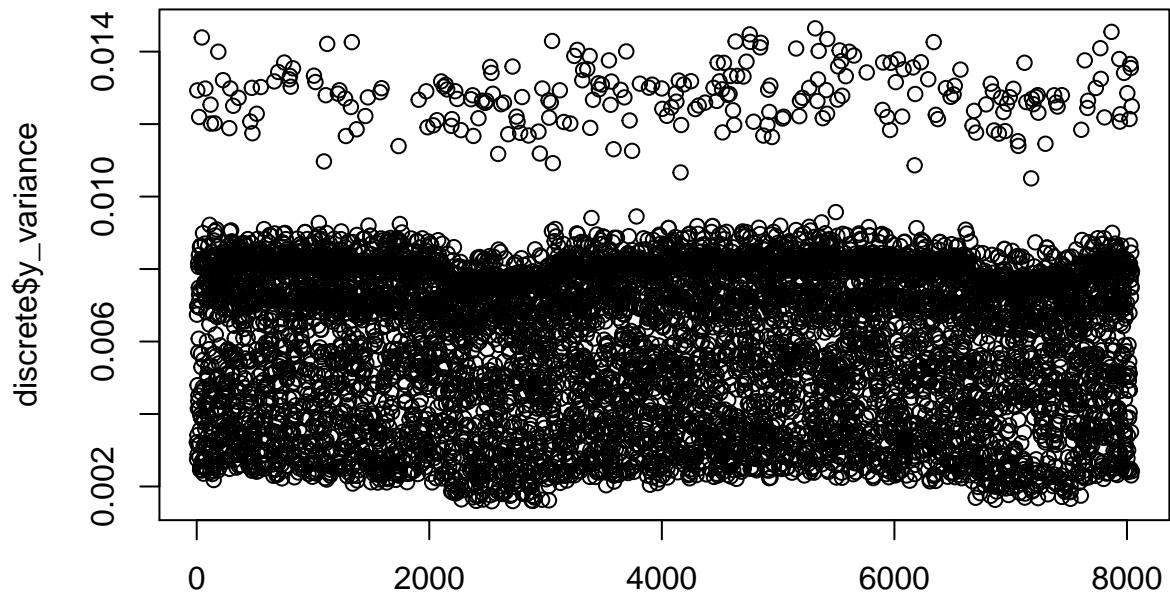
Continuous Filter Yaw Variance Over Time



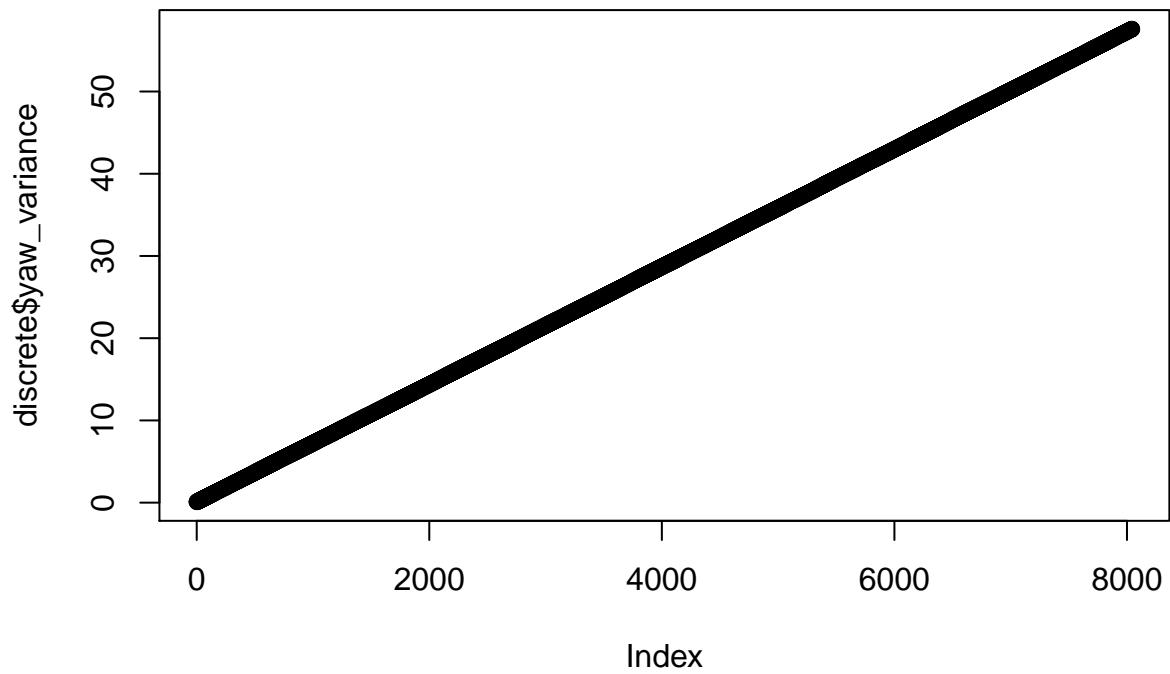
Discrete Filter X Variance Over Time



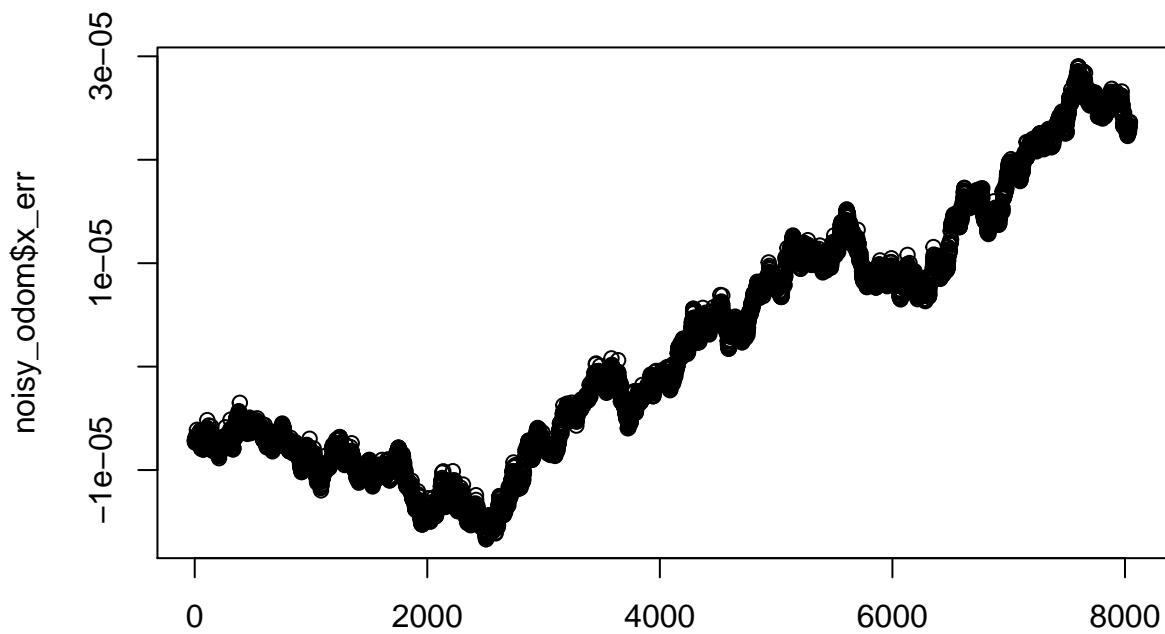
Discrete Filter Y Variance Over Time



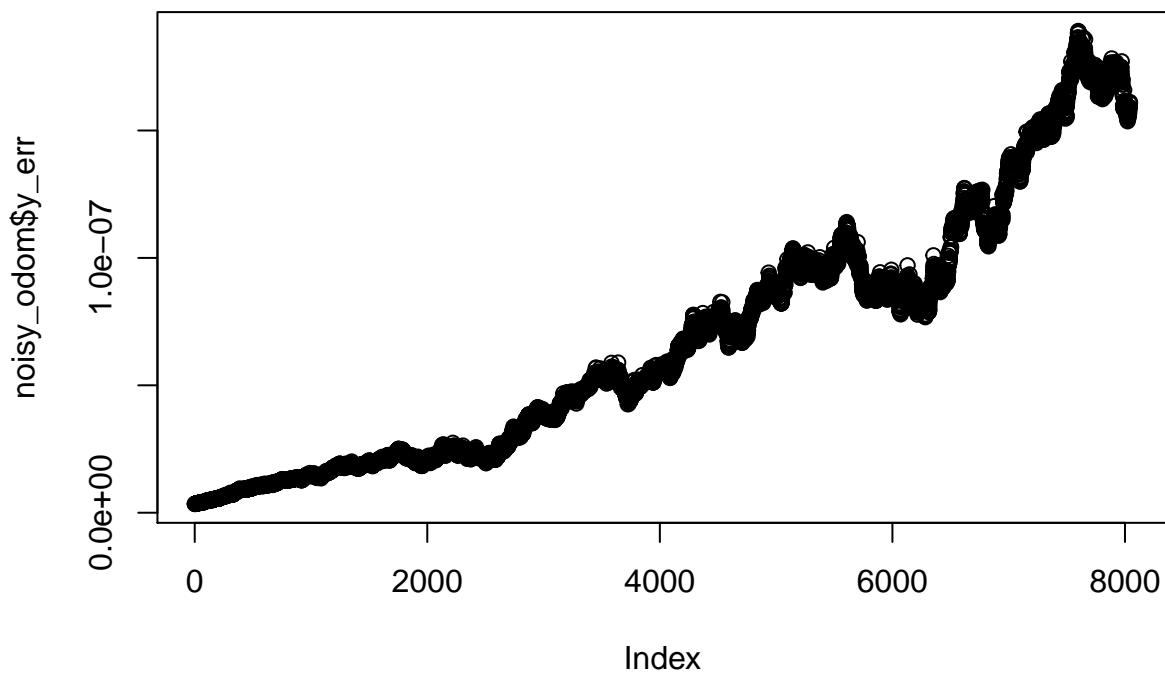
Discrete Filter Yaw Variance Over Time



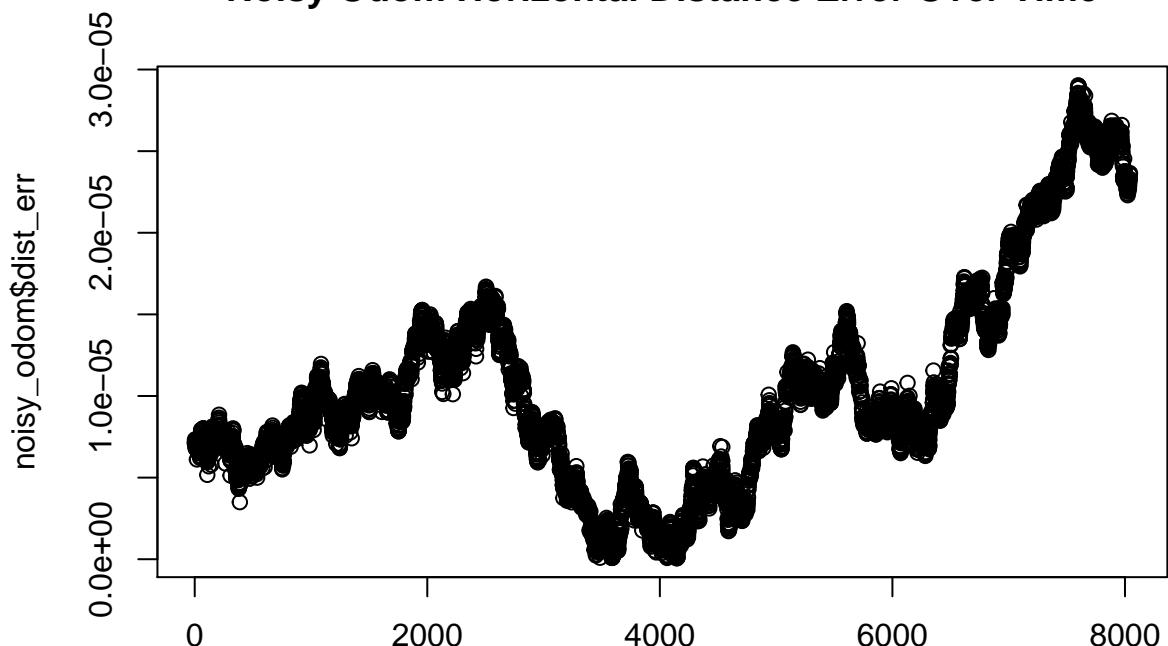
Noisy Odom X Error Over Time



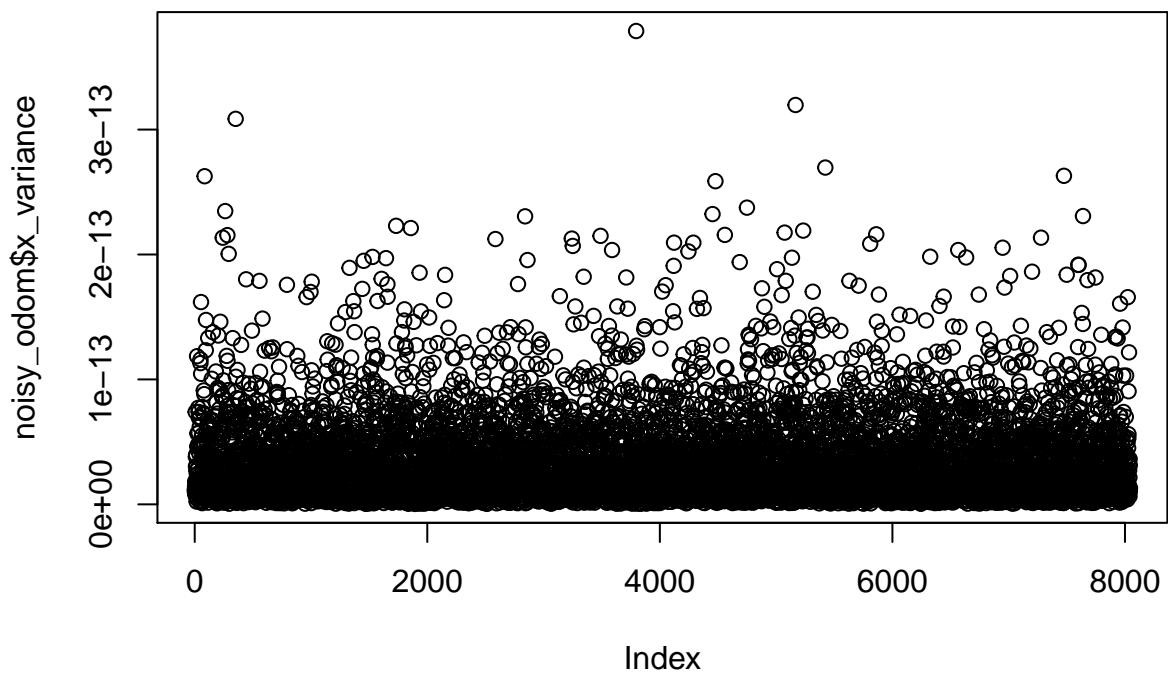
Noisy Odom Y Error Over Time



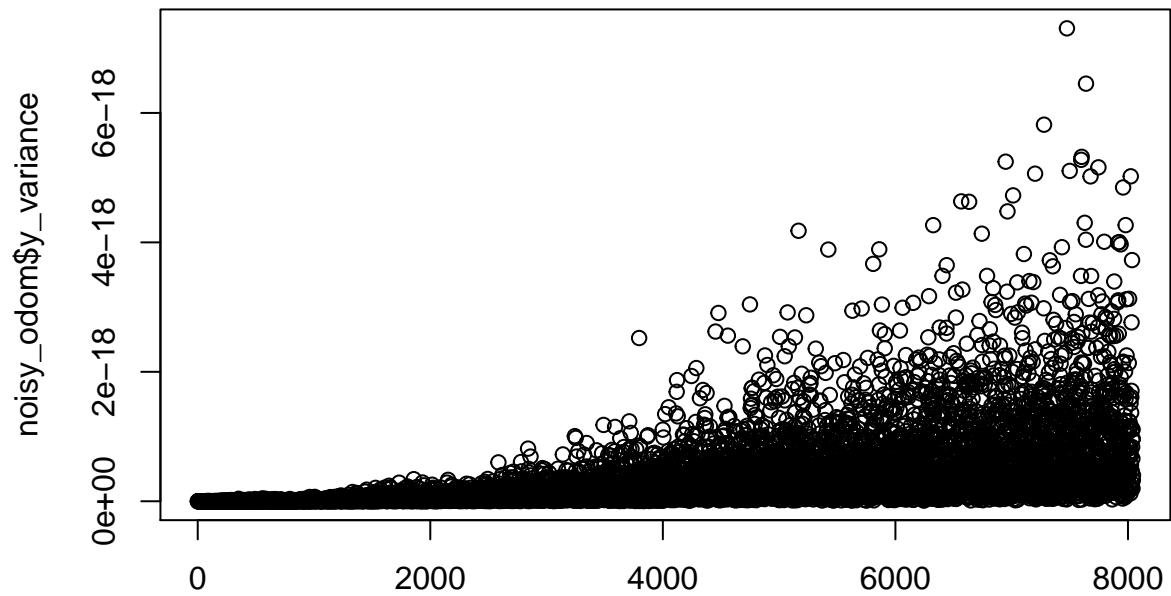
Noisy Odom Horizontal Distance Error Over Time



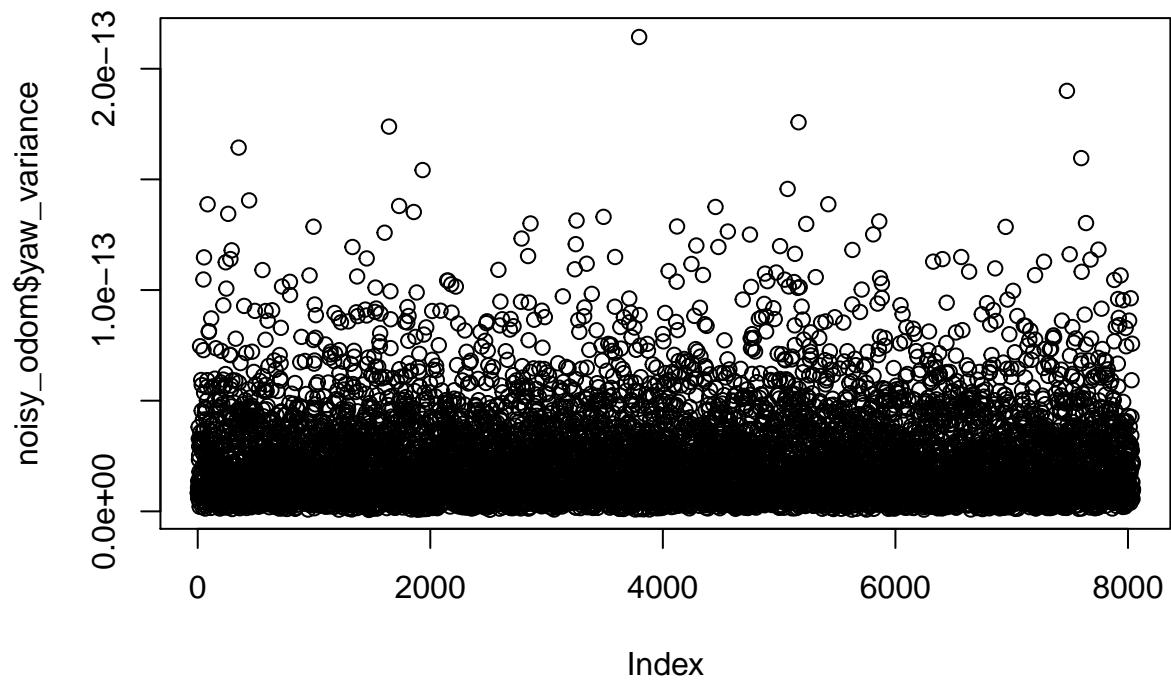
Variance of X Coordinate in Noisy Odometry



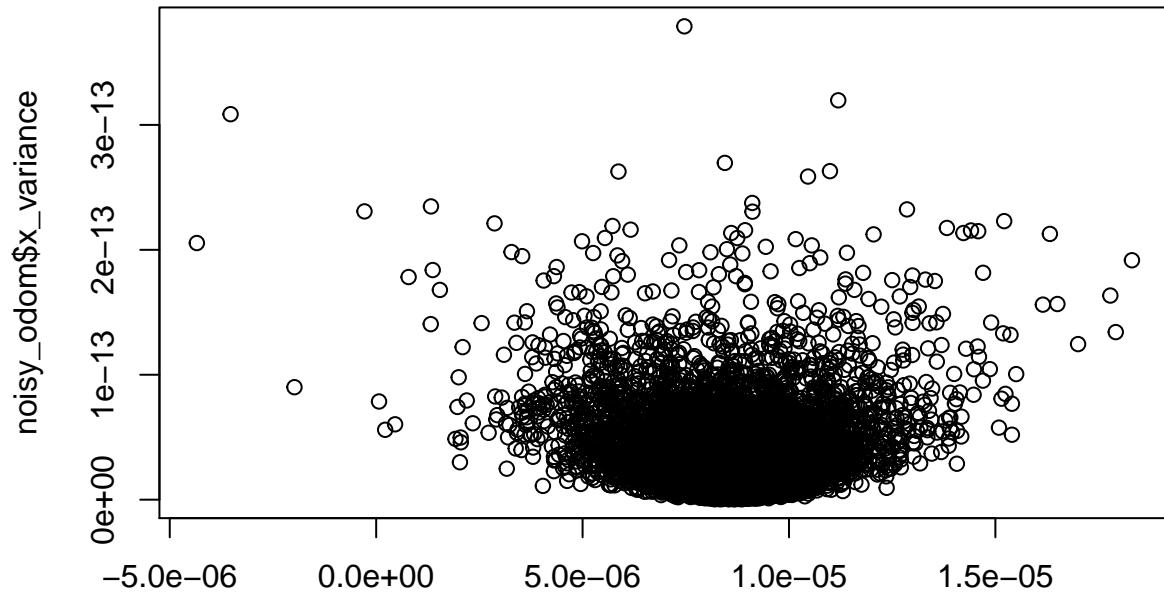
Variance of Y Coordinate in Noisy Odometry



Variance of Yaw Coordinate in Noisy Odometry



Variance vs. Velocity of X in Noisy Odometry



Variance vs. Velocity of Yaw in Noisy Odometry

