

two_stationary_noiseless Turtlebot 1 Report

Matthew Swartwout

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

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 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. 
## 1.531e-05 2.065e-03 4.119e-03 4.118e-03 6.176e-03 8.219e-03
```

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

```
##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max. 
## -2.270e-10 1.729e-06 6.171e-06 7.989e-06 1.338e-05 2.318e-05
```

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

```
##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max. 
## -1.327e-05 1.531e-03 2.827e-03 2.826e-03 4.189e-03 5.255e-03
```

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

```
##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max. 
## 1.531e-05 2.065e-03 4.119e-03 4.118e-03 6.176e-03 8.219e-03
```

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

```
##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max. 
## 7.610e-06 2.774e-05 4.837e-05 4.874e-05 6.974e-05 9.154e-05
```

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

```
##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max. 
## -2.268e-10 5.010e-08 1.089e-07 1.367e-07 2.028e-07 4.723e-07
```

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

```
##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max. 
## -5.100e-05 1.105e-05 2.901e-05 3.273e-05 5.139e-05 1.434e-04
```

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

```
##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max. 
## 7.610e-06 2.774e-05 4.837e-05 4.874e-05 6.974e-05 9.154e-05
```

```
summary(noisy_odom$x_err)
```

```
##      Min.    1st Qu.     Median      Mean    3rd Qu.      Max. 
## -1.350e-05 -4.844e-06 1.100e-06 -6.175e-07 2.897e-06 7.106e-06
```

```

summary(noisy_odom$y_err)

##      Min.   1st Qu.    Median     Mean   3rd Qu.   Max.
## -5.302e-07 -4.217e-07 -2.663e-07 -2.724e-07 -1.423e-07 -4.605e-09

summary(noisy_odom$dist_err)

##      Min.   1st Qu.    Median     Mean   3rd Qu.   Max.
## 3.196e-08 1.696e-06 3.305e-06 3.896e-06 5.274e-06 1.351e-05

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

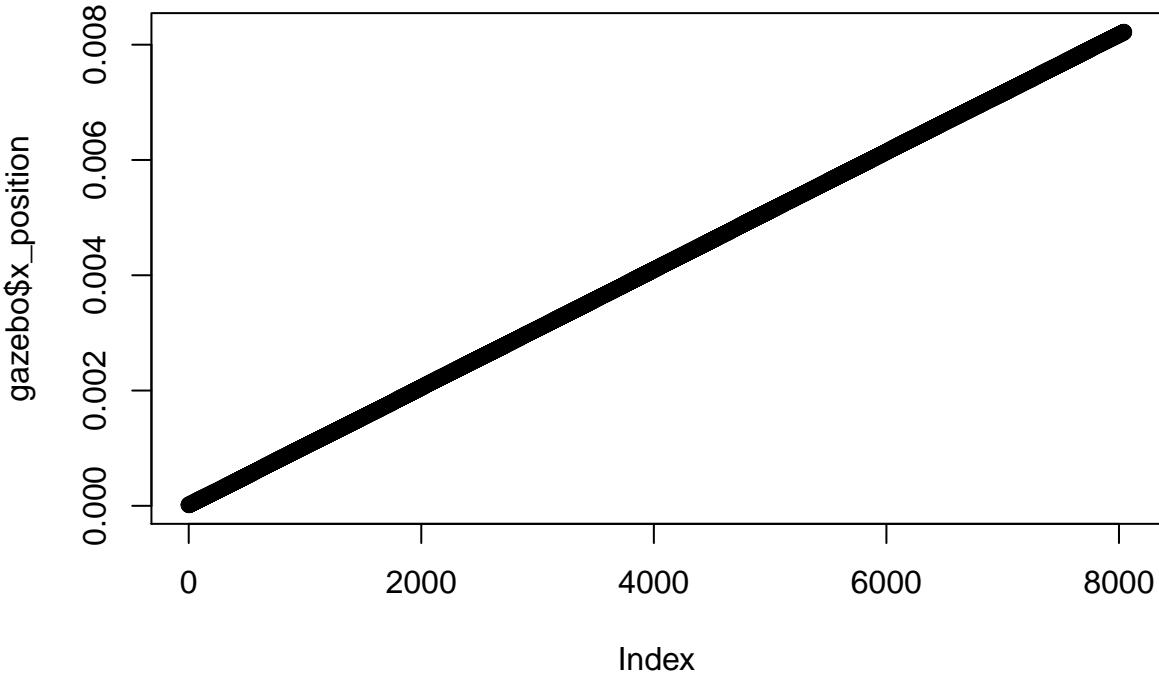
##      Min.   1st Qu.    Median     Mean   3rd Qu.   Max.
## 8.226e-05 2.114e-03 4.146e-03 4.146e-03 6.177e-03 8.209e-03

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

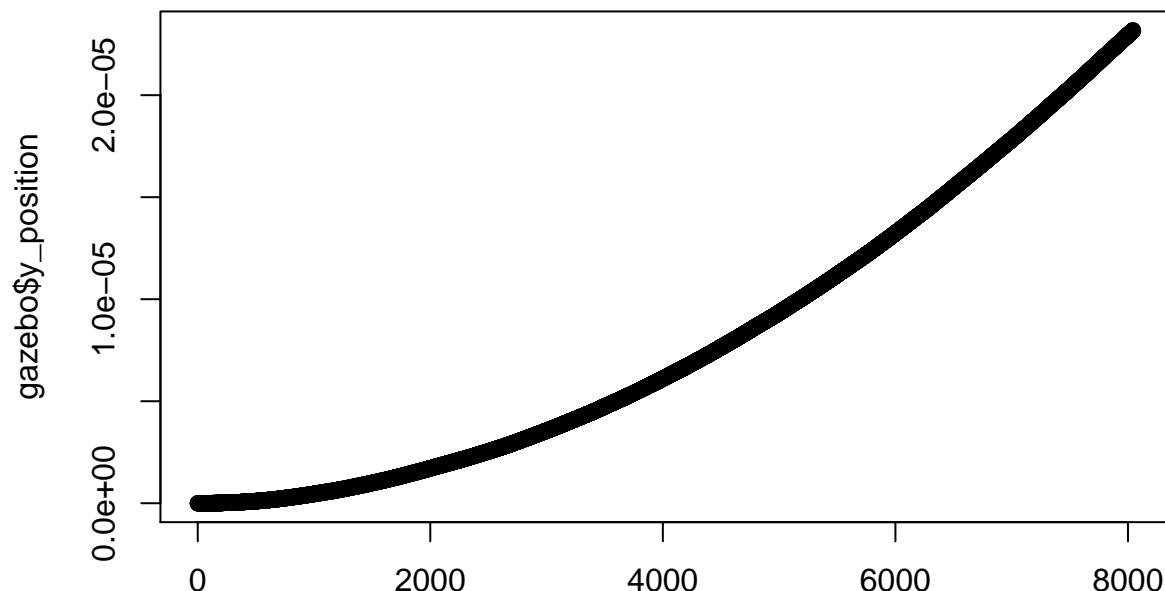
##      Min.   1st Qu.    Median     Mean   3rd Qu.   Max.
## 6.032e-16 9.022e-15 1.878e-14 2.440e-14 3.319e-14 2.259e-13

```

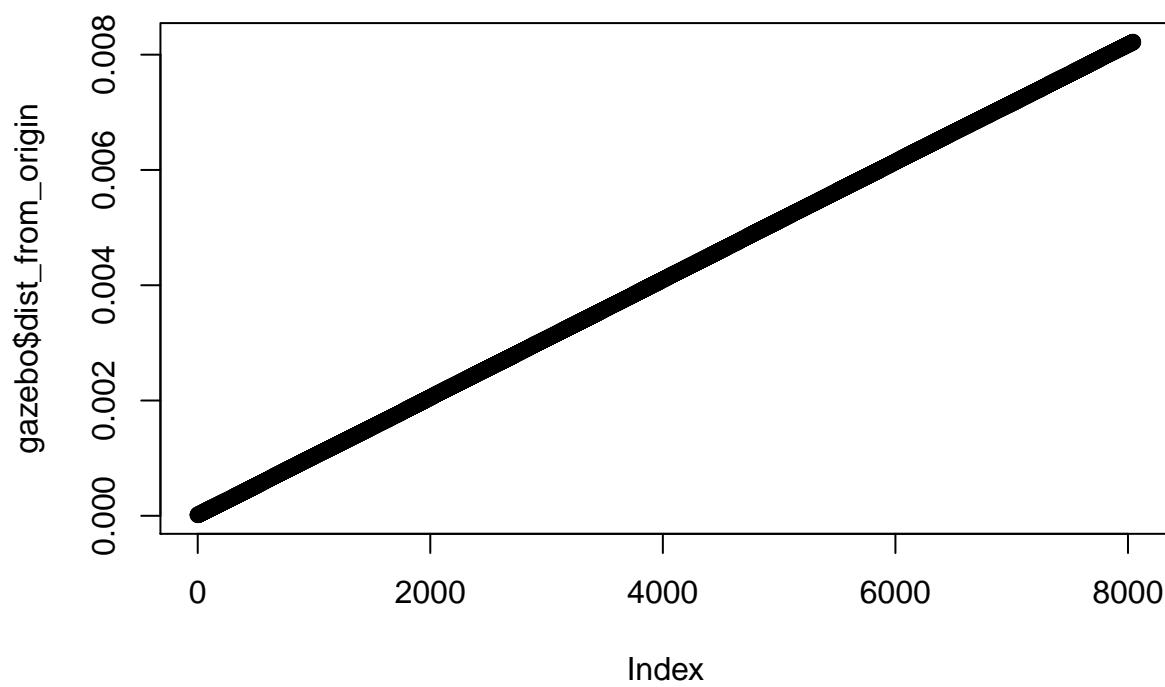
X coordinate of robot over time



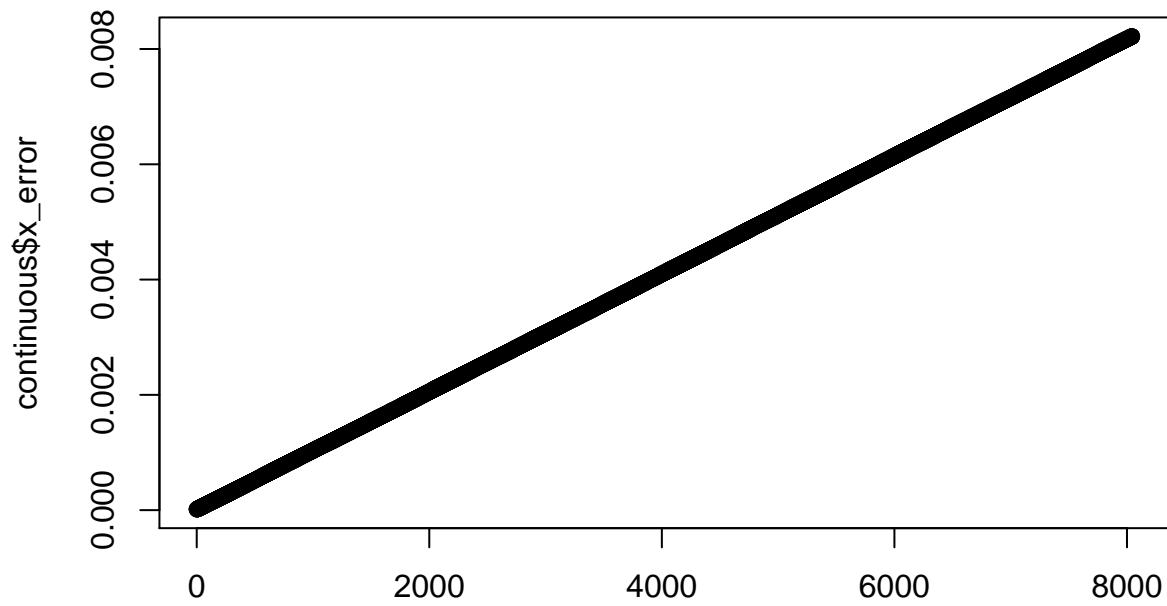
Y coordinate of robot over time



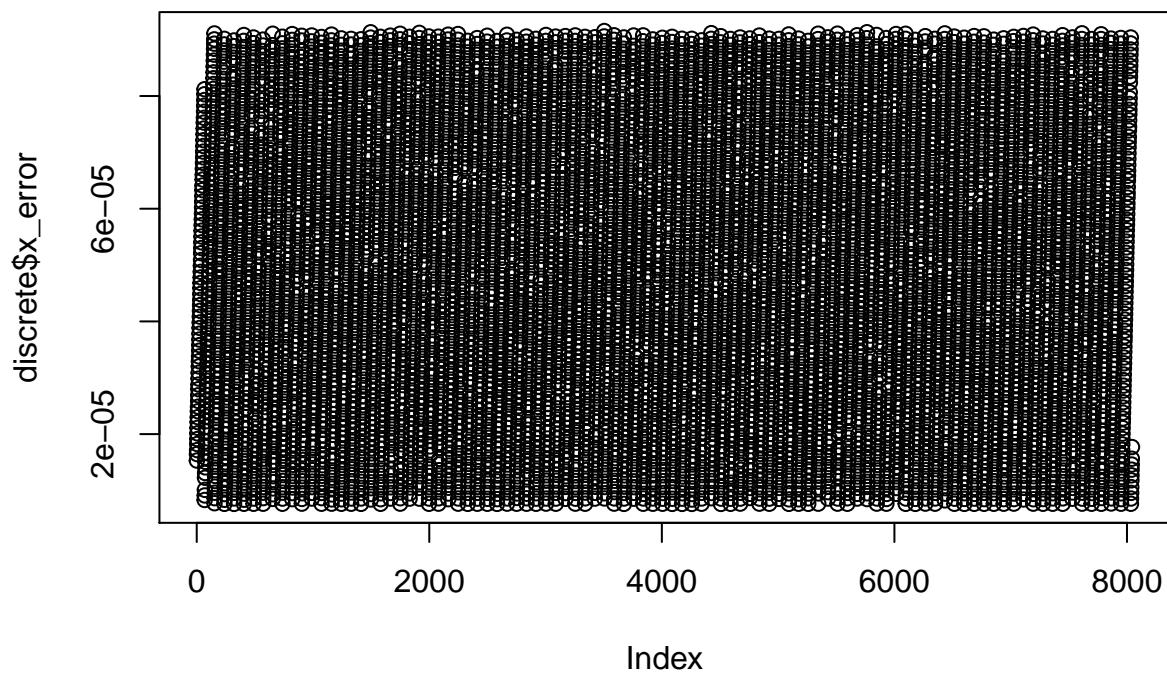
Distance from origin vs. time^{Index}



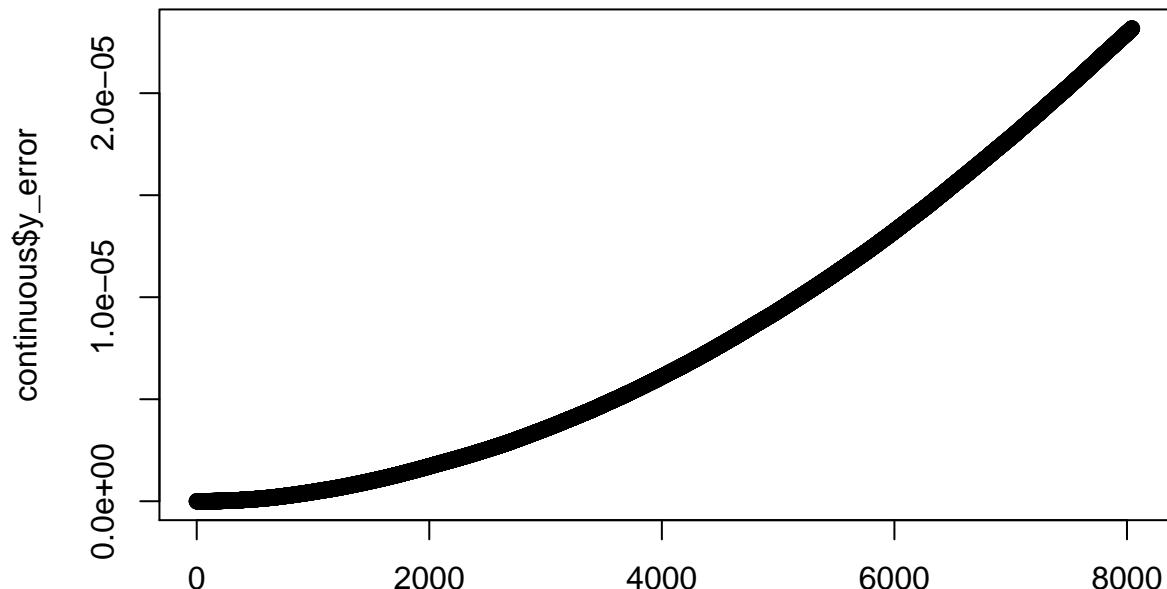
Continuous x_error over time



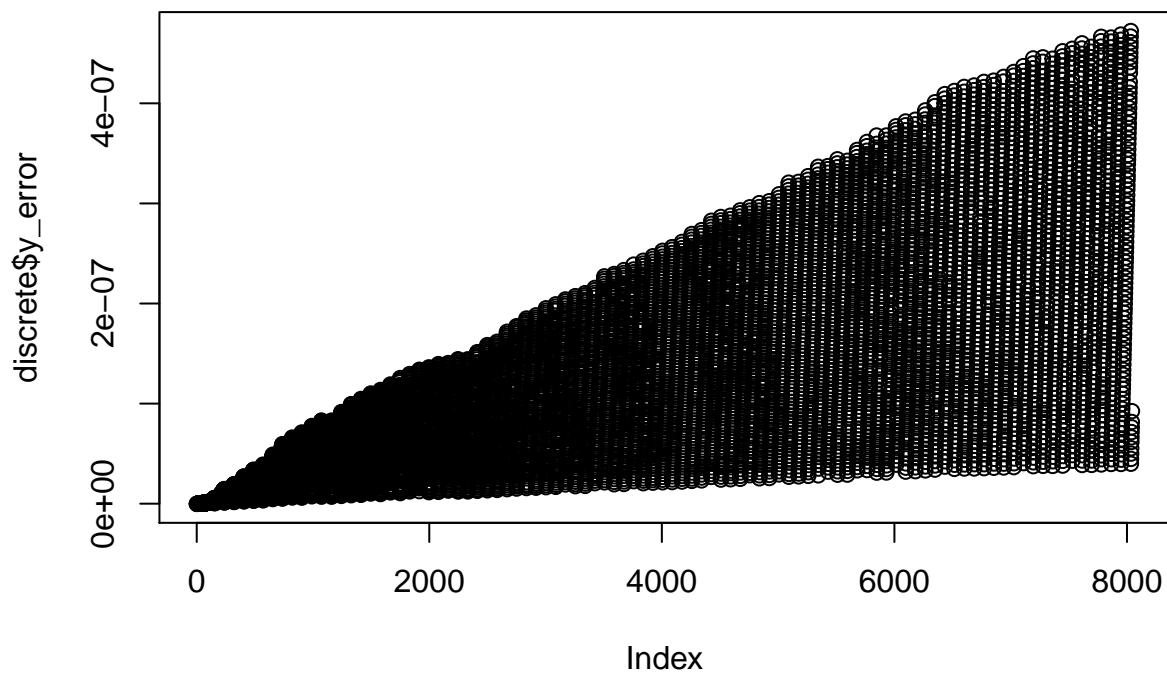
Discrete x_error over time



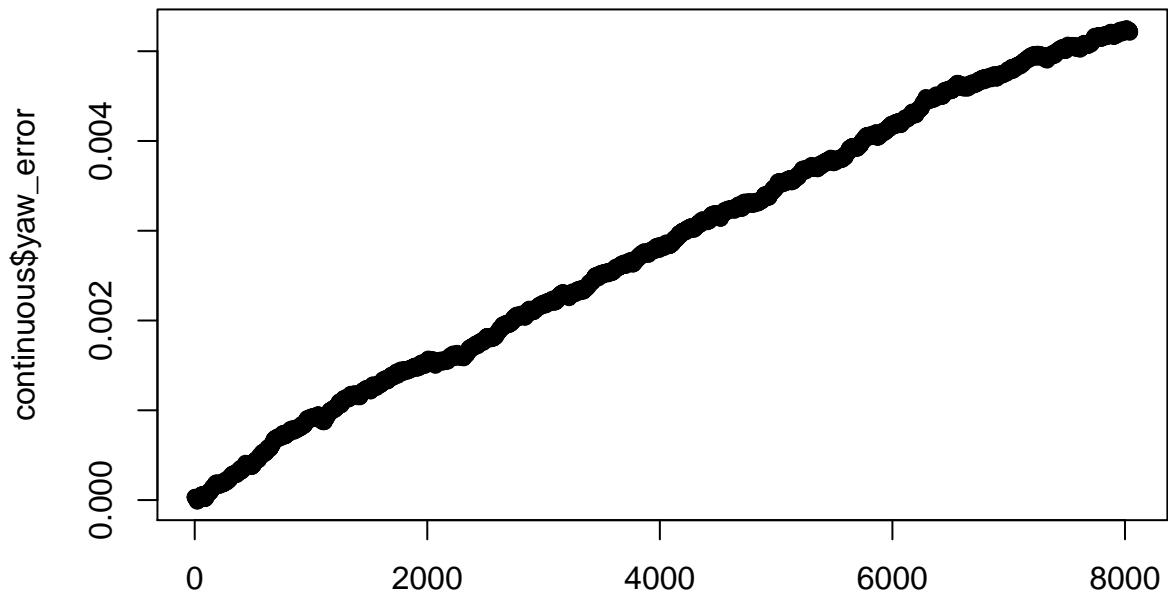
Continuous y_error over time



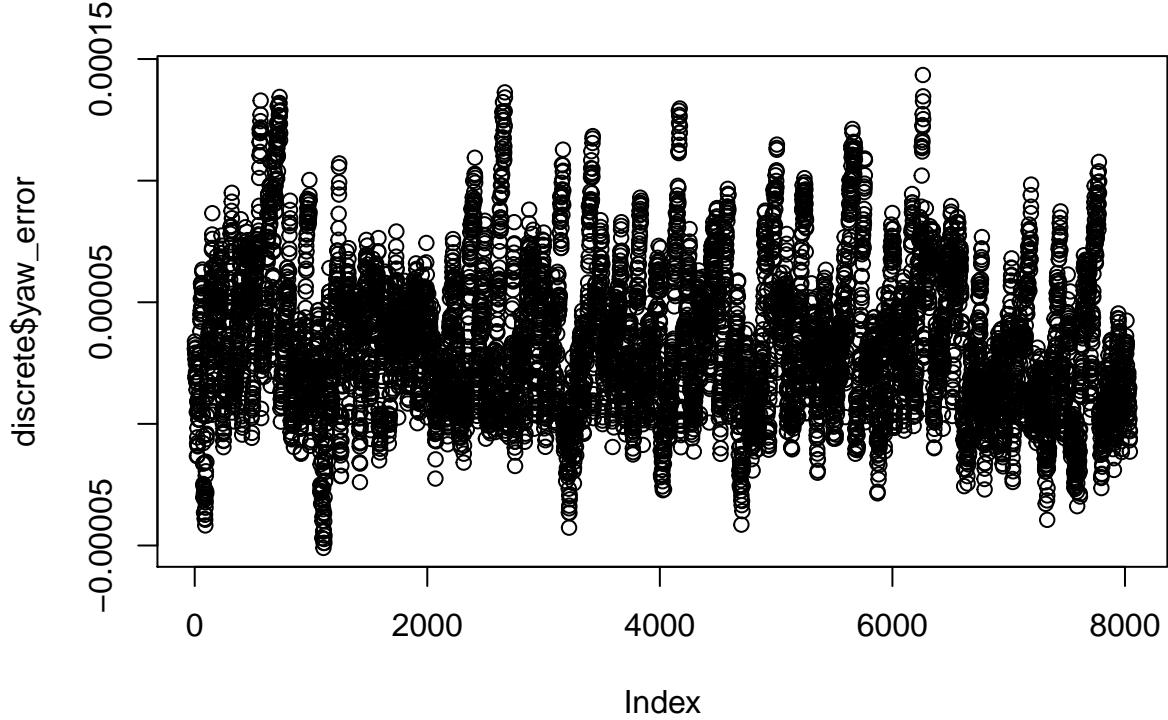
Discrete y_error over time



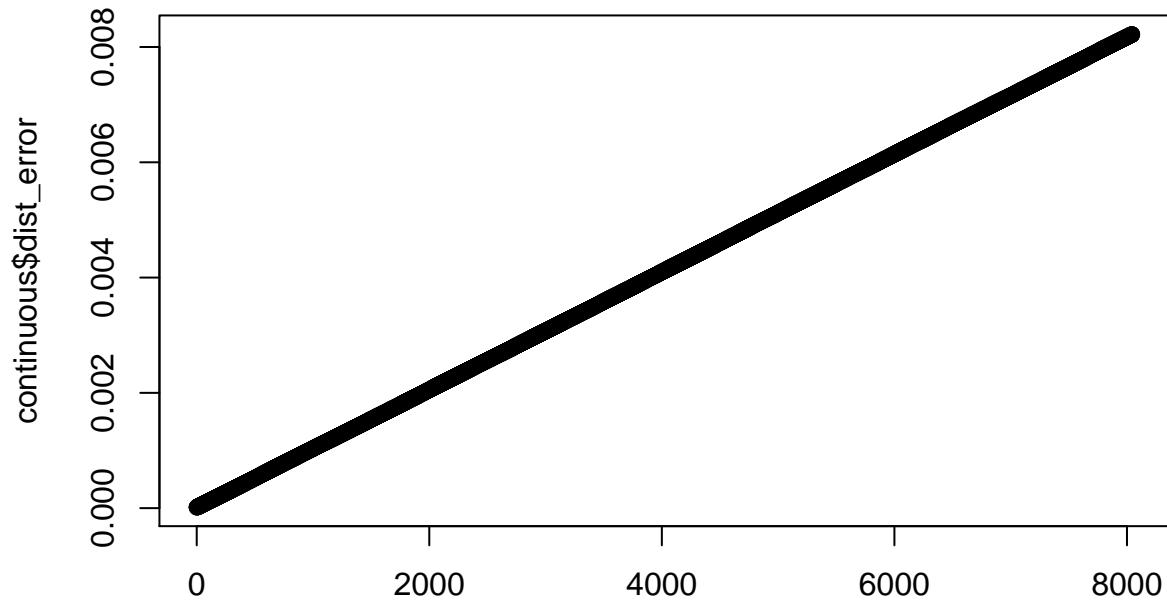
Continuous yaw error over time



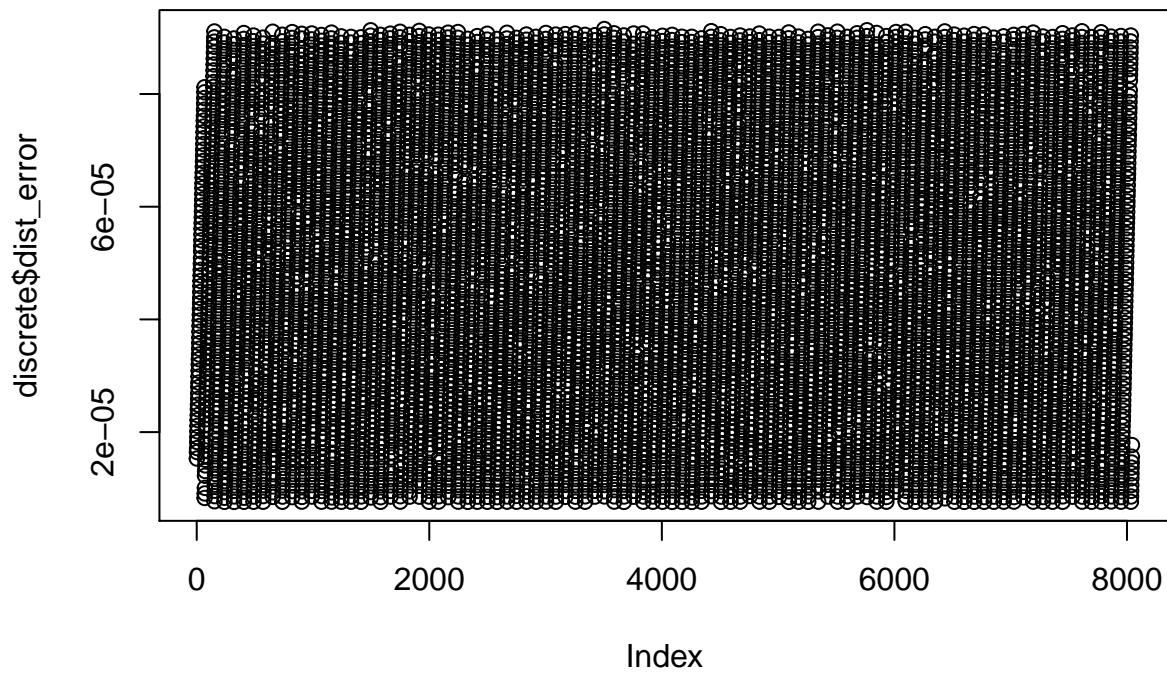
Discrete yaw error over time



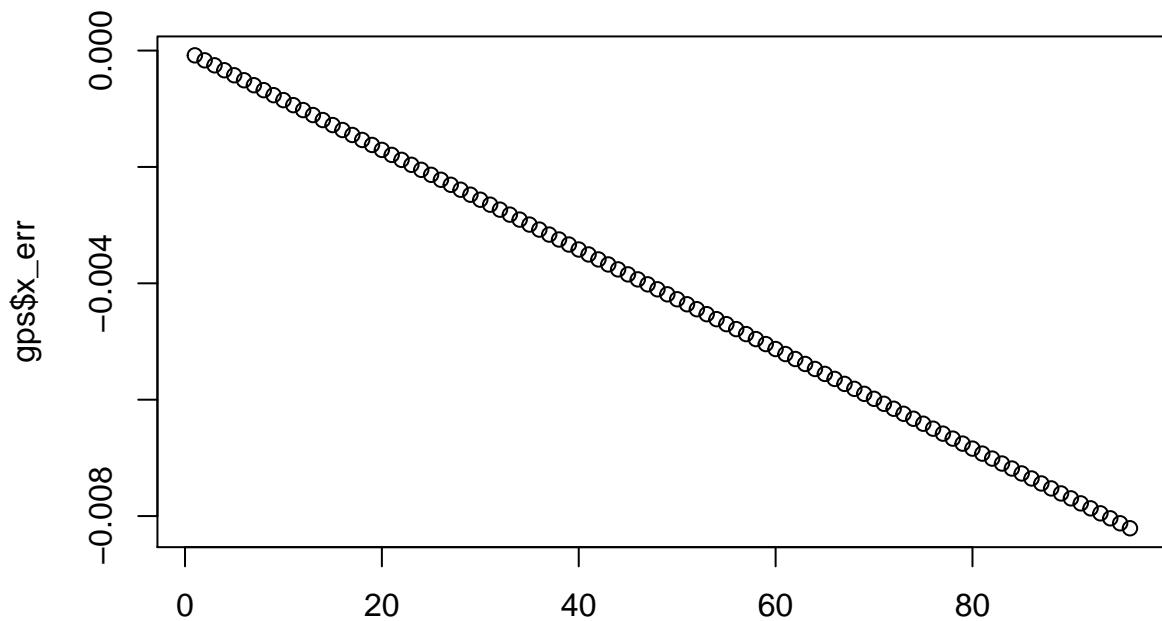
Continuous total distance error over time



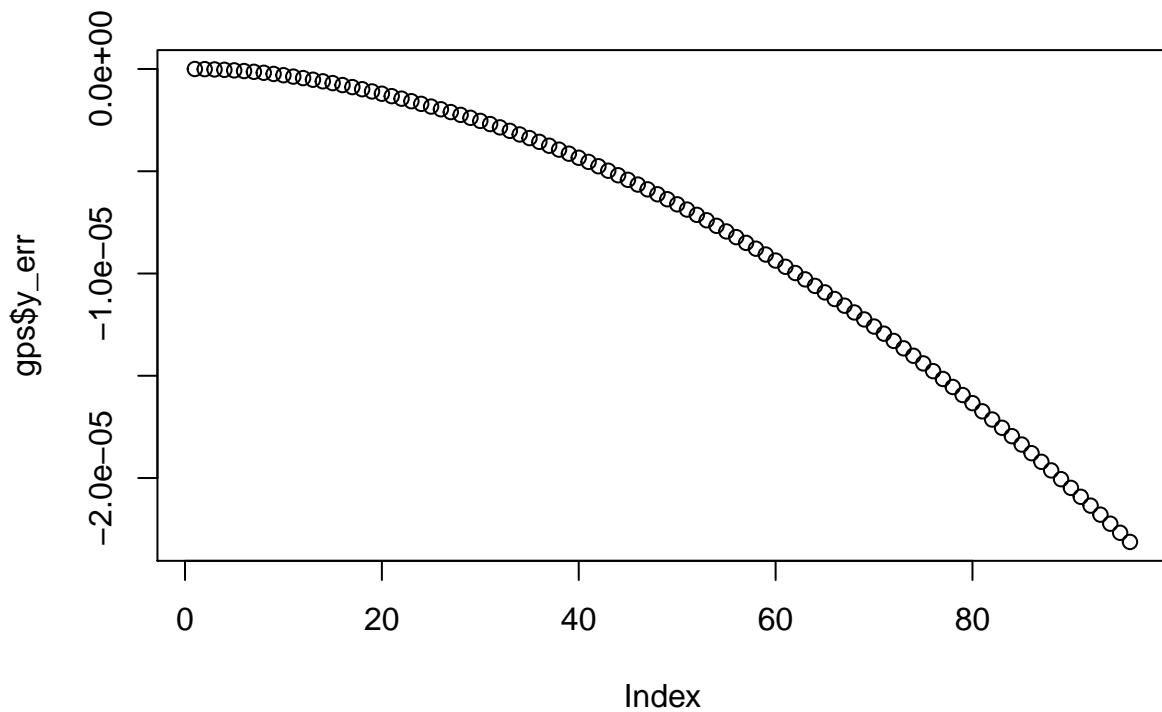
Discrete total distance error over time



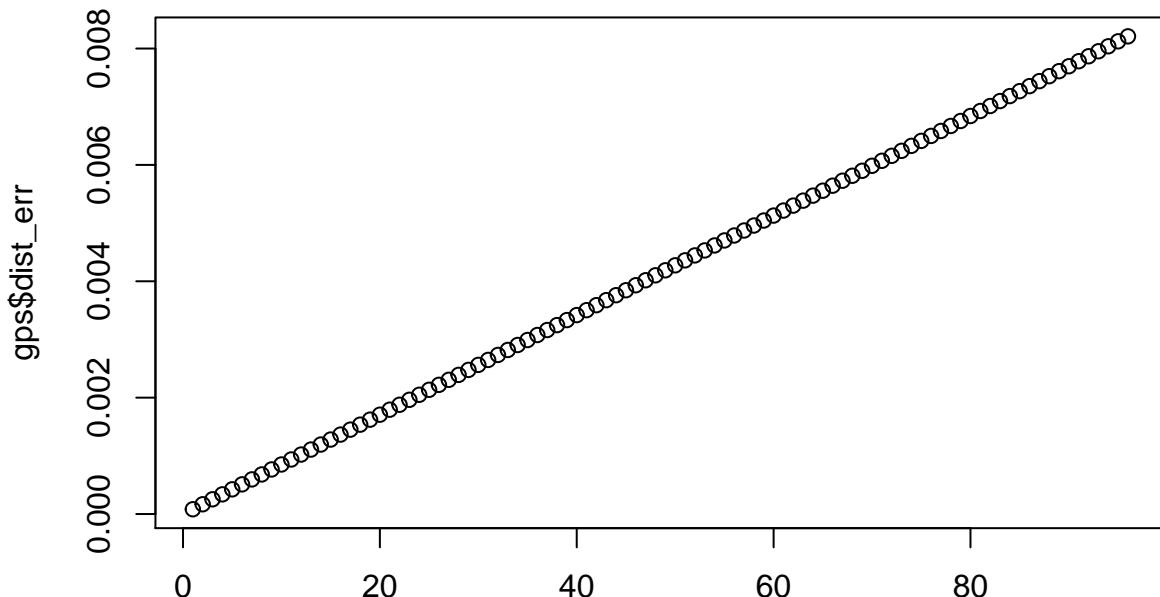
GPS X Error Over Time



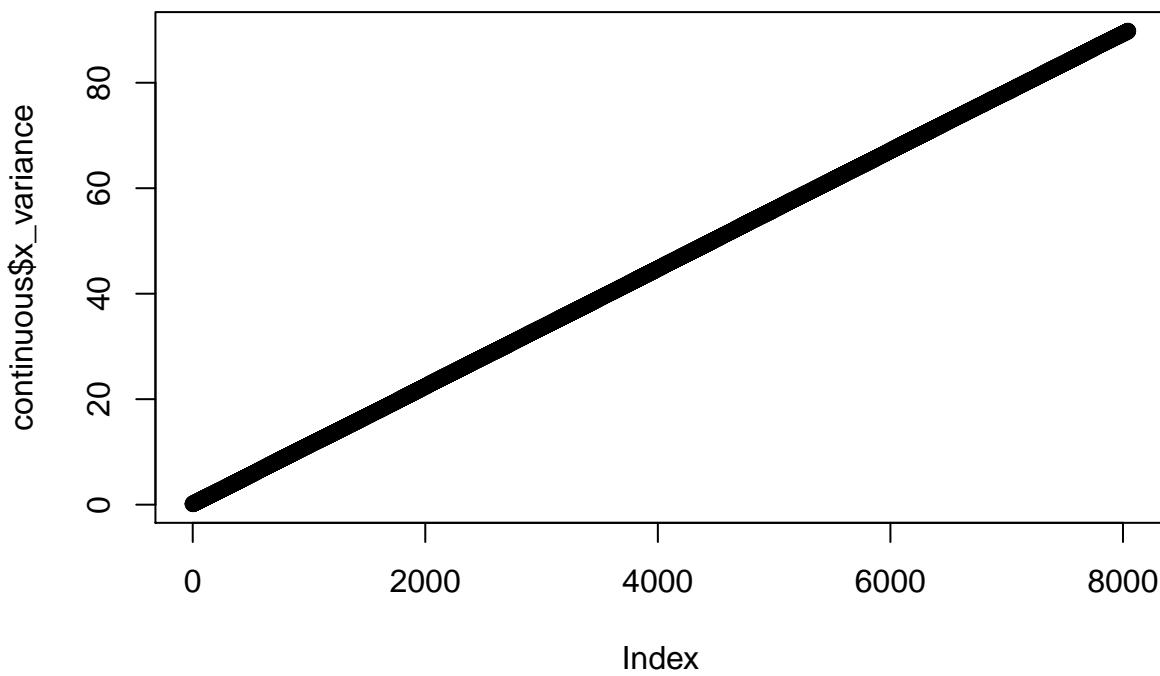
GPS Y Error Over Time



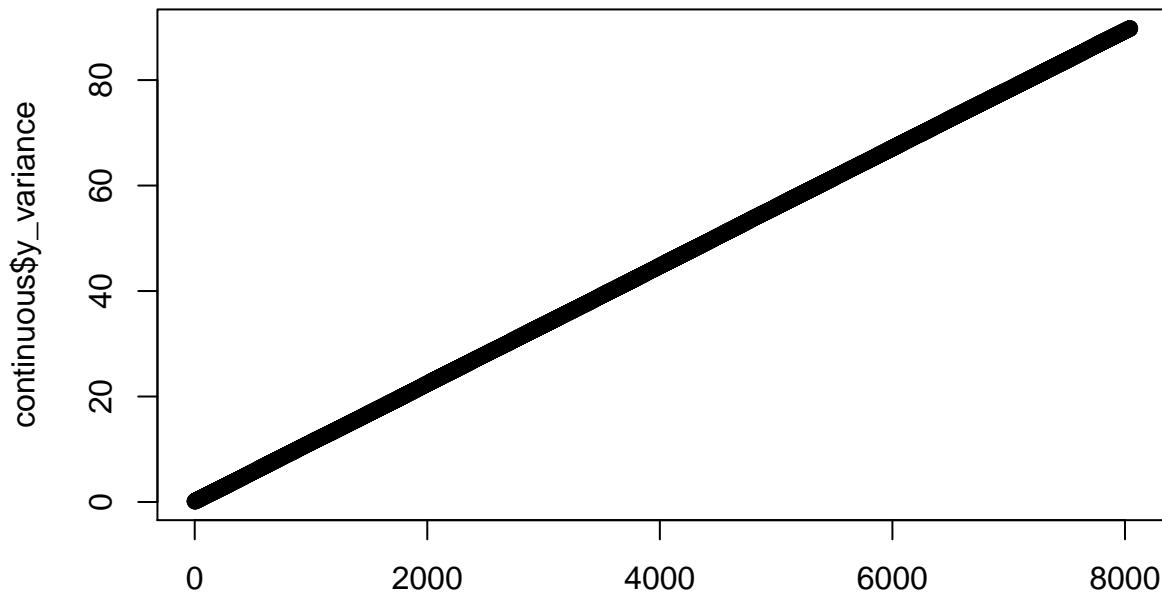
GPS Horizontal Distance Error Over Time



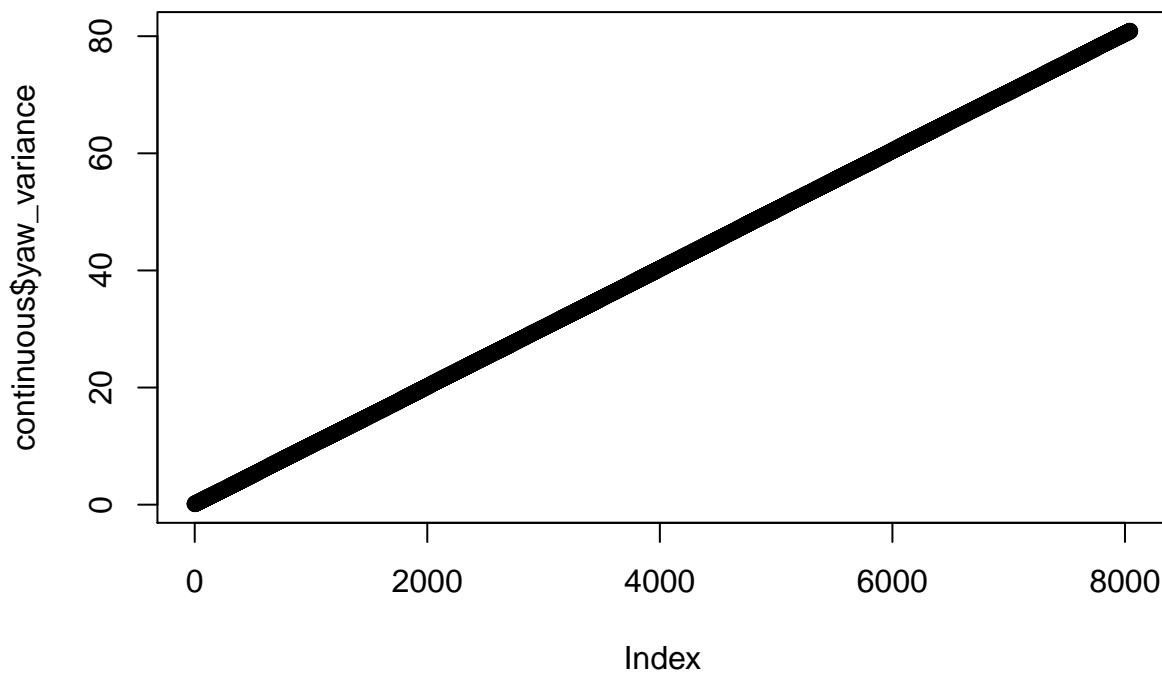
Continuous Filter X Variance Over Time



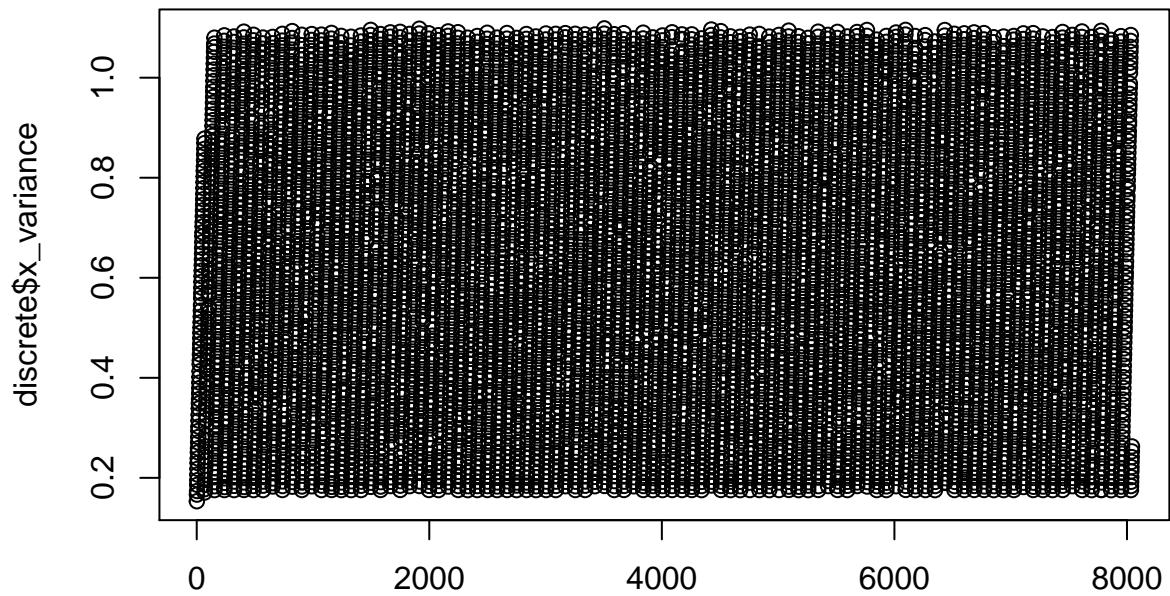
Continuous Filter Y Variance Over Time



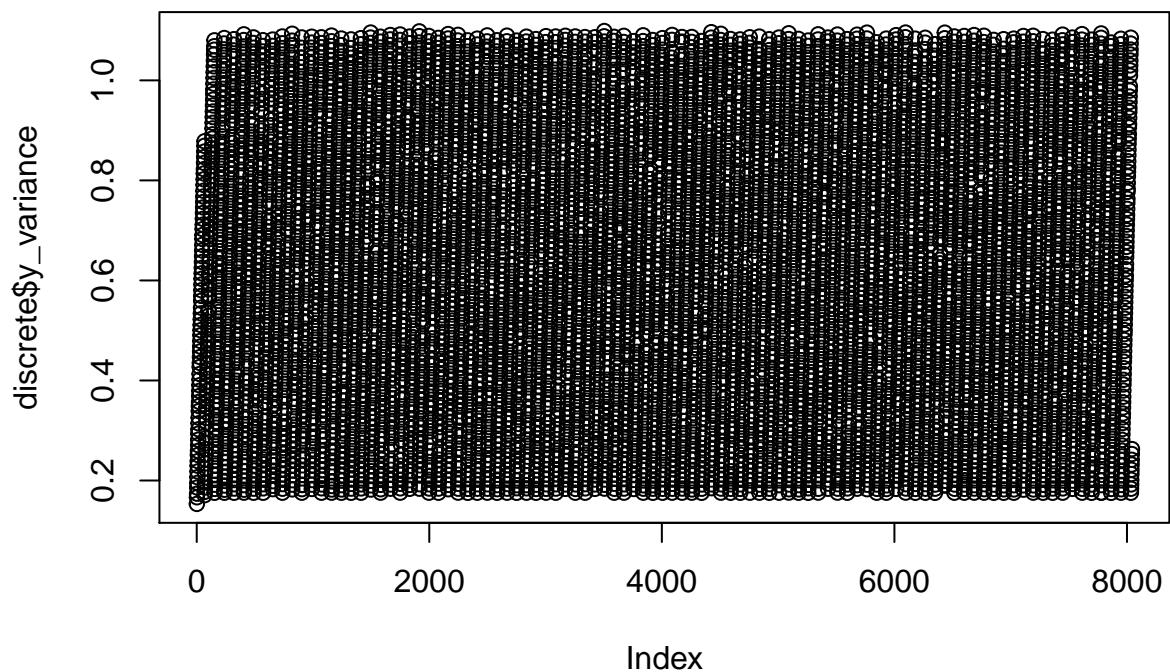
Continuous Filter ^{Index}Yaw Variance Over Time



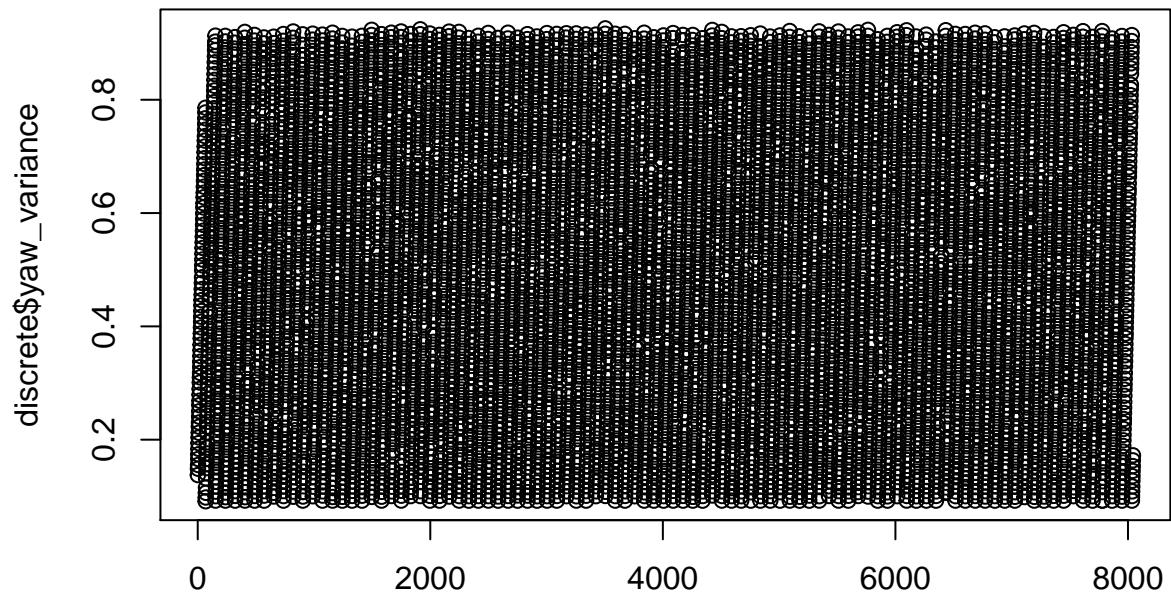
Discrete Filter X Variance Over Time



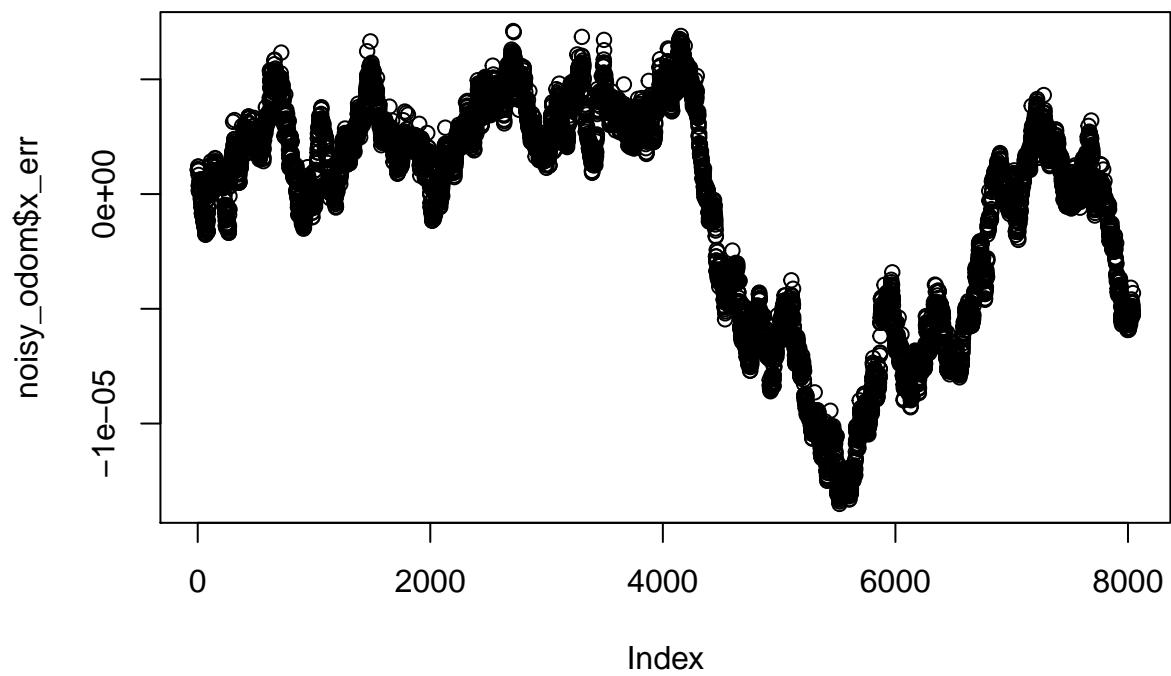
Discrete Filter Y Variance Over Time



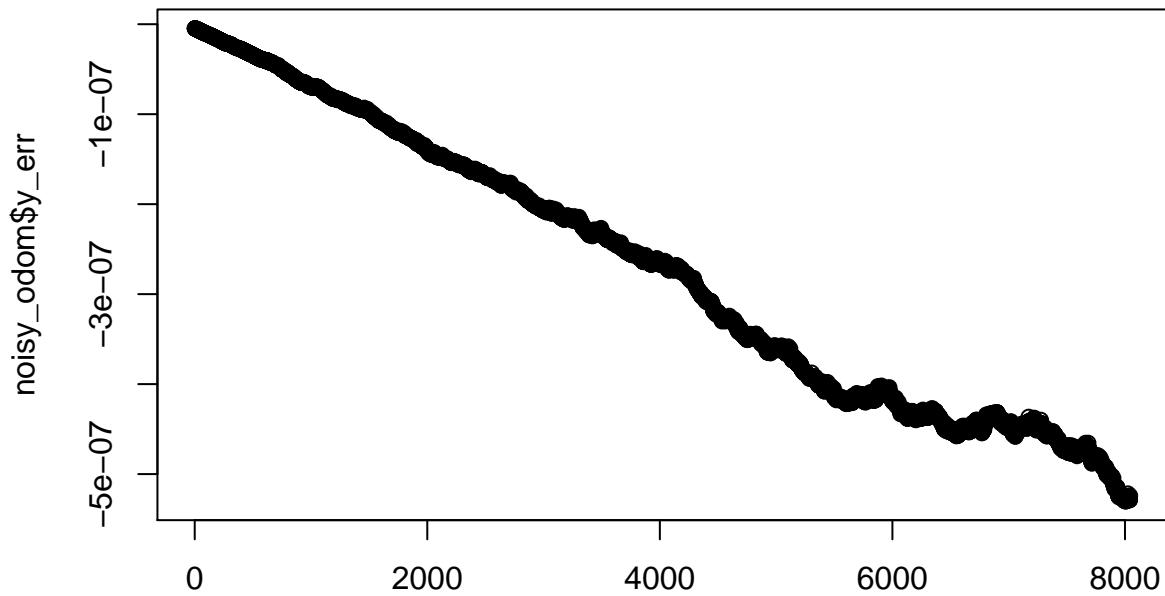
Discrete Filter Yaw Variance Over Time



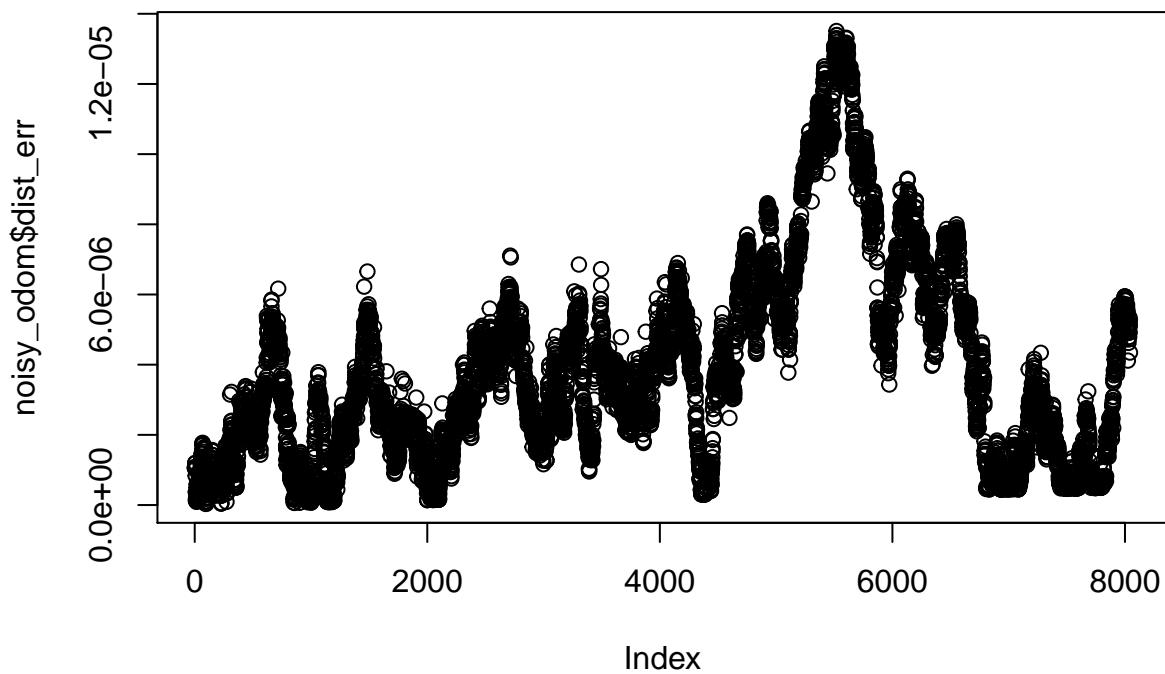
Noisy Odom X Error Over Time



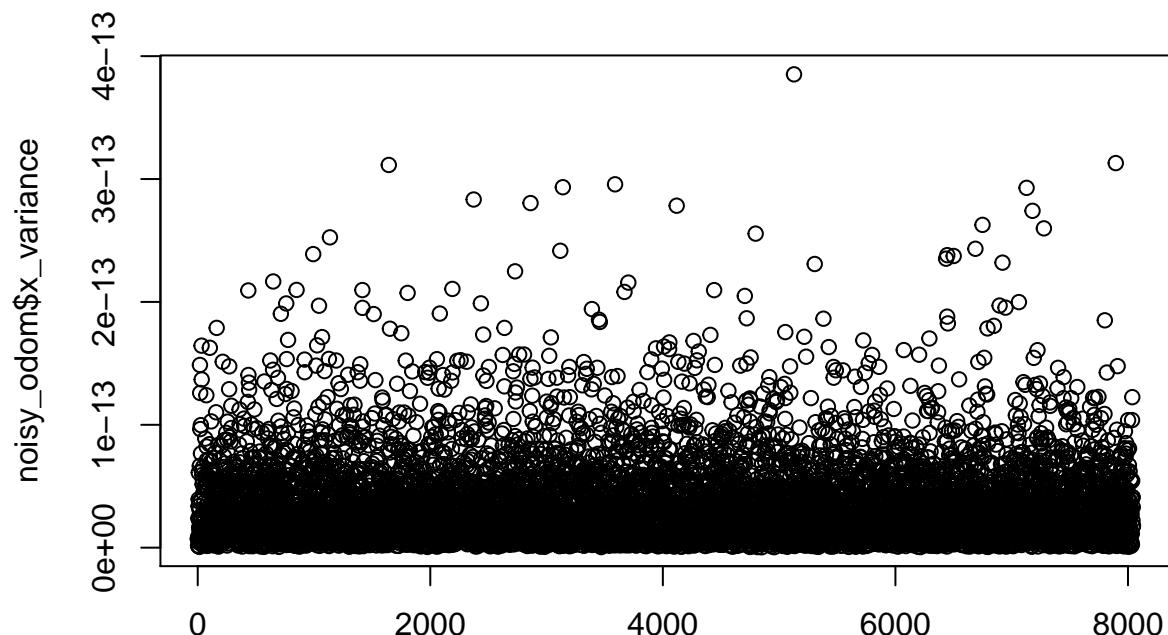
Noisy Odom Y Error Over Time



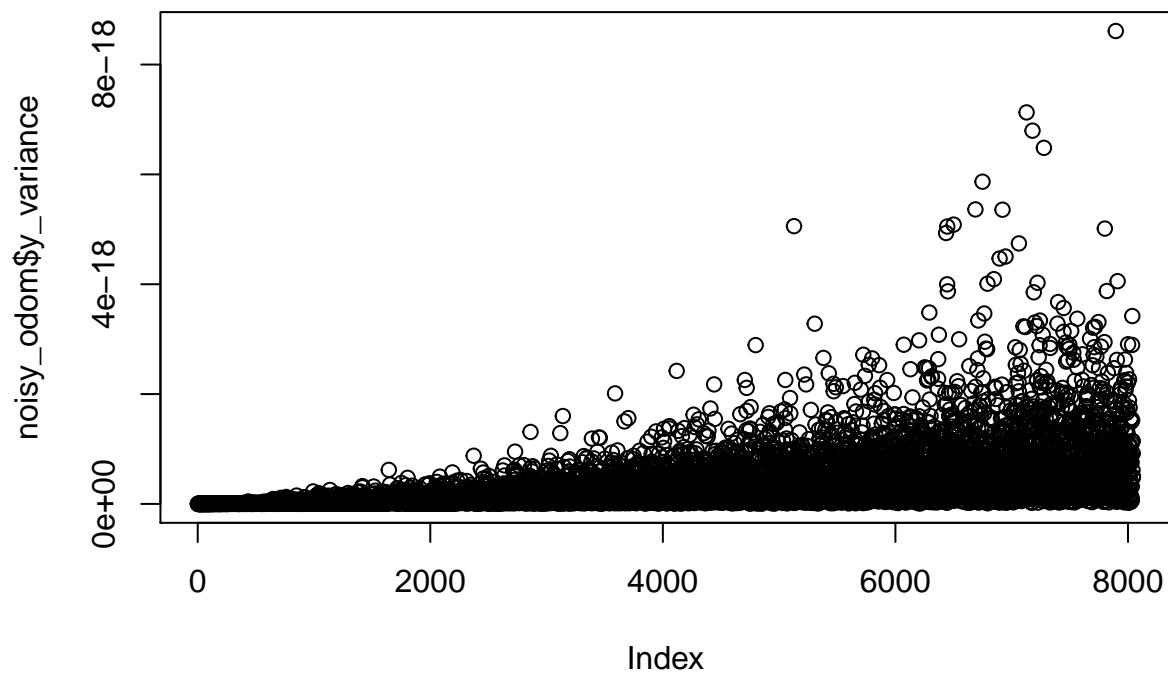
Noisy Odom Horizontal Distance Error Over Time



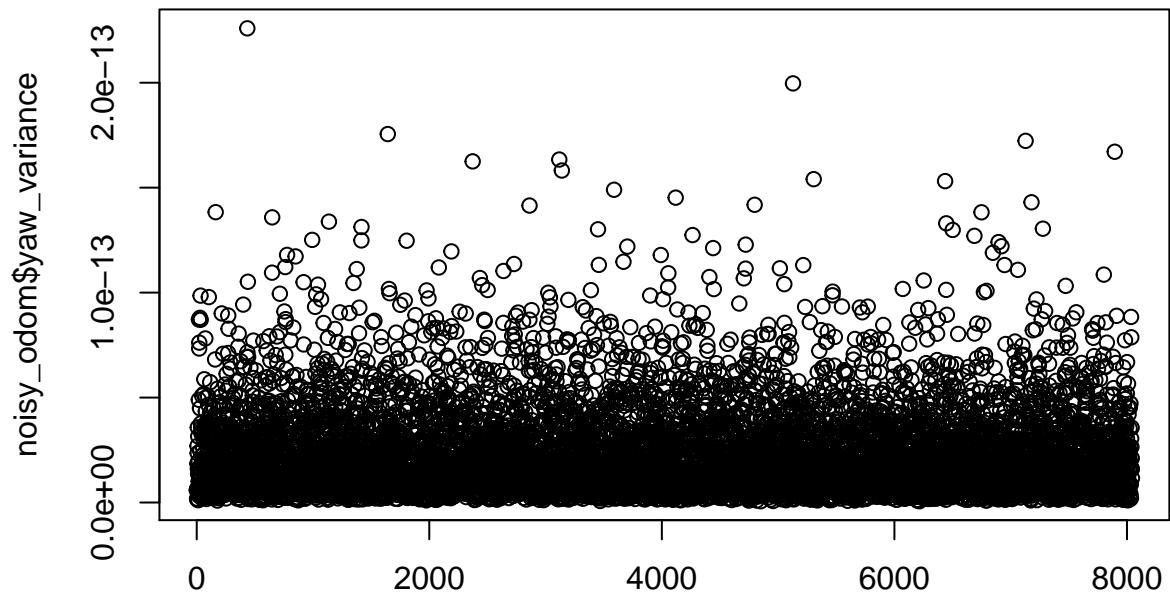
Variance of X Coordinate in Noisy Odometry



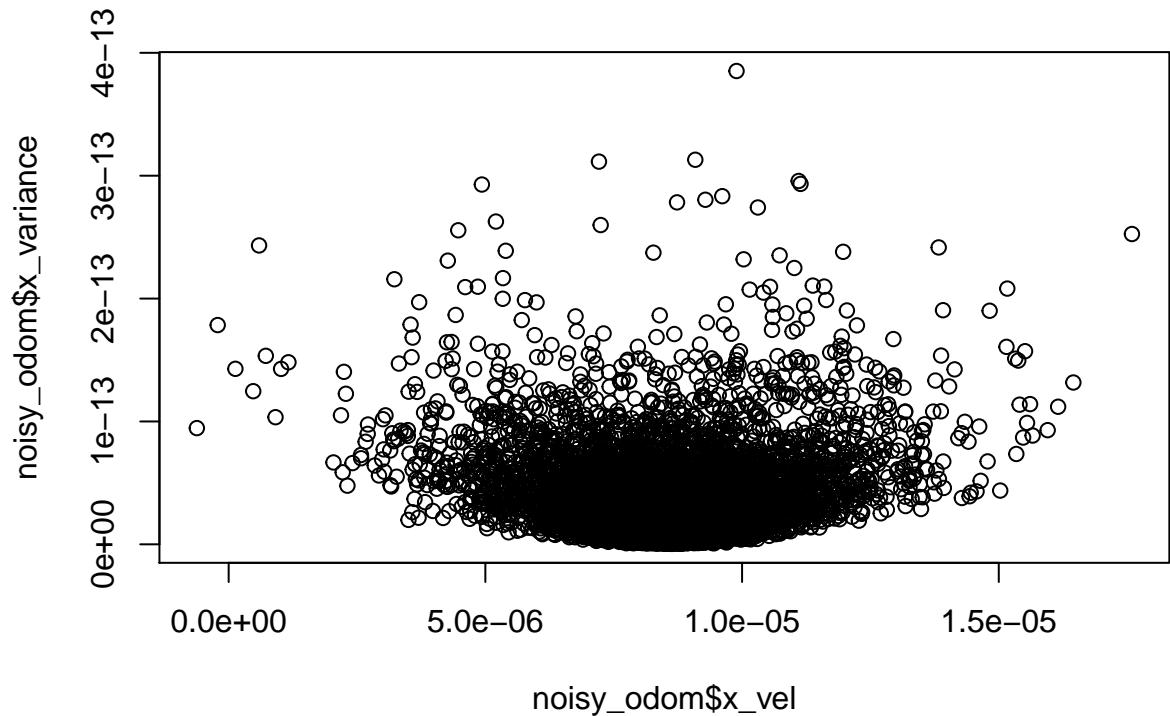
Variance of Y Coordinate in Noisy Odometry



Variance of Yaw Coordinate in Noisy Odometry



Variance vs. Velocity of X in Noisy Odometry



Variance vs. Velocity of Yaw in Noisy Odometry

