

two_mobile Turtlebot 2 Report

Matthew Swartwout

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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 48.7 seconds.

The total number of external pose measurements received by the robot during this time was 135 which means poses were received at an average of 0.3303156 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.
## -10.290 -9.222 -7.422 -5.580 -2.009  2.180

summary(continuous$y_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -0.8902  7.3750  8.6540  7.4550  9.1870 10.3600

summary(continuous$yaw_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -3.14000 -1.73000 -0.14540 -0.06449  1.59900  3.14000

summary(continuous$dist_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.000017  8.353000 11.310000  9.858000 12.940000 13.870000

summary(discrete$x_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -15.34000 -3.42500  0.03016 -0.76330  0.84430 22.42000

summary(discrete$y_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -10.9400  -0.3912   0.8260   2.2620   3.0780  20.9900

summary(discrete$yaw_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -3.1410 -1.4620 -0.6574 -0.3541  0.7303  3.1390

summary(discrete$dist_error)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.02459  0.94920  2.69500  5.77400 10.08000 24.12000

summary(noisy_odom$x_err)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## -1.1890 -0.1592  0.4253  0.3464  0.8073  1.5480
```

```

summary(noisy_odom$y_err)

##      Min.   1st Qu.    Median     Mean   3rd Qu.   Max.
## -1.5740000 -0.2924000  0.0002663  0.1566000  0.7378000 2.2940000

summary(noisy_odom$dist_err)

##      Min.   1st Qu.    Median     Mean   3rd Qu.   Max.
## 0.0000081 0.6597000 0.9630000 0.9580000 1.2750000 2.3060000

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

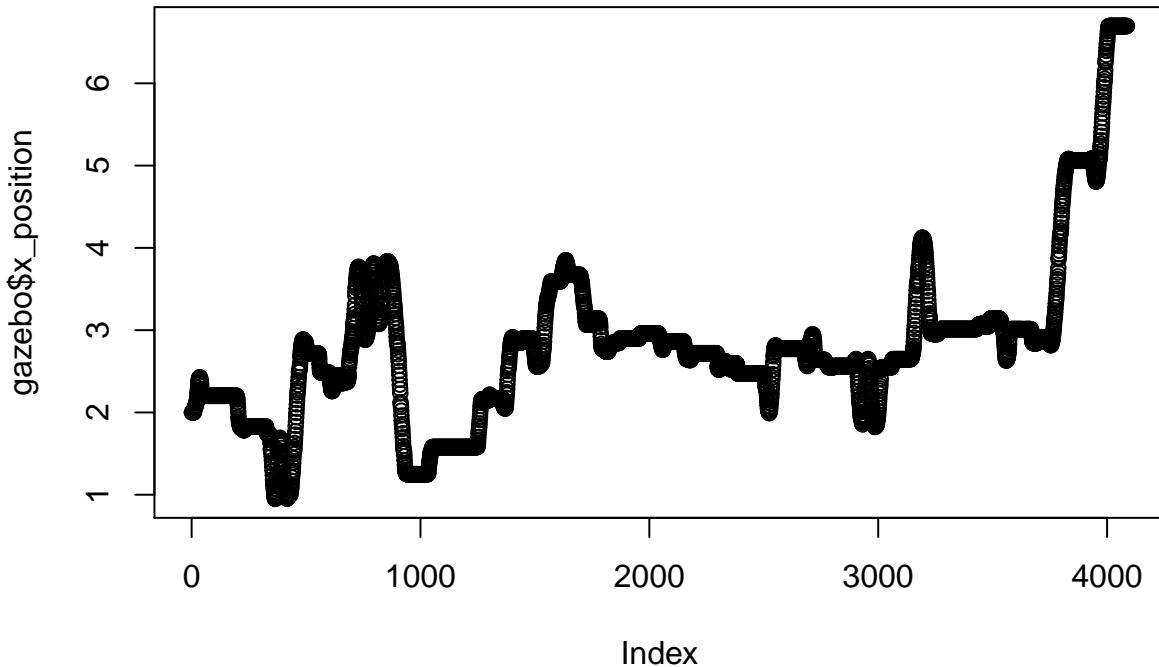
##      Min.   1st Qu.   Median   Mean   3rd Qu.   Max.
## 1.146   2.302   3.246   3.366   4.067   7.610

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

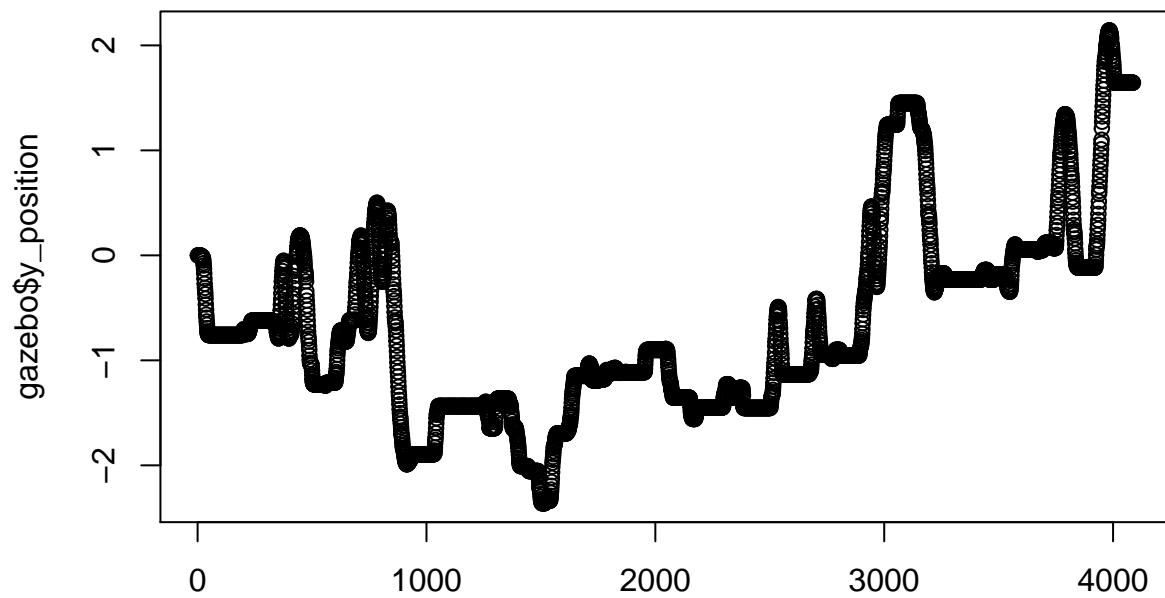
##      Min.   1st Qu.   Median   Mean   3rd Qu.   Max.
## 0.000e+00 1.833e-06 3.675e-06 5.744e-04 5.537e-06 8.531e-03

```

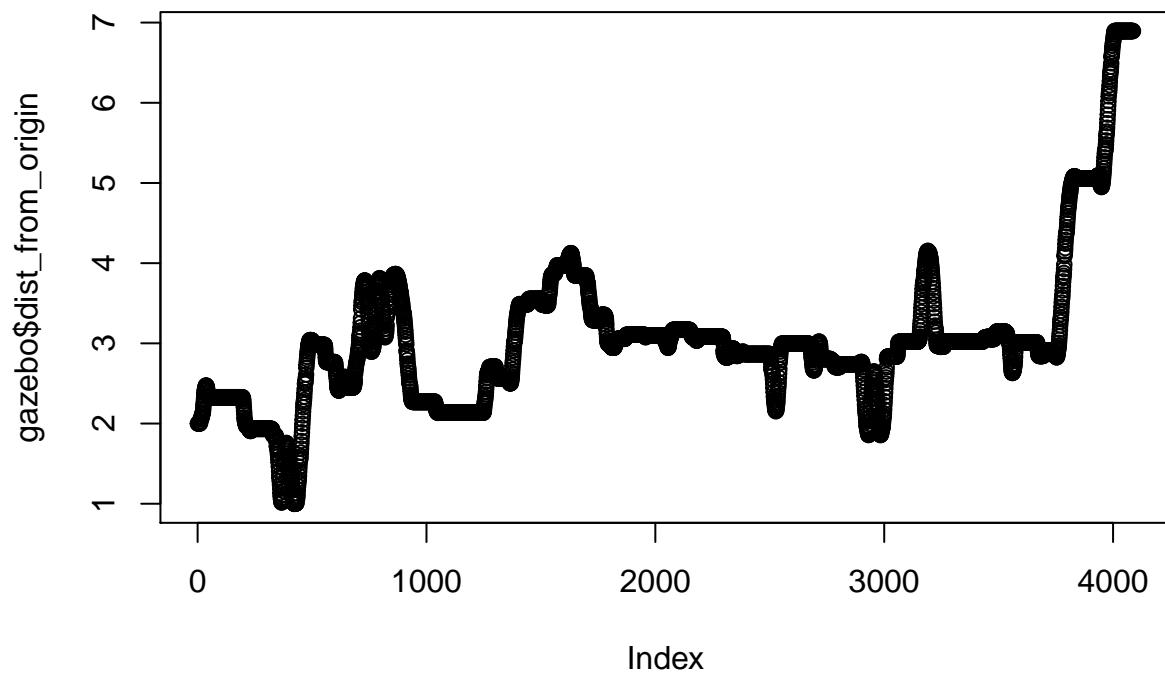
X coordinate of robot over time



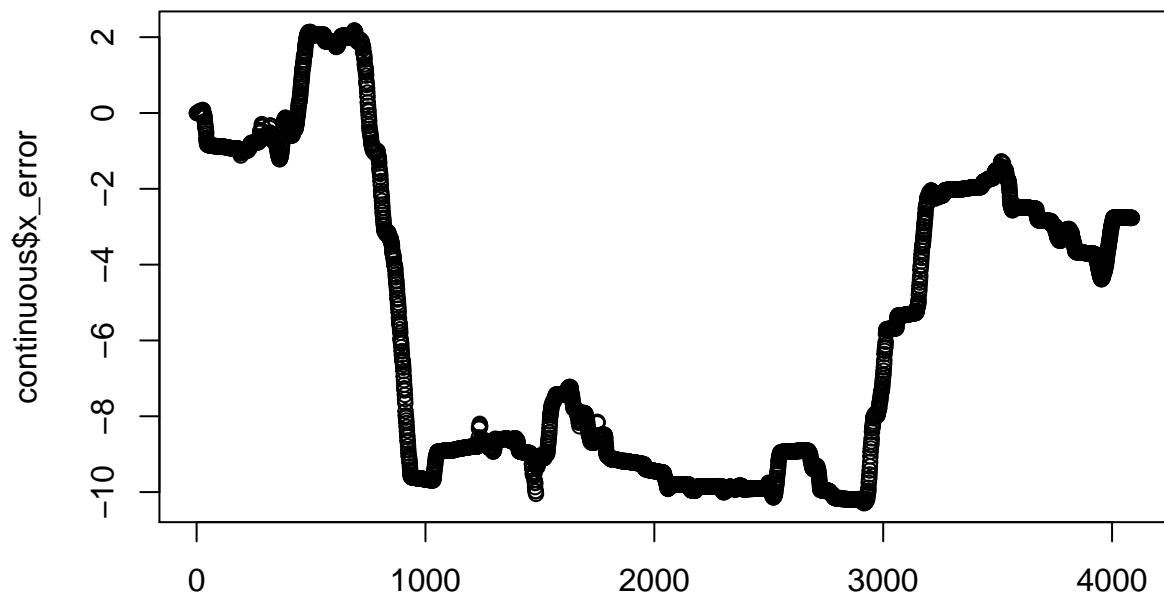
Y coordinate of robot over time



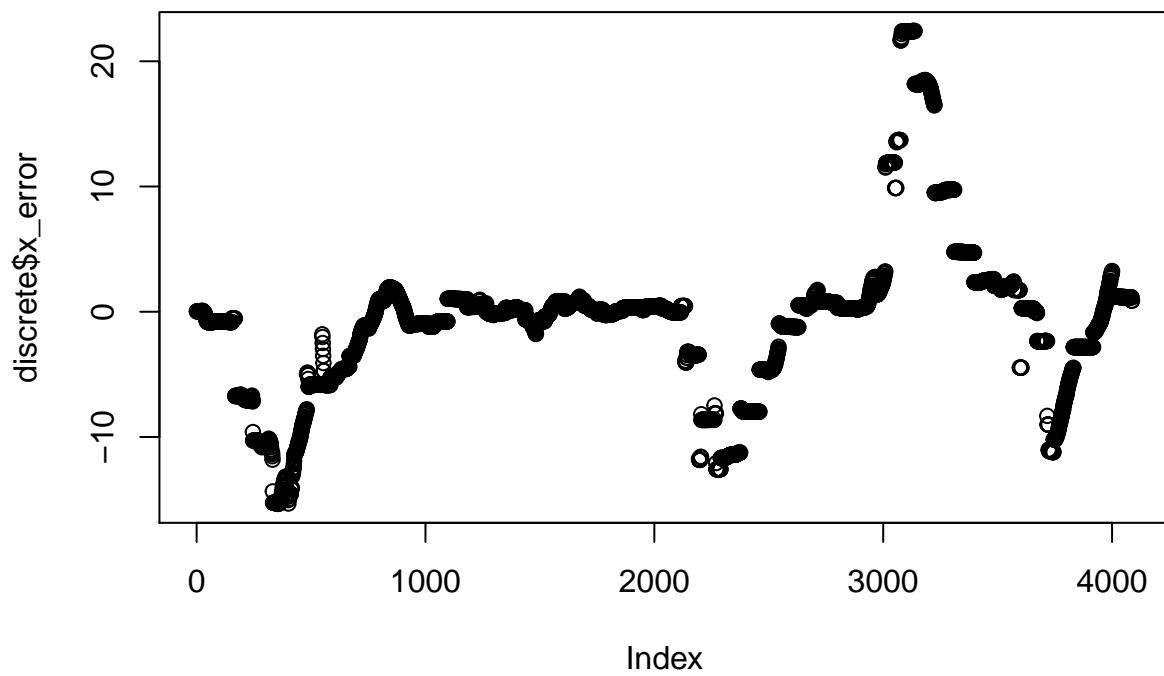
Distance from origin vs. time



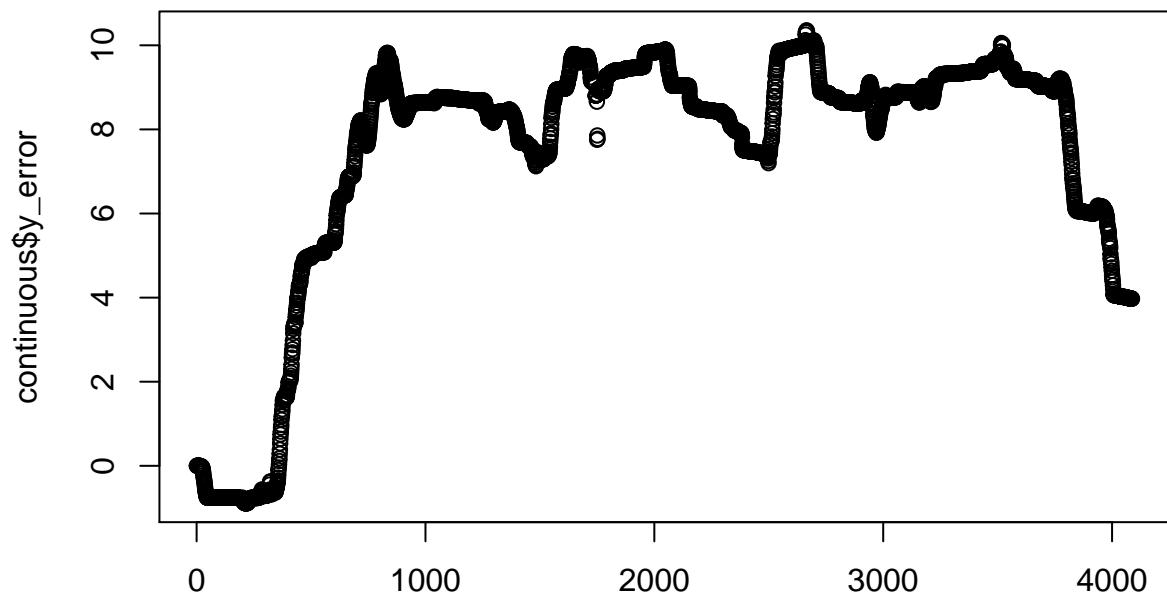
Continuous x_error over time



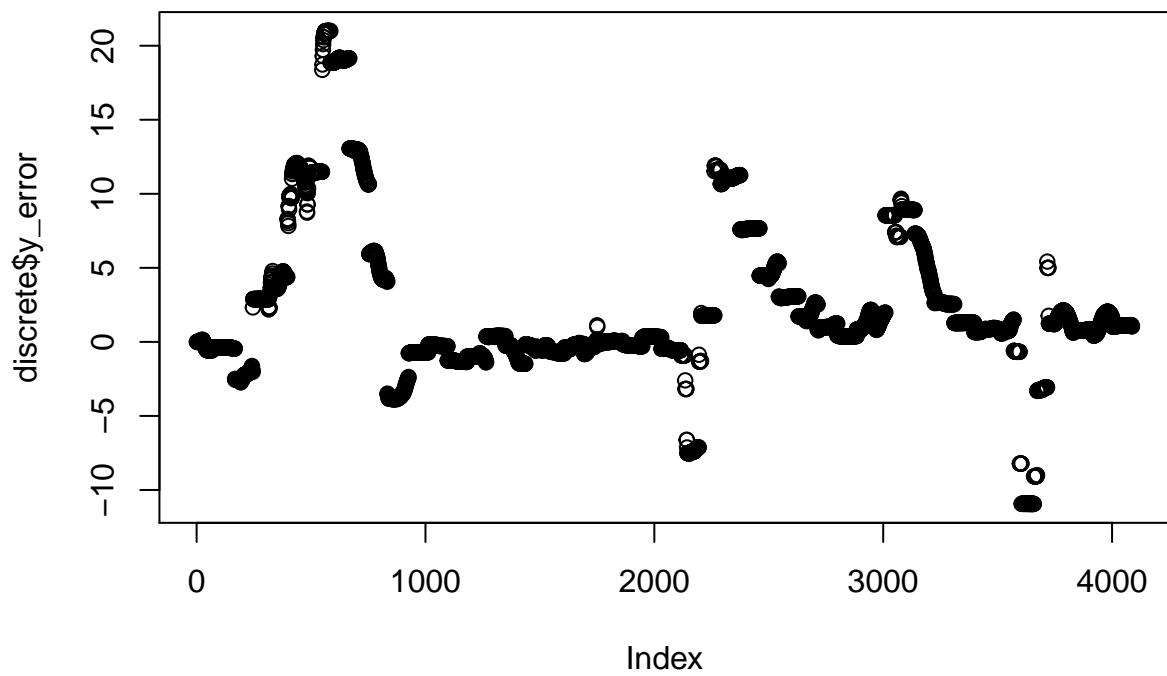
Discrete x_error over time



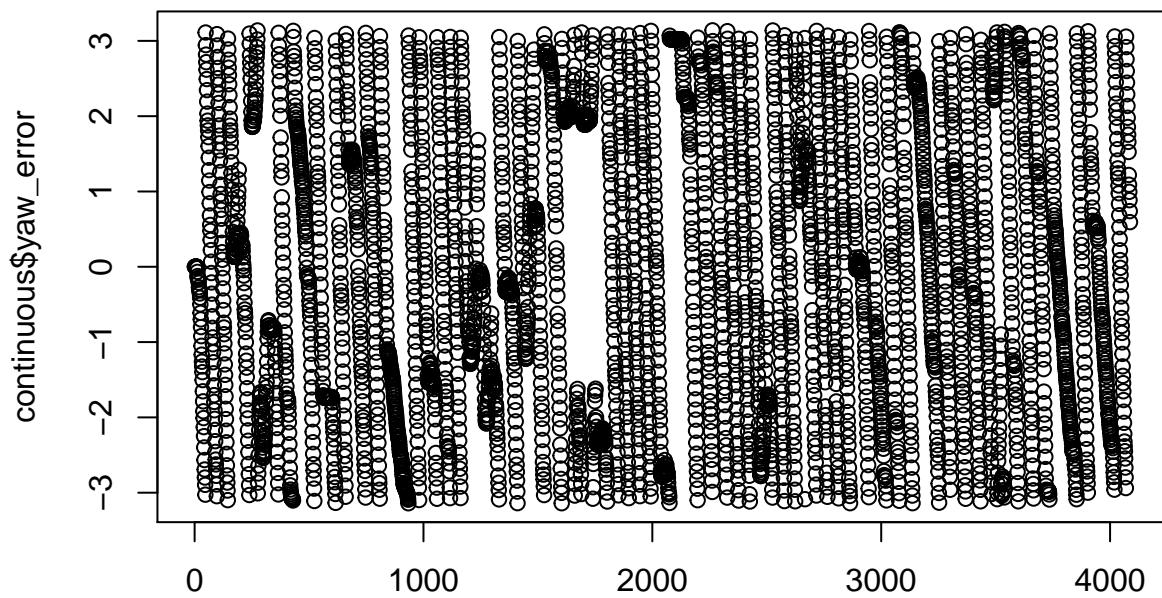
Continuous y_error over time



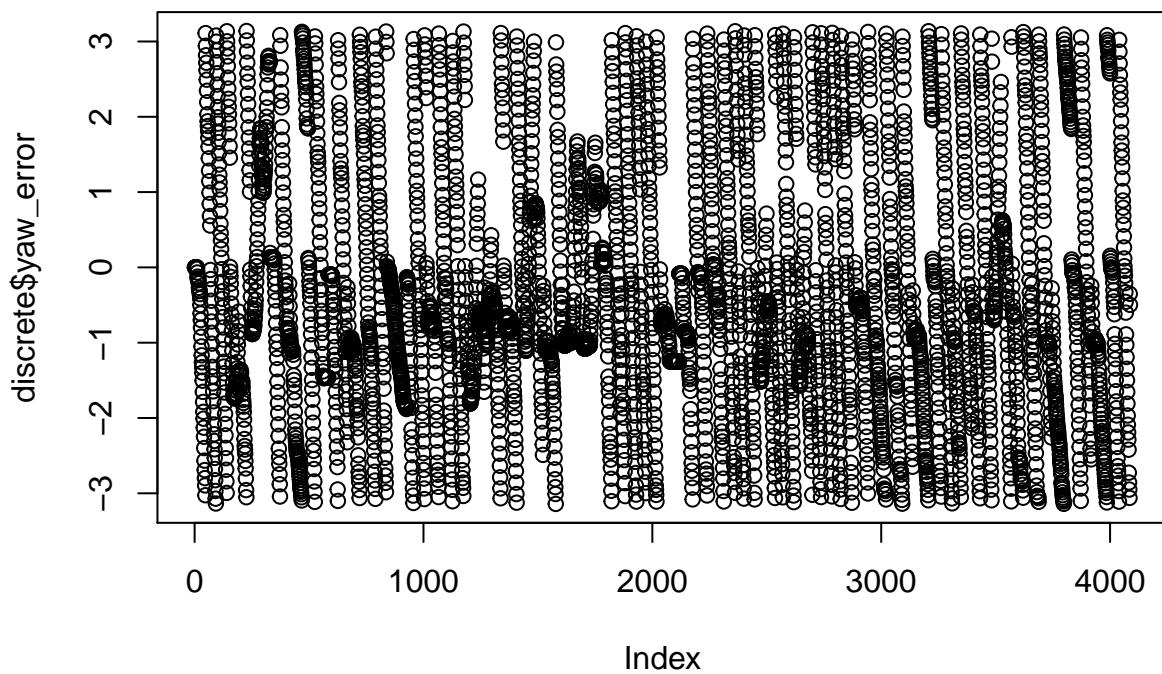
Discrete y_error over time



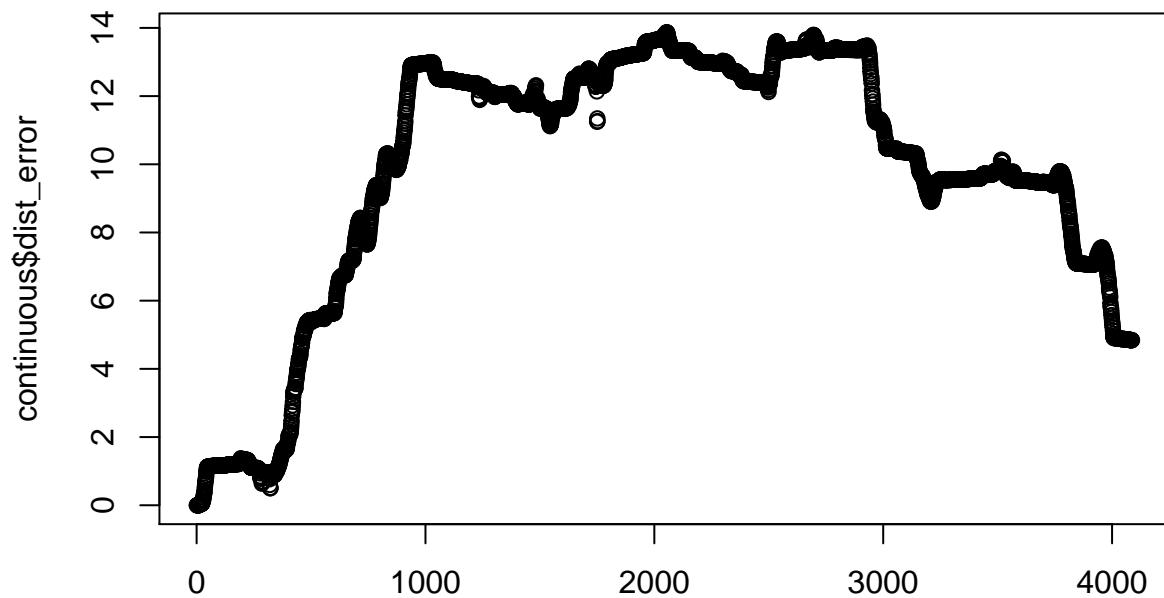
Continuous yaw error over time



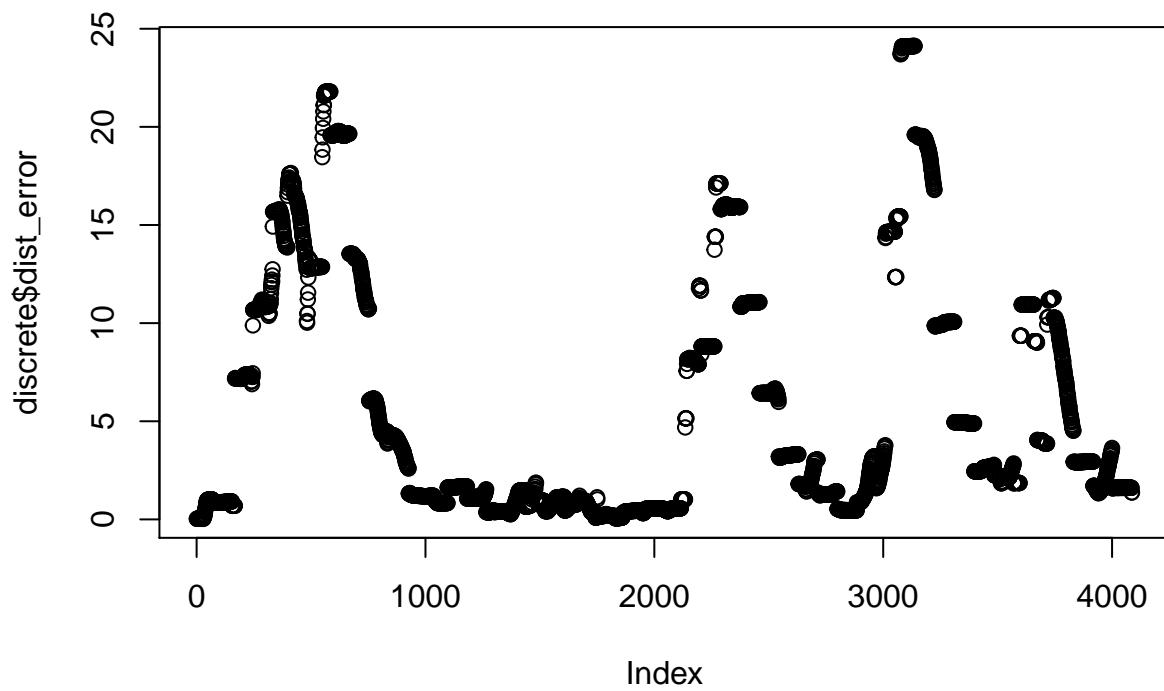
Discrete yaw error over time



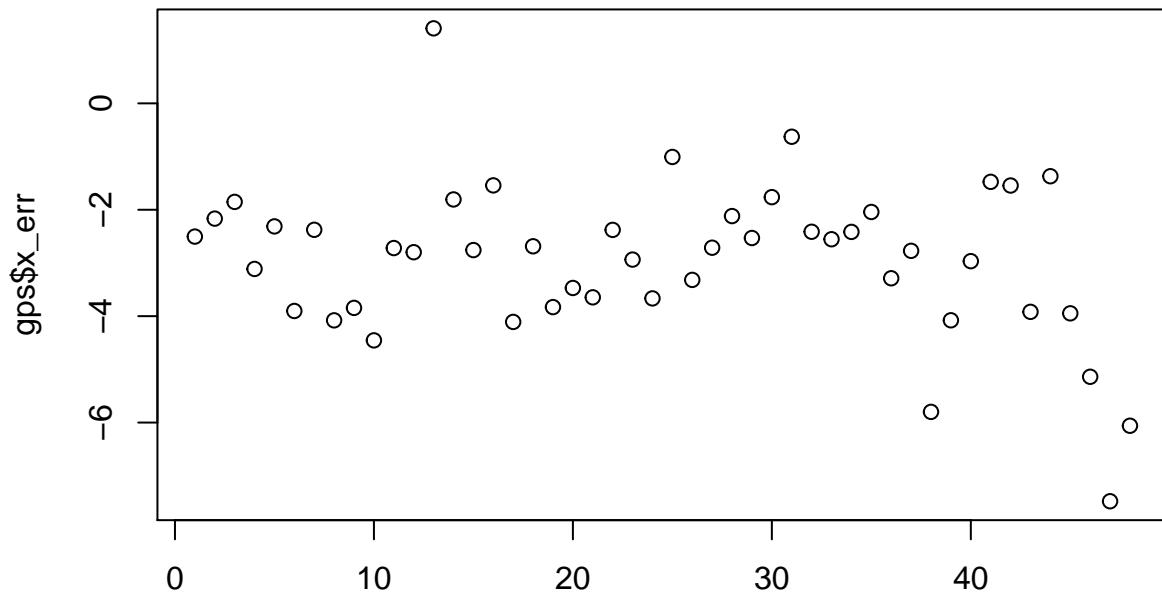
Continuous total distance error over time



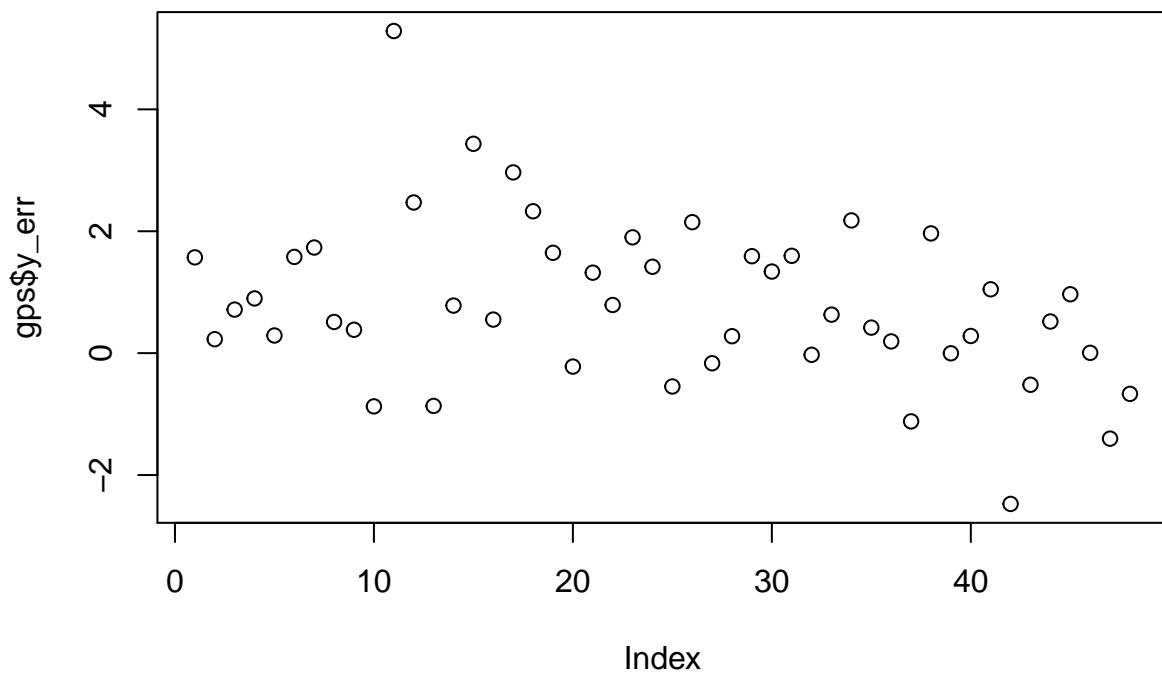
Discrete total distance error over time



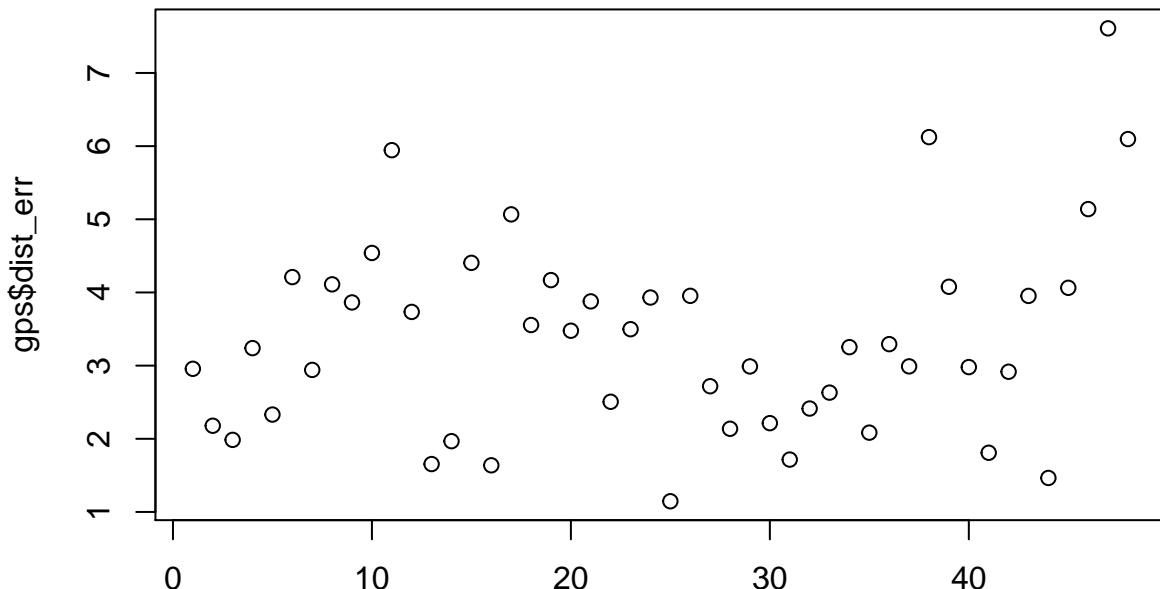
GPS X Error Over Time



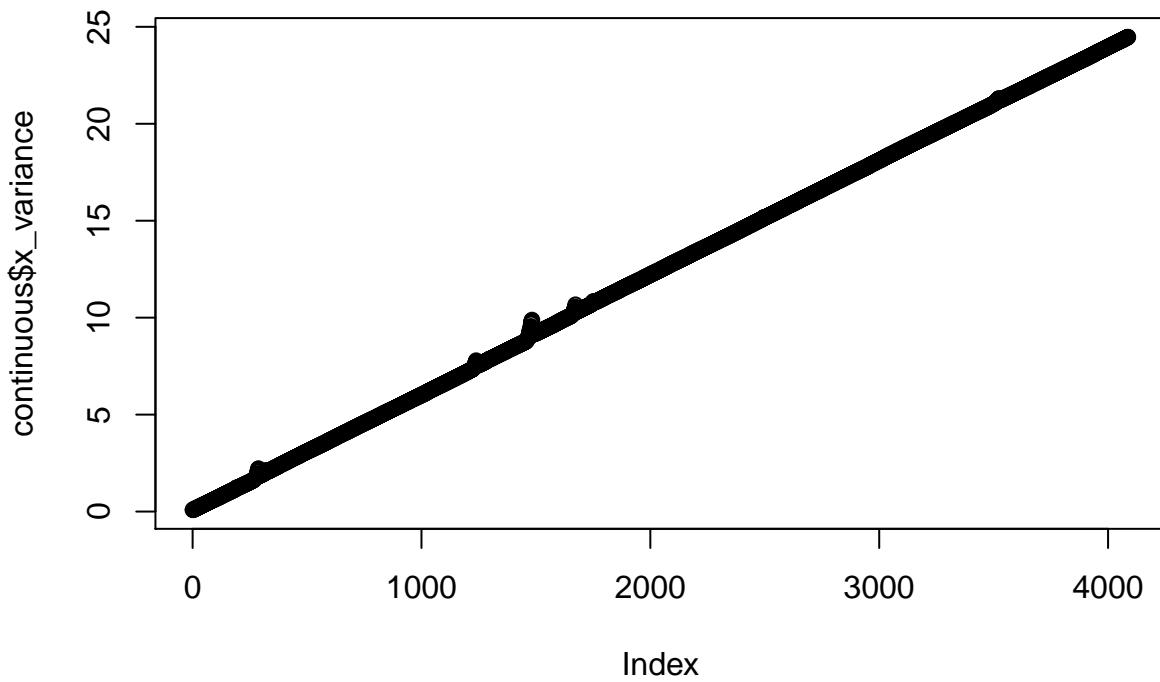
GPS Y Error Over Time



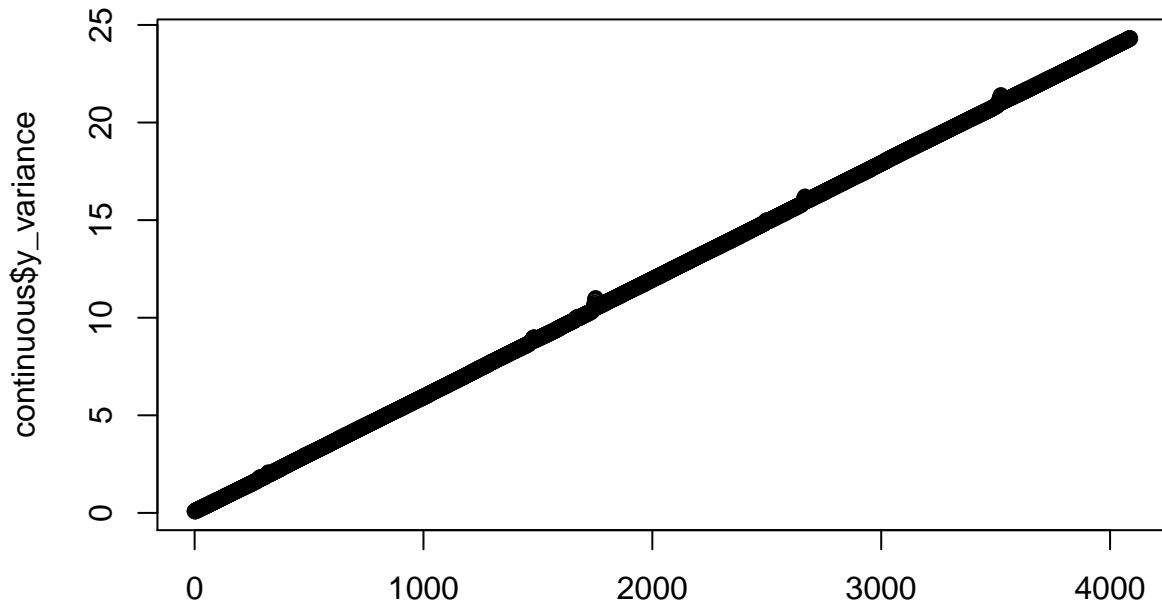
GPS Horizontal Distance Error Over Time



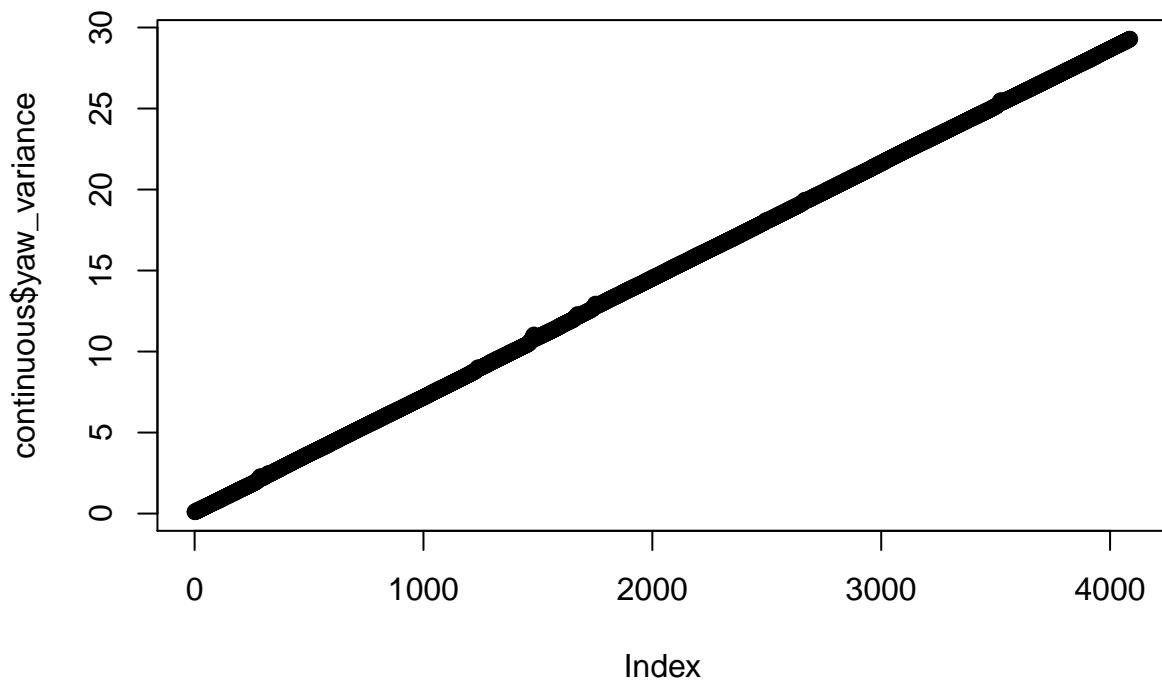
Continuous Filter X Variance Over Time



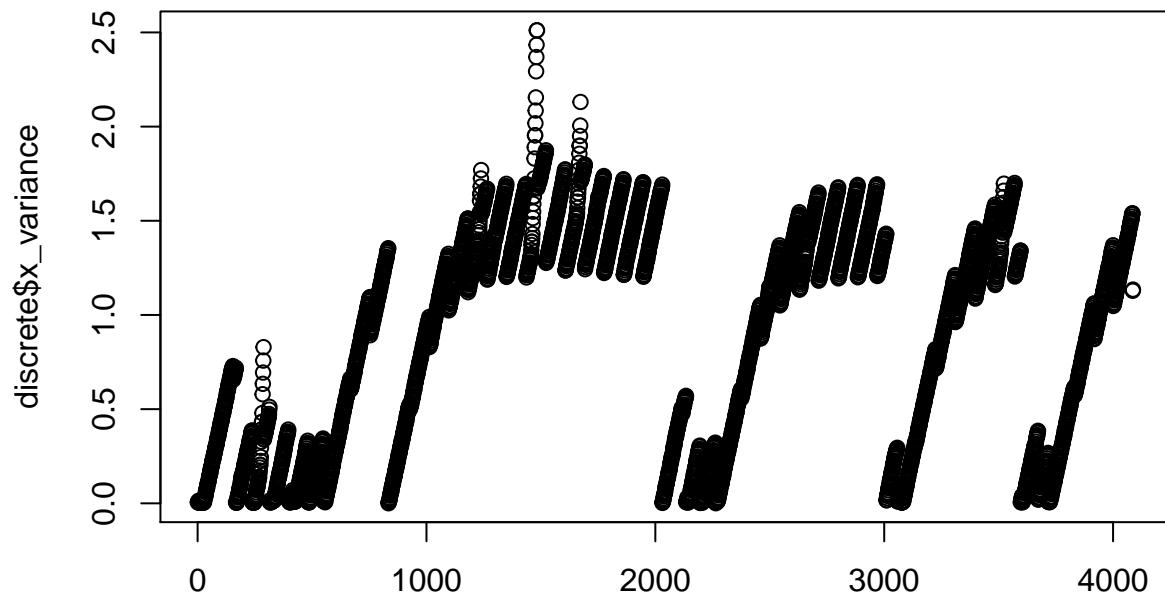
Continuous Filter Y Variance Over Time



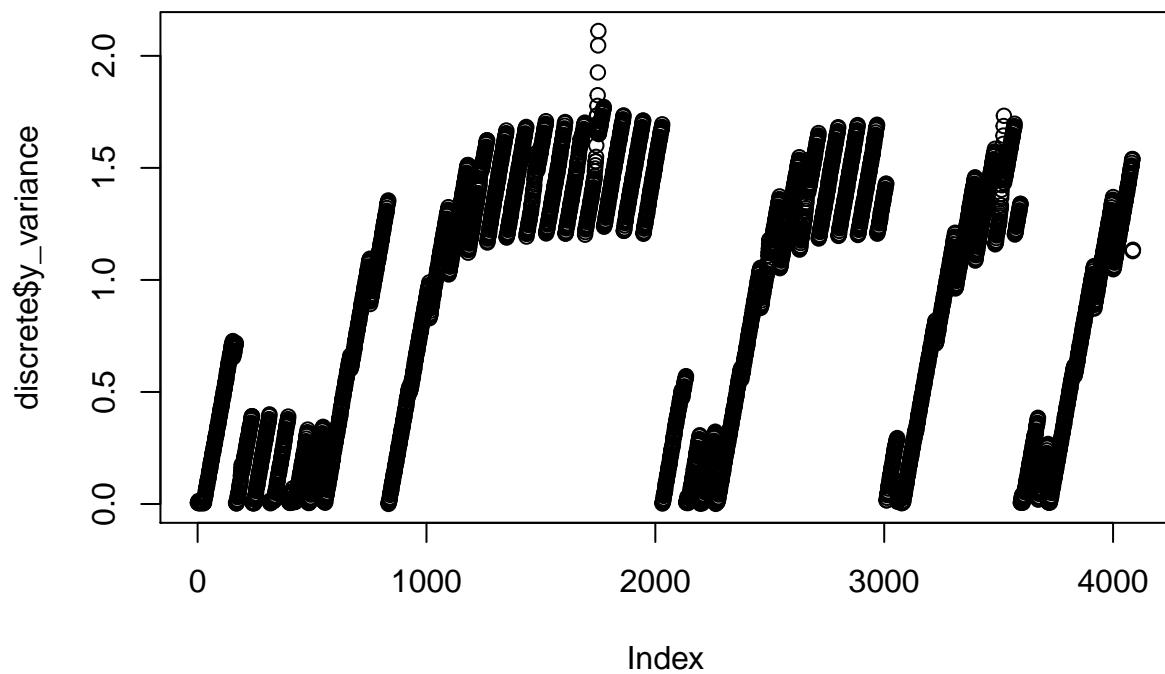
Continuous Filter Yaw Variance Over Time



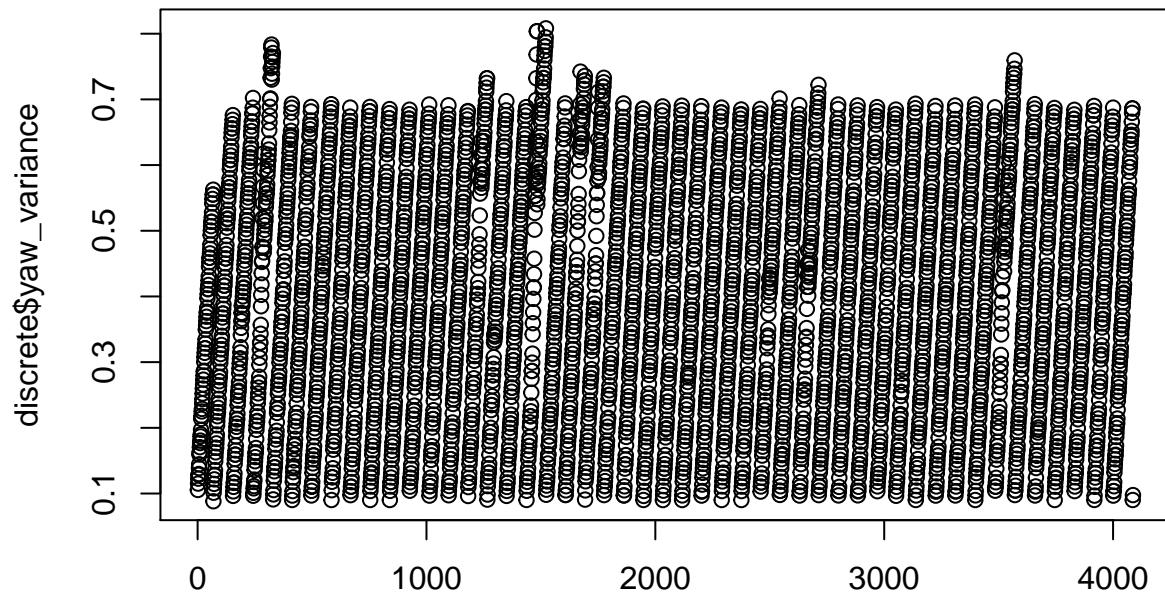
Discrete Filter X Variance Over Time



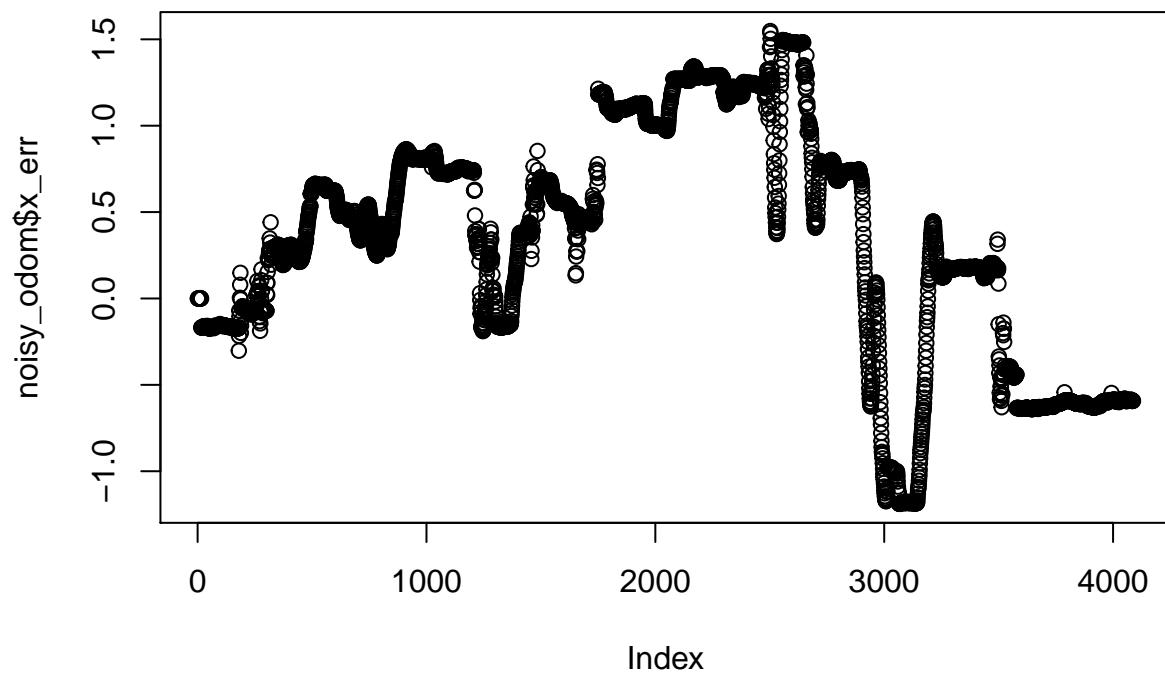
Discrete Filter Y Variance Over Time



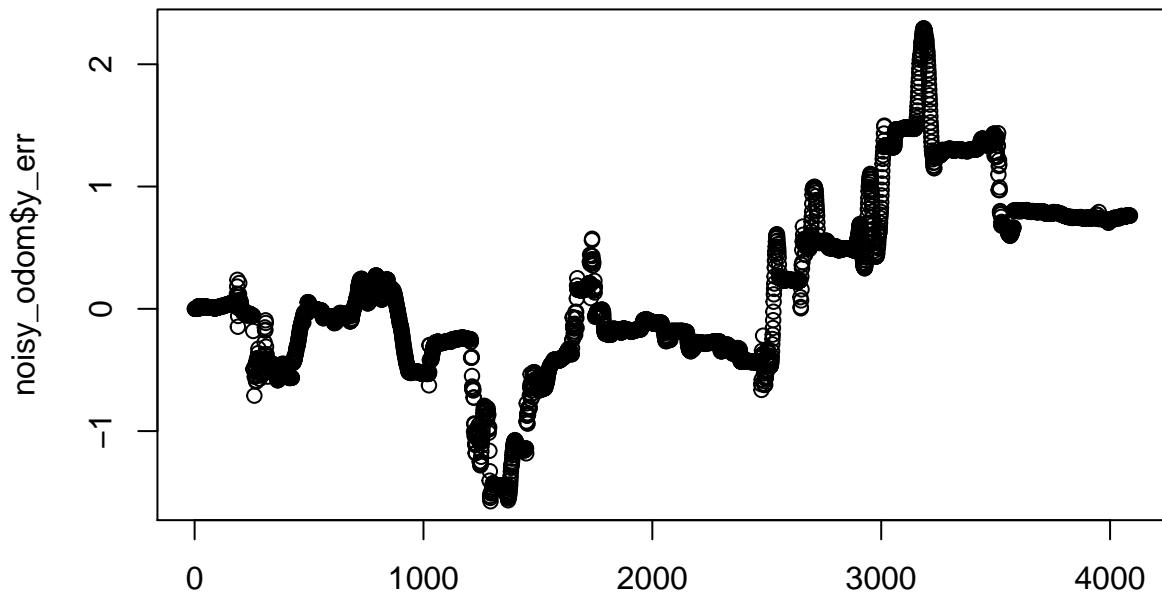
Discrete Filter Yaw Variance Over Time



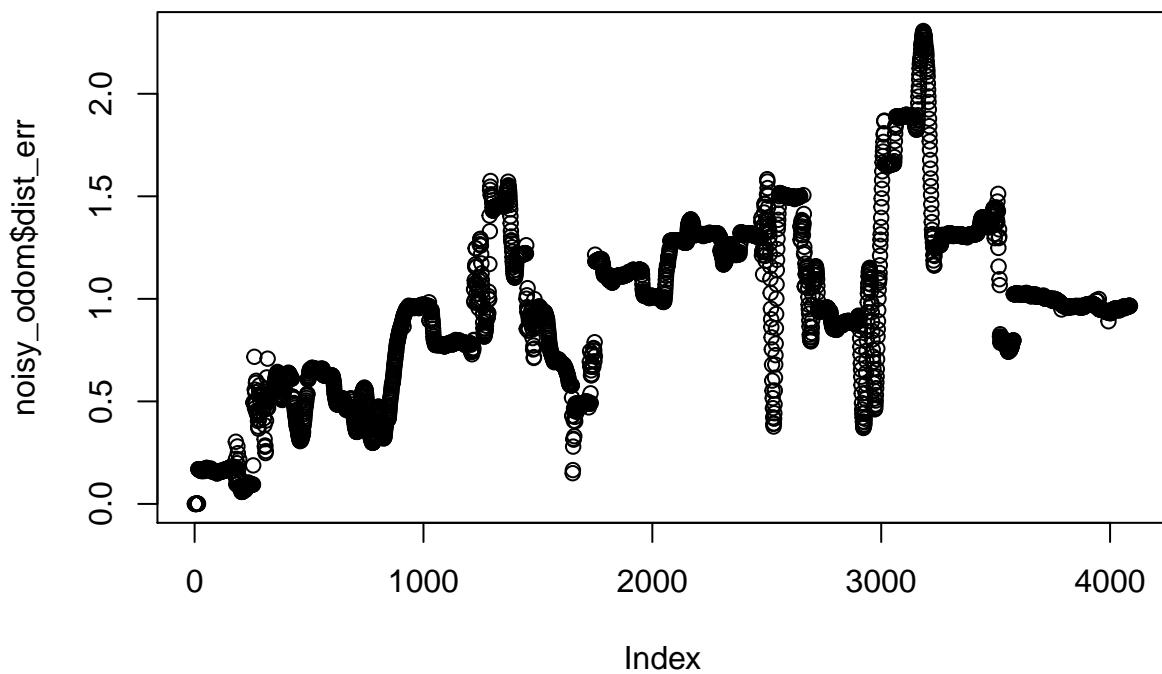
Noisy Odom X Error Over Time



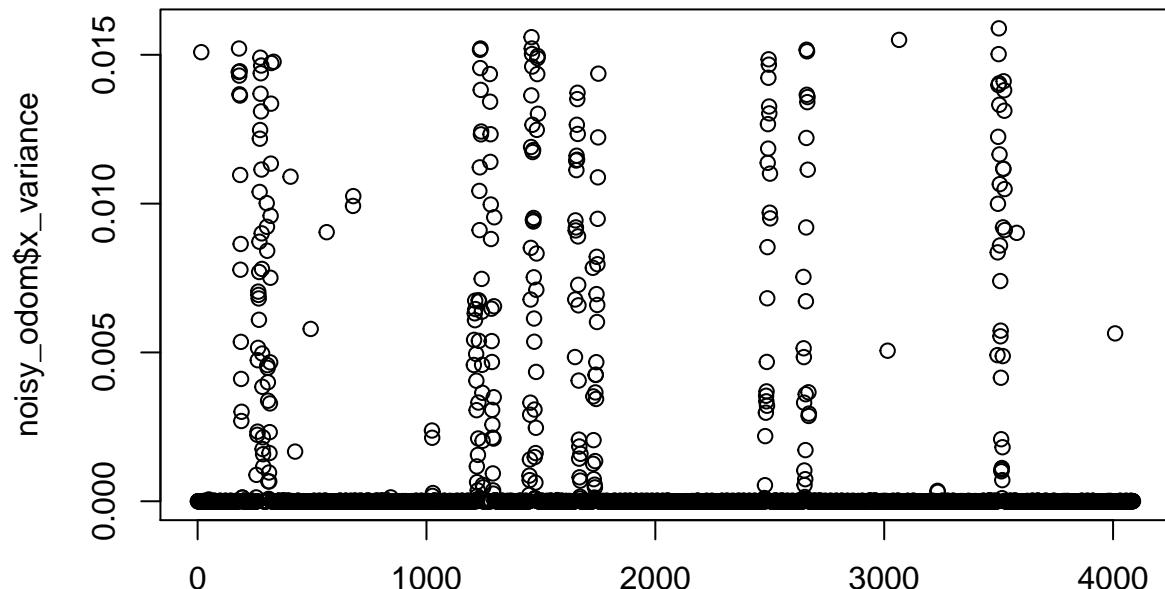
Noisy Odom Y Error Over Time



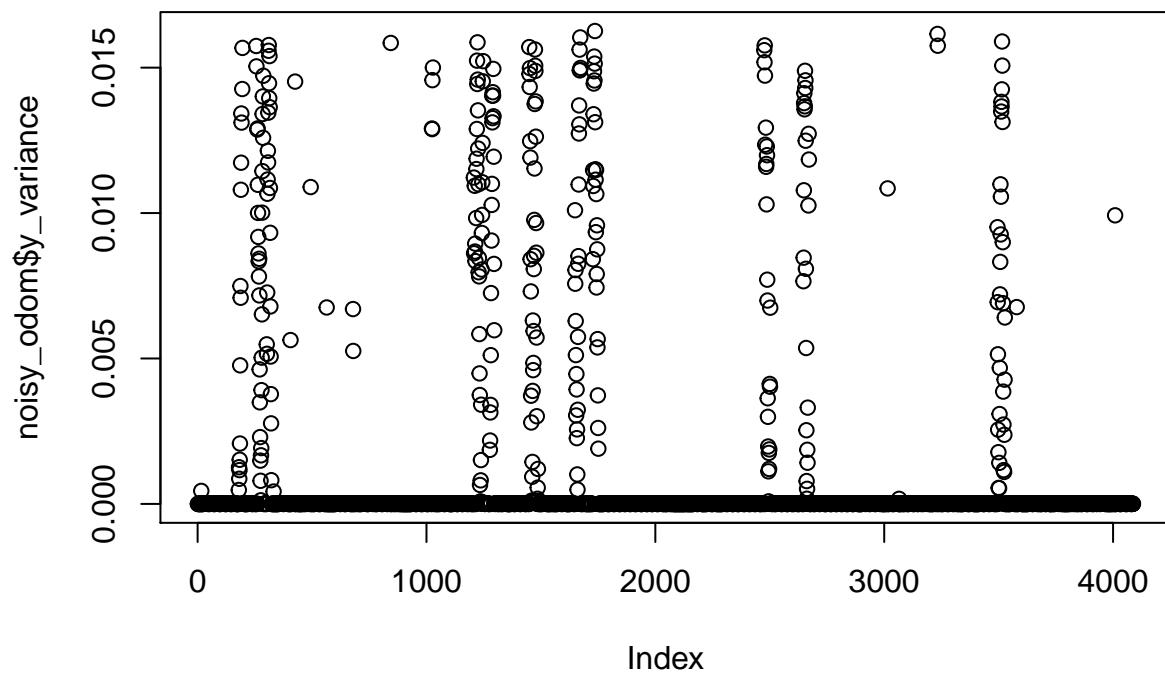
Noisy Odom Horizontal Distance Error Over Time



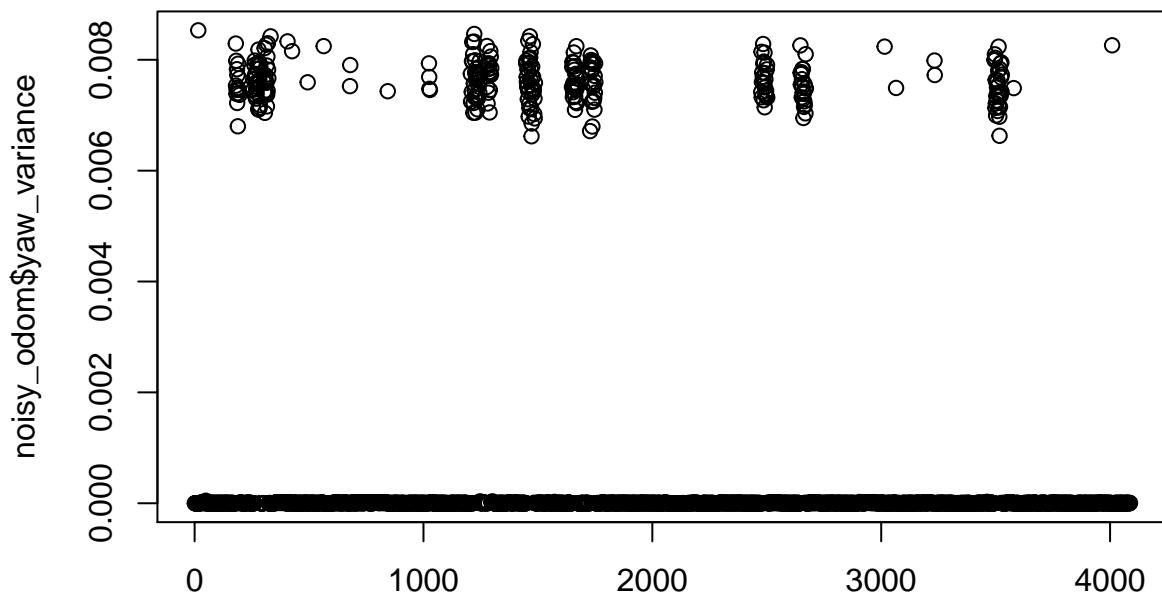
Variance of X Coordinate in Noisy Odometry



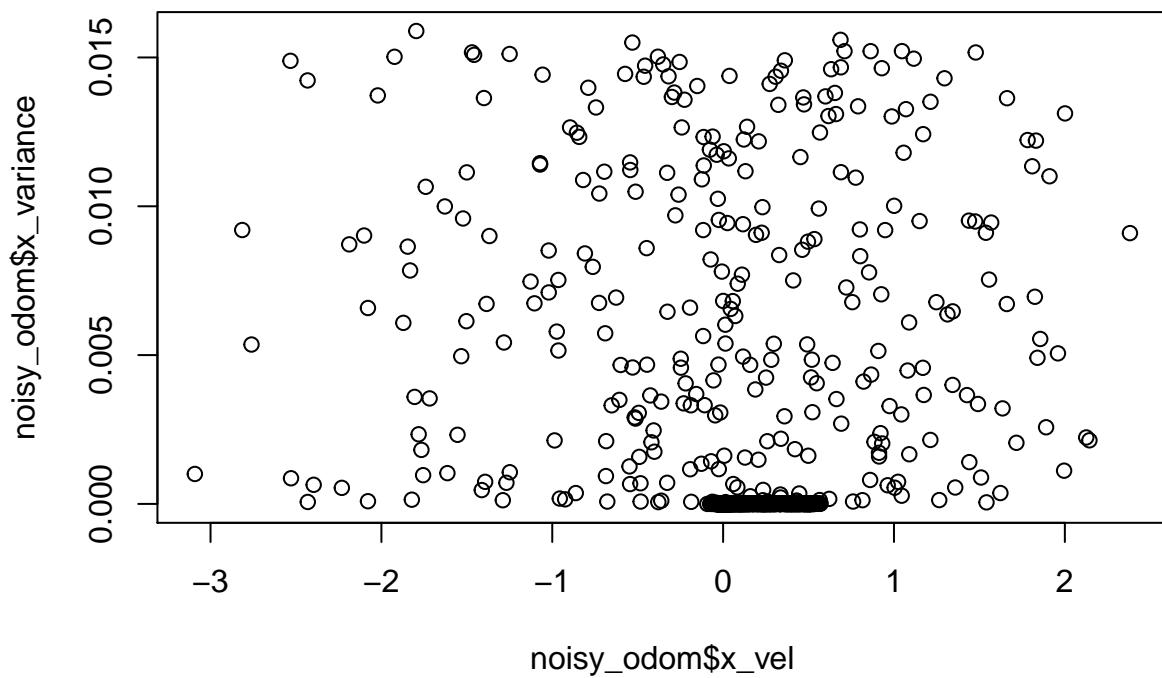
Variance of Y Coordinate in Noisy Odometry



Variance of Yaw Coordinate in Noisy Odometry



Variance vs. Velocity of X in Noisy Odometry



Variance vs. Velocity of Yaw in Noisy Odometry

