

two_stationary Turtlebot 1 Report

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

The runtime of this experiment was 0 hours, 0 minutes, and 50.7 seconds.

The total number of external pose measurements recieved 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.
## 1.351e-05 1.381e-04 2.611e-04 2.617e-04 3.856e-04 5.105e-04
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 7.066e-10 1.943e-08 5.311e-08 5.876e-08 9.189e-08 1.480e-07
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 0.0000879 0.0002026 0.0002896 0.0002960 0.0003793 0.0005029
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 1.351e-05 1.381e-04 2.611e-04 2.617e-04 3.856e-04 5.105e-04
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 0.0000135 0.2847000 0.3759000 0.4585000 0.7062000 0.8960000
```

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

```
##      Min. 1st Qu.  Median     Mean 3rd Qu.     Max.
## -1.2610 -0.7217 -0.5019 -0.5238 -0.1451  0.0000
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## -2.985e-05 1.656e-05 4.815e-05 5.296e-05 8.079e-05 1.902e-04
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 0.0000135 0.3196000 0.7982000 0.7150000 0.8107000 1.5470000
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 1.839e-05 2.332e-05 2.473e-05 2.438e-05 2.619e-05 2.920e-05
```

```
summary(noisy_odom$y_err)
```

```
##      Min.    1st Qu.    Median      Mean   3rd Qu.      Max.
## -1.334e-08 -1.126e-08 -9.030e-09 -9.298e-09 -7.296e-09 -5.760e-09
```

```
summary(noisy_odom$dist_err)
```

```
##      Min.    1st Qu.    Median      Mean   3rd Qu.      Max.
## 1.839e-05 2.332e-05 2.473e-05 2.438e-05 2.619e-05 2.920e-05
```

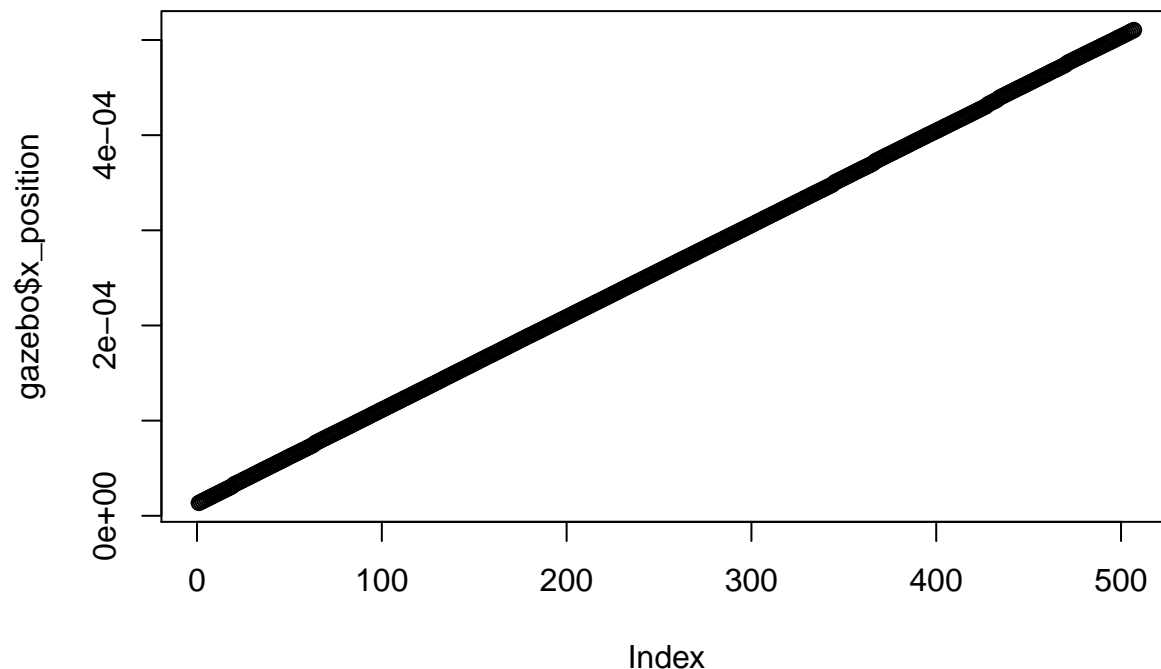
```
if (NROW(gps) > 0) {
  summary(gps$x_err)
  summary(gps$y_err)
  summary(gps$dist_err)
}
```

```
##      Min. 1st Qu.  Median      Mean 3rd Qu.      Max.
## 0.2772 0.5388 1.0910 1.4880 2.3310 3.3690
```

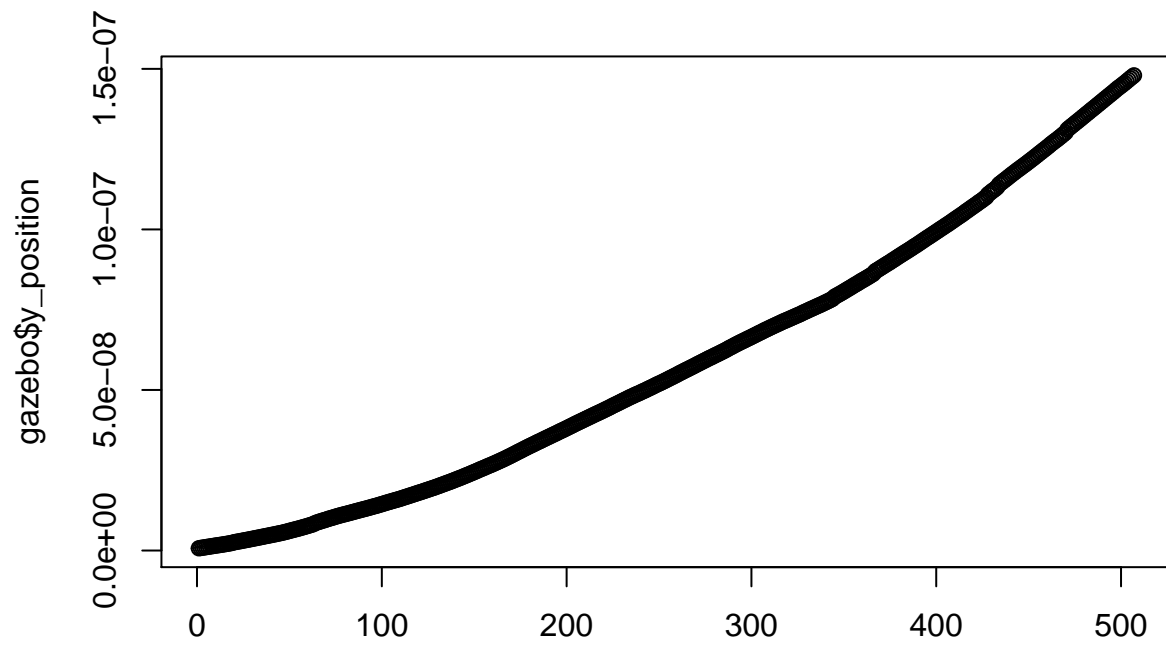
```
if (NROW(noisy_odom) > 0) {
  summary(noisy_odom$x_variance)
  summary(noisy_odom$y_variance)
  summary(noisy_odom$yaw_variance)
}
```

```
##      Min.    1st Qu.    Median      Mean   3rd Qu.      Max.
## 1.172e-15 8.124e-15 1.785e-14 2.392e-14 3.200e-14 2.777e-13
```

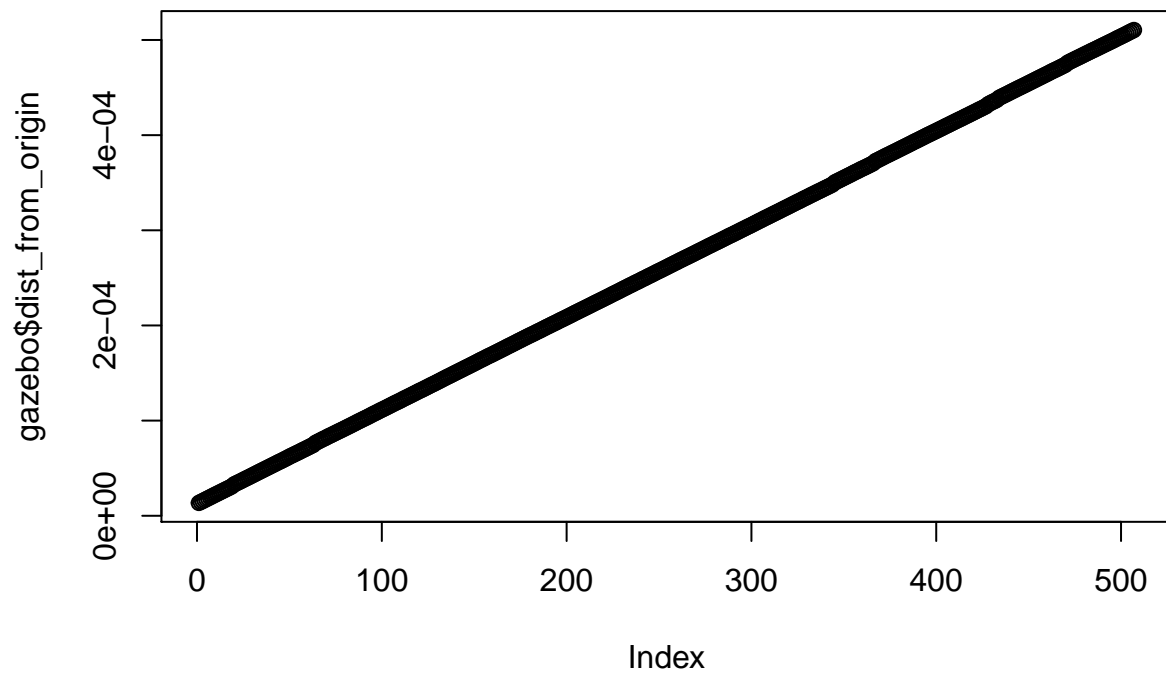
X coordinate of robot over time



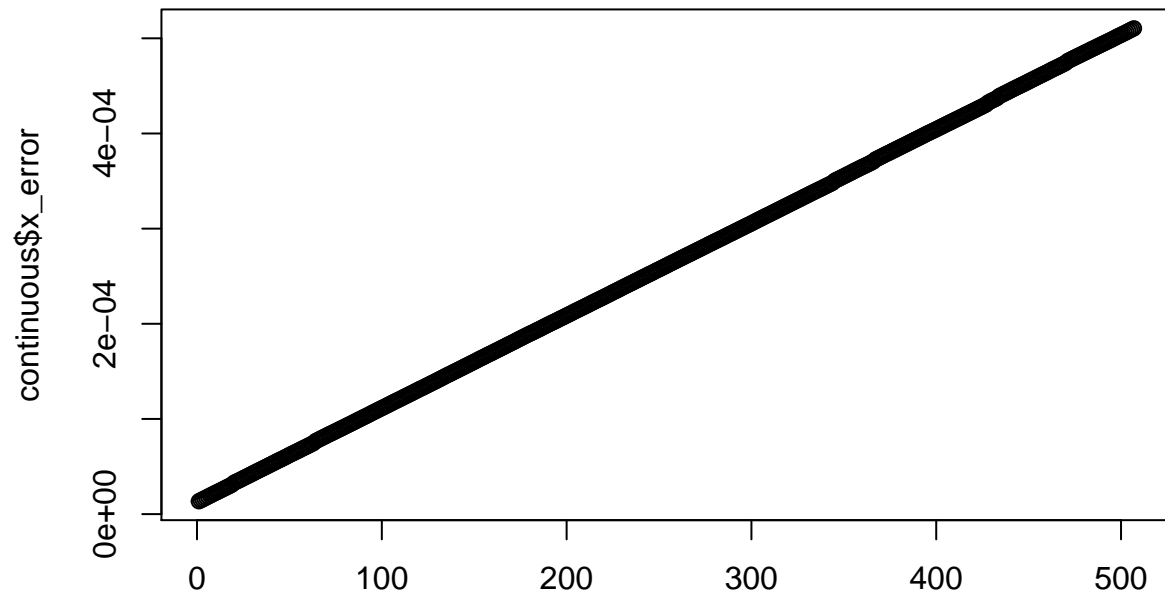
Y coordinate of robot over time



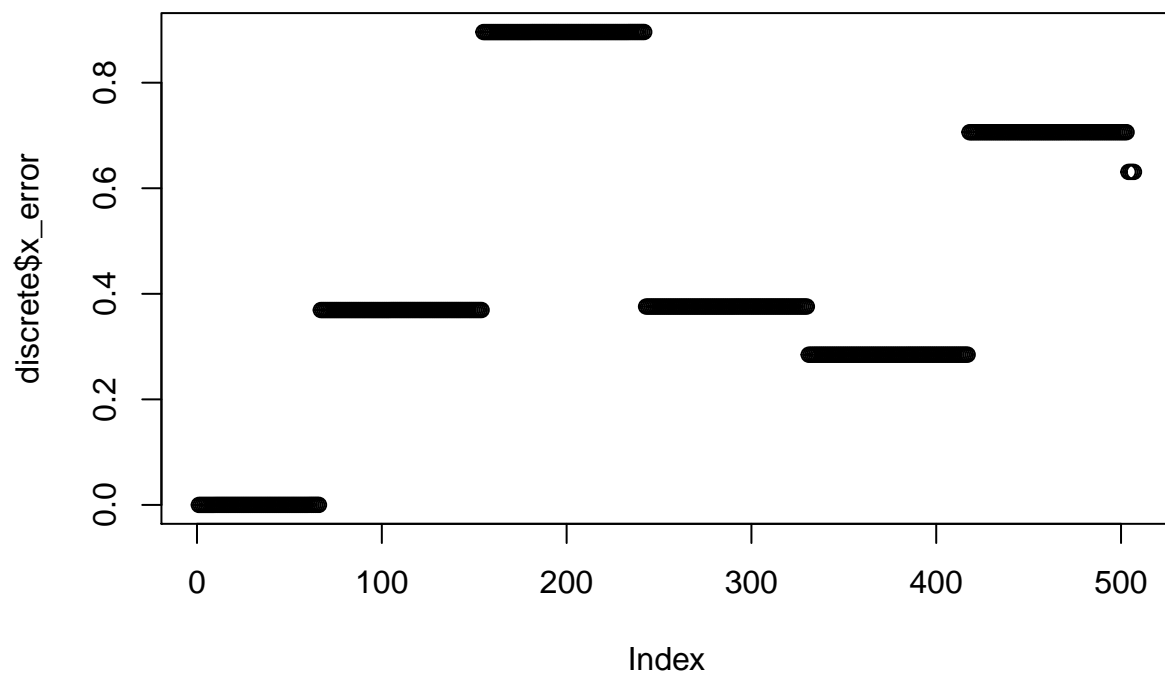
Distance from origin vs. time

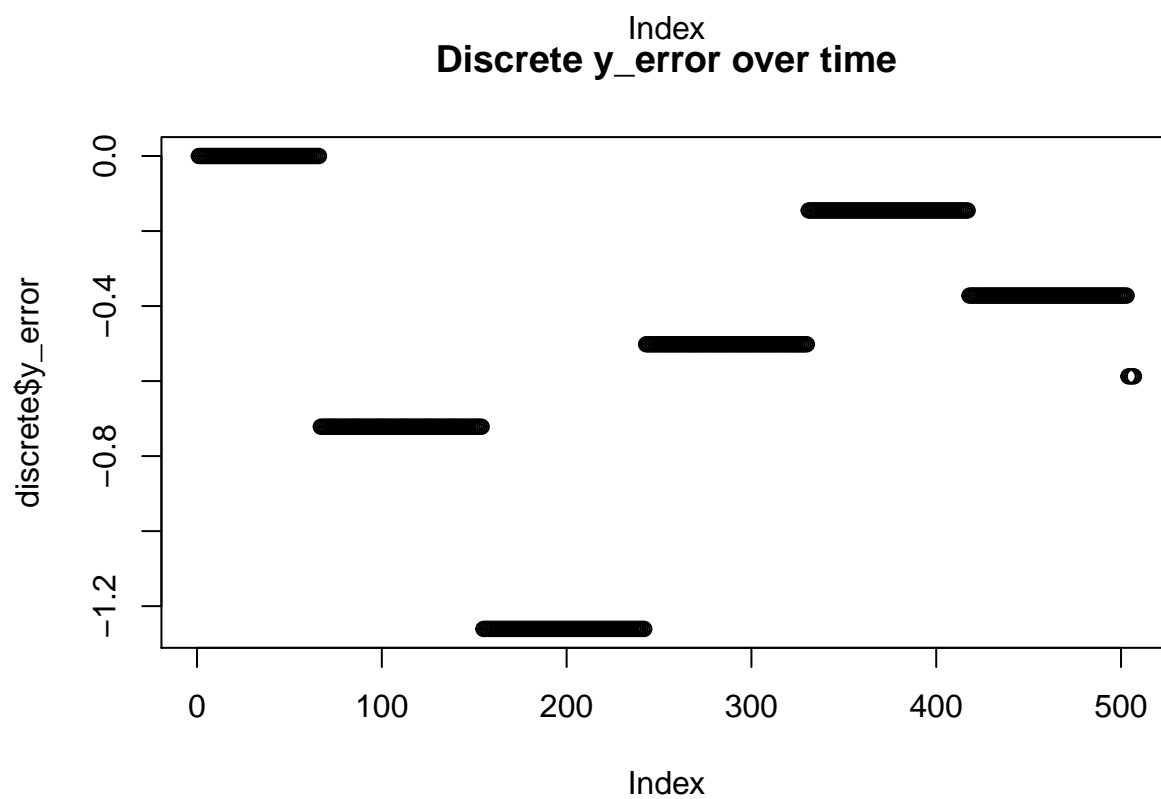
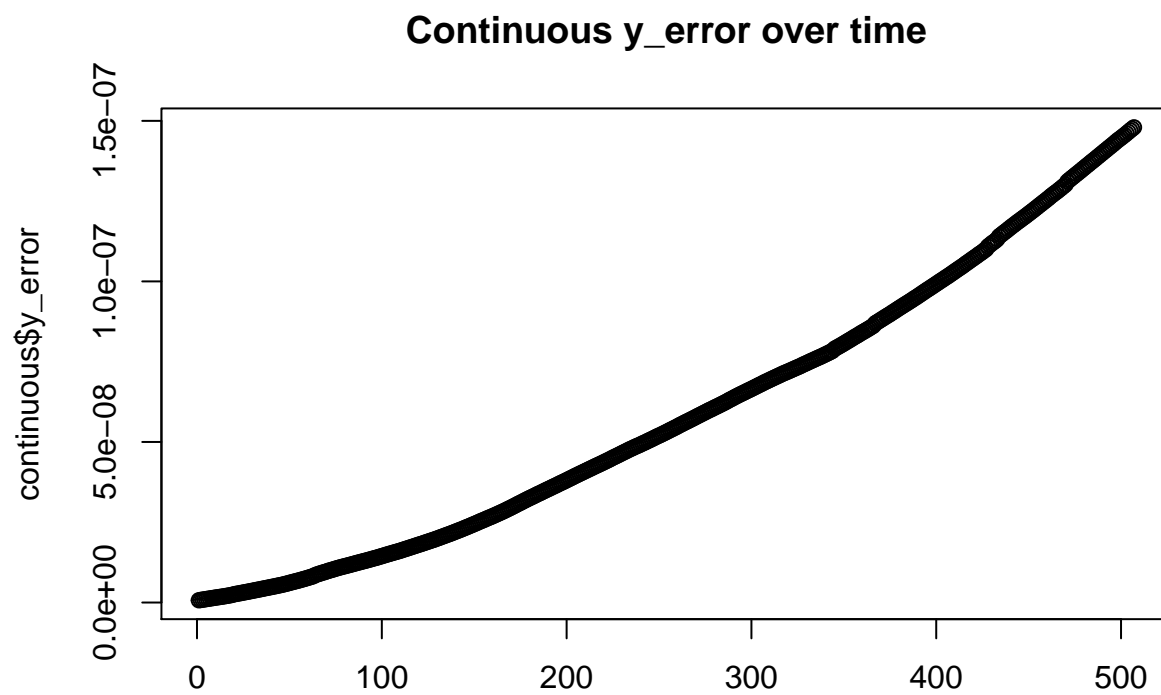


Continuous x_error over time

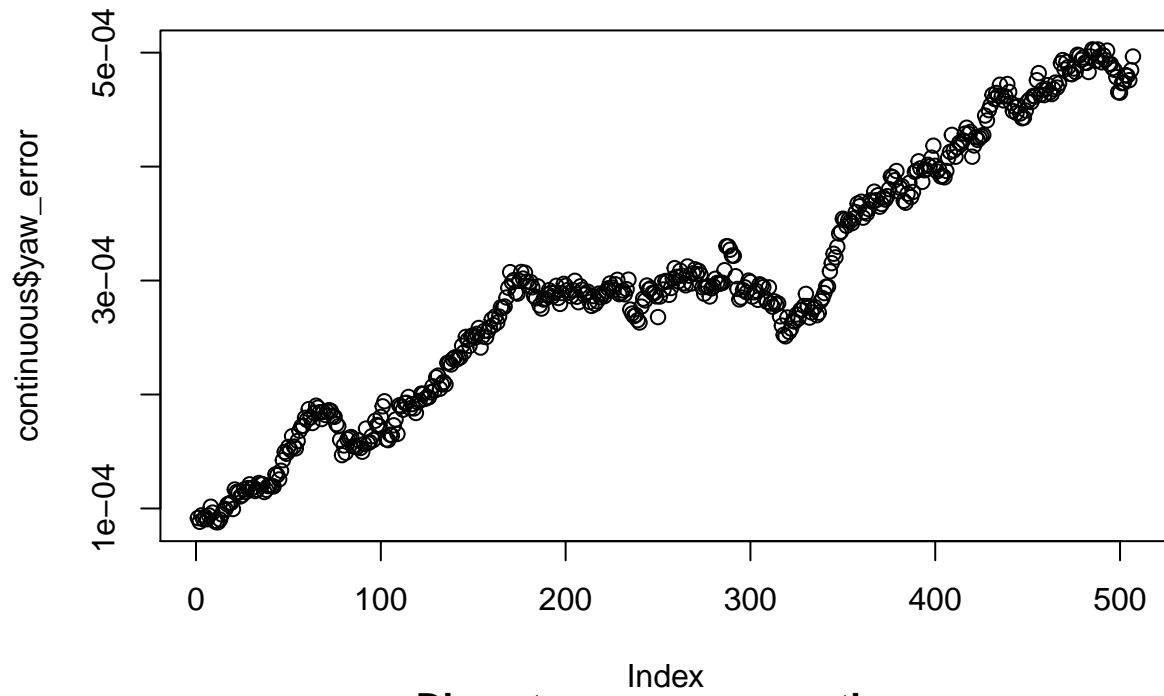


Discrete x_error over time

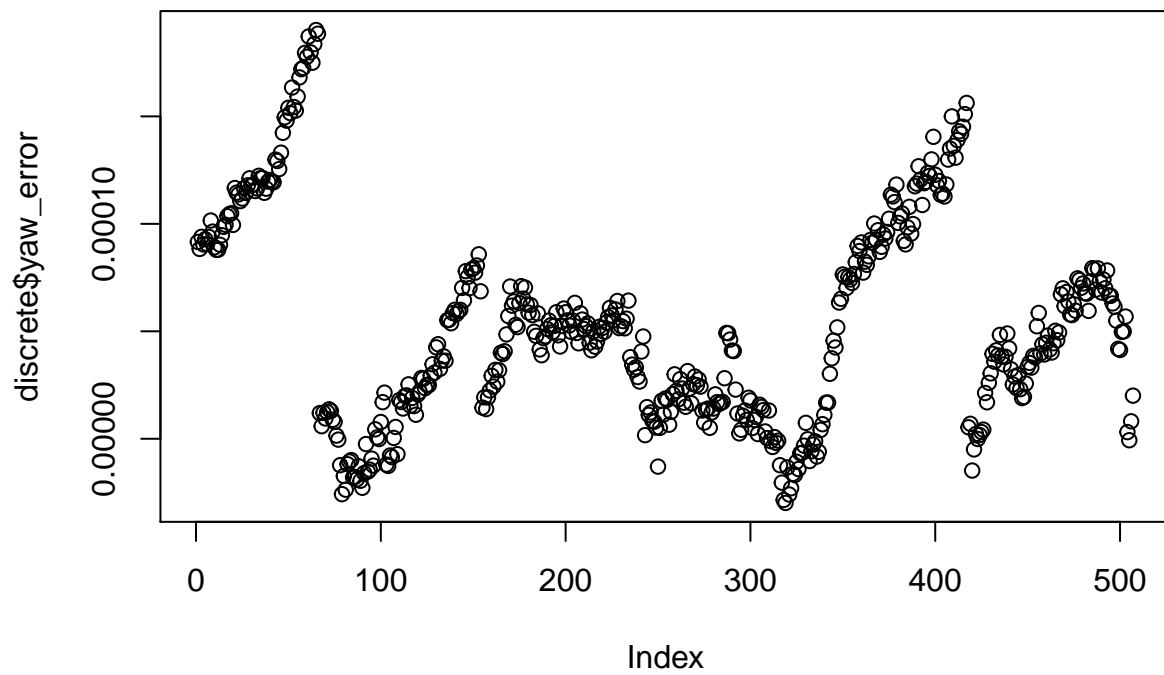




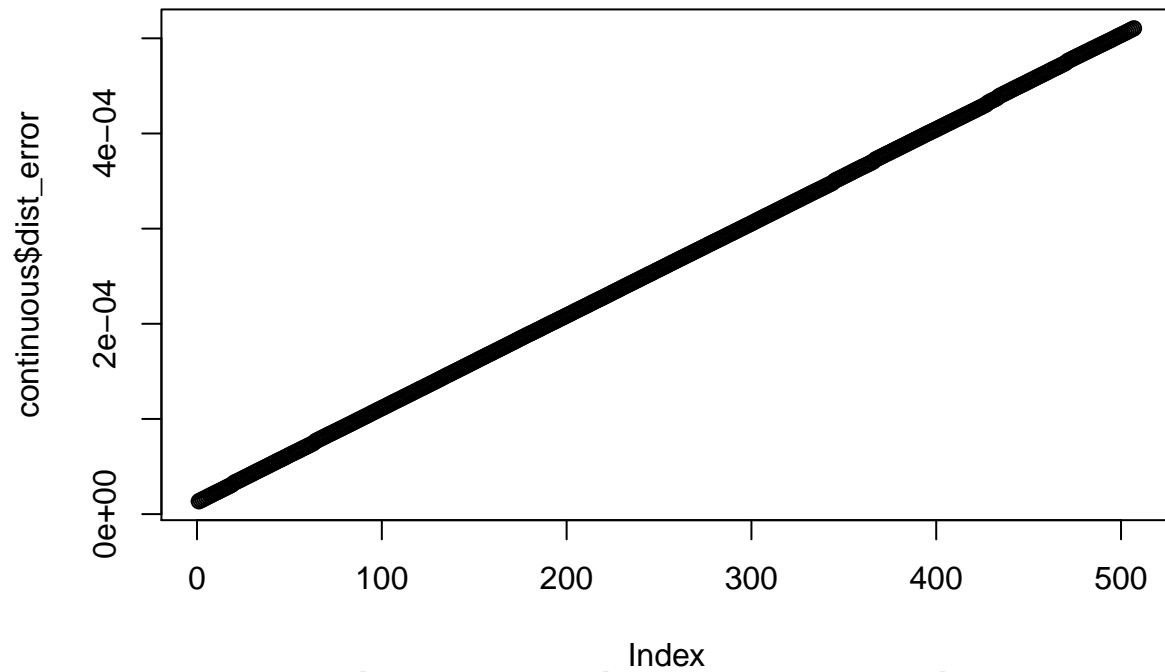
Continuous yaw error over time



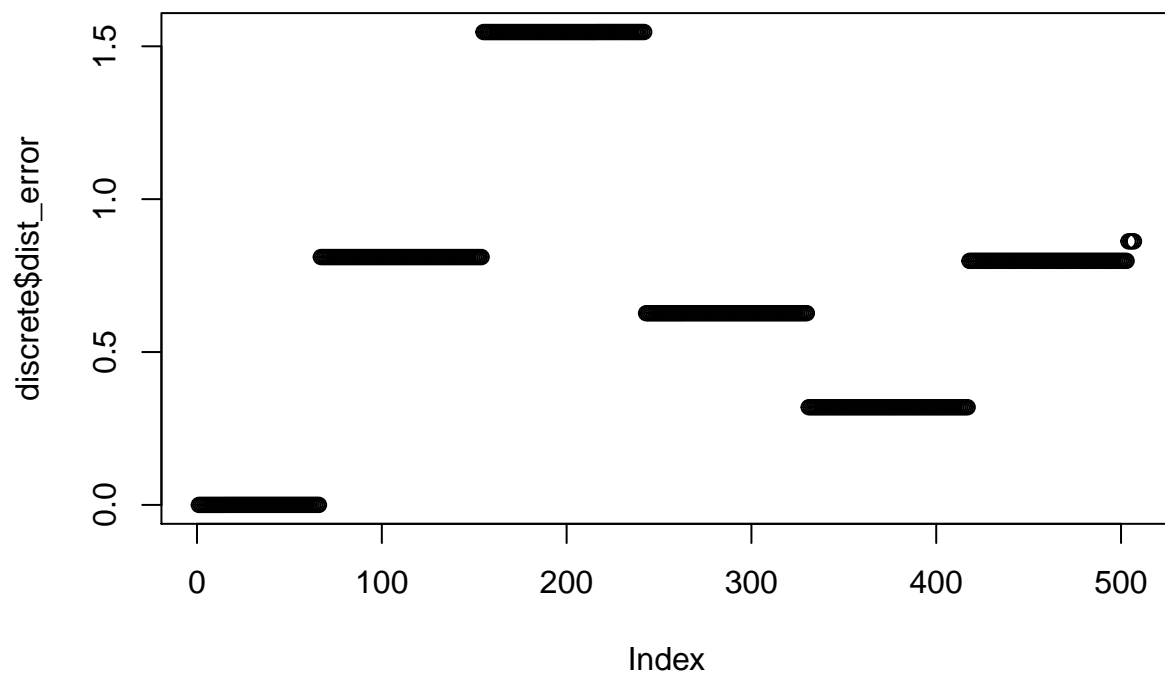
Discrete yaw error over time



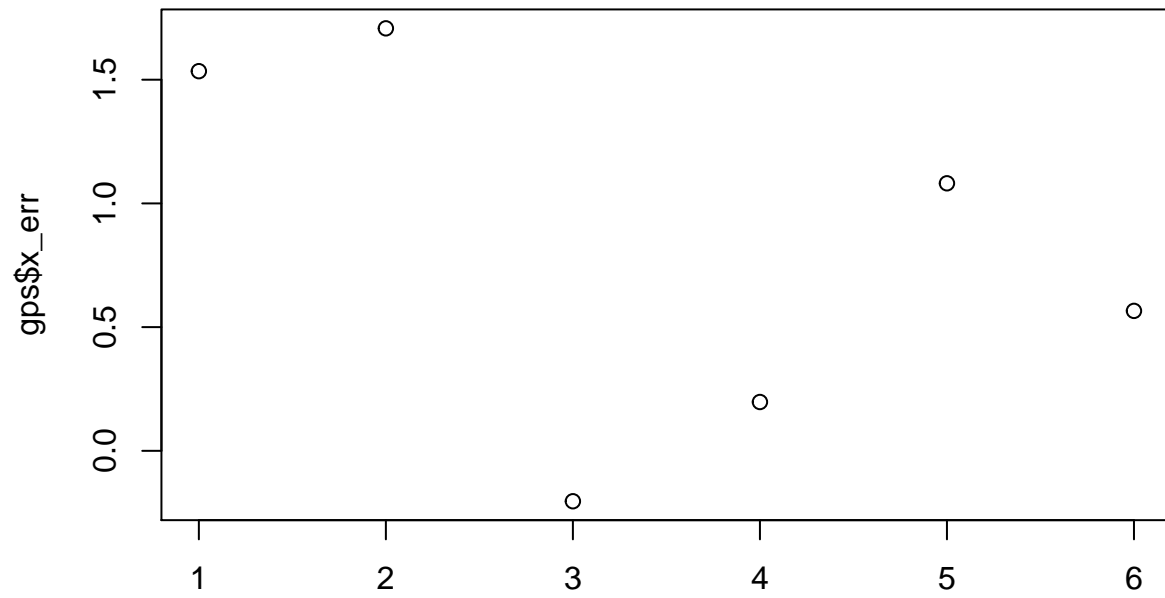
Continuous total distance error over time



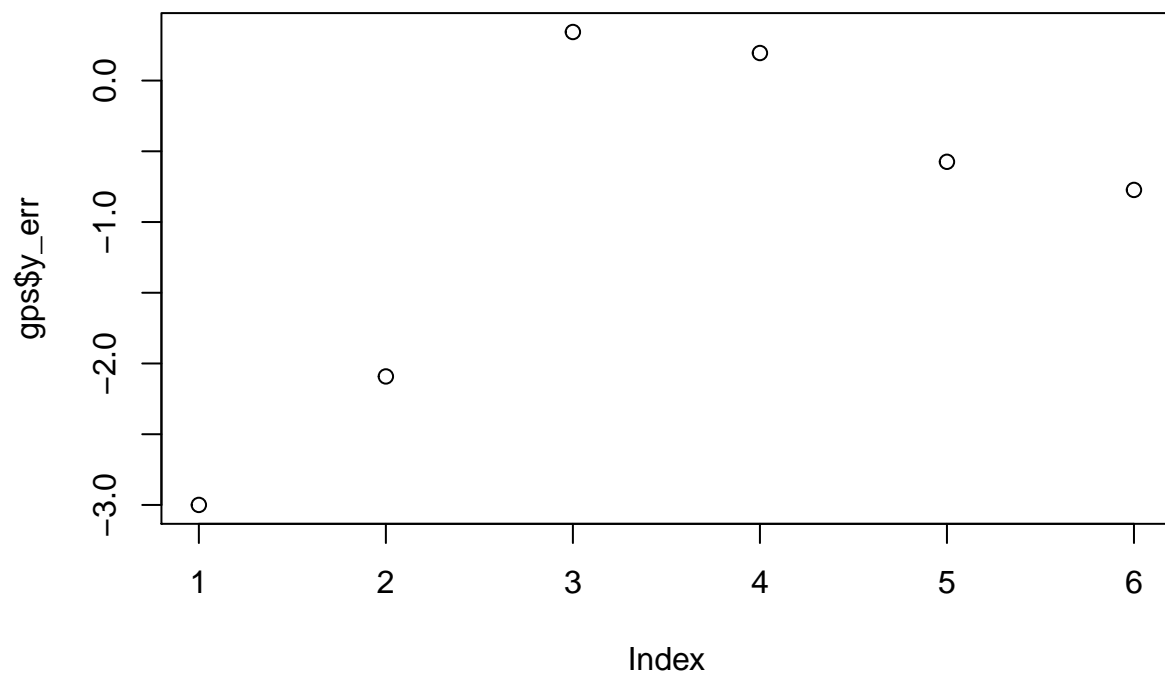
Discrete total distance error over time



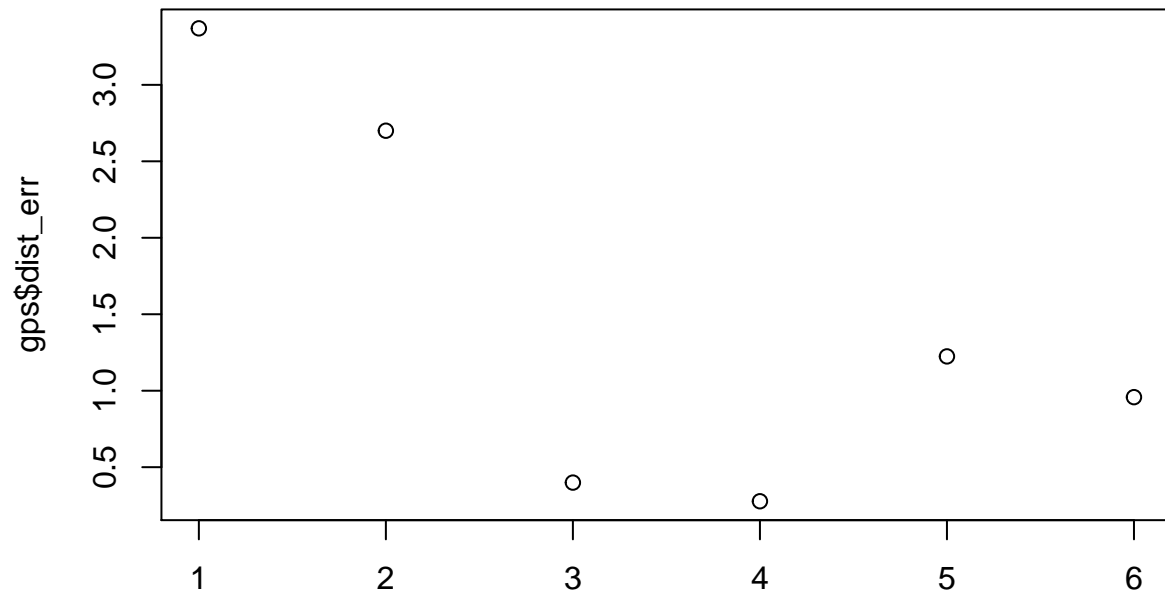
GPS X Error Over Time



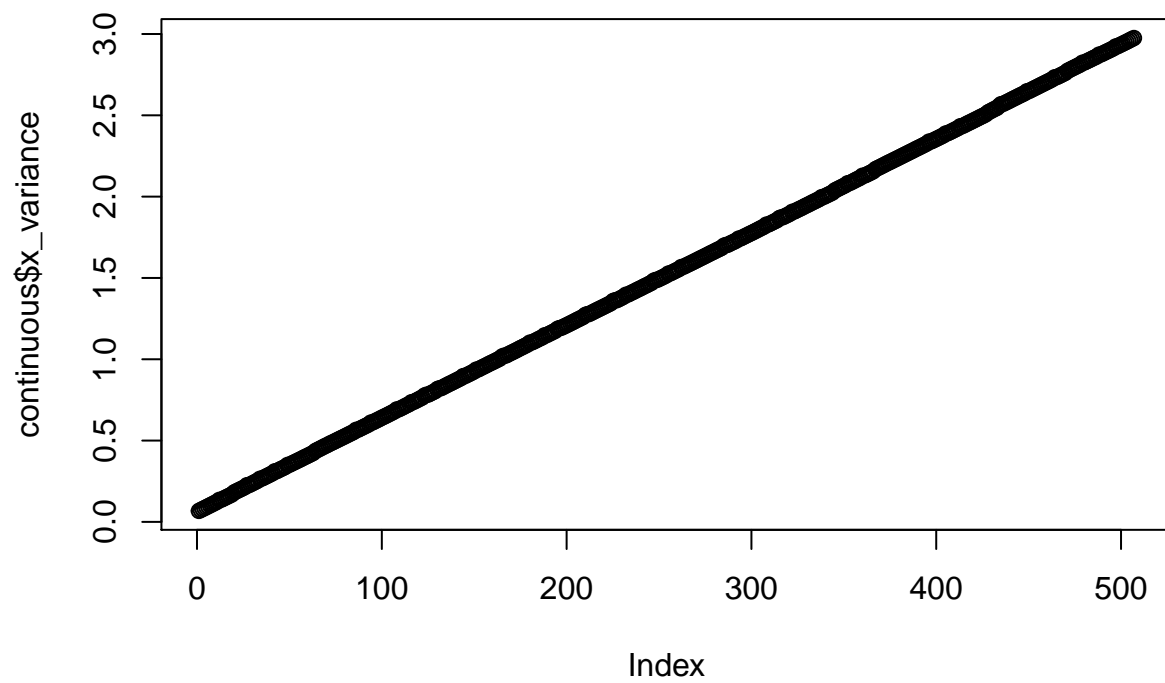
GPS Y Error Over Time



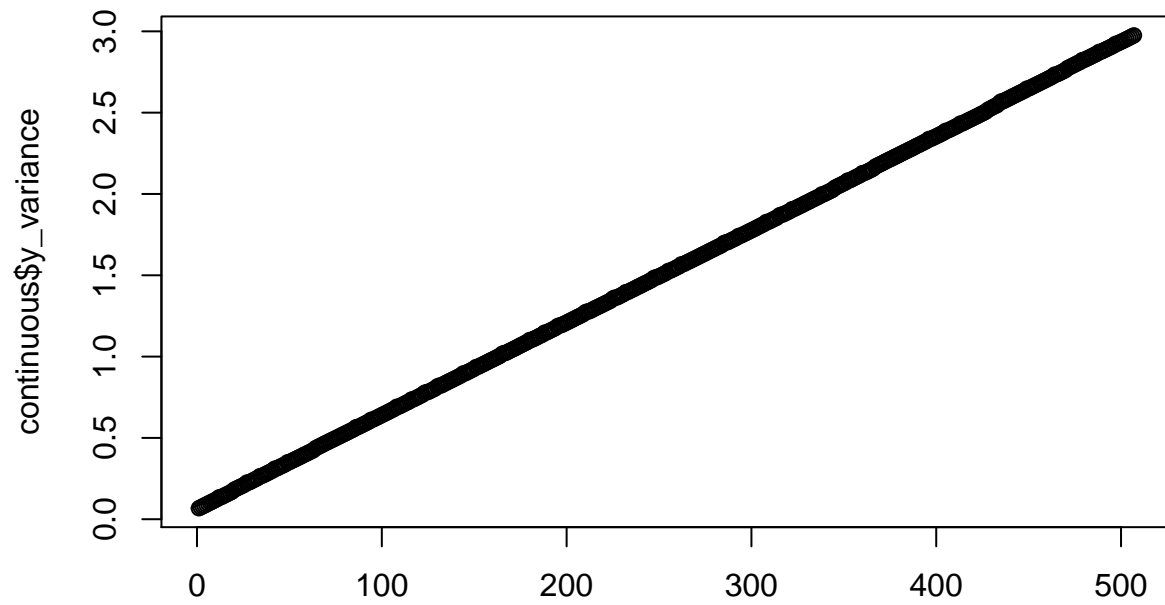
GPS Horizontal Distance Error Over Time



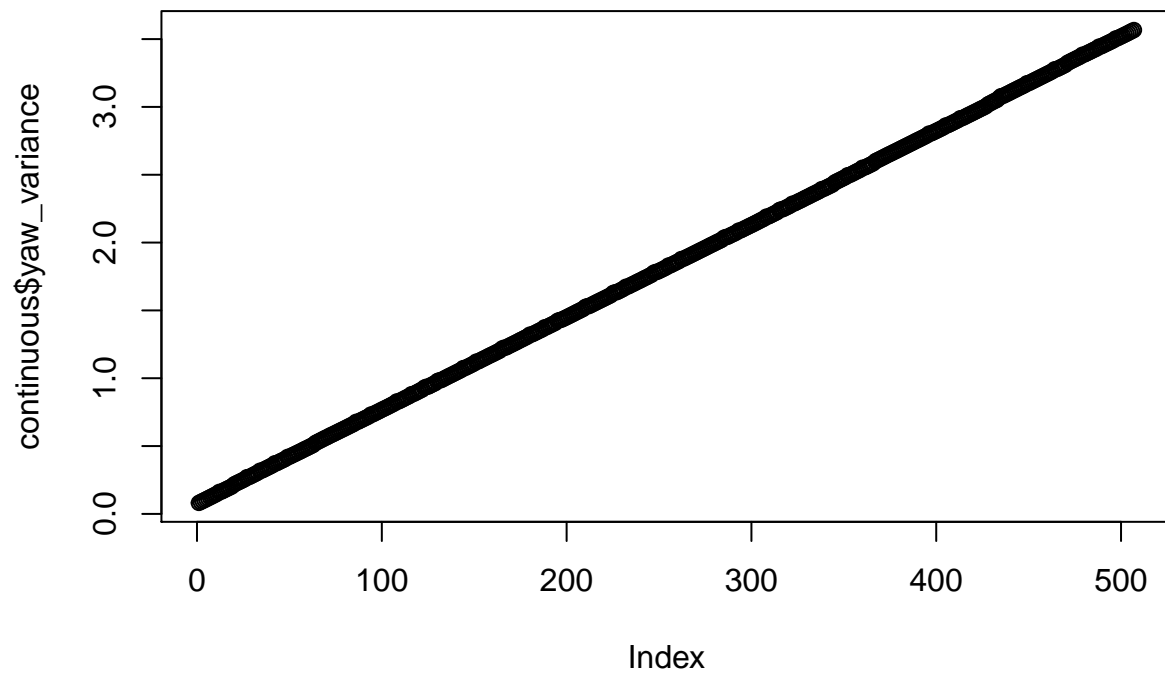
Continuous Filter X Variance Over Time



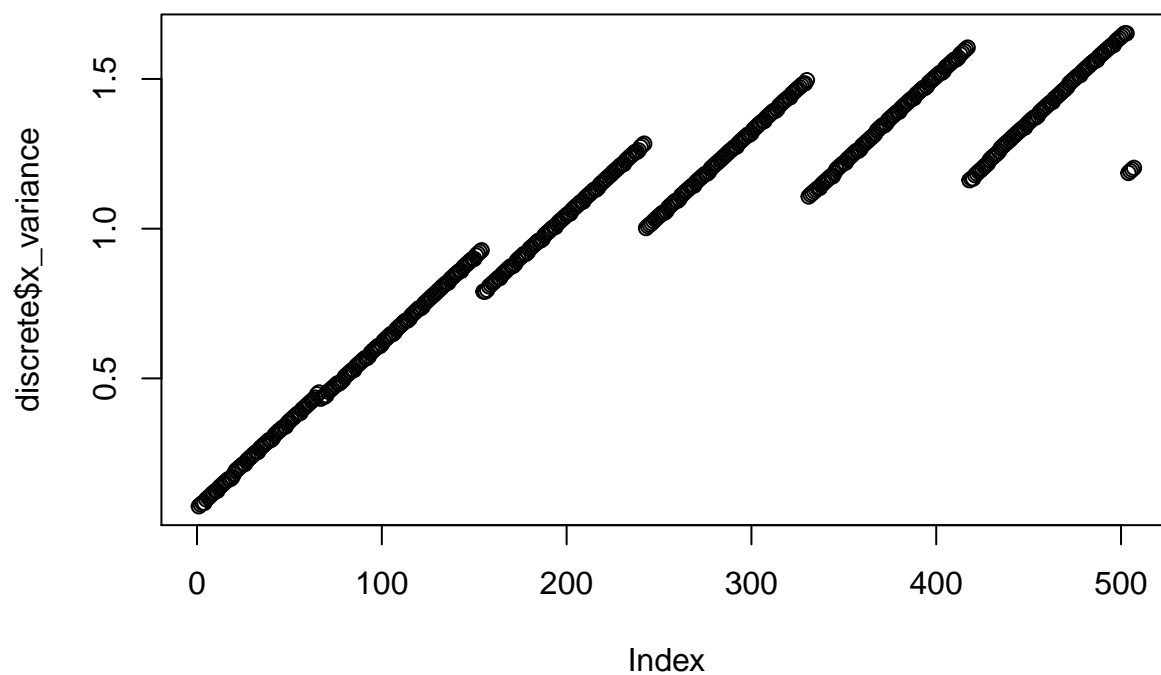
Continuous Filter Y Variance Over Time



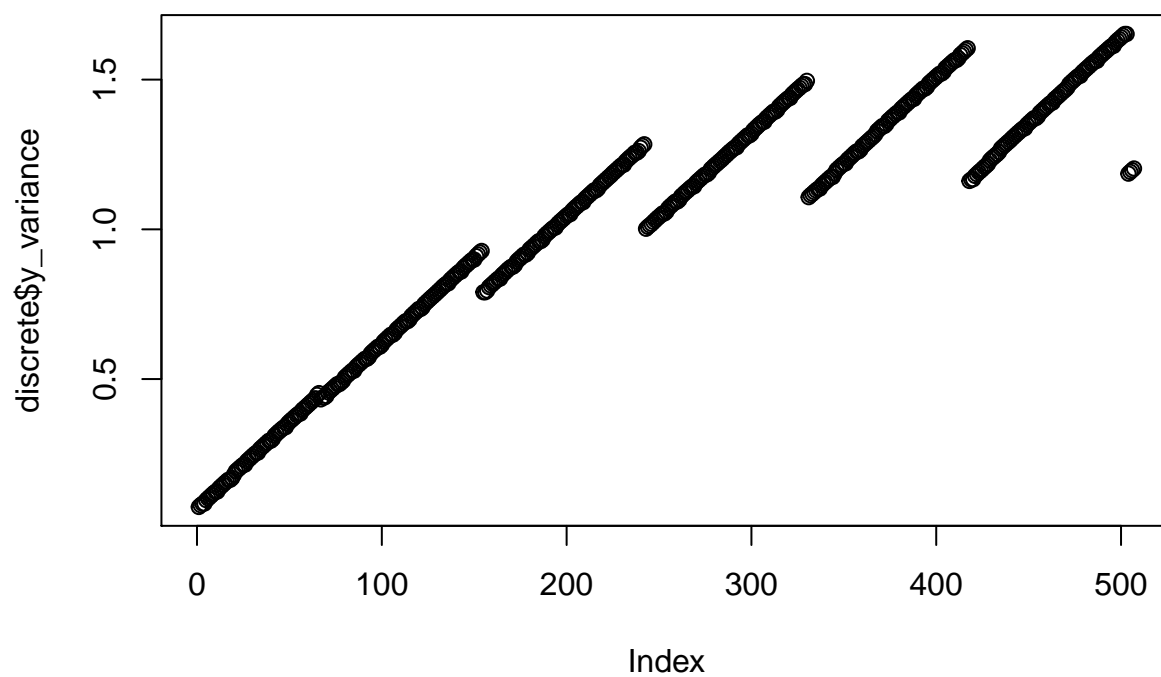
Continuous Filter Yaw Variance Over Time



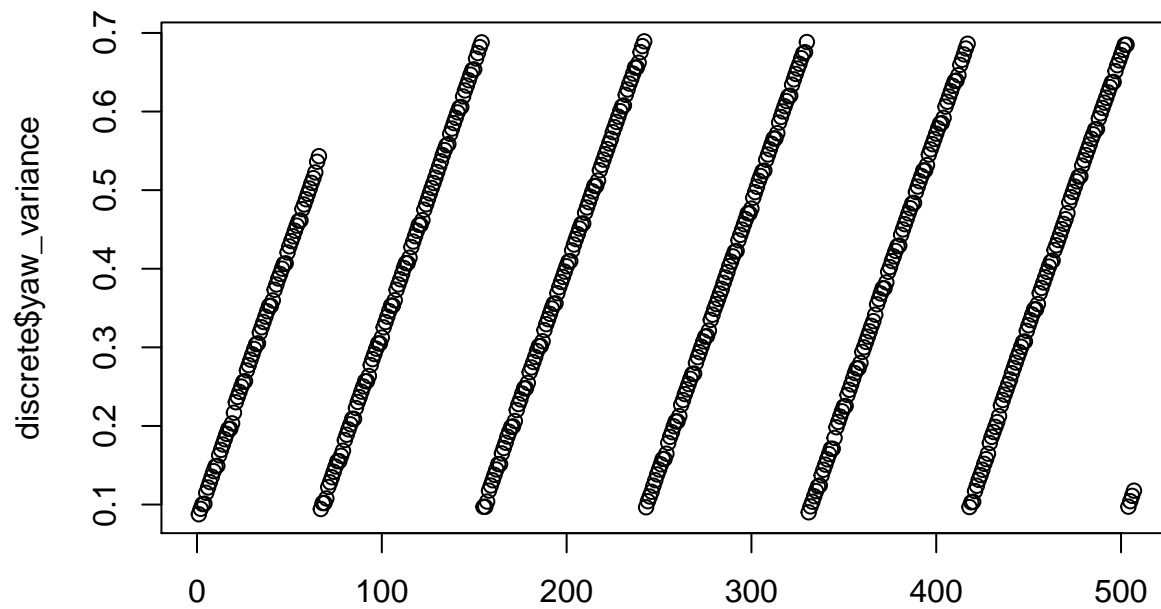
Discrete Filter X Variance Over Time



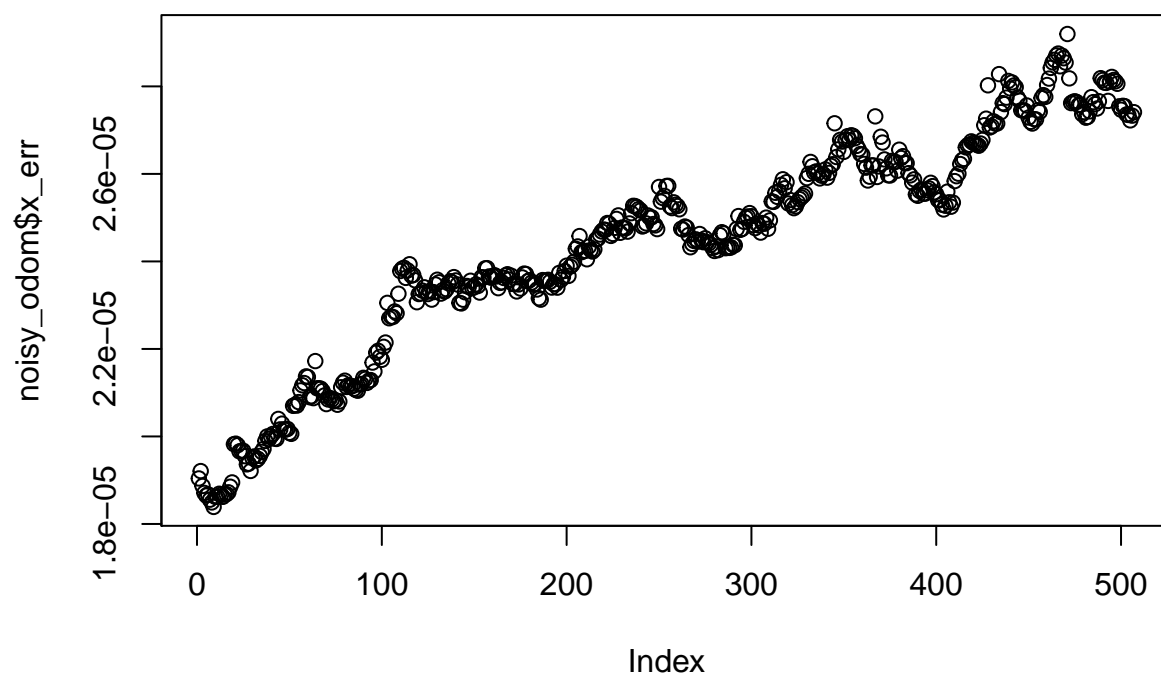
Discrete Filter Y Variance Over Time



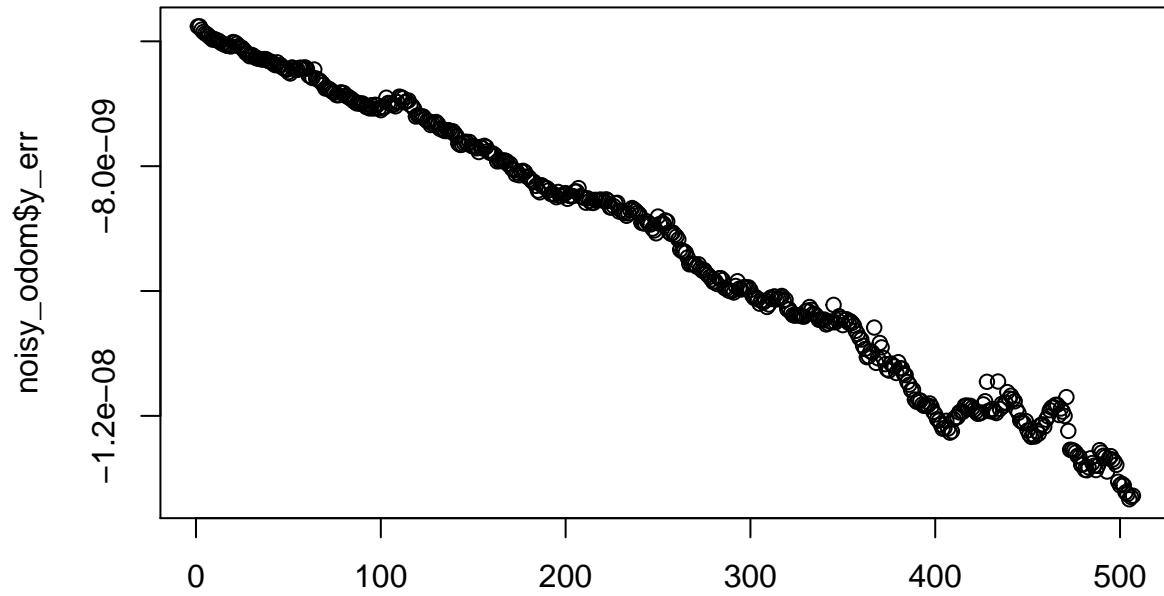
Discrete Filter Yaw Variance Over Time



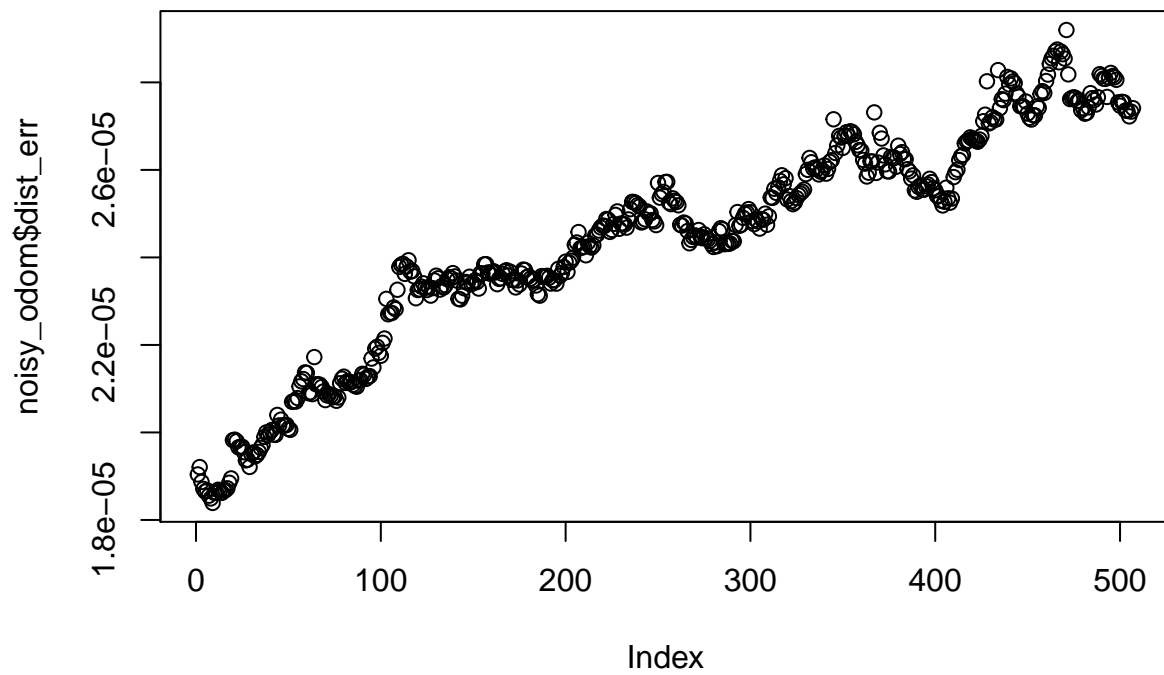
Noisy Odom X Error Over Time



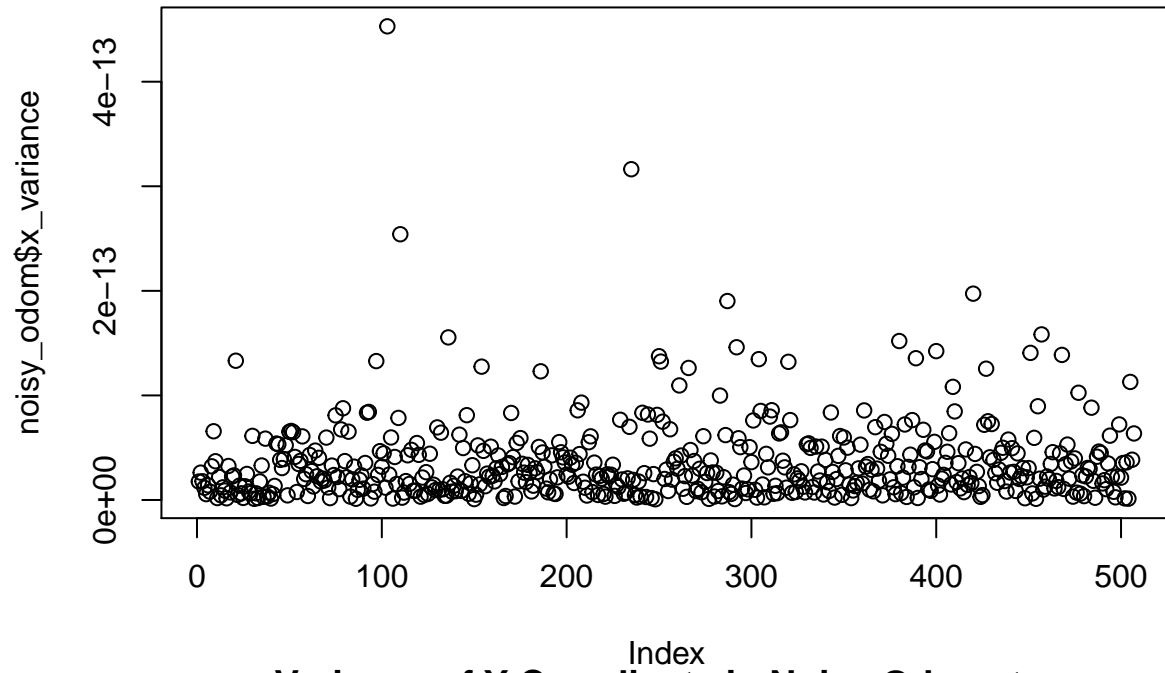
Noisy Odom Y Error Over Time



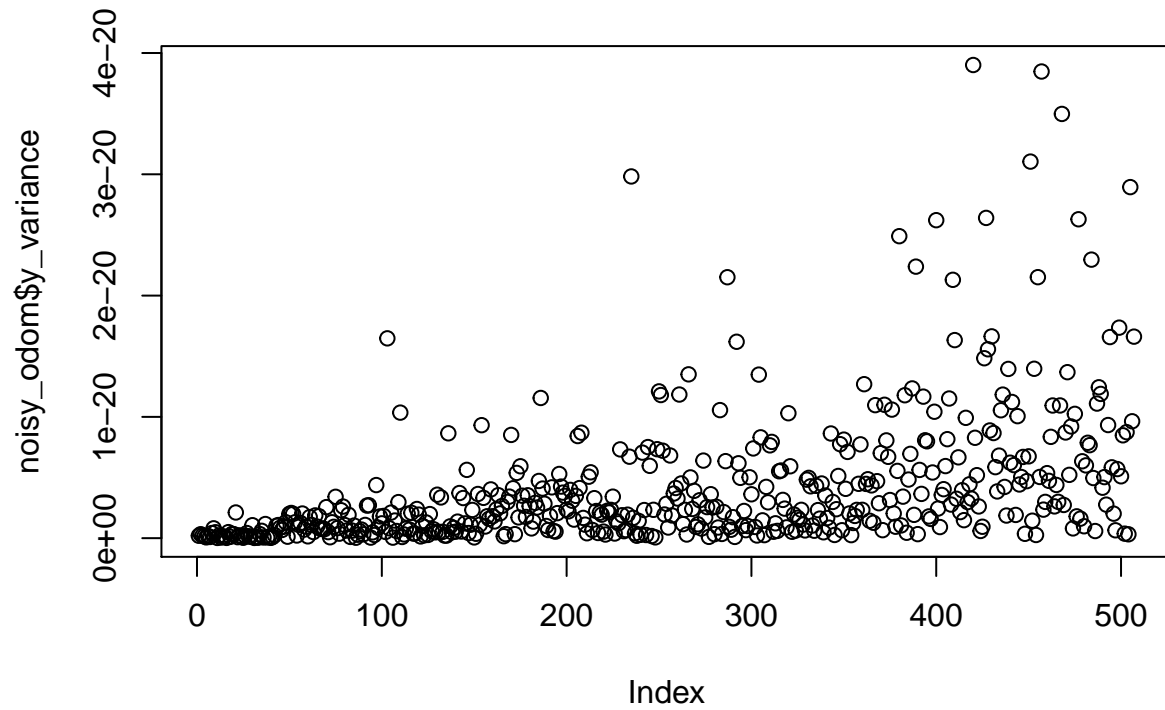
Noisy Odom Horizontal Distance Error Over Time



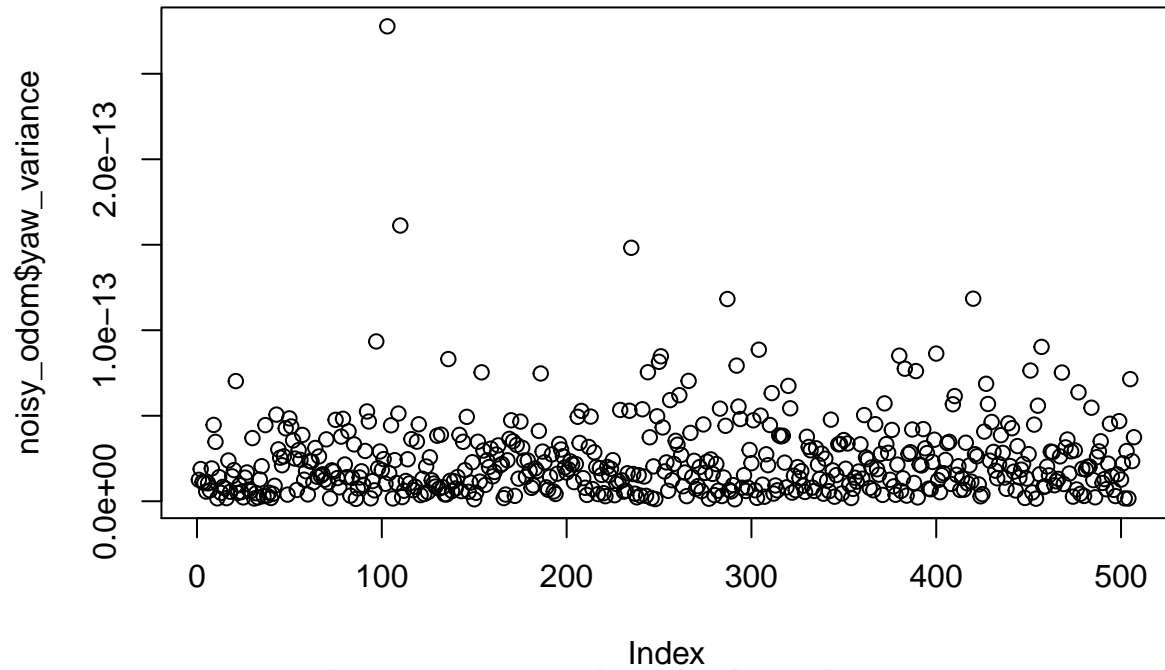
Variance of X Coordinate in Noisy Odometry



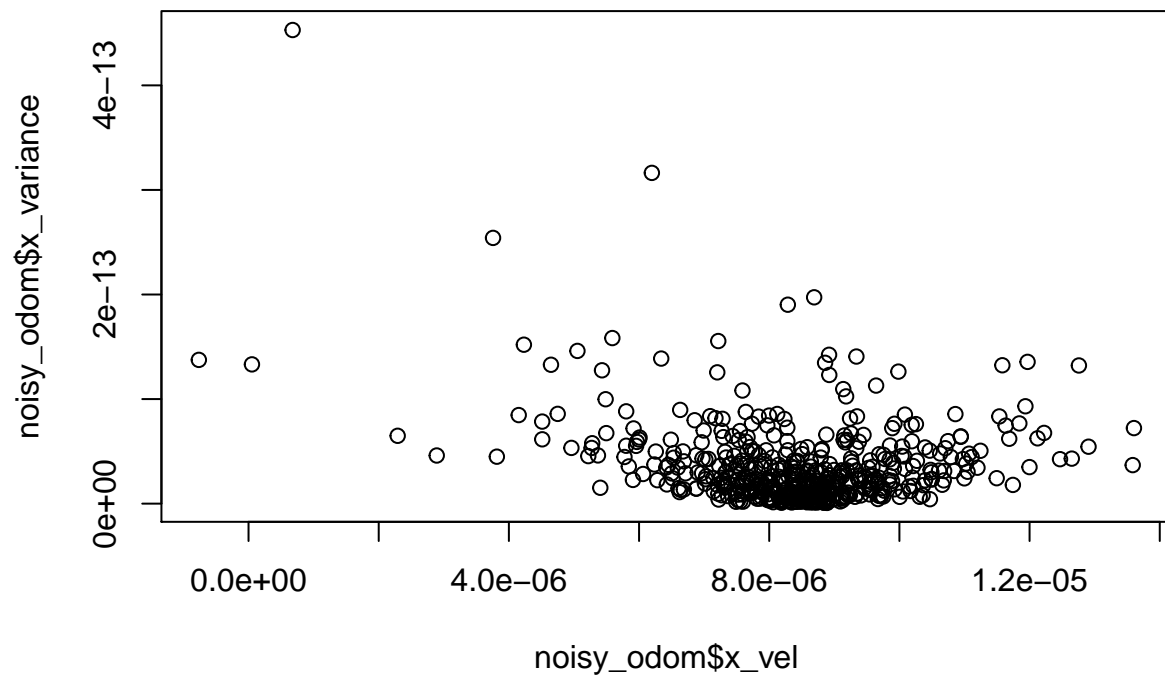
Variance of Y Coordinate in Noisy Odometry



Variance of Yaw Coordinate in Noisy Odometry



Variance vs. Velocity of X in Noisy Odometry



Variance vs. Velocity of Yaw in Noisy Odometry

