

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, 0 minutes, and 49.6 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.
## 1.477e-05 1.377e-04 2.622e-04 2.628e-04 3.880e-04 5.129e-04
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 1.028e-09 1.366e-08 3.172e-08 4.198e-08 6.616e-08 1.182e-07
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 5.879e-05 1.209e-04 1.936e-04 2.345e-04 3.622e-04 4.535e-04
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 1.477e-05 1.377e-04 2.622e-04 2.628e-04 3.880e-04 5.129e-04
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 7.693e-06 2.818e-05 4.827e-05 4.875e-05 6.911e-05 9.170e-05
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 7.188e-10 4.025e-09 7.403e-09 1.040e-08 1.423e-08 3.799e-08
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## -3.779e-05 1.215e-05 3.747e-05 4.466e-05 7.585e-05 1.397e-04
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 7.693e-06 2.818e-05 4.827e-05 4.875e-05 6.911e-05 9.170e-05
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## -5.350e-06 -4.180e-06 -3.169e-06 -3.193e-06 -2.410e-06 3.877e-07
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 6.570e-09 6.915e-09 7.452e-09 7.566e-09 8.212e-09 8.959e-09
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 2.166e-07 2.410e-06 3.169e-06 3.195e-06 4.180e-06 5.350e-06
```

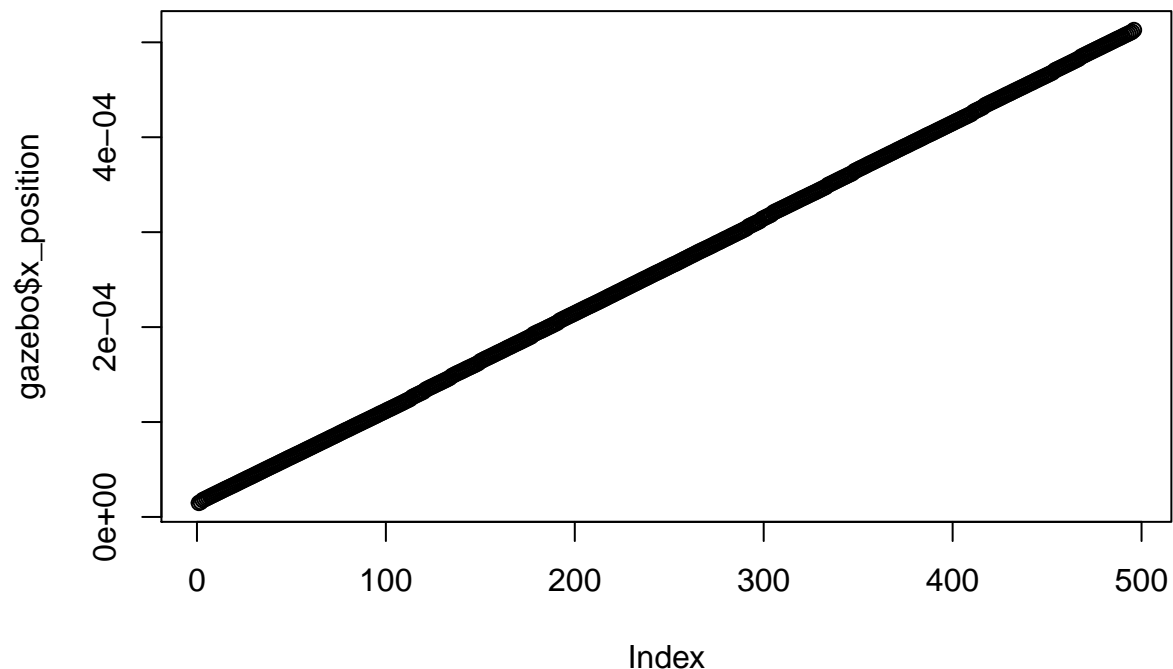
```
if (NROW(gps) > 0) {
  summary(gps$x_err)
  summary(gps$y_err)
  summary(gps$dist_err)
}
```

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 8.077e-05 1.882e-04 2.950e-04 2.951e-04 4.023e-04 5.092e-04
```

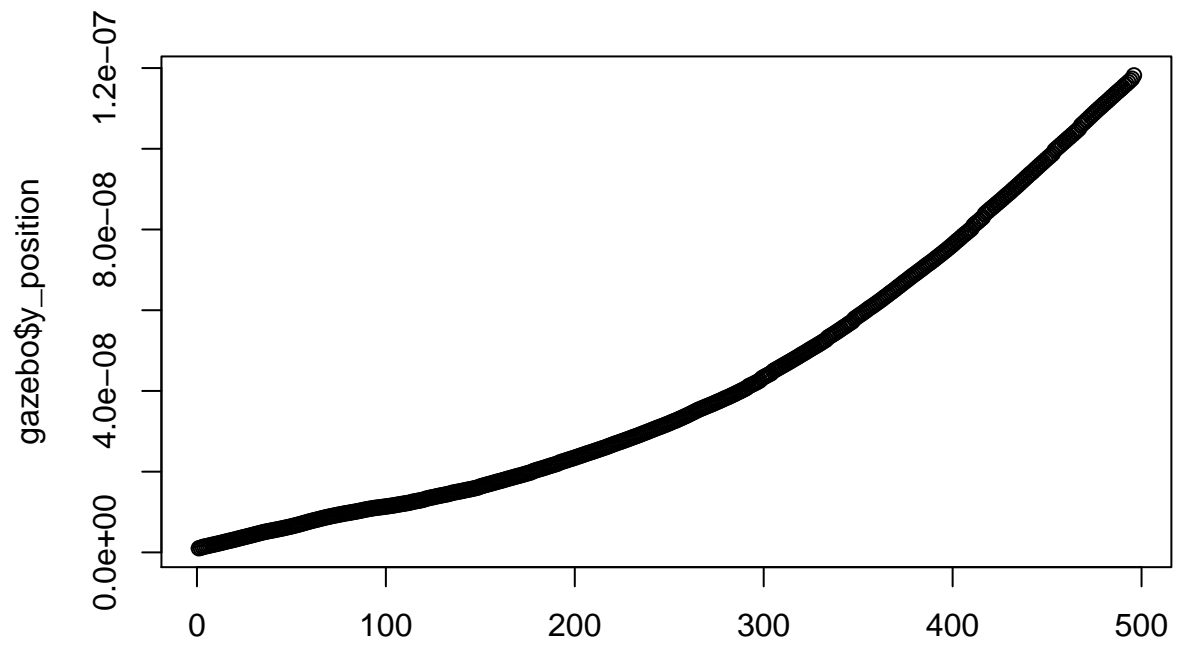
```
if (NROW(noisy_odom) > 0) {
  summary(noisy_odom$x_variance)
  summary(noisy_odom$y_variance)
  summary(noisy_odom$yaw_variance)
}
```

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 1.194e-15 8.354e-15 1.759e-14 2.390e-14 3.001e-14 2.500e-13
```

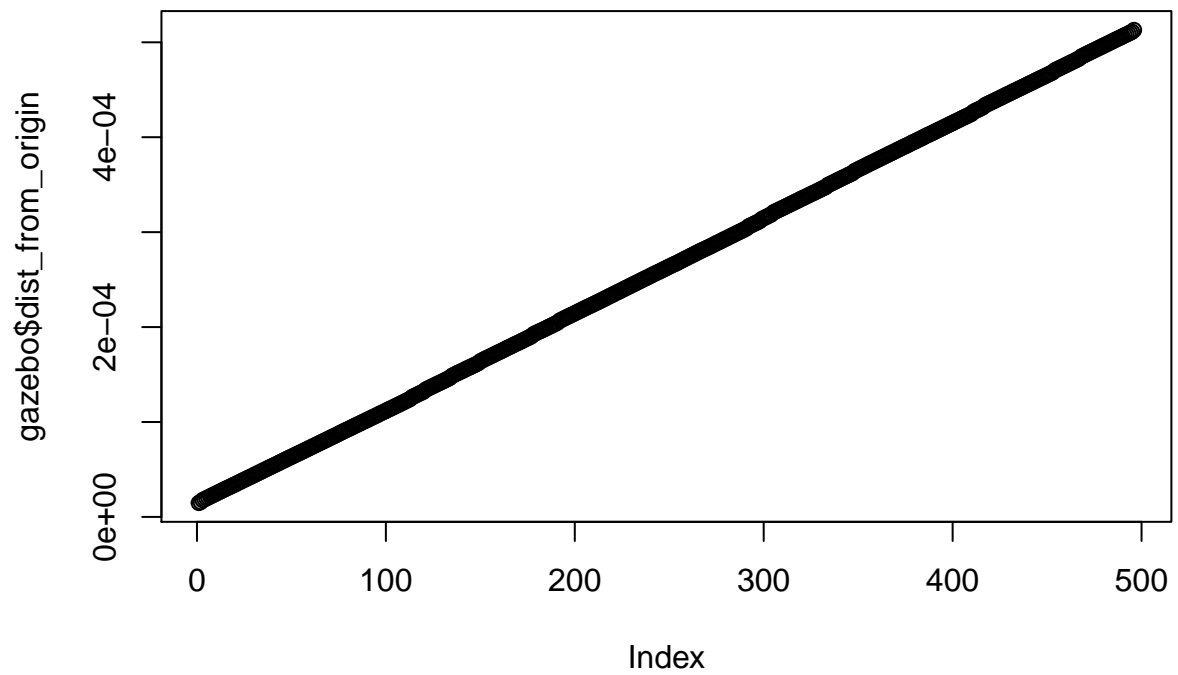
X coordinate of robot over time



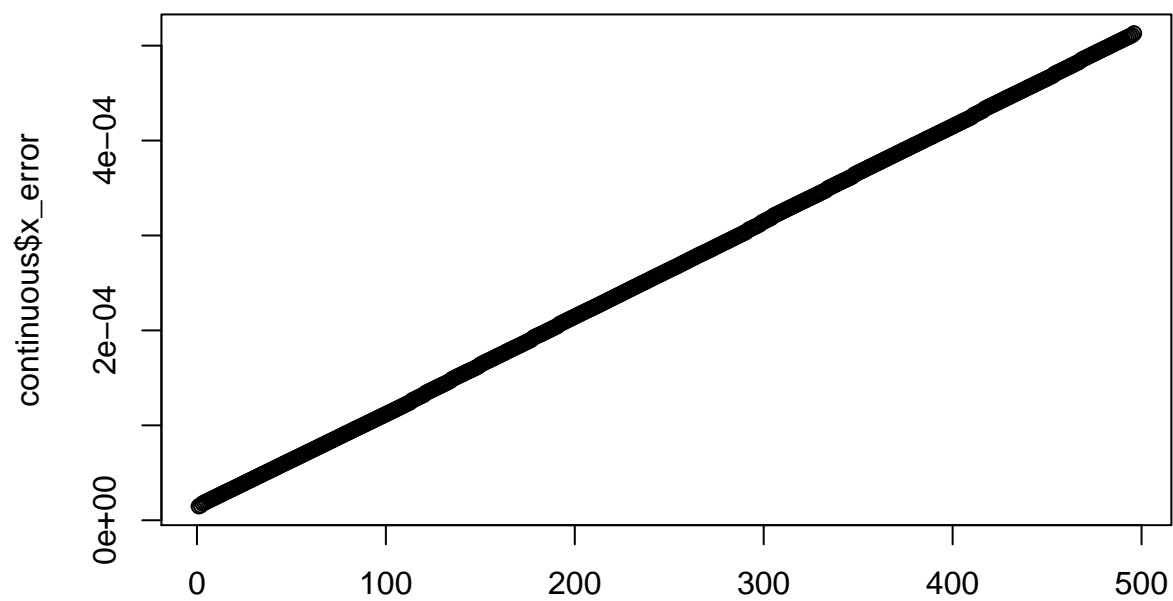
Y coordinate of robot over time



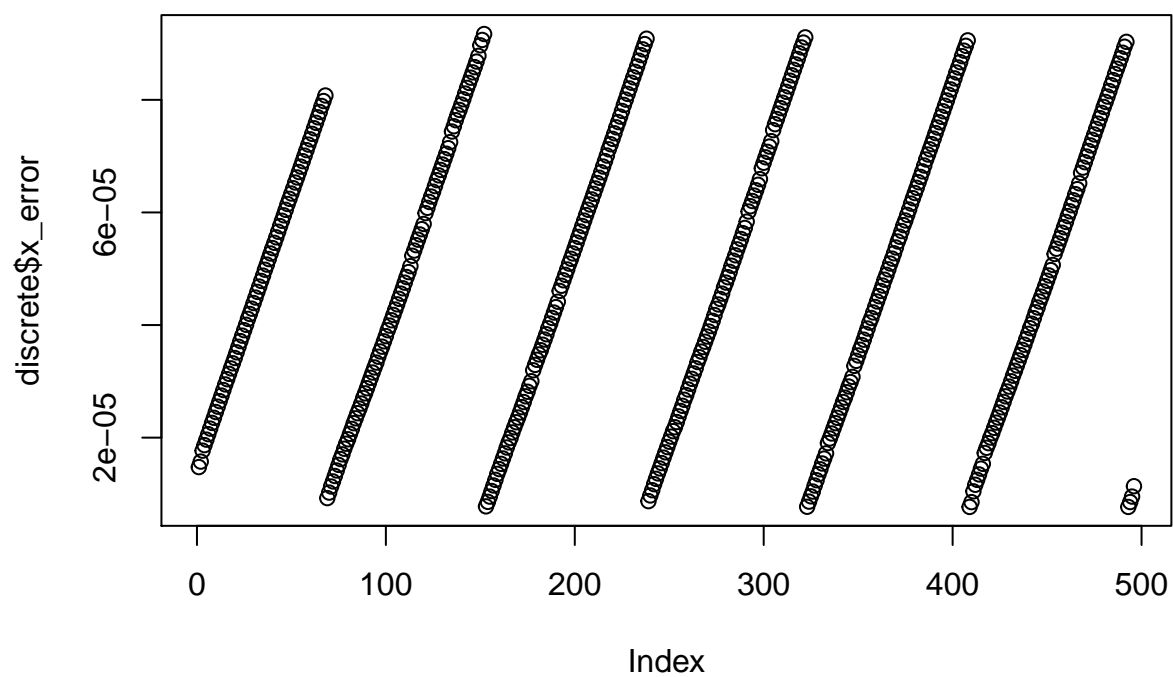
Distance from origin vs. time

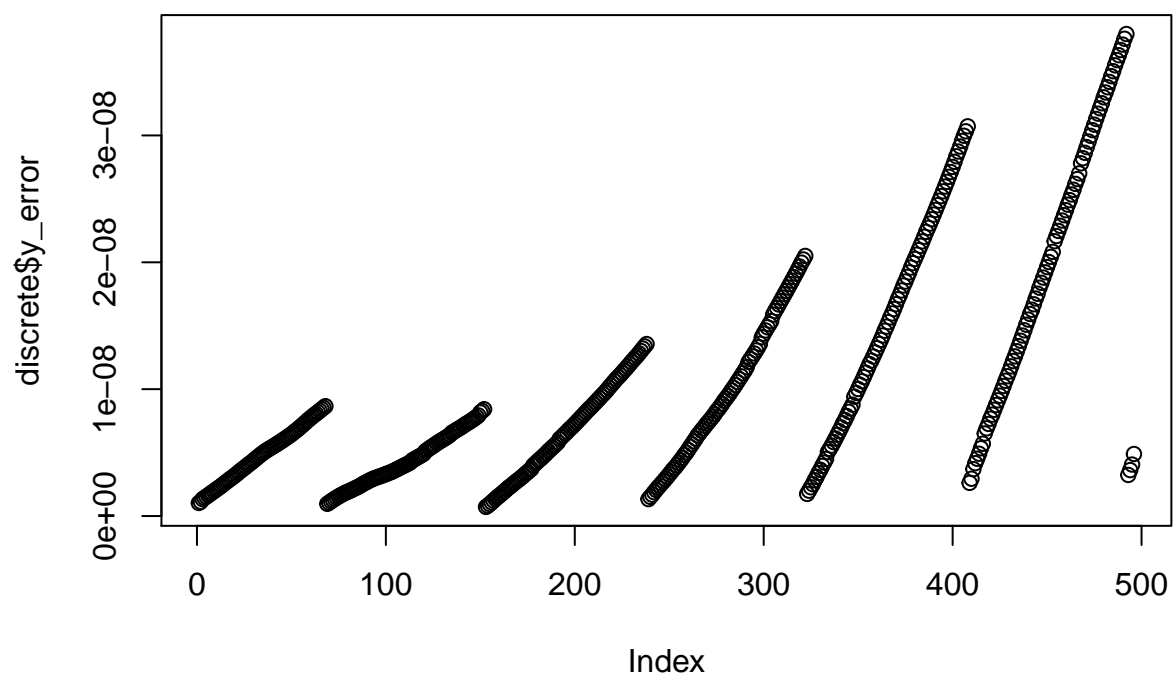
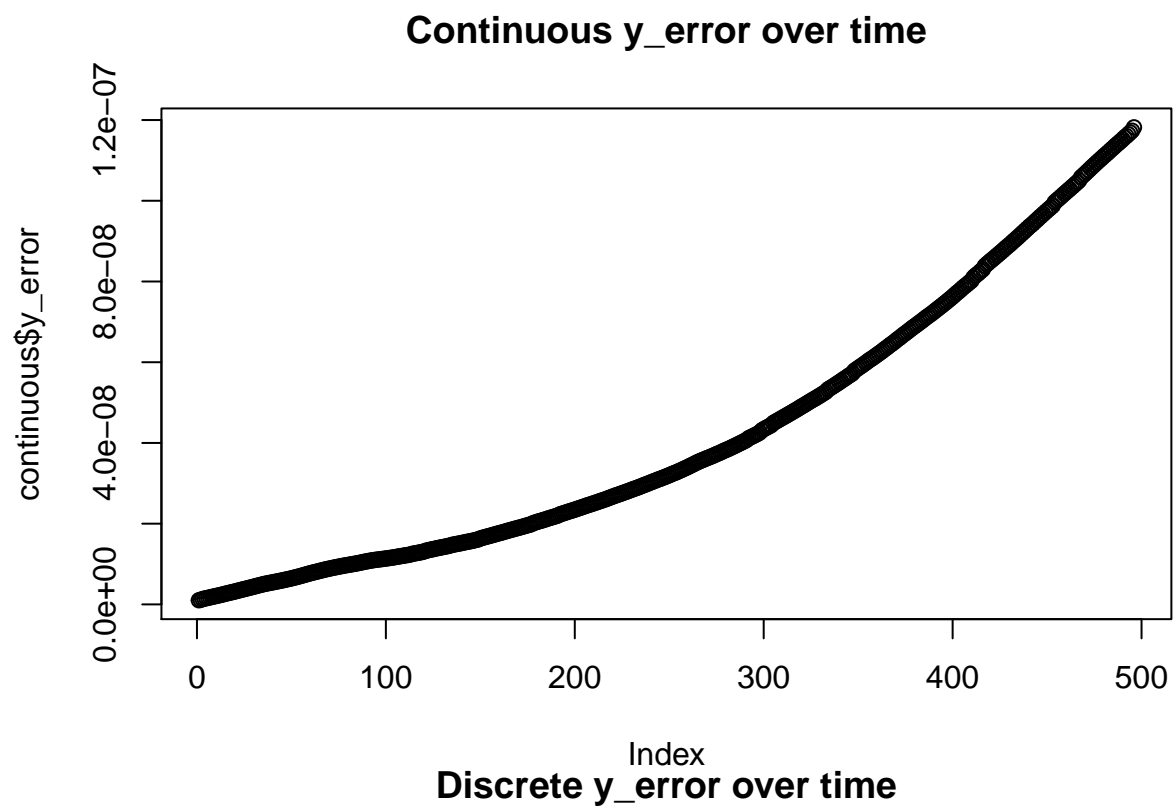


Continuous x_error over time

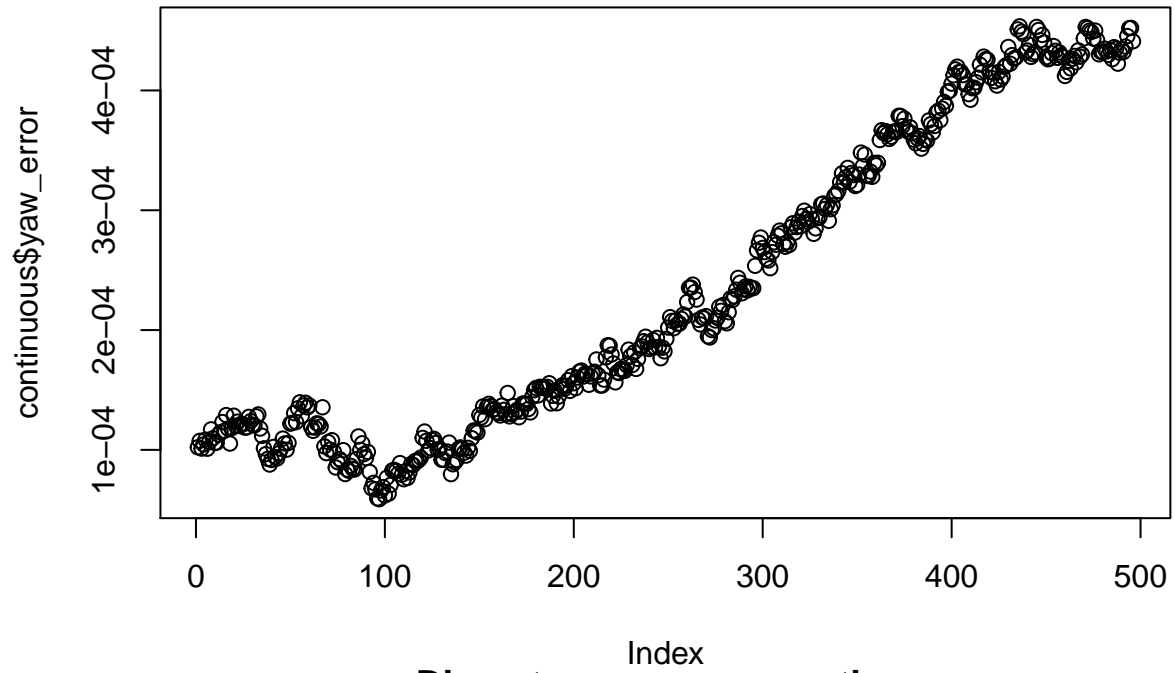


Discrete x_error over time

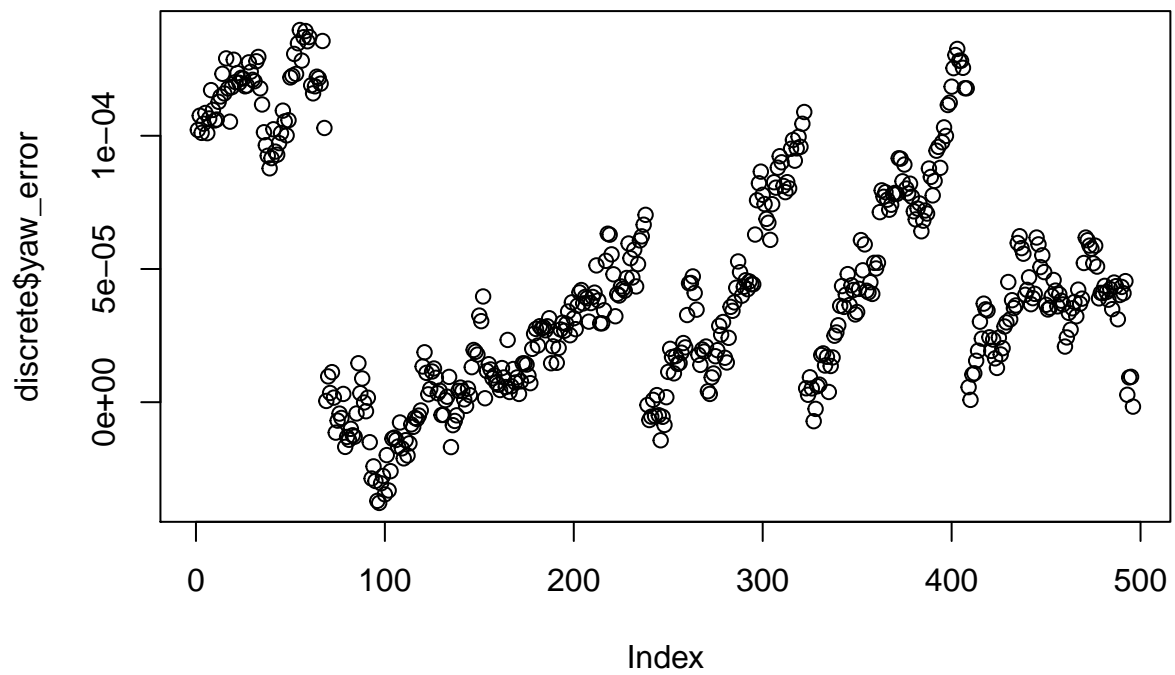




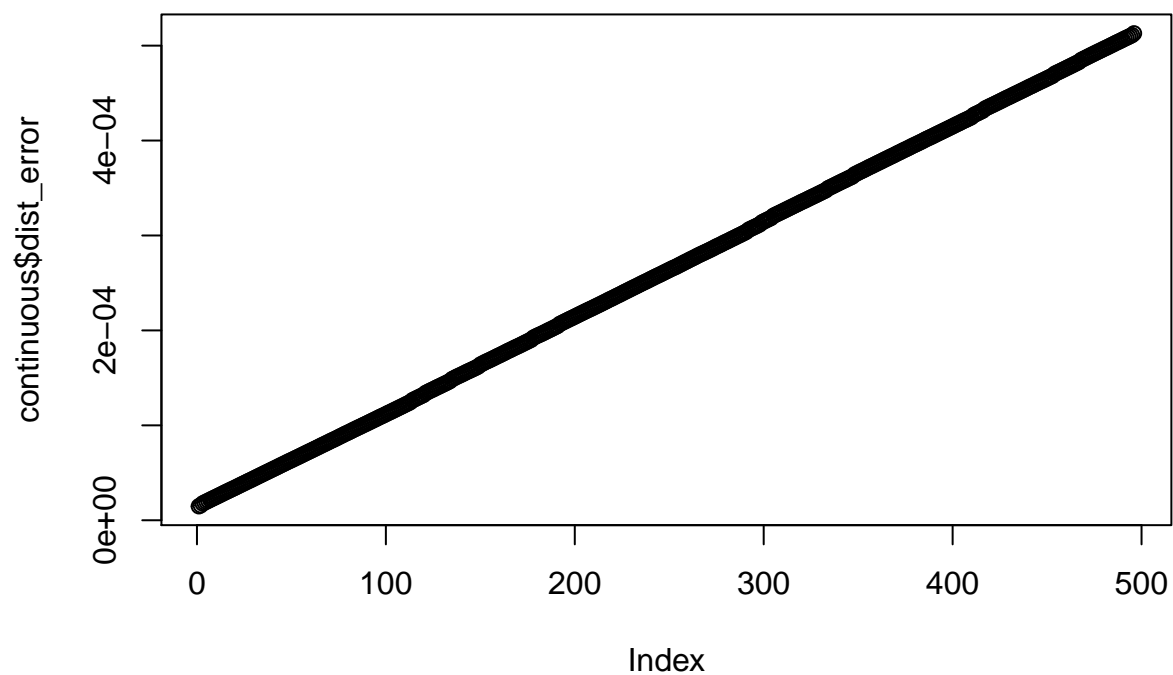
Continuous yaw error over time



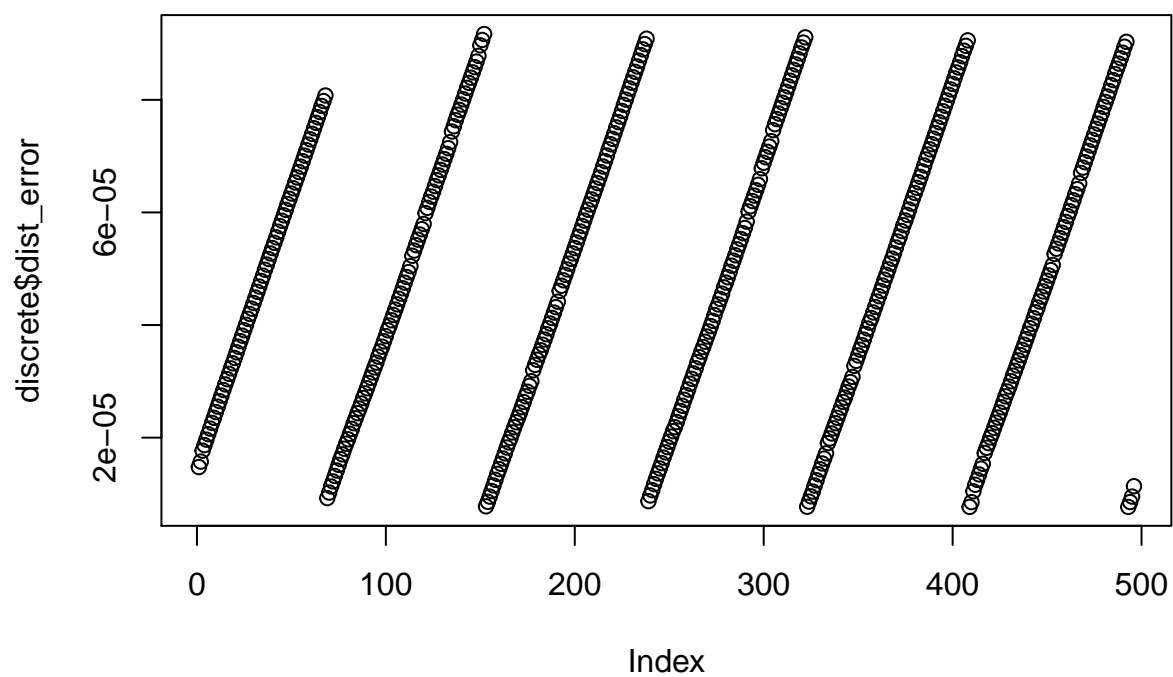
Discrete yaw error over time



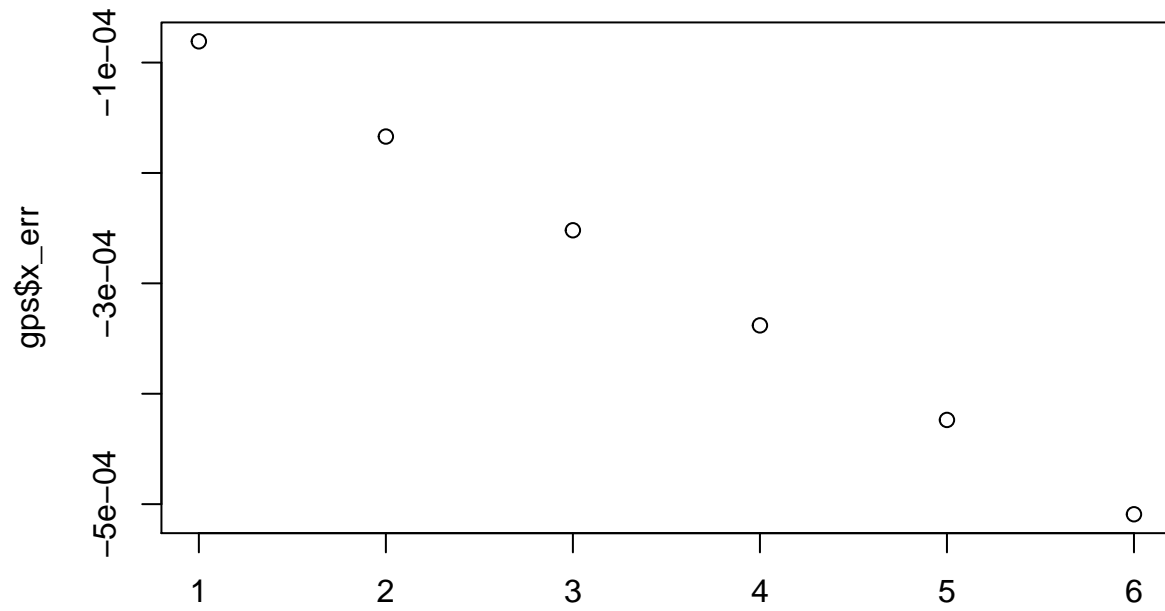
Continuous total distance error over time



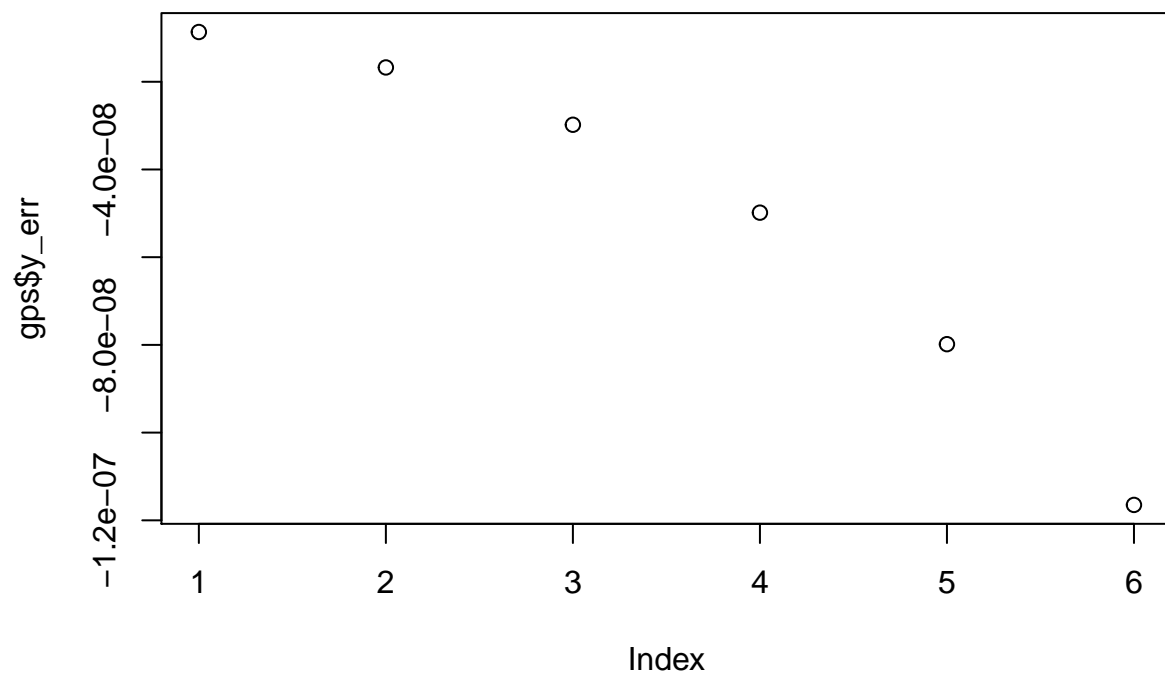
Discrete total distance error over time



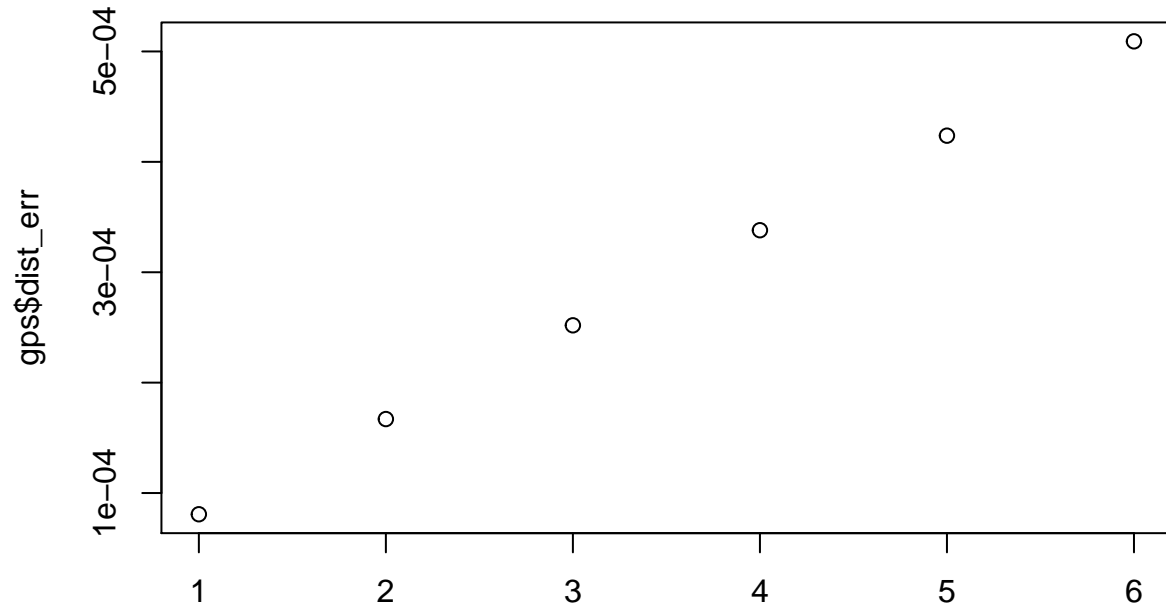
GPS X Error Over Time



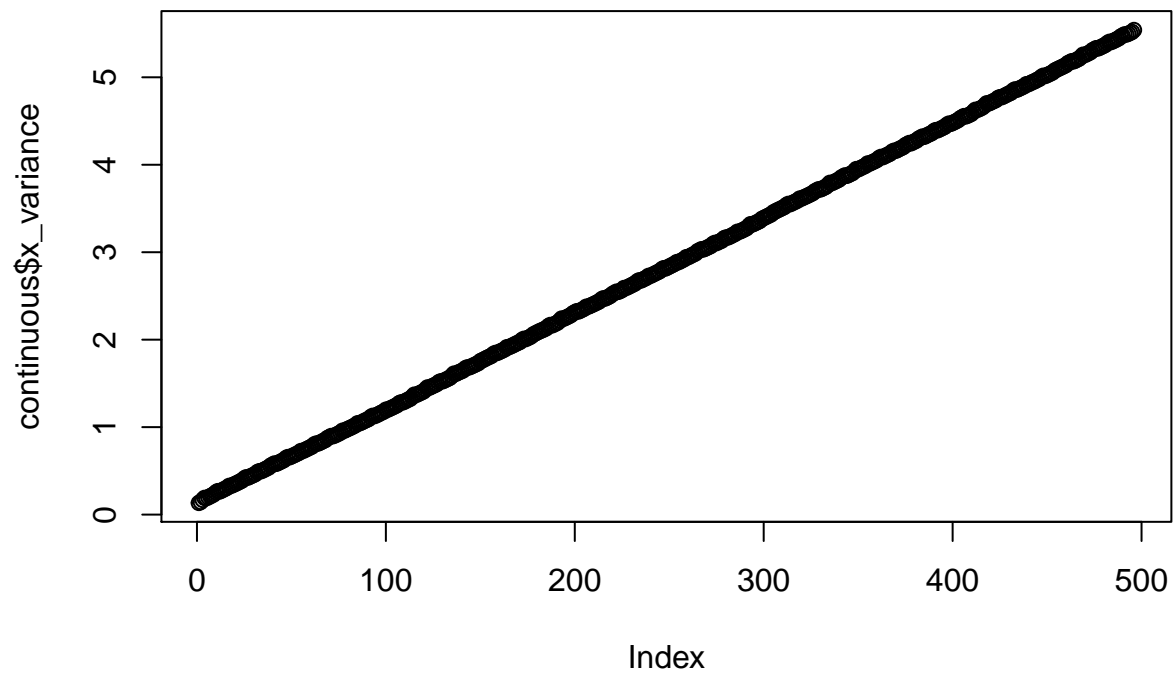
GPS Y Error Over Time



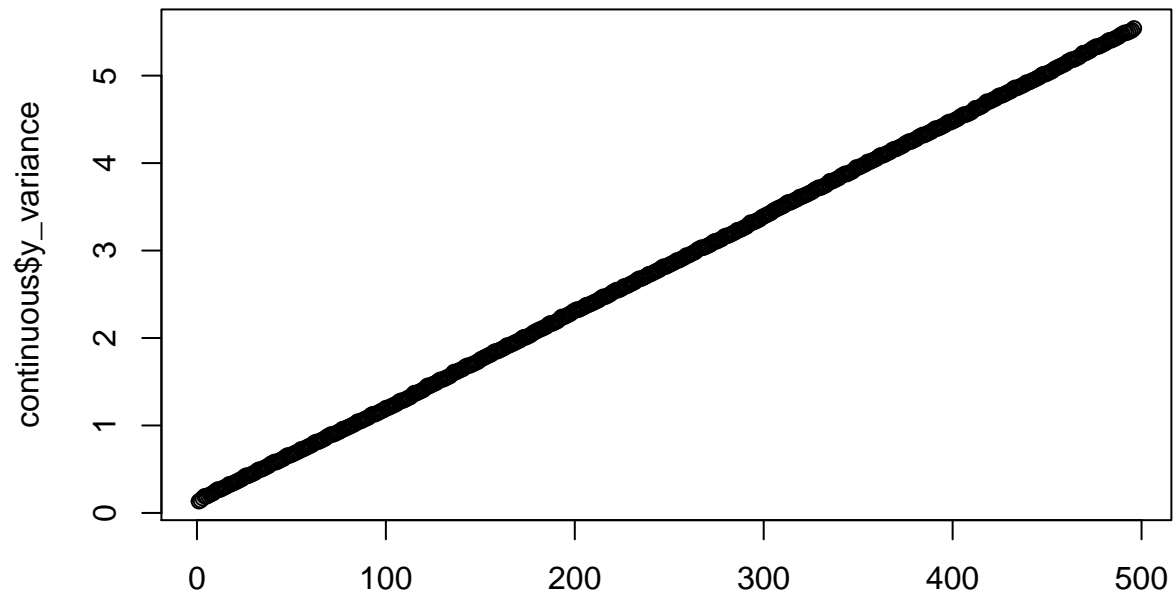
GPS Horizontal Distance Error Over Time



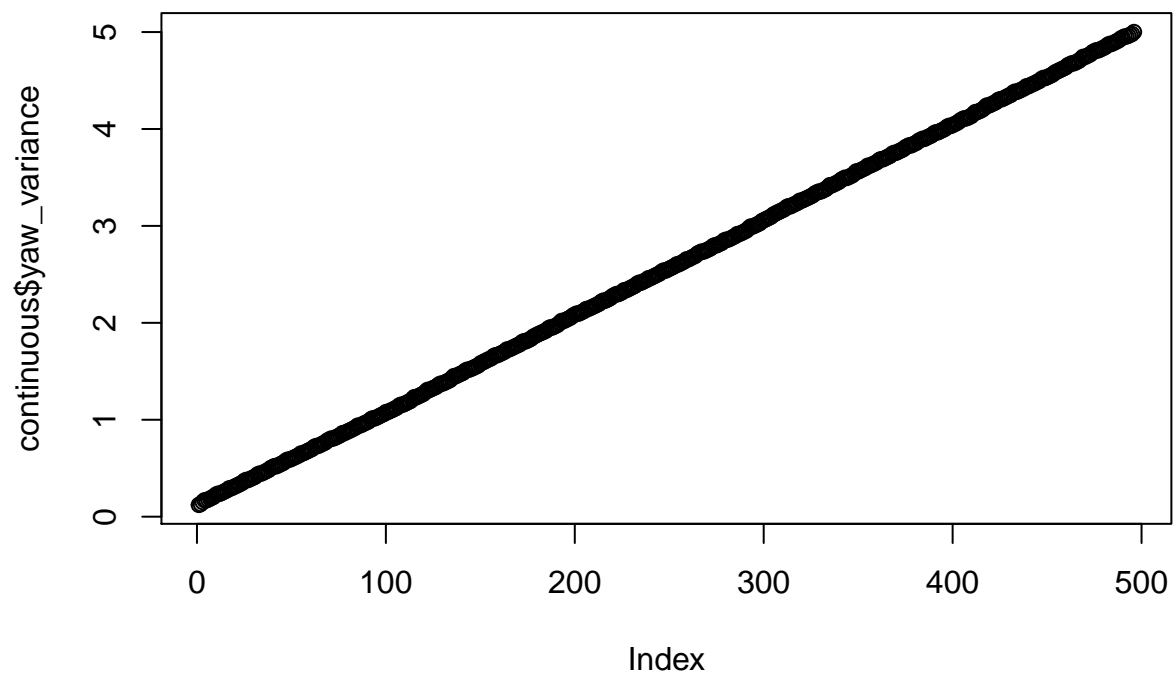
Continuous Filter X Variance Over Time



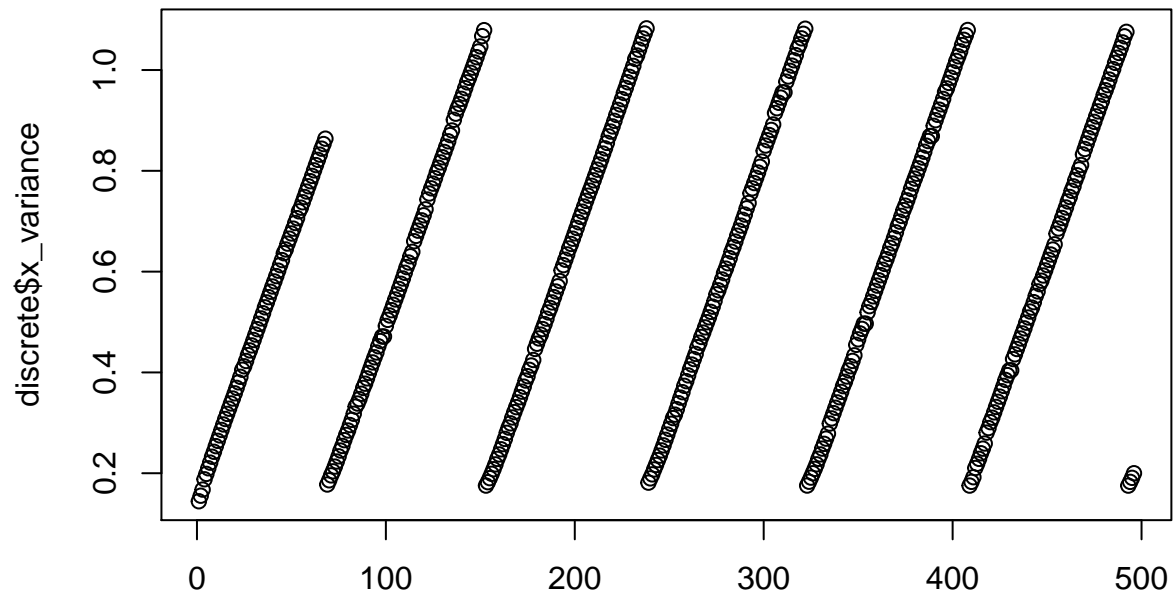
Continuous Filter Y Variance Over Time



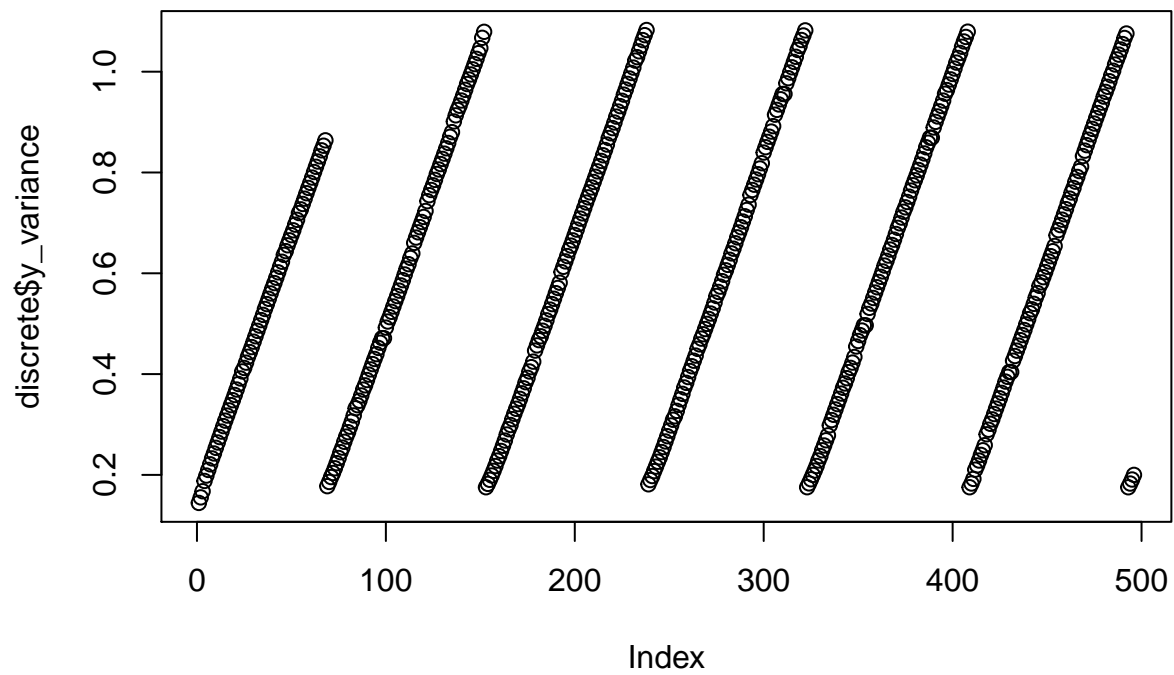
Continuous Filter Yaw Variance Over Time



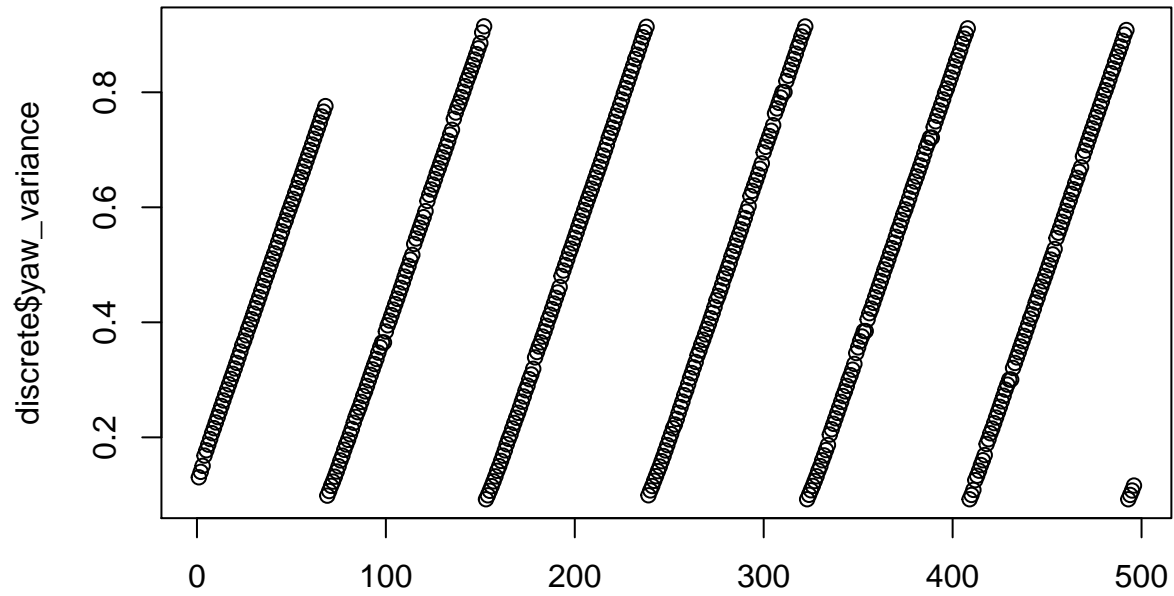
Discrete Filter X Variance Over Time



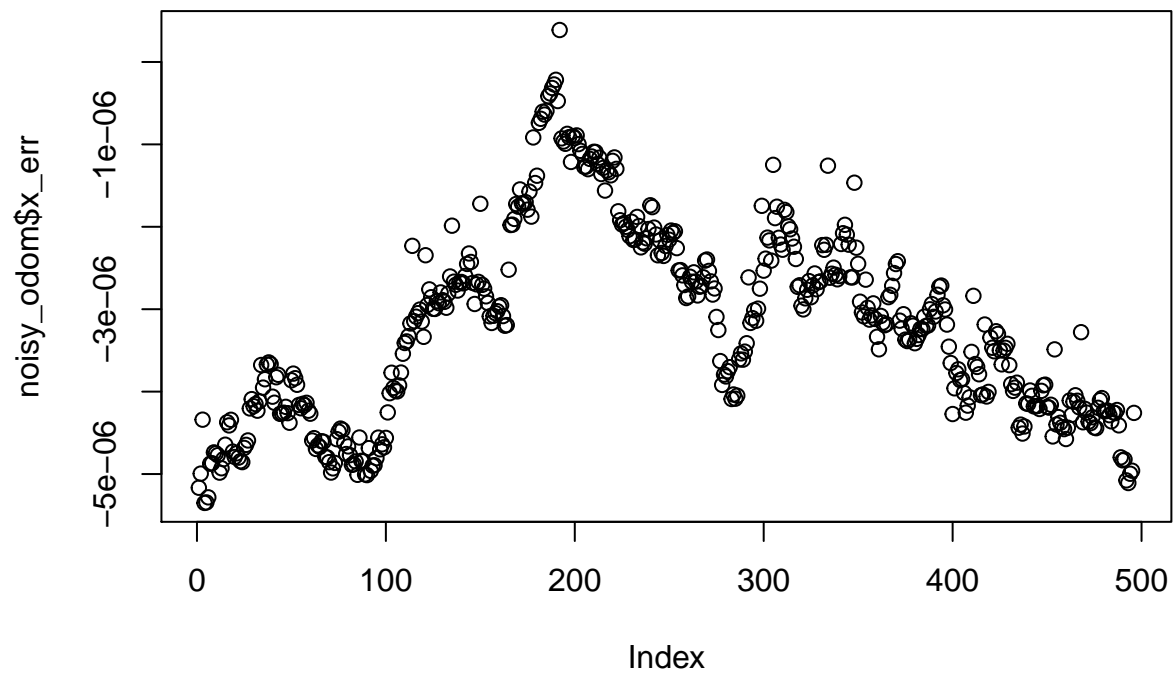
Discrete Filter Y Variance Over Time



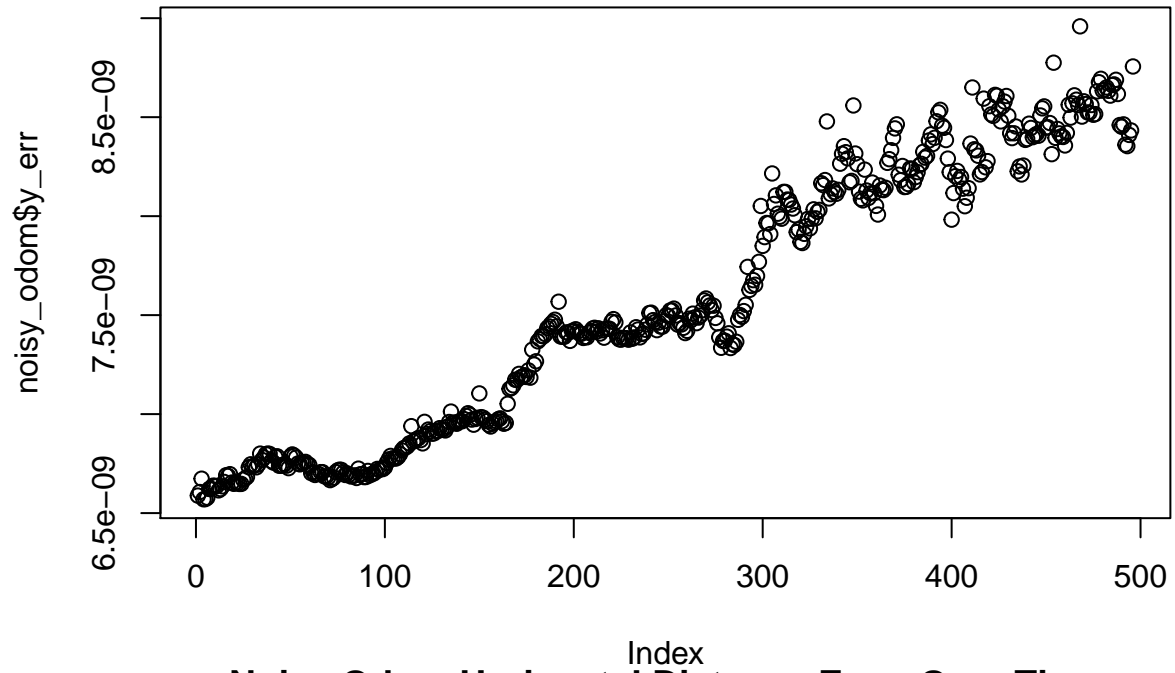
Discrete Filter Yaw Variance Over Time



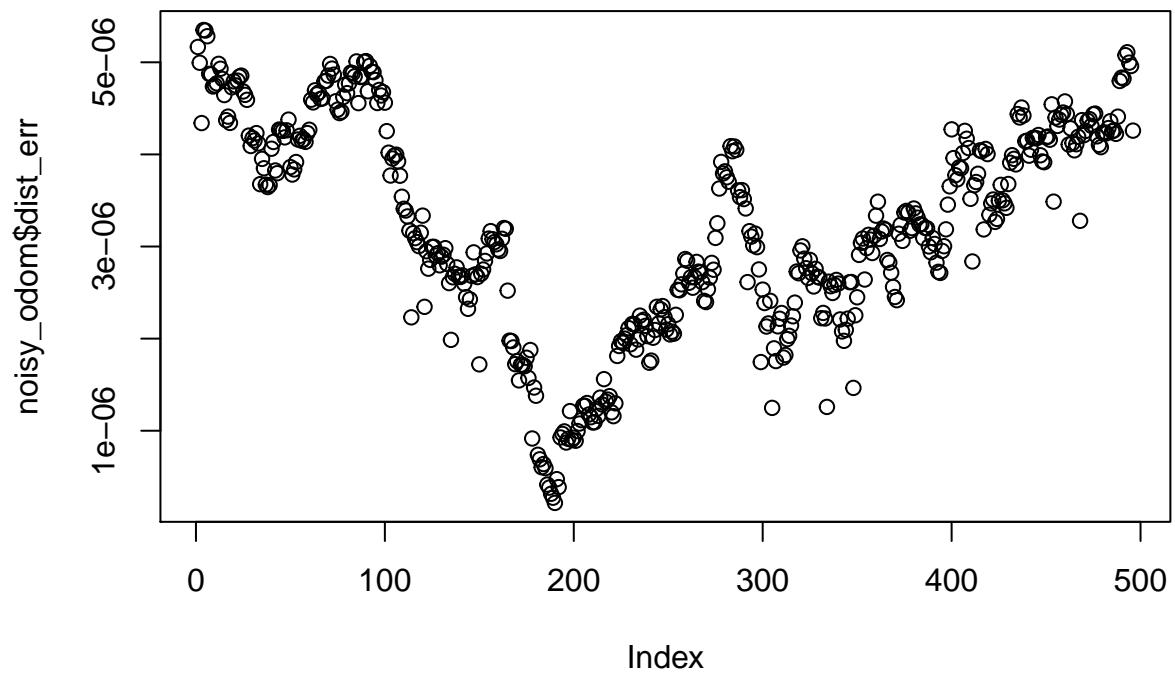
Noisy Odom X Error Over Time



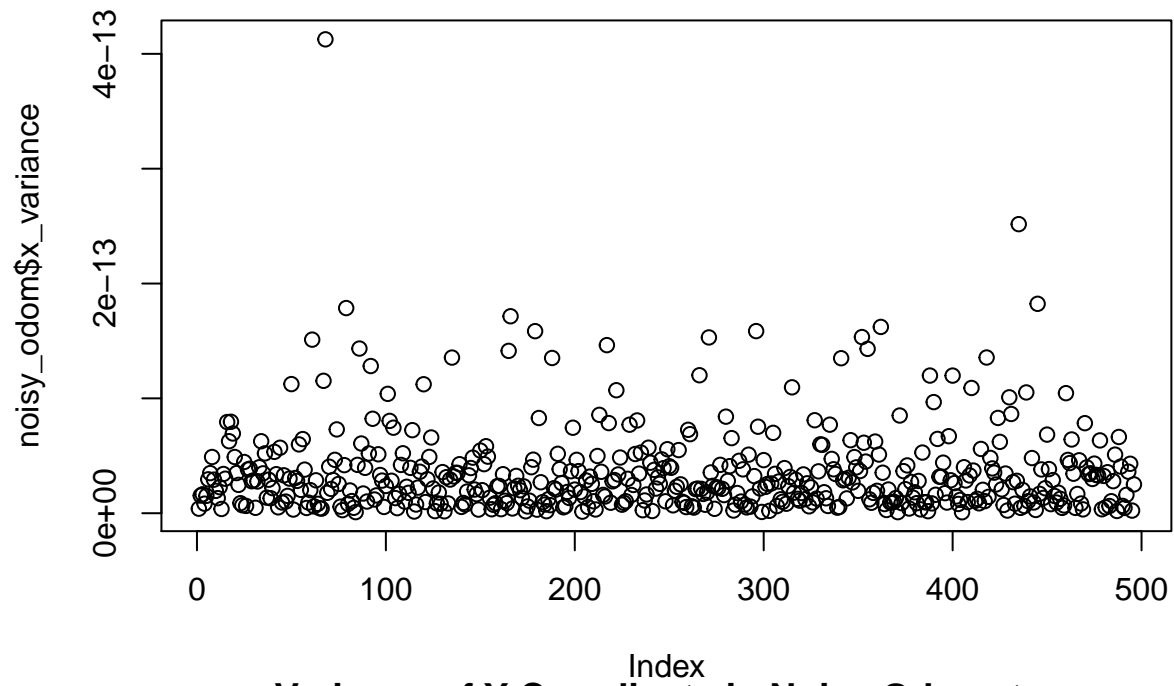
Noisy Odom Y Error Over Time



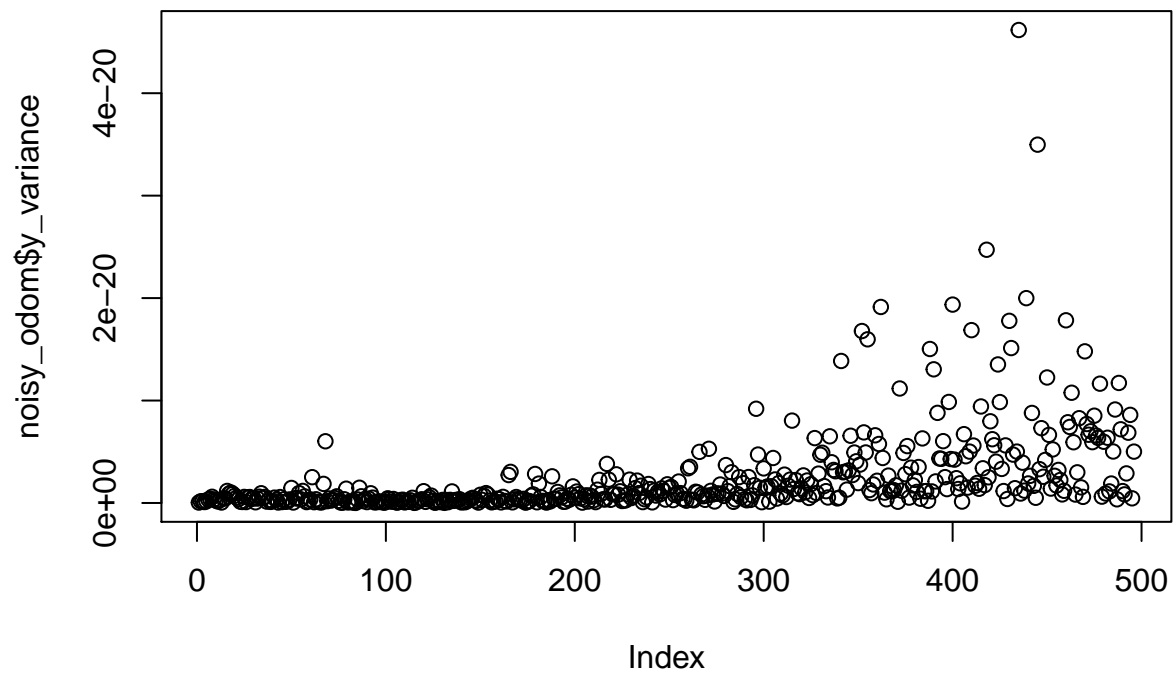
Noisy Odom Horizontal Distance Error Over Time



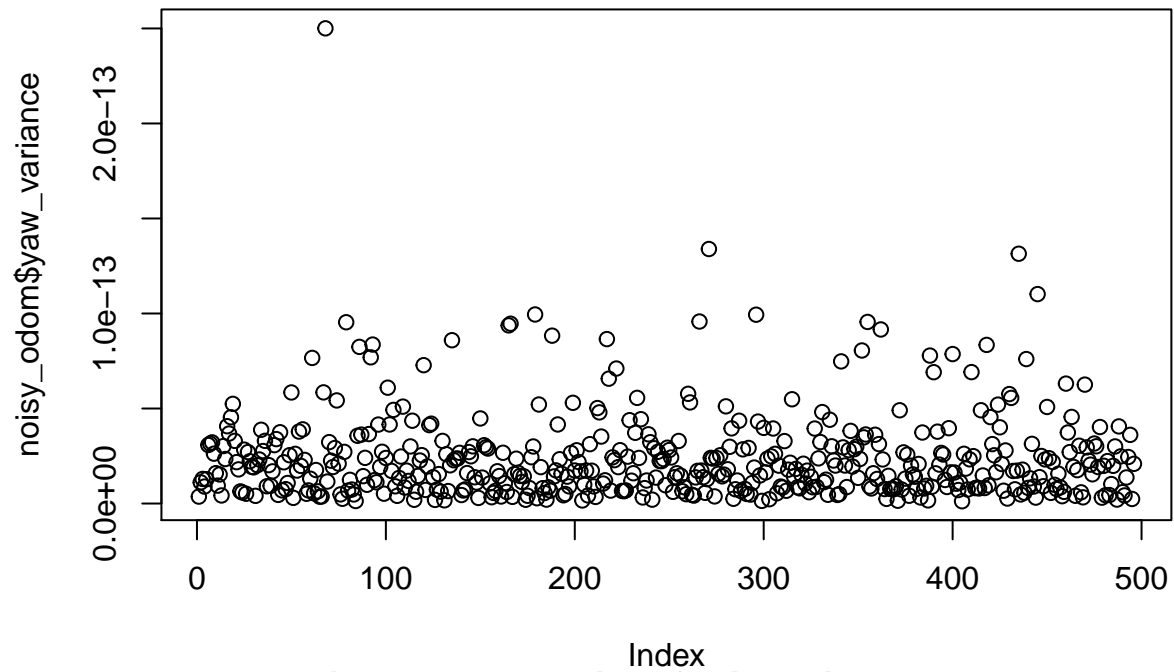
Variance of X Coordinate in Noisy Odometry



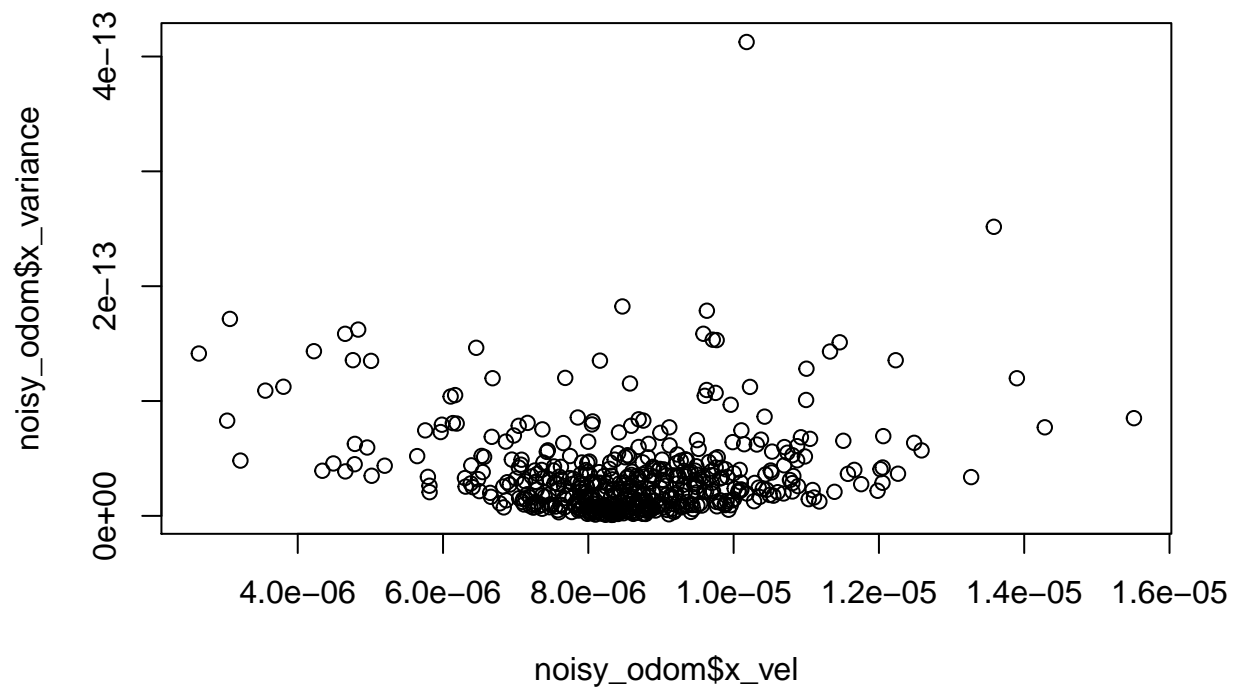
Variance of Y Coordinate in Noisy Odometry



Variance of Yaw Coordinate in Noisy Odometry



Variance vs. Velocity of X in Noisy Odometry



Variance vs. Velocity of Yaw in Noisy Odometry

