

# one\_stationary\_noiseless\_no\_gps Turtlebot 1 Report

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This is a summary of the data from the one\_stationary\_noiseless\_no\_gps experiment, Turtlebot #1.

The runtime of this experiment was 0 hours, 0 minutes, and 49.3 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.
## 1.456e-05 1.392e-04 2.643e-04 2.641e-04 3.892e-04 5.138e-04
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 4.172e-10 1.259e-08 3.025e-08 3.605e-08 5.681e-08 9.527e-08
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 5.951e-05 1.240e-04 1.757e-04 1.899e-04 2.538e-04 3.642e-04
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 1.456e-05 1.392e-04 2.643e-04 2.641e-04 3.892e-04 5.138e-04
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 1.456e-05 1.392e-04 2.643e-04 2.641e-04 3.892e-04 5.138e-04
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 4.173e-10 1.259e-08 3.025e-08 3.605e-08 5.681e-08 9.526e-08
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 5.951e-05 1.240e-04 1.757e-04 1.899e-04 2.538e-04 3.642e-04
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 1.456e-05 1.392e-04 2.643e-04 2.641e-04 3.892e-04 5.138e-04
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## -1.545e-05 -1.291e-05 -8.662e-06 -1.006e-05 -7.943e-06 -5.746e-06
```

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

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 3.776e-09 4.560e-09 4.988e-09 4.864e-09 5.255e-09 5.494e-09
```

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

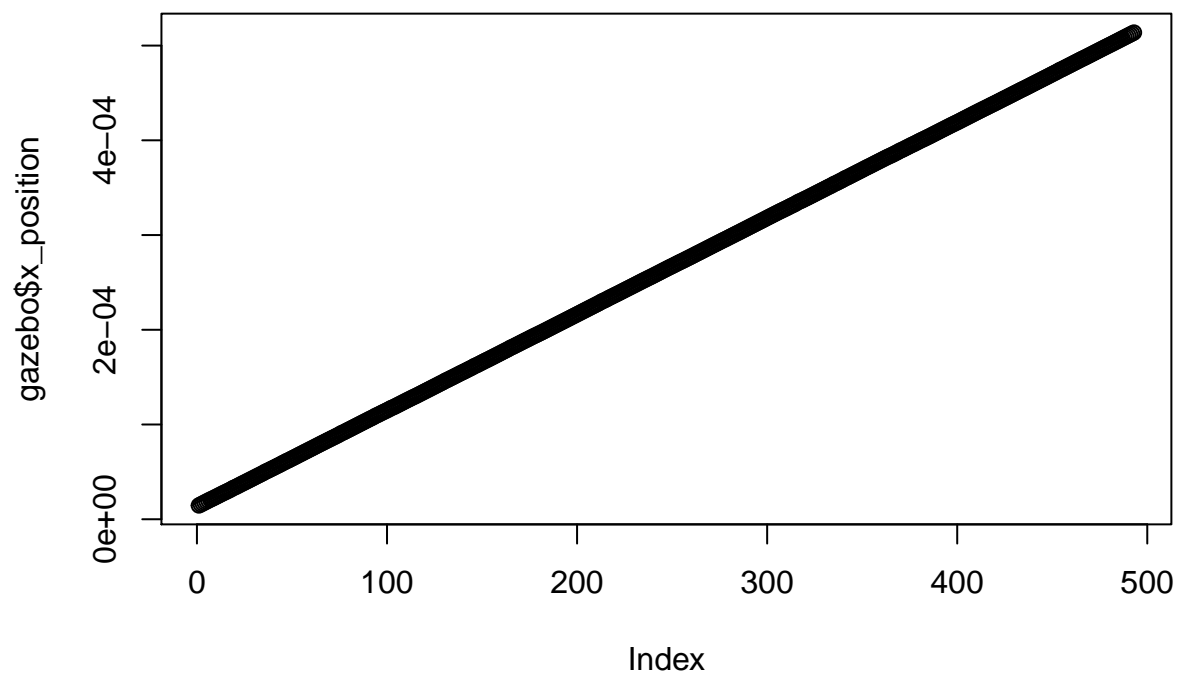
```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 5.746e-06 7.943e-06 8.662e-06 1.006e-05 1.291e-05 1.545e-05
```

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

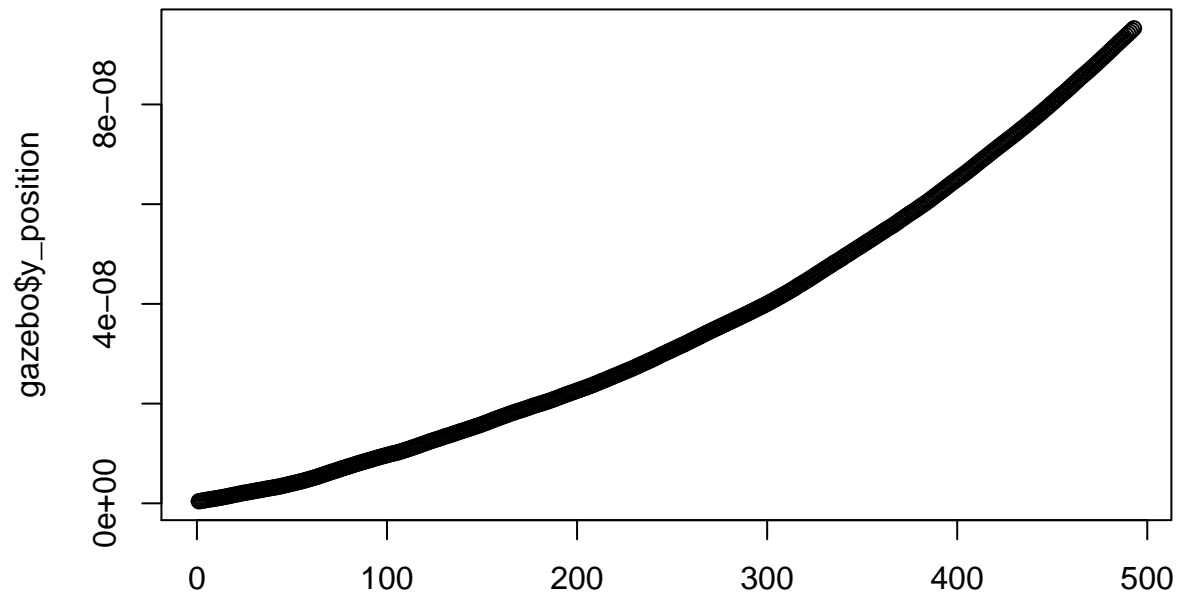
if (NROW(noisy_odom) > 0) {
  summary(noisy_odom$x_variance)
  summary(noisy_odom$y_variance)
  summary(noisy_odom$yaw_variance)
}
```

```
##      Min.   1st Qu.   Median     Mean   3rd Qu.     Max.
## 1.030e-15 8.613e-15 1.820e-14 2.308e-14 3.302e-14 1.331e-13
```

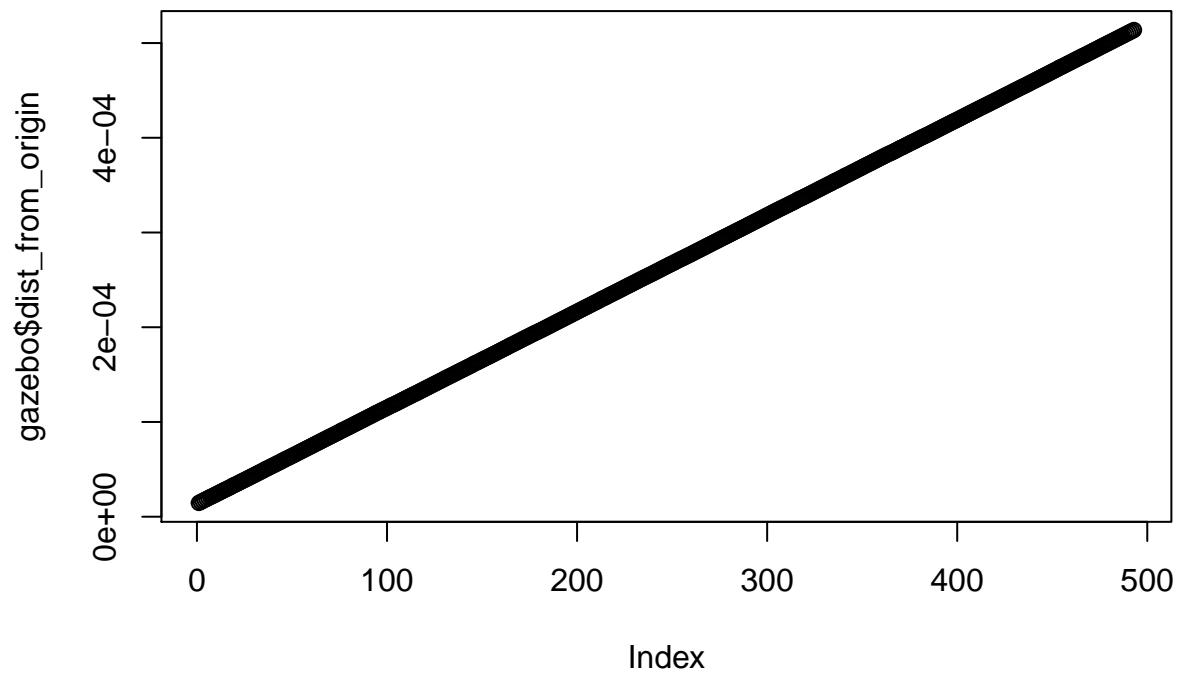
### X coordinate of robot over time



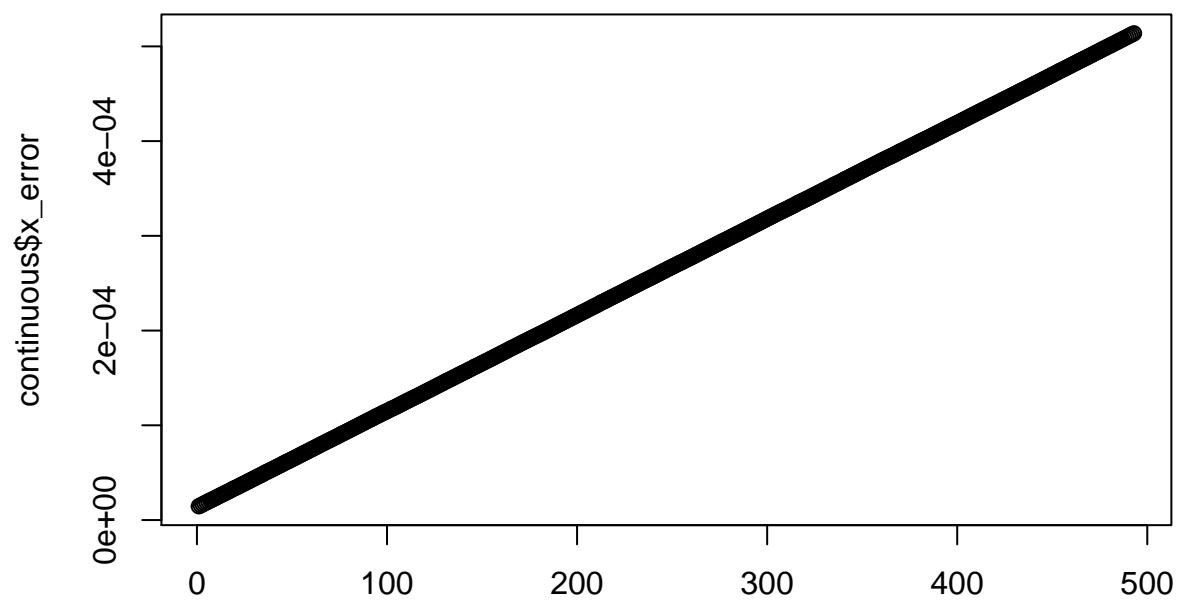
**Y coordinate of robot over time**



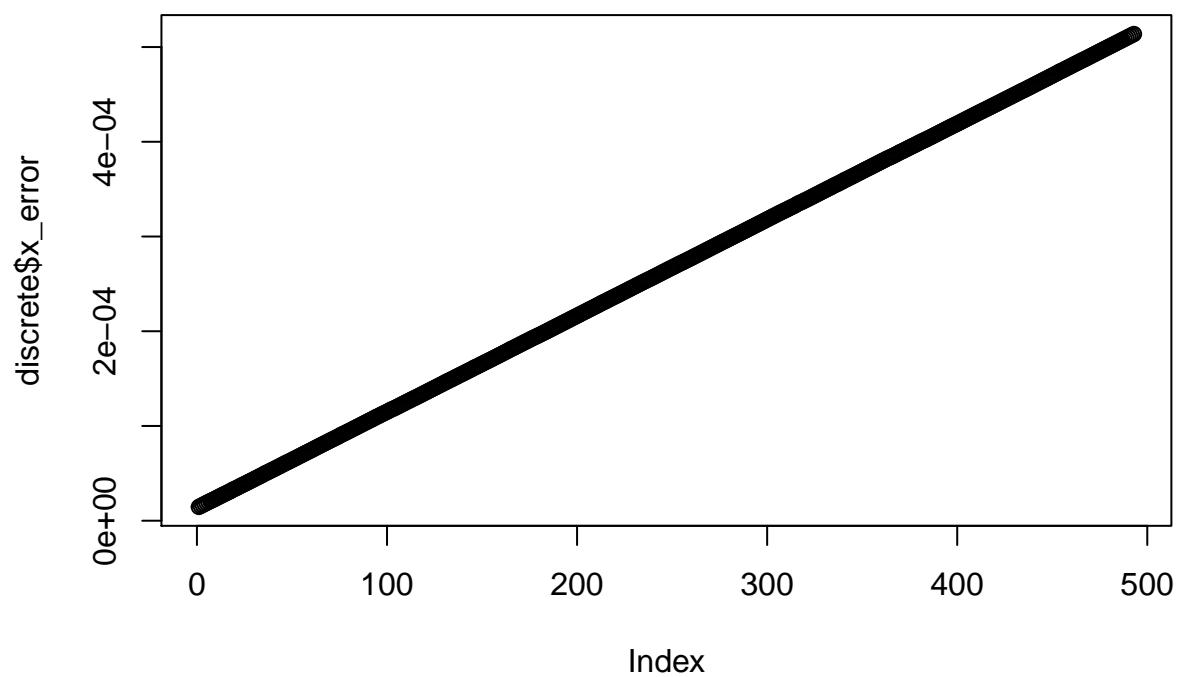
**Distance from origin vs. time**



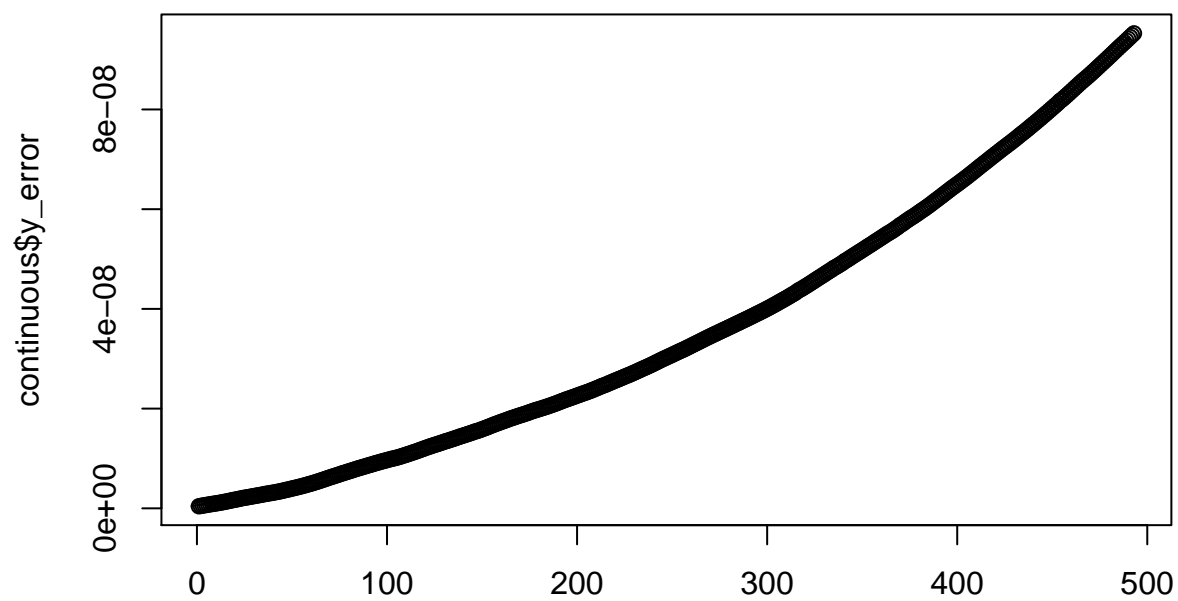
**Continuous x\_error over time**



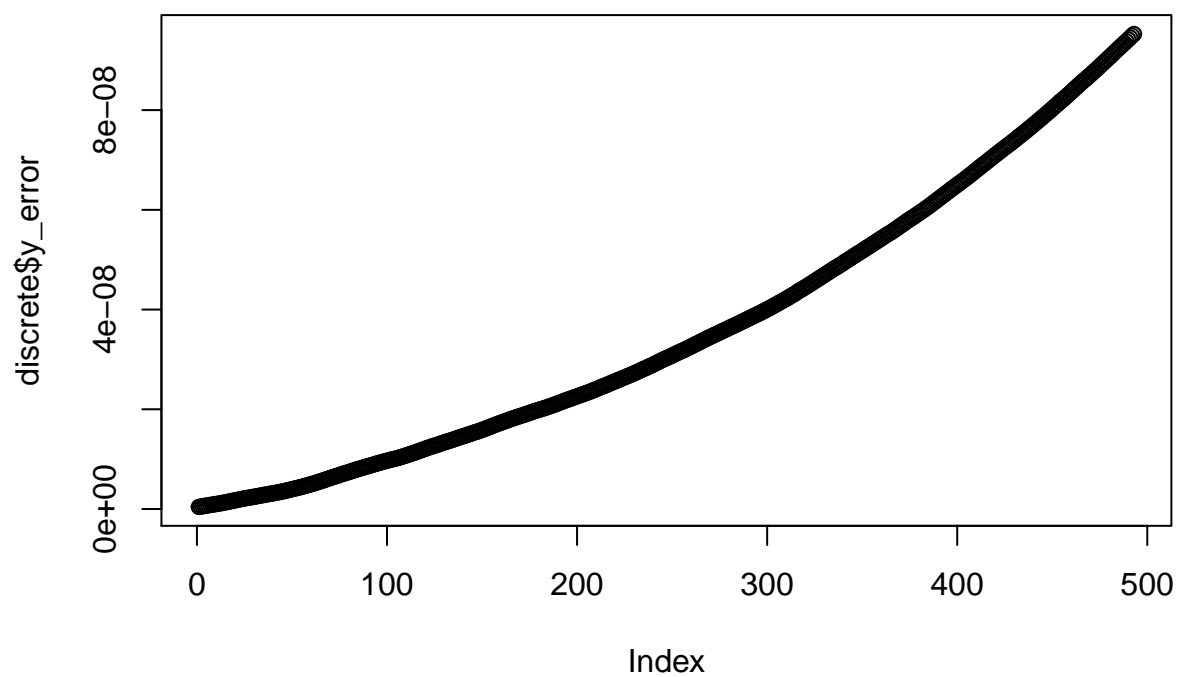
**Discrete x\_error over time**



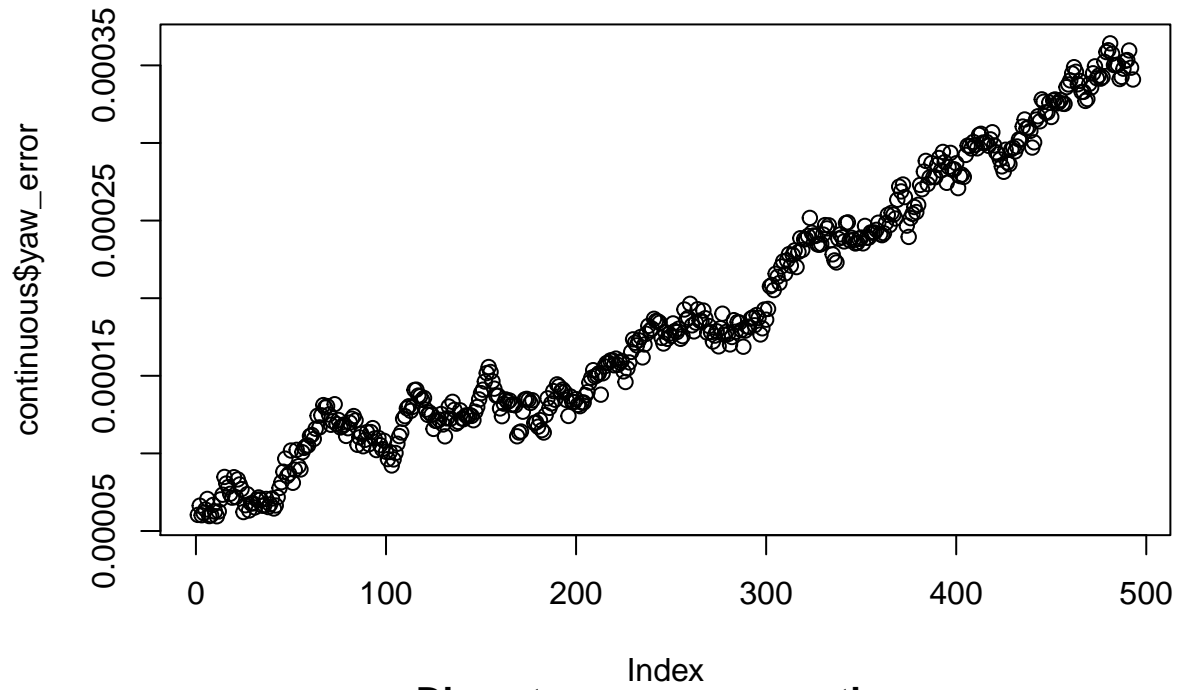
**Continuous y\_error over time**



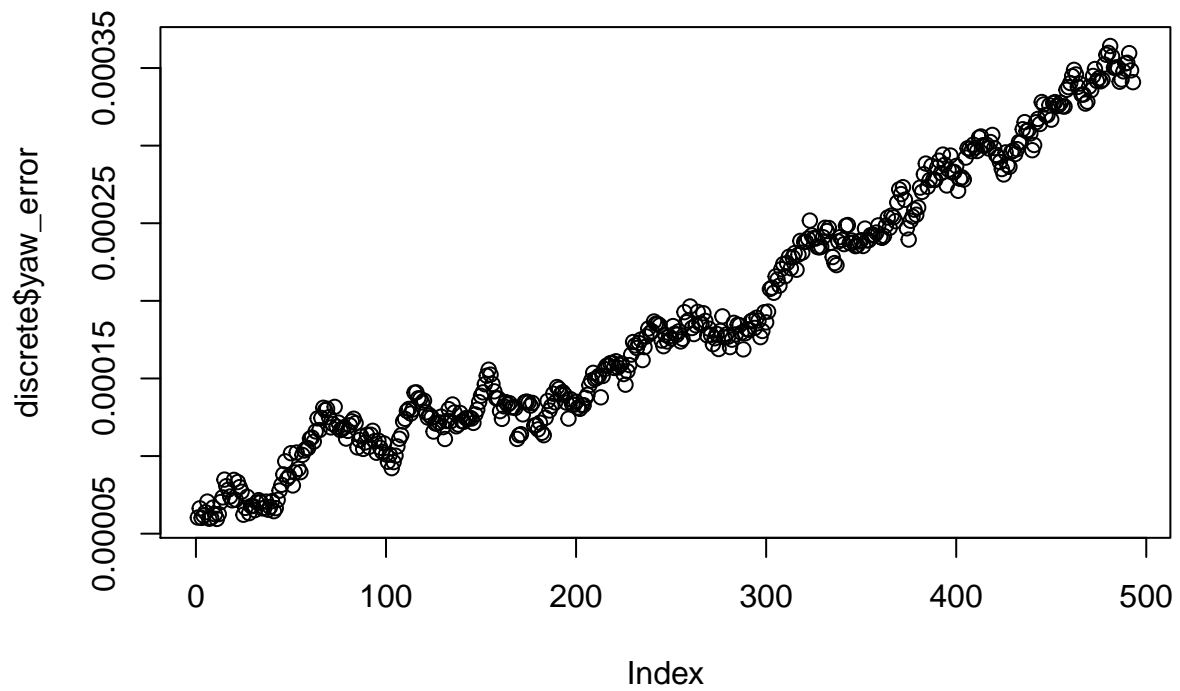
**Discrete y\_error over time**



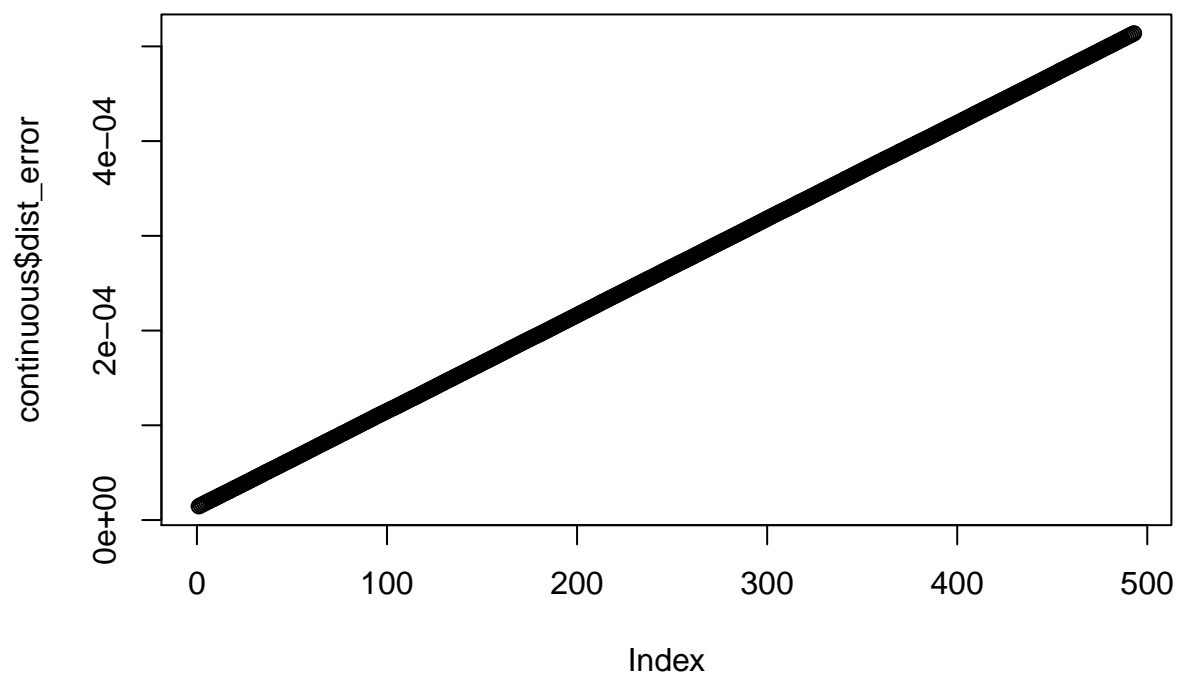
**Continuous yaw error over time**



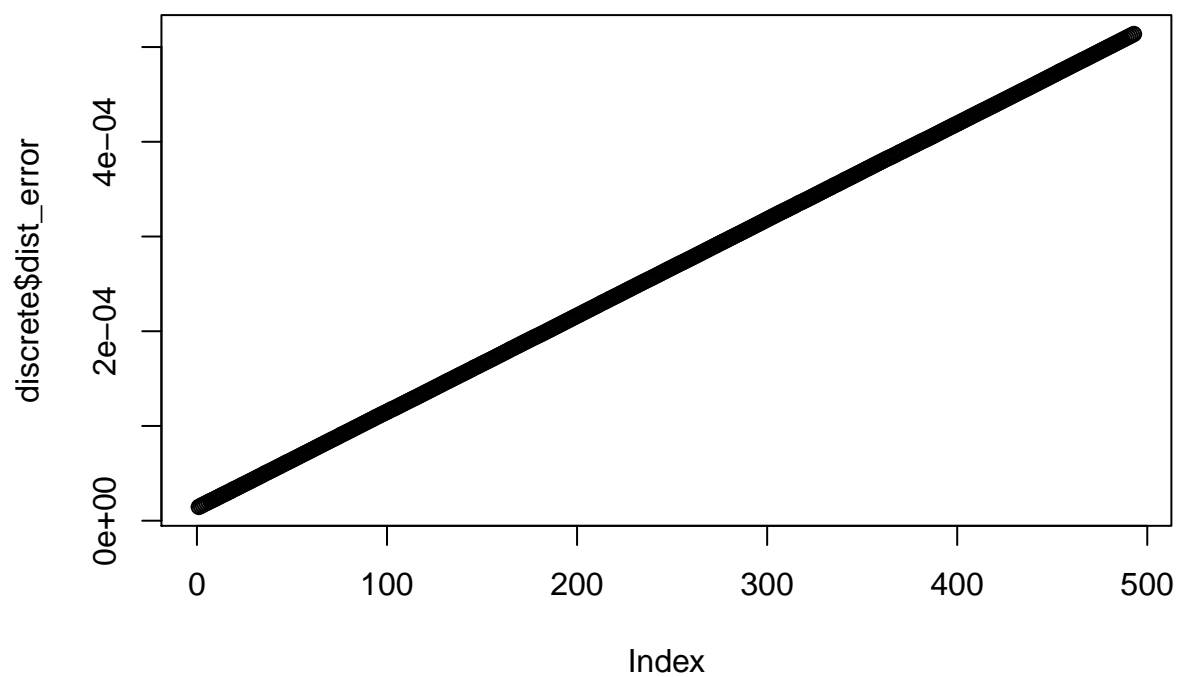
**Discrete yaw error over time**



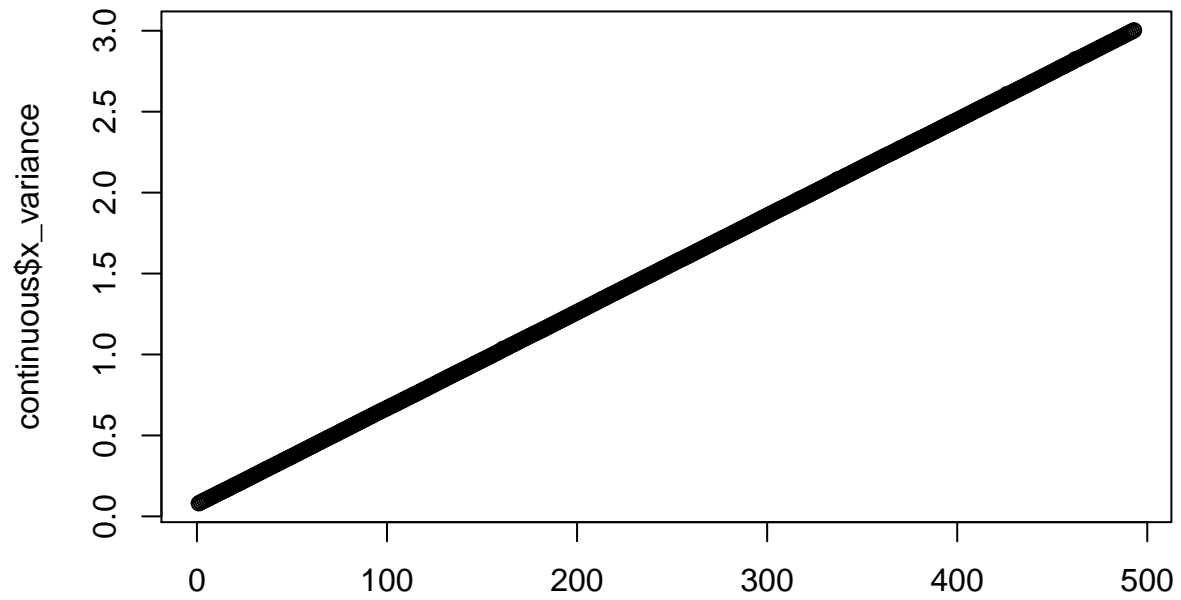
**Continuous total distance error over time**



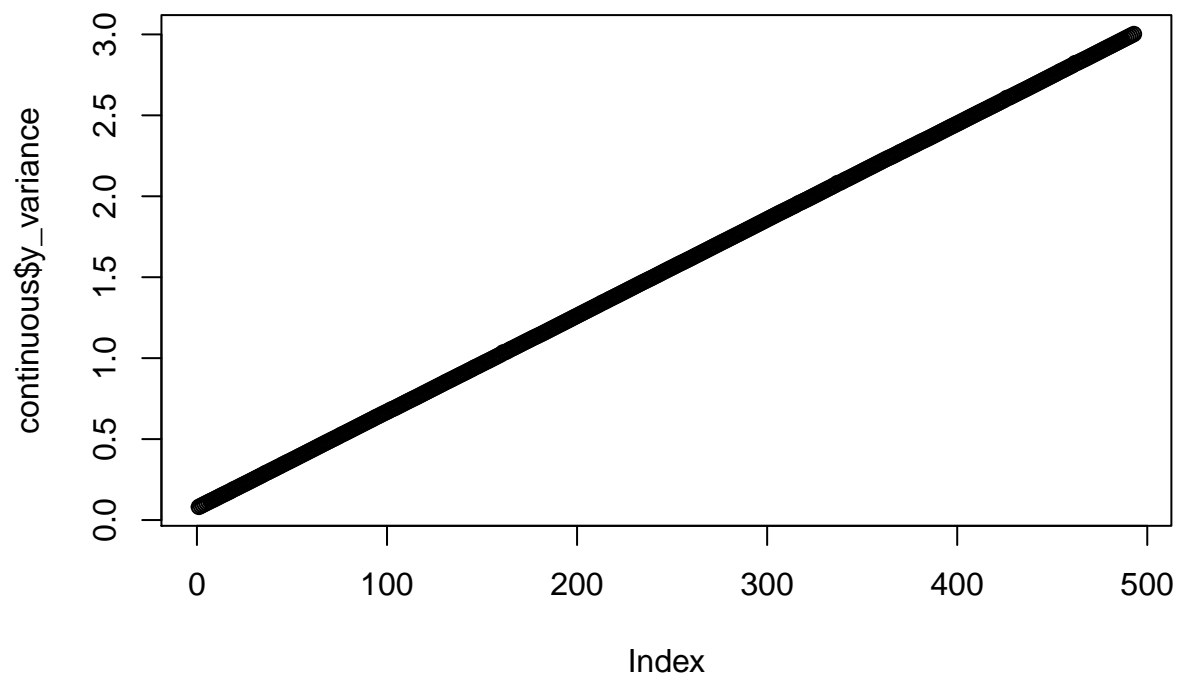
**Discrete total distance error over time**



**Continuous Filter X Variance Over Time**

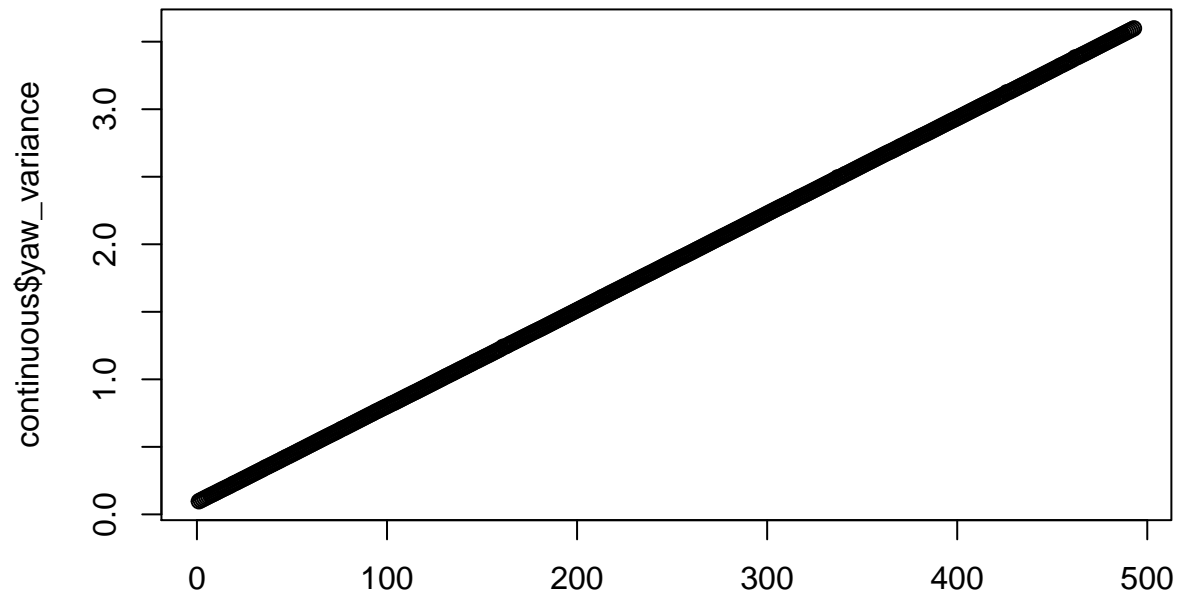


**Continuous Filter Y Variance Over Time**

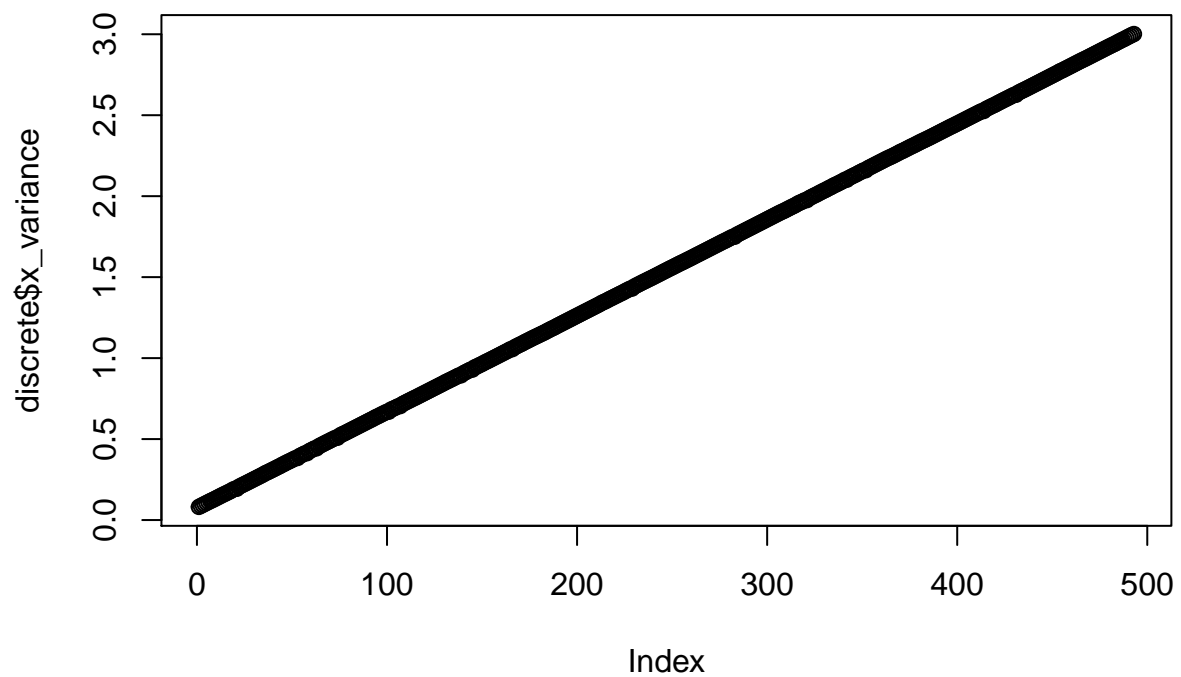




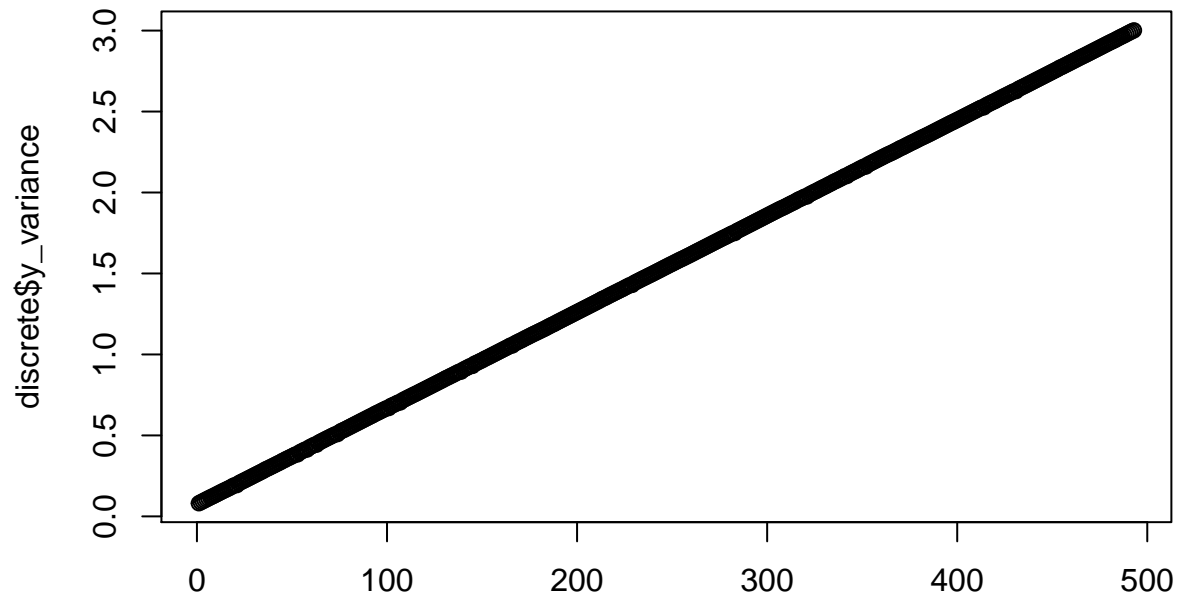
**Continuous Filter Yaw Variance Over Time**



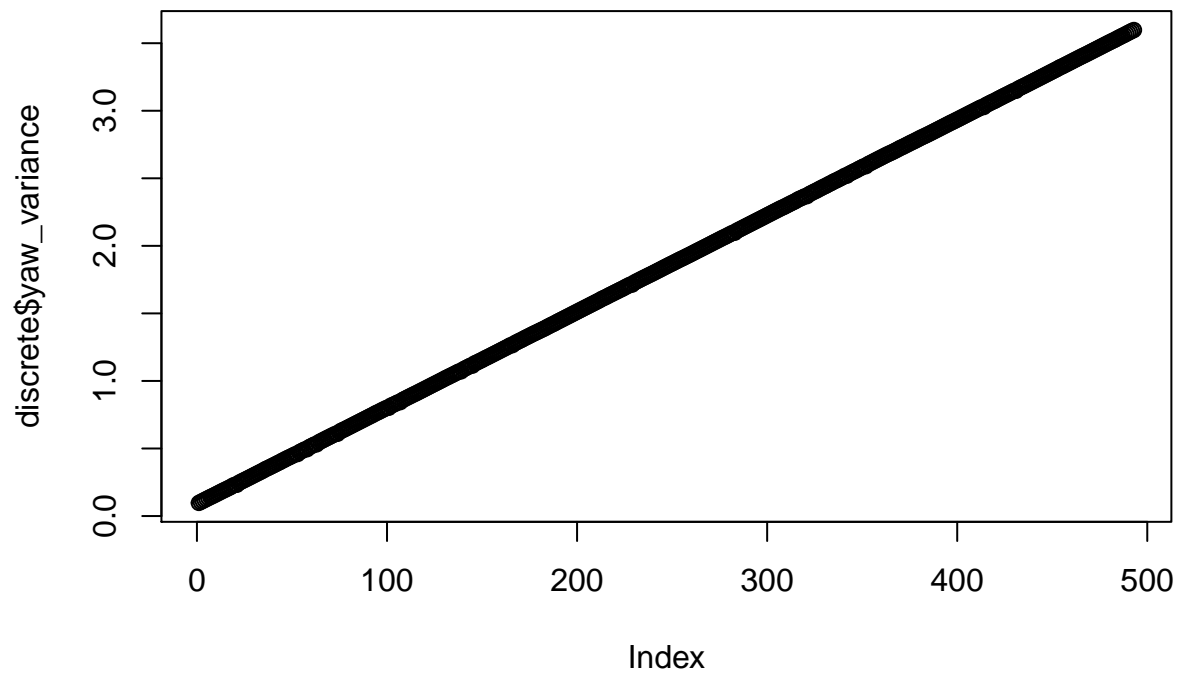
**Discrete Filter X Variance Over Time**



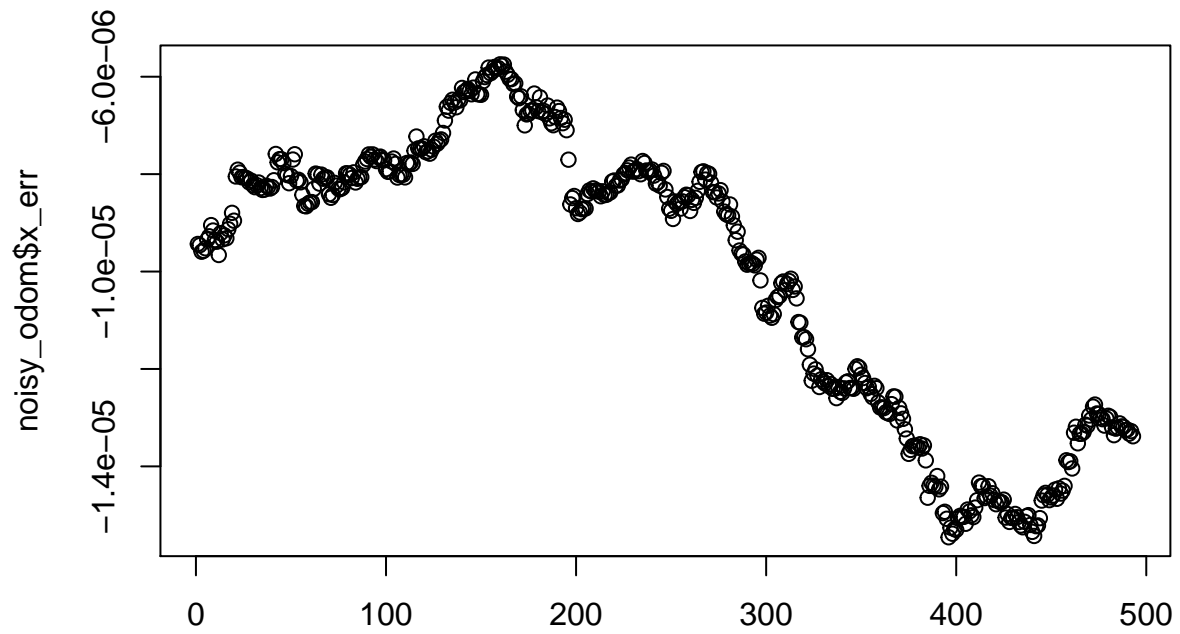
**Discrete Filter Y Variance Over Time**



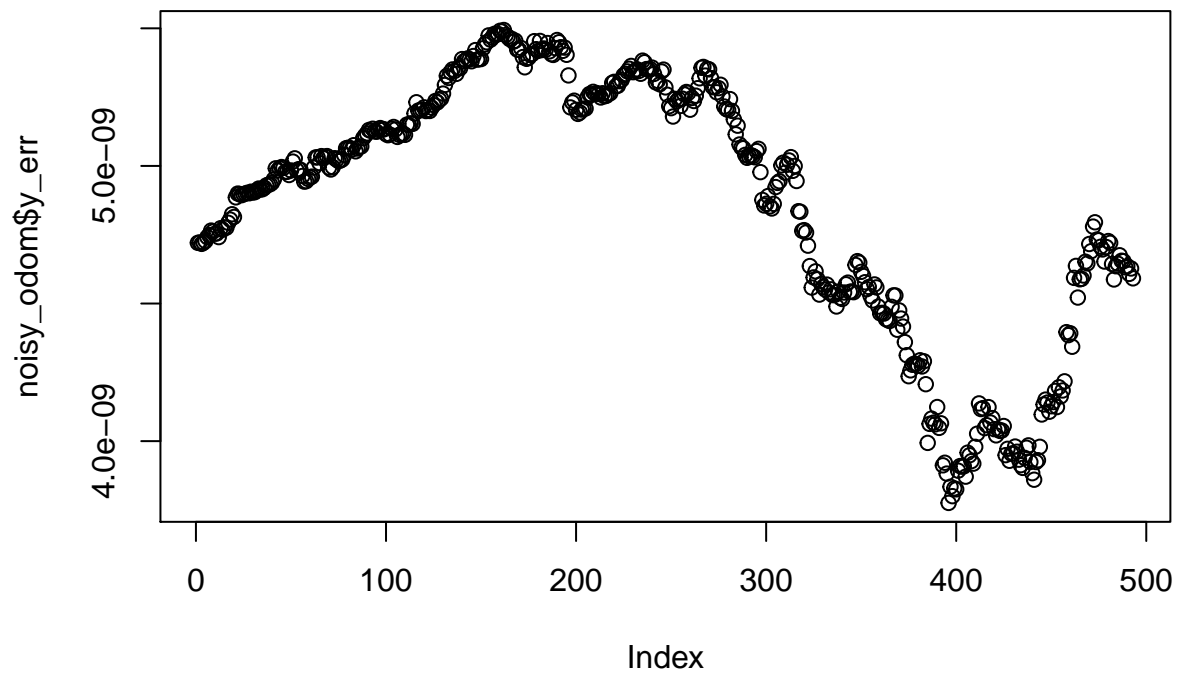
**Discrete Filter Yaw Variance Over Time**



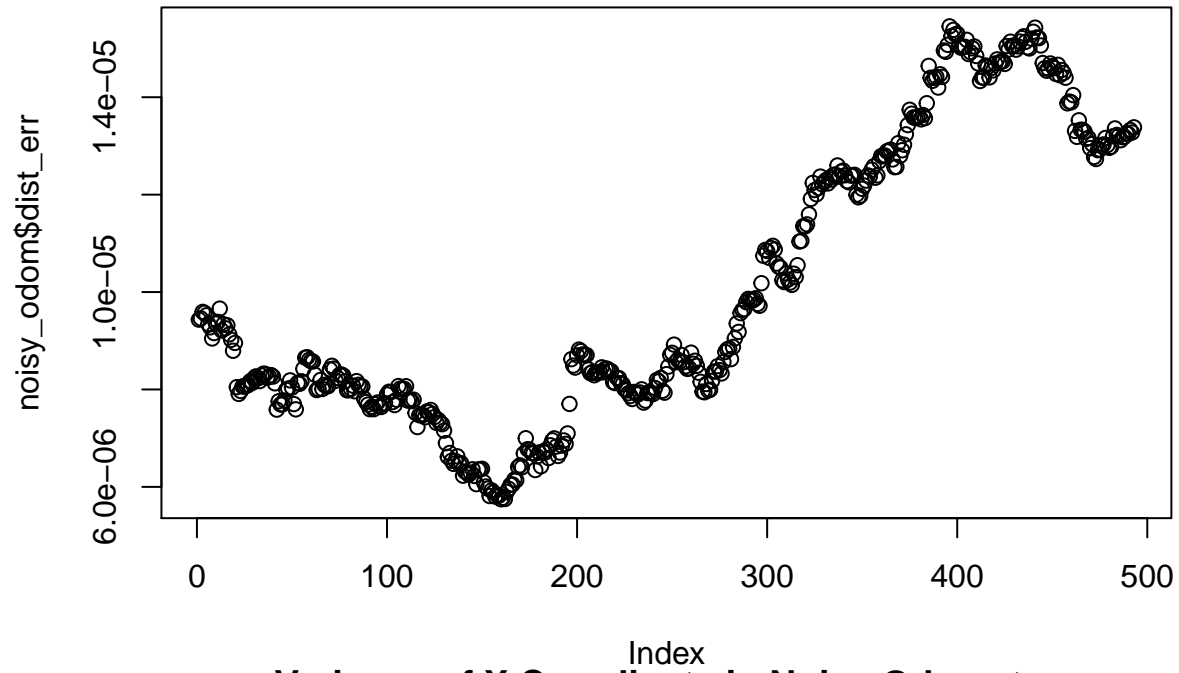
**Noisy Odom X Error Over Time**



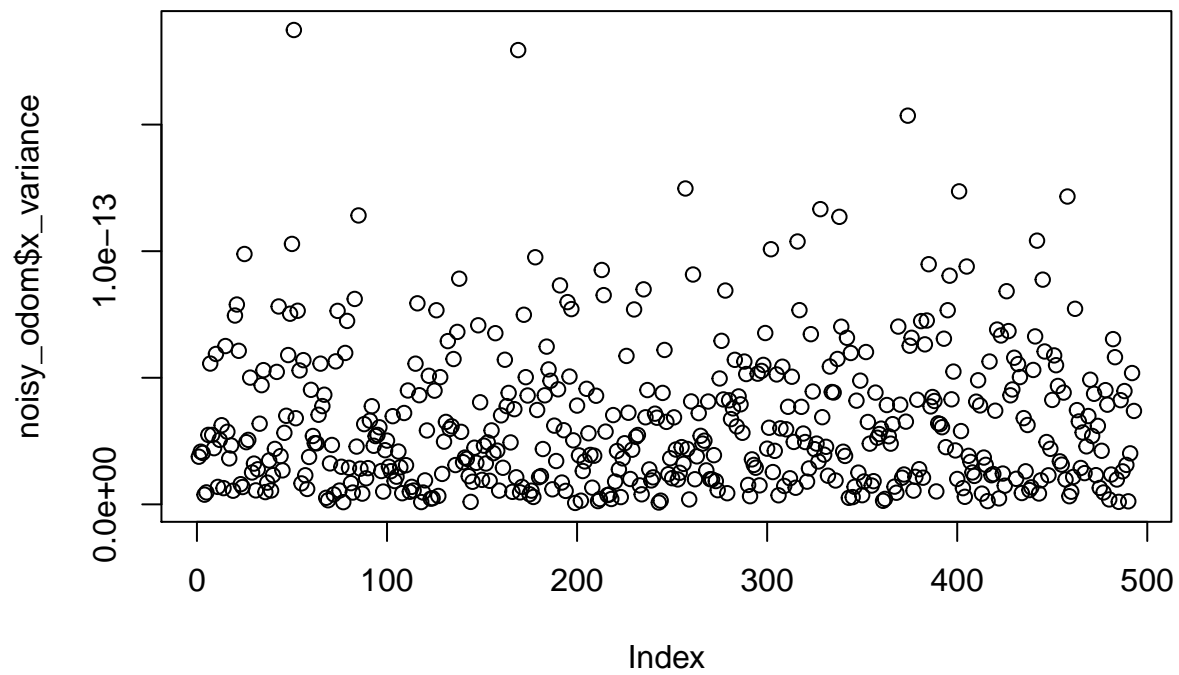
**Noisy Odom Y Error Over Time**



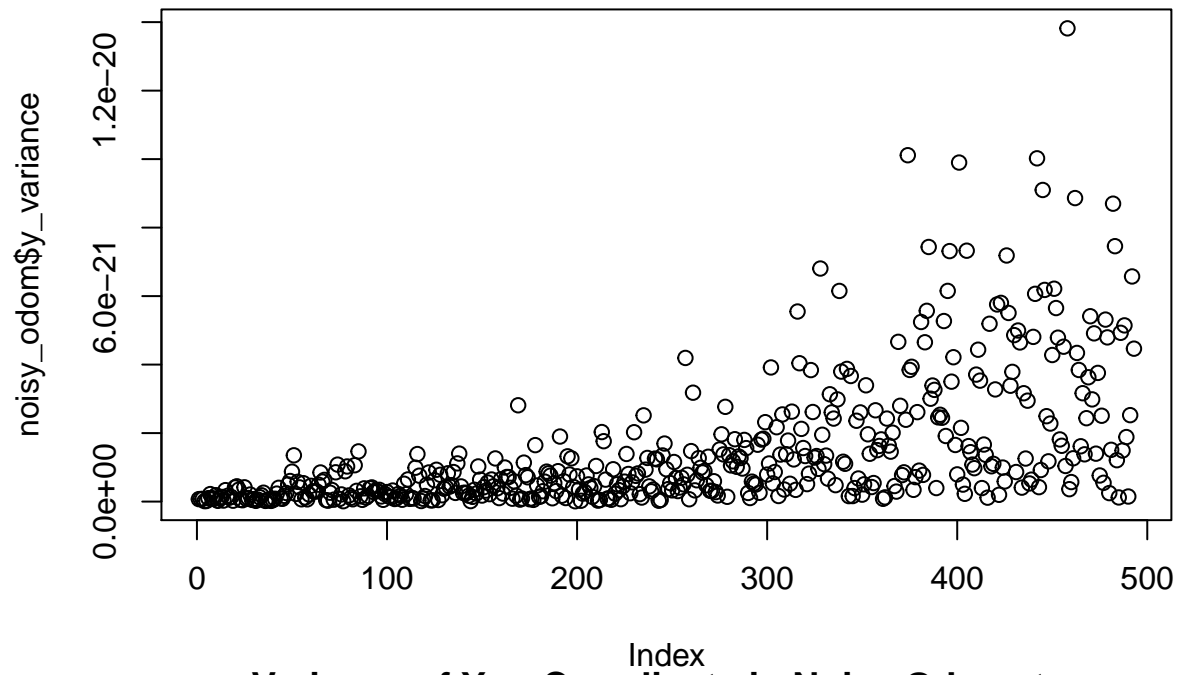
**Noisy Odom Horizontal Distance Error Over Time**



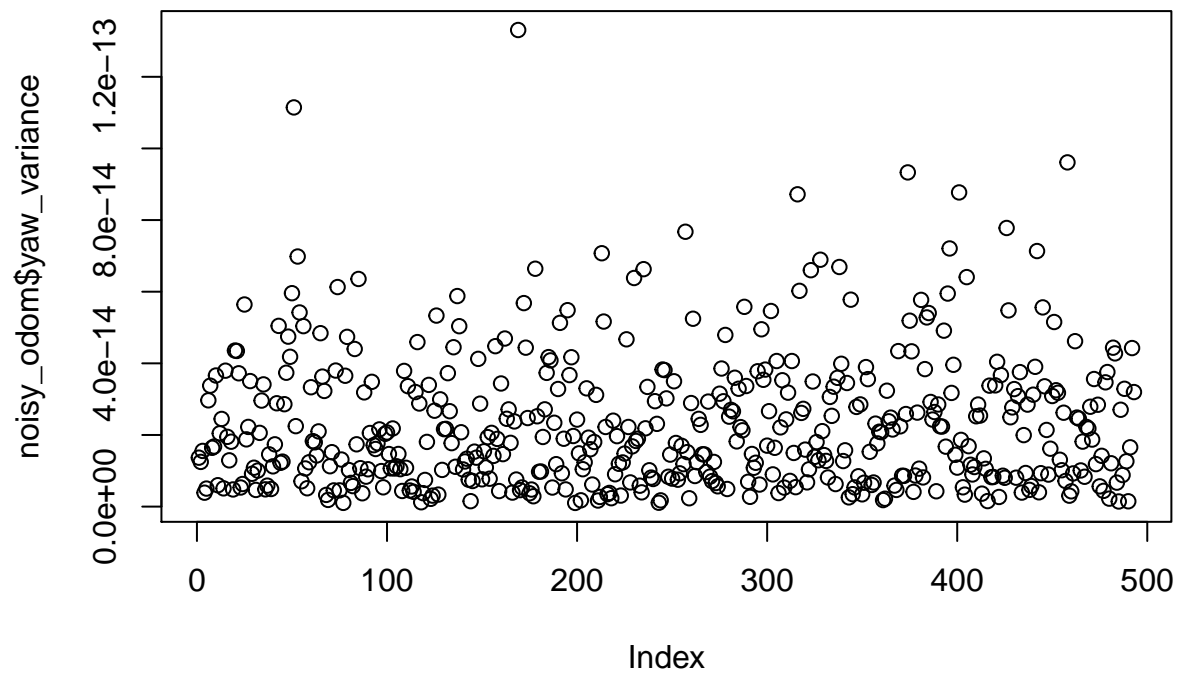
**Variance of X Coordinate in Noisy Odometry**



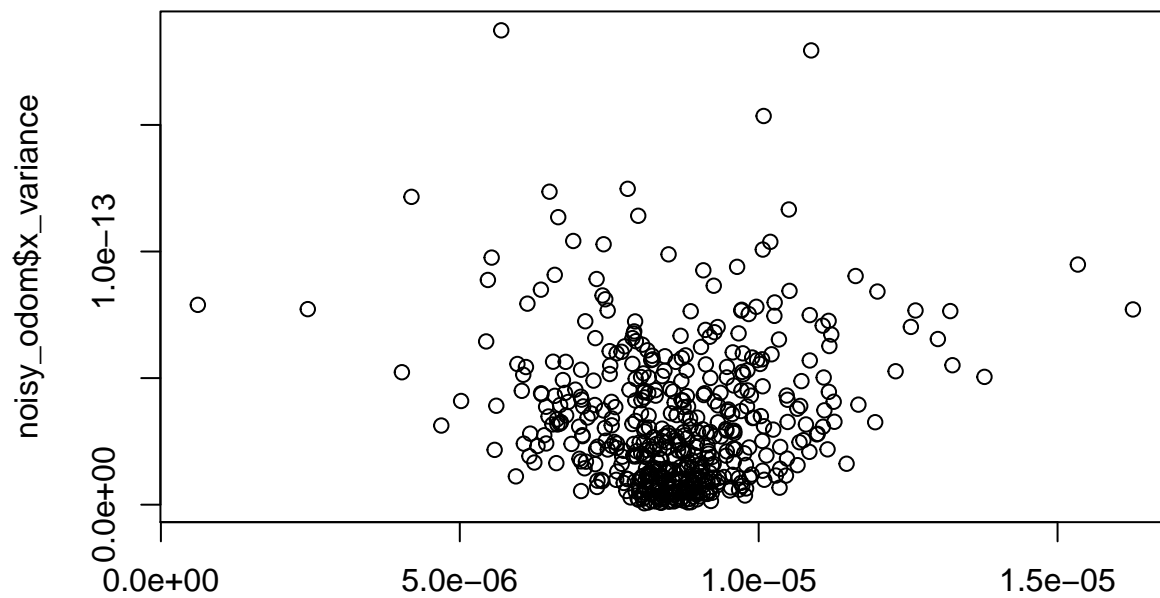
**Variance of Y Coordinate in Noisy Odometry**



**Variance of Yaw Coordinate in Noisy Odometry**



**Variance vs. Velocity of X in Noisy Odometry**



**Variance vs. Velocity of Yaw in Noisy Odometry**

