# Project 3 Report

In this part of the project, the following augmented state vector is used . This gives a new process model with time-varying bias:

Evaluating the Jacobian matrix of the process model:

The observation model is:

Evaluating the Jacobian matrix of the observation model:

Initializing the covariance matrix P:

Evaluating the Jacobian matrix at the expected values of the involved variables in the process model:

The measurement noise matrix is given by:

Hence, the covariance measurement noise matrix is given by:

The additional discrepancy instantaneous translation time varying error matrix is given by:

Finally, the covariance matrix is given by:

Using the above equations, the estimated bias can be determined and is shown in Figure 1 as a function of time below:

Chart, line chart

Description automatically generated

Figure 1: Gyro Bias against Time

As seen from the graph, the bias comes hovers around the real data of -0.97 degrees per second, and hence it matches with the value of the “offline” approach.