* UKF

1. Problem

Construct “Unscented Kalman Filter”. Here the model is added an additive Gaussian which are not considered the previous chapter. However, the mean and the covariance are easily calculated under the assumption that, and are independent.

1. Predict Step
   1. Define Sigma Points with weighting function

where

* 1. Unscented Transform:

Calculate the mean and the variance of the non-linear transform at each “sigma point” as

1. Correction step
   1. Unscented Transform:

Generate the transformed sigma points in the measurement projection. Here the measurement is so that

* 1. Calculate the mean and the variance of the measurement
  2. Kalman Gain

First find the cross variance

Then The Kalman gain is

And the correction

and its covariance is

%%% Kim’s comment

1. First we should find the sigma points of
2. There are two non-linear transformation, we should get as
3. In this procedure, every mean and the covariance is approximated, however , they are a good approximation.

%%%

* 1. Kalman Gain

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| --- | --- | --- |
|  | Kalman Filter | Unscented |
| Generate  Sigma Points |  |  |
| Predic  tion |  |  |
| Correc  tion |  |  |