3.8 discrete Kalman

* Model
* initial: k=0

3.8.a) compute a priori ( and posteriori covariance for

For k= 1; covariance:

+ Since at , there is no previous estimation, assume

+

For

+

+

3.8.b) compute optimal gain

For k= 1;

+

For

+

3.8.c) compute optimate estimator with

For k= 0; since no prediction,

+

For

For

+

4.10 Continuous function basis

Define is an inner product, then

which implies that is an orthonormal basis in this space.

Hence the minimum mean square approximation (estimator) of is the orthogonal projection in the space of span

Hence

can be determined

4.12 LSE in static systems(batch type)

4.12.a)

1. The least square estimator is
2. Since the estimation error

By the assumption

And the estimation error variance is

Hence the estimation error variance converges to 0 as converges to infinite

1. If we do not know , then

implies the estimator is biased. And You may show the estimation error variance converges to zero as converges to infinite.

This means even if the variance converges to zero, the mean of the estimator does not converge to the true value, implies the estimator is unbiased.

How to estimate along with and ? If we know , then

.QED