

1. PREDICTION

- 1a. state $\hat{\mathbf{x}}_{k|k-1} = \mathbf{F}_k \hat{\mathbf{x}}_{k-1} + \mathbf{B}_k \mathbf{u}_k$
- 1b. state covariance $\mathbf{P}_{k|k-1} = \mathbf{F}_k \mathbf{P}_{k-1|k-1} \mathbf{F}_k^T + \mathbf{Q}_k$
- 2a. measurement $\hat{\mathbf{z}}_{k|k-1} = \mathbf{H}_k \hat{\mathbf{x}}_{k|k-1}$
- 2b. measurement covariance
(called innovation covariance) $\mathbf{S}_k = \mathbf{H}_k \mathbf{P}_{k|k-1} \mathbf{H}_k^T + \mathbf{R}_k$
3. gain $\mathbf{K}_k = \mathbf{P}_{k|k-1} \mathbf{H}_k^T \mathbf{S}_k^{-1}$

observation is received

4. innovation $\mathbf{y}_k = \mathbf{z}_k - \hat{\mathbf{z}}_{k|k-1}$

2. UPDATE

- 5a. state $\hat{\mathbf{x}}_{k|k} = \hat{\mathbf{x}}_{k|k-1} + \mathbf{K}_k \mathbf{y}_k$
- 5b. state covariance $\mathbf{P}_{k|k} = (\mathbf{I} - \mathbf{K}_k \mathbf{H}_k) \mathbf{P}_{k|k-1}$

system model

covariance

'unknown'