

0. Set Initial values:

$$\hat{\mathbf{x}}_0, \mathbf{P}_0$$

1. Predict state & error covariance:

$$\hat{\mathbf{x}}_k^- = \mathbf{A}\hat{\mathbf{x}}_{k-1}^-$$

$$\mathbf{P}_k^- = \mathbf{A}\mathbf{P}_{k-1}\mathbf{A}^T + \mathbf{Q}$$

2. Compute the Kalman gain:

$$\mathbf{K}_k = \mathbf{P}_k^- \mathbf{H}^T (\mathbf{H}\mathbf{P}_k^- \mathbf{H}^T + \mathbf{R})^{-1}$$

3. Compute the state estimate:

$$\hat{\mathbf{x}}_k = \hat{\mathbf{x}}_k^- + \mathbf{K}_k (\mathbf{z}_k - \mathbf{H}\hat{\mathbf{x}}_k^-)$$

4. Compute the error covariance :

$$\mathbf{P}_k = \mathbf{P}_k^- - \mathbf{K}_k \mathbf{H}\mathbf{P}_k^-$$

Repeat

Output
State
Estim.

$\hat{\mathbf{x}}_k$

Input
Meas.

\mathbf{z}_k