

Initialisation of parameters

$$\mathbf{P}_0, \mathbf{x}_0, \mathbf{H}_0, \Phi_0, \mathbf{Q}_0, \mathbf{R}_0,$$

Time update

Compute *a priori* estimate:

$$\hat{\mathbf{x}}_k^- = \Phi_{k-1} \hat{\mathbf{x}}_{k-1} + \mathbf{B}_{k-1} \mathbf{u}_{k-1}$$

Compute *a priori* error covariance:

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

Measurement update

Compute Kalman gain:

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

Compute *a posteriori* estimate:

$$\hat{\mathbf{x}}_k = \hat{\mathbf{x}}_k^- + \mathbf{K}_k [\mathbf{z}_k - \mathbf{H}_k \hat{\mathbf{x}}_k^-]$$

Update error covariance:

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

Output