Initialisation of parameters

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

Time update

Compute *a priori* estimate:

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

Compute *a priori* error covariance:

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

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:

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

Output