Initialisation of parameters

$x_0, P_0, Q_0, R_0,$

Time update

Compute *a priori* estimate:
$$\hat{x}_k^- = \phi_{k-1}(x_{k-1}, u_{k-1})$$
Compute Jacobian matrix:
$$\Phi_{k-1}^{[1]} = \left. \frac{\partial \phi_{k-1}(x, u)}{\partial x} \right|_{x=\hat{x}_{k-1}, u=u_{k-1}}$$
Compute *a priori* error covariance:
$$P_k^- = \Phi_{k-1}^{[1]} P_{k-1} \Phi_{k-1}^{[1]T} + Q_{k-1}$$

Measurement update

Compute Jacobian matrix:
$$H_k^{[1]} = \left. \frac{\partial h_k(x)}{\partial x} \right|_{x=\hat{x}_k}$$
Compute Kalman gain:
$$K_k = P_k^- H_k^{[1]T} [H_k^{[1]} P_k^- H_k^{[1]T} + R_k]^{-1}$$
Compute *a posteriori* estimate:
$$\hat{x}_k = \hat{x}_k^- + K_k[z_k - h_k(\hat{x}_k^-)]$$
Update error covariance:
$$P_k = [I_n - K_k H_k^{[1]}] P_k^-$$

Output