

Iterated Extended Kalman Filter

- Initialization: $x_{k,0}^a = x_k^f$
- Iterative improvement: for $i = 0 : n - 1$ do

$$\begin{aligned} K_{k,i} &= P_k^f J_h^T(x_{k,i}^a) \left(J_h(x_{k,i}^a) P_k^f J_h^T(x_{k,i}^a) + R_k \right)^{-1} \\ x_{k,i+1}^a &= x_k^f + K_{k,i} (z_k - h(x_{k,i}^a)) \end{aligned}$$

- Finalize update:

$$\begin{aligned} P_k &= (I - K_{k,n-1} J_h(x_{k,n-1}^a)) P_k^f \\ x_k^a &= x_{k,n}^a \end{aligned}$$

Note that P_k is not used during the iteration, so we only need to update it once at the end.