Formulas

\[
\hat{y}_{k+1} = \frac{\hat{y}_k \sigma_k^2 + y_{k+1} \sigma_k^2}{\hat{\sigma}_k^2 + \sigma_{k+1}^2}
\] 
(1)

\[
(\hat{\sigma}_k^2 + 1)^{-1} = (\sigma_k^2)^{-1} + (\sigma_{k+1}^2)^{-1}
\] 
(2)

\[
\hat{x}_{k+1} = \hat{x}_k + K(x_{k+1} - \hat{x}_k)
\] 
(3)

\[
K = P_k (P_k + C_{k+1})^{-1}
\] 
(4)

\[
\hat{x}_{k+1} = x_k + \hat{x}_k + 1
\] 
(5)

\[
P_{k+1} = P_k + C_{k+1}
\] 
(6)

\[
x(k+1|k) = \Phi x(k) + \Gamma u(k)
\] 
(7)

\[
P_x(k+1|k) = \Phi P_x(k) \Phi^T + C_w
\] 
(8)

\[
r(k+1) = z(k+1) - H x(k+1|k)
\] 
(9)

\[
K(k+1) = P_x(k+1|k) H^T (HP_x(k+1|k) H^T + C_v)^{-1}
\] 
(10)

\[
P_x(k+1) = (I - K(k+1) H) P_x(k+1|k)
\] 
(11)

\[
x(k+1|k) = \Phi [x(k), u(k)]
\] 
(12)

\[
P_x(k+1|k) = J_x P_x(k) J_x^T + J_u P_u(k) J_u^T + C_w
\] 
(13)

\[
r(k+1) = z(k+1) - H[x(k+1|k)]
\] 
(14)

\[
x(k+1) = x(k+1|k) + K(k+1)r(k+1)
\] 
(15)

\[
K(k+1) = P_x(k+1|k) J_H^T (J_H P_x(k+1|k) J_H^T + C_v)^{-1}
\] 
(16)

\[
P_x(k+1) = (I - K(k+1) J_H) P_x(k+1|k)
\] 
(17)

\[
P(L_{T+1}|D_{T+1}) = \alpha_T P(s|l) P(L_T = l|D_T)
\] 
(18)

\[
P(L_{T+1} = l|D_{T+1}) = \sum_{l'} P(l|l', a) P(L_T = l'|D_T)
\] 
(19)

\[
\text{Bel}(x_{t+1}) \propto p(s_{t+1}|x_{t+1}) \int p(x_{t+1}|x_t, a_t) \text{Bel}(x_t) \, dx_t
\] 
(20)