$$\hat{x}_t = f(\#, u_t)$$

$$\hat{P}_t = F_x \# {F_x}^T + F_u Q_t {F_u}^T$$

$$\hat{z}_i = h_i(\#, y_i)$$

$$S = H \# H^T + R$$

$$K_t = \hat{P}_t H S^{-1}$$

Then

$$x_t = \# + K_t \left(z_{0:n} - \hat{z}_{0:n}\right)$$

$$P_t = \# - K_t S {K_t}^T$$