\[
\begin{align*}
\hat{P}_k &= E(\hat{e}_k \hat{e}_k^T) \\
\tilde{P}_k &= E(\tilde{e}_k \tilde{e}_k^T) \\
\tilde{P}_{k|k} &= \hat{P}_k \\
\tilde{P}_{k|k-1} &= \bar{P}_k \\
\end{align*}
\]

\[
\begin{align*}
x_{k|k} &= \hat{x}_k \\
x_{k|k-1} &= \tilde{x}_k \\
e_{k|j} &= x_{k|j} - x_k \\
e_{k|k} &= \hat{x}_k - x_k = \hat{e}_k \\
e_{k|k-1} &= \tilde{x}_k - x_k = \bar{e}_k \\
\end{align*}
\]

\[
K_k = \tilde{P}_k H_k^T (H_k \tilde{P}_k H_k^T + R_k)^{-1}
\]

\[
\begin{align*}
\hat{x}_{k+1} &= \Phi_k \hat{x}_k \\
\bar{P}_{k+1} &= \Phi_k \tilde{P}_k \Phi_k^T + Q_k
\end{align*}
\]

\[
\hat{P}_k = (I - K_k H_k) \tilde{P}_k
\]

Figure 10. The process cycle of Kalman filtering.