2. Filtr Kalmana

2.1. Wprowadzenie

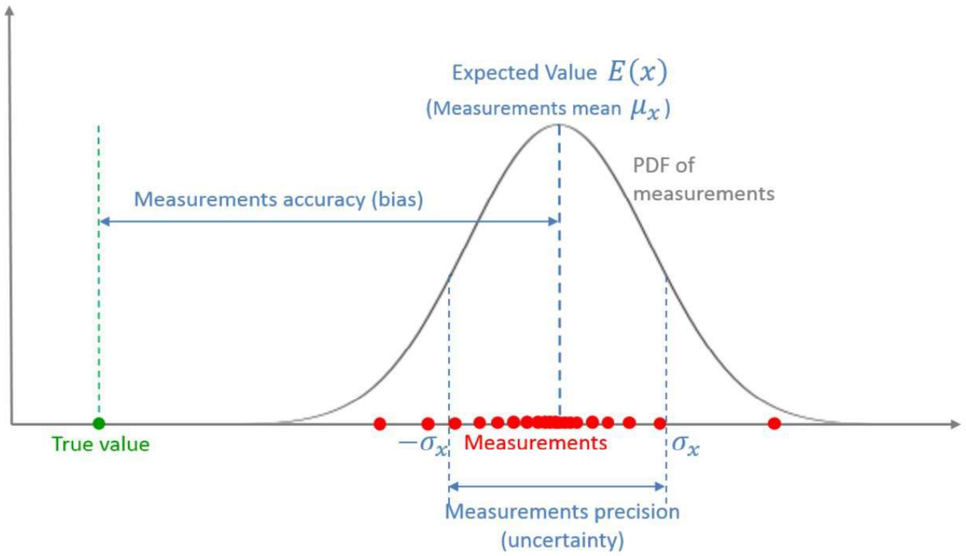
źródła:
https://www.kalmanfilter.net/kalman1d.html
http://www.bzarg.com/p/how-a-kalman-filter-works-in-pictures/

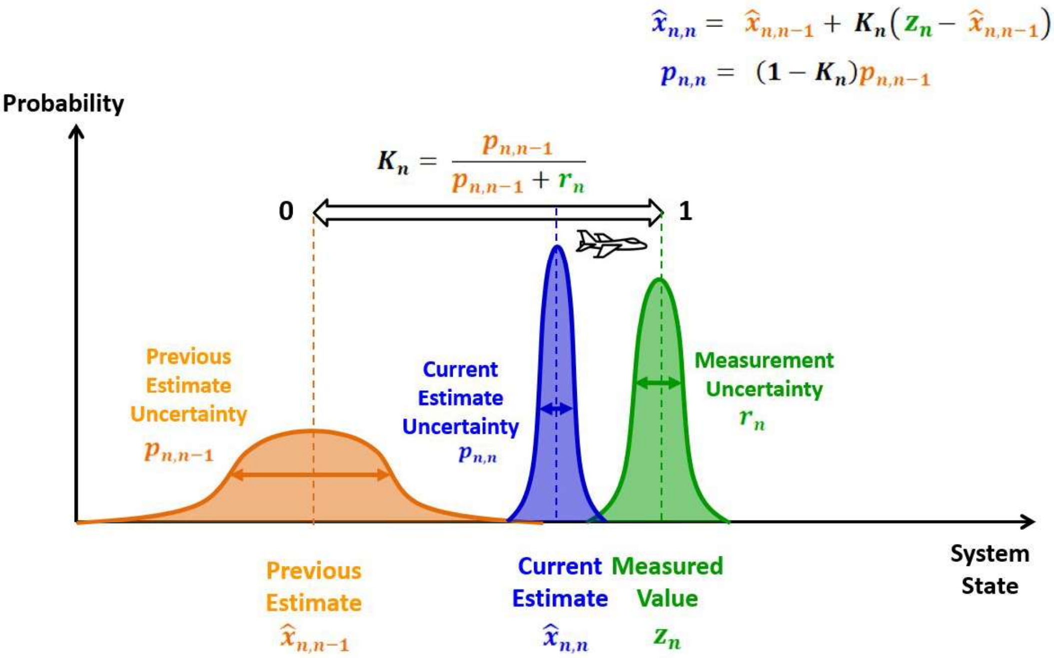
predykcja:

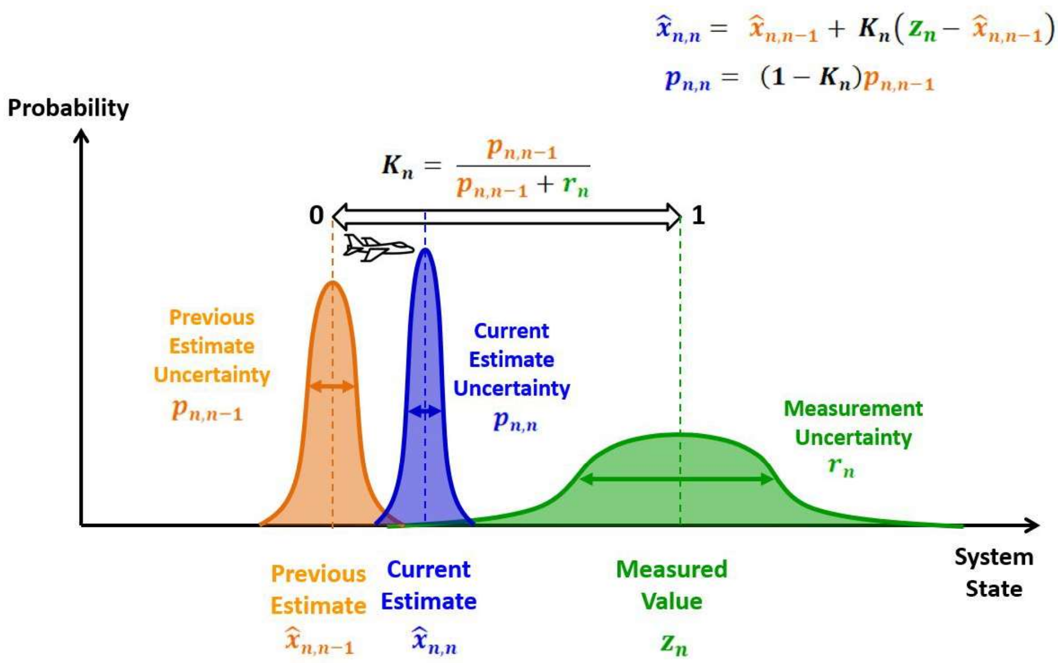
$$\hat{x}_k = A\hat{x}_{k-1} + Bu_{k-1}$$
$$\hat{P}_k = AP_{k-1}A^T + Q$$

korekcja:

$$K = P_k C^T (CP_k C^T + R)^{-1}$$
$$\bar{x}_k = \hat{x}_k + K(y - C\hat{x}_k)$$
$$P_k = \hat{P}_k - KC\hat{P}_k$$







2.2. Odtwarzanie małych kątów (fuzja akcelerometru i żyroskopu)

Równanie systemu przy założeniu dryftu żyroskopu

$\theta_k = \theta_{k-1} + (\omega_{k-1} - g_{bias})\Delta t$

Zapisując w postaci

$x_k = Ax_{k-1} + Bu_{k-1}$

Stan:

$$x = \begin{bmatrix} \theta \\ g_{bias} \end{bmatrix}$$

$$A = \begin{bmatrix} 0 & -\Delta t \\ 0 & 1 \end{bmatrix}$$

$$B = \begin{bmatrix} \Delta t \\ 0 \end{bmatrix}$$

$$C = H = \begin{bmatrix} 1 & 0 \end{bmatrix}$$