

$x$  : estimate

$P$  : Uncertainty covariance

$F$  : State transition matrix

$U$  : motion vector

$Z$  : measurement

$H$  : measurement function

$R$  : measurement noise

$I$  : Identity matrix

Prediction:

$$x' = F \cdot x + u$$

$$P' = F \cdot P \cdot F^T$$

Measurement update:

$$y = Z - H \cdot x$$

$$S = H \cdot P \cdot H^T + R$$

$$K = P \cdot H^T \cdot S^{-1}$$

$$x' = x + Ky$$

$$P' = (I - kH) \cdot P$$