$$x_{k+1} = a x_k + \varepsilon_k \qquad y_{k1} = (1 + x_k^2)^{1/2} + v_k$$

$$P(x_{k|k} \mid y_1 \text{---} y_k) \qquad (C)x_k + v_k$$

$\rightarrow a = -1 \qquad y_1 \text{---} y_{100}$

$y_1 \quad y_{100}$

$$P(a \mid y_1 \text{---} y_{100})$$

$z_k \sim a$

② Acc, Gyro IMU 1 2 3

$A_x \; A_y \; A_z \qquad \omega_x \; \omega_y \; \omega_z$

yaw pitch roll

Vicon

$R_1 \text{---} R_N$

$$R_1 \times \begin{bmatrix} 0 \\ 0 \\ g \end{bmatrix} = \begin{bmatrix} g_x \\ g_y \\ g_z \end{bmatrix}$$

(θ, ω)

$\left(\cos\frac{\theta}{2}, \sin\frac{\theta}{2}, \omega\right)$

$$\boxed{q = (q_0, q)}$$

② UKF

$$\begin{bmatrix} q \\ \omega \end{bmatrix}$$

$Q \quad R \rightarrow Q$

$Q \rightarrow \in A$

multi $\quad q_1 \times q_2$

3D Rotations

Euler Angles $\quad$ non-id Rotation Matrix $\quad$ Axis Angle

$RPY \rightarrow XYZ \Leftrightarrow \begin{bmatrix} & & \\ & & \\ & & \end{bmatrix}_{3\times3} \leftrightarrow (\theta, \omega)$

pure rotat

$q = (v_0, v) \qquad (R \leftrightarrow q) \rightarrow (\theta, \omega)$

$q_1 \times q_2 = (\qquad) \qquad [\ ]$

$q_0 + q_1 i + q_2 j + q_3 k \qquad \left(\cos\frac{\theta}{2}, \sin\frac{\theta}{2}\omega\right)$ unit

Given a map $\rightarrow$ localization

Given the position/pose $\rightarrow$ Mapping
(x, y, z, orient)

SLAM