Coordinate Systems

Quaternions

$$q = a + \mathrm{i}b + \mathrm{j}c + \mathrm{k}d \qquad a, b, c, d \in \mathbb{R}$$

$$\Leftrightarrow$$

$$q = \begin{pmatrix} a \\ b \\ c \\ d \end{pmatrix} \in \mathbb{R}^4$$

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$$\text{represent rotation} \quad \Leftrightarrow \quad \|q\| = 1 \quad \Leftrightarrow \quad q \in \mathcal{S}^3$$

Drift Correction

$$\dot{q}(t) = \tilde{f}(q(t))$$

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$$\dot{q}(t) = \tilde{f}(q(t)) - \lambda(q(t))$$