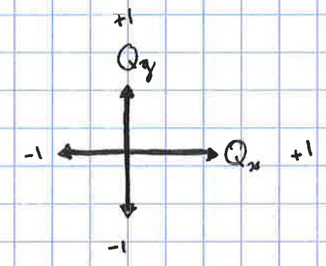


$\vec{Q}$ is a joystick input

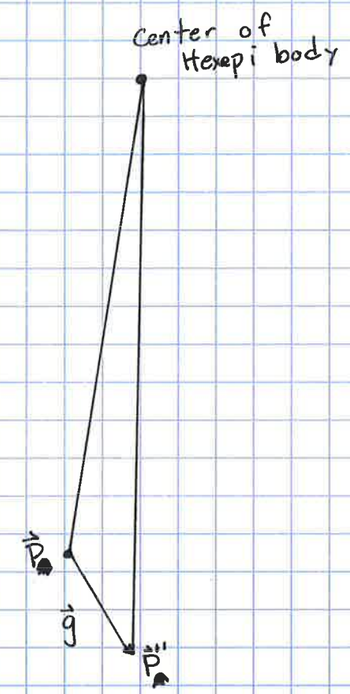
Q_x, Q_y have a magn. of -1 to 1

$g = \vec{Q} \cdot \Delta t$

$\vec{P} = \langle x, y, z \rangle$

$\vec{P}'' = \langle x'', y'', z'' \rangle$

$\vec{P}'' = \vec{P} + \vec{Q} \cdot \Delta t$



INTERSTATES

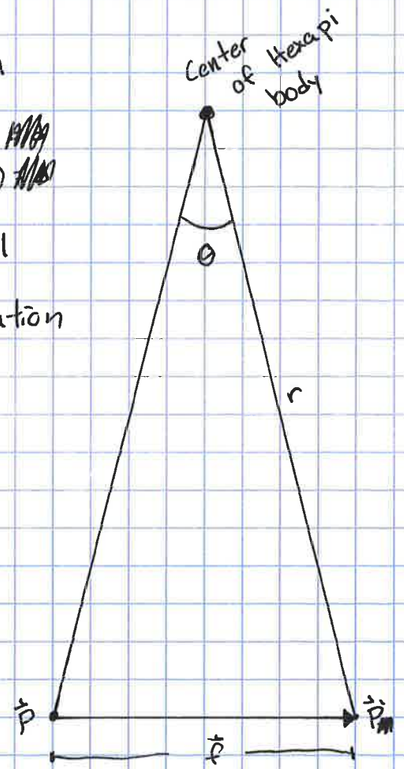
$\vec{T}$ is a joystick input

Δt is the Loop step time.

$\vec{T}$ is clockwise (-1)
or counter clockwise (+1)

a magn. of -1 to +1

1, -1 are fastest rotation
0 is no rotation.



$\theta = 2 \cdot \sin^{-1}\left(\frac{f}{2r}\right)$

$f = \vec{T} \cdot \Delta t$

$\vec{P}$: $\langle x, y, z \rangle$

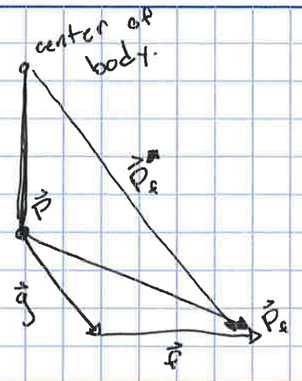
$\vec{P}'$: $\langle x', y', z' \rangle$

$$\vec{P}' = \begin{bmatrix} x' \\ y' \\ z' \end{bmatrix} = \begin{bmatrix} x\cos\theta - y\sin\theta \\ x\sin\theta + y\cos\theta \\ z \end{bmatrix}$$

$\vec{F} = \vec{P}' - \vec{P}$

positive θ is couter clockwise

INTERSTATES



$\vec{q} = \vec{Q} \cdot \Delta t$

$\vec{f} = \vec{P}' - \vec{P}$

$\vec{P}_f = \cancel{\vec{P}} + \vec{Q} \cdot \Delta t + \vec{P}' - \cancel{\vec{P}}$

$\vec{P}_f = \vec{Q} \cdot \Delta t + \vec{P}'$

where $\vec{P}' = \begin{bmatrix} x\cos\theta - y\sin\theta \\ x\sin\theta + y\cos\theta \end{bmatrix}$

and $\theta = 2\sin^{-1}\left(\frac{\vec{T} \cdot \Delta t}{2\sqrt{x^2+y^2}}\right)$

$\theta = 2 \cdot \sin^{-1}\left[\frac{\vec{T} \cdot \Delta t}{2\sqrt{x^2+y^2}}\right]$

$\vec{P}_f = \begin{bmatrix} Q_x \\ Q_y \end{bmatrix} \cdot \Delta t + \begin{bmatrix} x\cos\theta - y\sin\theta \\ x\sin\theta + y\cos\theta \end{bmatrix}$

$\vec{P}$ is known (initial position)

$\vec{Q}$ and $\vec{T}$ are Joy Stick inputs

Δt is the definition (i.e. resolution) of motion.

INTERSTATES