

# LAND OF THE CURIOUS

---

LUT School  
Lappeenranta-Lahti University of Technology LUT



# ESTIMATING AIRCRAFT ORIENTATION WITH EKF



Presented by Matteo Bonfadini

February 16, 2025

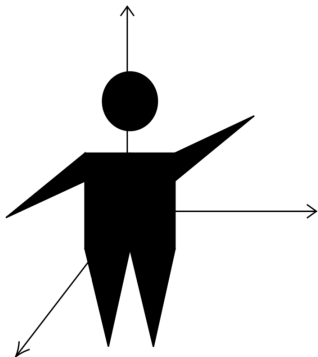
# ILLUSTRATING THE MODEL

Bob



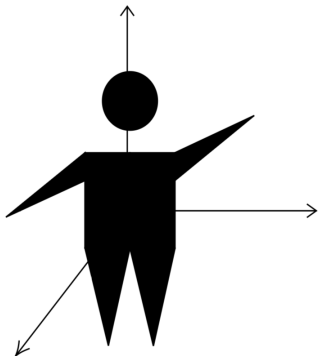
# ILLUSTRATING THE MODEL

Bob (reference frame)

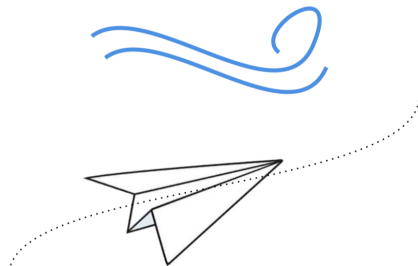


# ILLUSTRATING THE MODEL

Bob (reference frame)

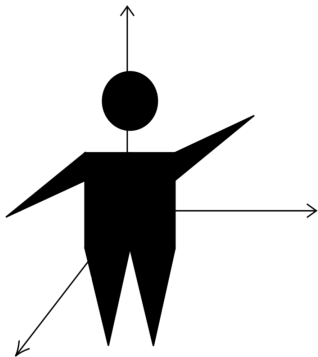


Aircraft

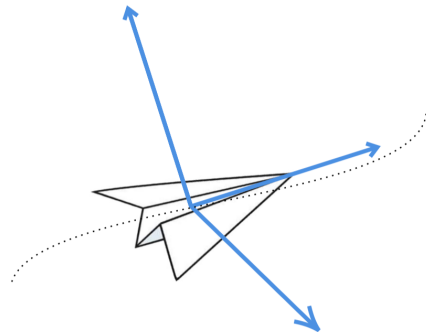


# ILLUSTRATING THE MODEL

Bob (reference frame)

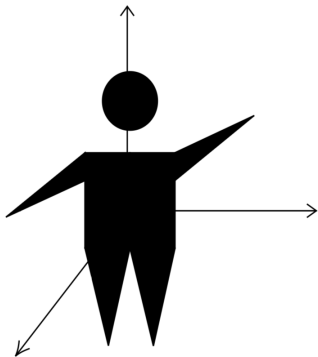


Aircraft (body frame)

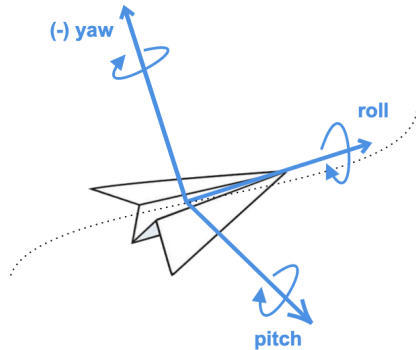


# ILLUSTRATING THE MODEL

Bob (reference frame)

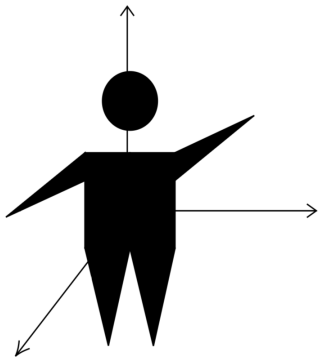


Aircraft (body frame)

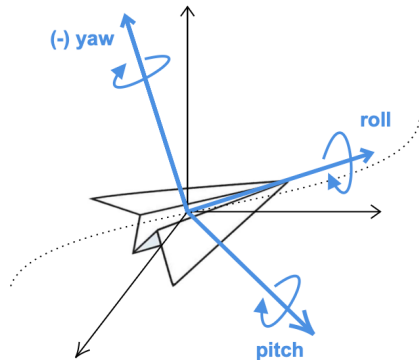


# ILLUSTRATING THE MODEL

Bob (reference frame)



Aircraft (body frame)





# EULER ANGLES



$$\mathbf{x}_k = \begin{bmatrix} \phi_k \\ \theta_k \\ \psi_k \end{bmatrix}$$

$$\mathbf{x}_k = \mathbf{f}(\mathbf{x}_{k-1}) + \mathbf{q}_{k-1}$$

$$\mathbf{y}_k = \mathbf{h}(\mathbf{x}_k) + \mathbf{r}_k$$



LUT  
University