Making Flips with Quadrotors in Constrained Environments

Presentation 9

Elie Hatem[1], Sébastien Briot[2], Isabelle Fantoni[2]

[1]École Centrale de Nantes, Laboratoire des Sciences du Numérique de Nantes (LS2N), Nantes, France
[2]CNRS, Laboratoire des Sciences du Numérique de Nantes (LS2N), Nantes, France

July 12, 2021

Index

The equations of motion of a quadrotor:

$$\dot{\boldsymbol{p}}_i = \boldsymbol{v}_i$$

$$\dot{\boldsymbol{v}}_i = \frac{T}{m} \begin{bmatrix} 2(q_w q_y + q_x q_z) \\ 2(q_y q_z - q_w q_x) \\ 1 - 2(q_x^2 + q_y^2) \end{bmatrix} + \boldsymbol{g}$$

$$\dot{\boldsymbol{q}}_i = \frac{1}{2} \begin{bmatrix} 0 \\ \boldsymbol{\omega}_i \end{bmatrix} \otimes \boldsymbol{q}_i$$

$$\dot{\boldsymbol{\omega}}_i = \boldsymbol{I}_i^{-1} \boldsymbol{\tau}_i - \boldsymbol{I}_i^{-1} (\boldsymbol{\omega}_i \times \boldsymbol{I}_i \boldsymbol{\omega}_i)$$