ME579 - Final Project Proposal:
Euler-Lagrange Drone Dynamics and Trajectory Control

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Objective

Understand the basics of quadcopter modeling and control, complete a self-coding program to achieve the drone dynamic and trajectory control. Finally, design a robust drone delivering task.

Content

1. Mathematical model of Euler-Lagrange drone dynamics in MATLAB.
2. Validation using the example case.

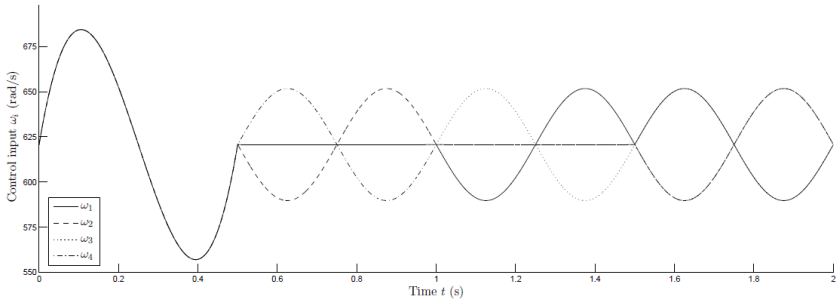

Figure 2: Control inputs ω_i

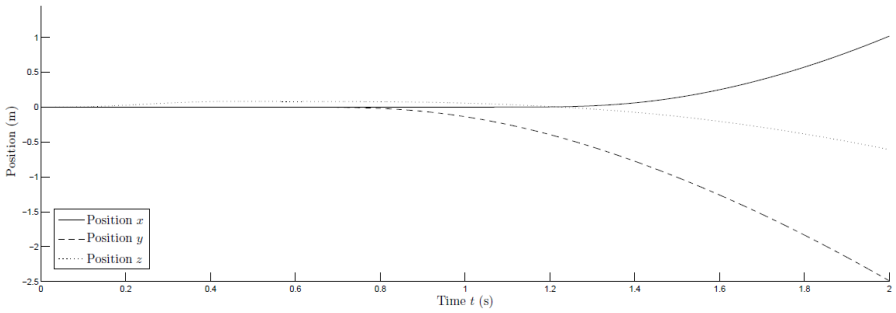

Figure 3: Positions x, y, and z

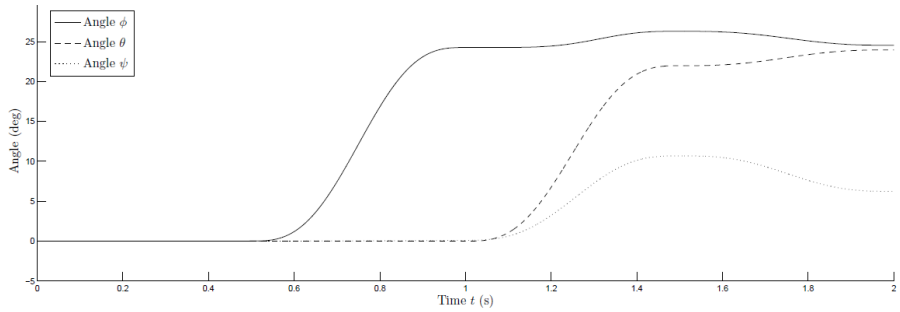

Figure 4: Angles ϕ, θ, and ψ

3. Trajectory control

Test:

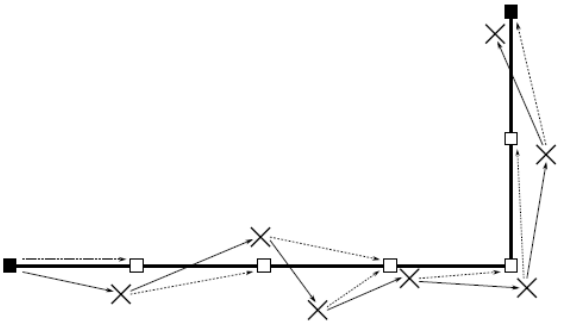

Figure 14: Example of checkpoint flight pattern with external disturbances

Design:

i) Pre-defined h_0, h_d, W_0, while P_0 as the delivering office station or vehicle position.

ii) Input destination coordinates(customer apartment) P_1 and box weight W_{box}, achieving an safe drone delivering mission.