1 Summary

2 Problem Statement

We wish to understand 'optimal' trajectory planning for aircraft subject to various disturbances over a fixed interval of time and/or distance. Such planning is important as an upper bound to the theoretical performance of an implemented controller's response to disturbances and or command responses.

To perform this investigation we will use an optimal control

2.1 Problem Definition

For an optimal control problem we seek the state $\mathbf{x}(t)$ and control $\mathbf{u}(t)$ traces which optimize the value of some total cost $J(\mathbf{x}, \mathbf{u})$ and constraint functions $G(x, u) \leq 0$, $L(x, u) = 0$. We are able in this problem formulation to encode the system dynamics $\dot{\mathbf{x}} = f(\mathbf{x}, \mathbf{u})$ into the constraints.

3 Modeling

4 Aerodynamics Model

5 Rigid Motion Model

6 Problem