

Abstract

The core of this project focuses on how to make aerial vehicles fly autonomously from an initial position to a goal. This is done by making a mathematical model for the UAV, a brief study of the sensors needed to estimate the UAVs state, then designing an LQR controller for the trajectory tracking and finally using an artificial potential field function for the navigation. The mathematical model is done by studying the kinematics and dynamics for a single UAV, it is then linearised and the system's observability and controllability are checked to develop the LQR. We conduct computer simulations to test the theoretical findings and evaluate the proposed methods. Finally, we conclude the paper with the discussion and the results, and provide directions and ideas to do further research on the topic.