NORTHERN ARIZONA UNIVERSITY

MASTER'S THESIS

Quadrotor Flight Path Energy Optimization

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Declaration of Authorship

I, Edward KEMPER, declare that this thesis titled, 'Quadrotor Flight Path Energy Optimization' and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University.
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
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- I have acknowledged all main sources of help.
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NORTHERN ARIZONA UNIVERSITY

Abstract

Niranjan Venkatraman

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Master of Science

Quadrotor Flight Path Energy Optimization

by Edward KEMPER

In this paper we develope and compare two methods for the flight path energy optimisation of a quadrotor UAV between two known points. First we use classical optimal control techniques and find an approximate solution to the resulting boundary value problem. This method is shown to be too computationally intensive to provide a solution in a reasonable amount of time. The second method that is developed is a heuristic technique which minimizes the energy of the flight path through optimal PID controller tuning. Simulation results of the heuristic show that both reliable control of the system and energy minimization are achieved.

Acknowledgements

The acknowledgements and the people to thank go here, don't forget to include your project advisor...

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Symbols

a	distance	m
P	power	W (Js^{-1})
ω	angular frequency	$rads^{-1}$

more?

For my Parents Jack and Carol...