

A Convex Optimal and LQG Control Approach for Quadcopters

Pádraig Lysandrou*

Cornell University, Ithaca, New York, 14853

The independent project report shall be a maximum of 15 pages in double-spaced format, including all graphs and data tables, not including title page or reference section. The report shall include the sections listed below.

The abstract shall be one paragraph, giving a brief description of the motivation and purpose of the project and also listing key results.

Nomenclature

A	=	amplitude of oscillation
a	=	cylinder diameter
C_p	=	pressure coefficient
C_x	=	force coefficient in the x direction
C_y	=	force coefficient in the y direction
c	=	chord
dt	=	time step
F_x	=	X component of the resultant pressure force acting on the vehicle
F_y	=	Y component of the resultant pressure force acting on the vehicle
f, g	=	generic functions
h	=	height
i	=	time index during navigation
j	=	waypoint index
K	=	trailing-edge (TE) nondimensional angular deflection rate

*Undergraduate Student, Electrical and Computer Engineering, AIAA Student Member

I. Introduction and Theory

This section shall introduce the **multivariate** control approach and describe relevant theory background in approximately three to five page(s). The Theory section is one of the most important sections of the paper, as this relays to the reader your knowledge of the subject matter.

II. Procedure

This section describes the steps involved in the control design and tuning. It also shall describe the simulation setup and include explanatory diagrams and figures when appropriate. As a rule of thumb, this should be written with the intention of giving step-by-step instructions to someone else to complete the same design and be able to obtain your exact result. This shall be done in approximately three to five pages.

III. RESULTS

This section should be the meat of your report. It should be three to six pages. If the control design and validation have multiple components, you may use sub-sections as necessary. Include a description of simulation findings, using diagrams, figures, and numerical data measurements (by means of tables) that provide a convincing argument on the effectiveness and shortcomings of your chosen multivariable controller, in the context of the original design objectives. It may be appropriate to put some of the raw data into Appendices. Plot the results in a meaningful way- “a plot is worth a thousand words,” do NOT underestimate the power of a good plot! Consider using statistical analysis if appropriate when completing a plot. Verify your findings through the theory. Possible causes of error should also be addressed in the concluding paragraph.

IV. Conclusions

Explain in one paragraph what are the main contributions of your project, the main theoretical findings, and provide a summary of the control performance along with any recommendations for improvements through future work.

V. ref

Be sure to cite any references you used in this lab report using approved IEEE standards.