



INSTITUTO SUPERIOR TÉCNICO  
Universidade Técnica de Lisboa



## **Título da Dissertação**

Subtítulo (facultativo)

## **Nome Completo do Candidato**

Dissertação para a obtenção de Grau de Mestre em  
**Engenharia Aeroespacial**

### **Júri**

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| Vogais:        | Nome do Vogal 1       |
|                | Nome do Vogal 2       |
|                | Nome do Vogal 3       |

**Mês e Ano**



Dedicated to someone special...



## **Acknowledgments**

A few words about the university, financial support, research advisor, dissertation readers, faculty or other professors, lab mates, other friends and family...



## Resumo

Inserir o resumo em Português aqui com o máximo de 250 palavras e acompanhado de 4 a 6 palavras-chave...

**Palavras-chave:** palavra-chave1, palavra-chave2,...





## **Abstract**

Insert your abstract here with a maximum of 250 words, followed by 4 to 6 keywords...

**Keywords:** keyword1, keyword2,...



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# Chapter 1

## Introduction

Insert your chapter material here...

### 1.1 Motivation

Relevance of the subject...

### 1.2 State-of-the-art

Insert your section material with the appropriate citations. These can be cited in the following way:

- Citation mode #1 - ?
- Citation mode #2 - ?
- Citation mode #3 - [?]
- Citation mode #4 - ?
- Citation mode #5 - [?]
- Citation mode #6 - ?
- Citation mode #7 - ?
- Citation mode #8 - ?
- Citation mode #9 - ?
- Citation mode #10 - [?]

#### 1.2.1 Tables

Insert your subsection material and for instance a few tables...

|        |        |
|--------|--------|
| item 1 | item 2 |
| item 3 | item 4 |

Table 1.1: Table caption

Make reference to Table 1.1.

| Model         | $C_L$ | $C_D$ | $C_{My}$ |
|---------------|-------|-------|----------|
| Euler         | 0.083 | 0.021 | -0.110   |
| Navier–Stokes | 0.078 | 0.023 | -0.101   |

Table 1.2: Aerodynamic coefficients.

Here is an example of a table with merging columns:

|           | Virtual memory [MB] |               |
|-----------|---------------------|---------------|
|           | Euler               | Navier–Stokes |
| Wing only | 1,000               | 2,000         |
| Aircraft  | 5,000               | 10,000        |
| (ratio)   | $5.0\times$         | $5.0\times$   |

Table 1.3: Memory usage comparison (in MB).

1.2.2 Drawings

Insert your subsection material and for instance a few drawings...

The schematic illustrated in Fig. 1.1 can represent some sort of algorithm.

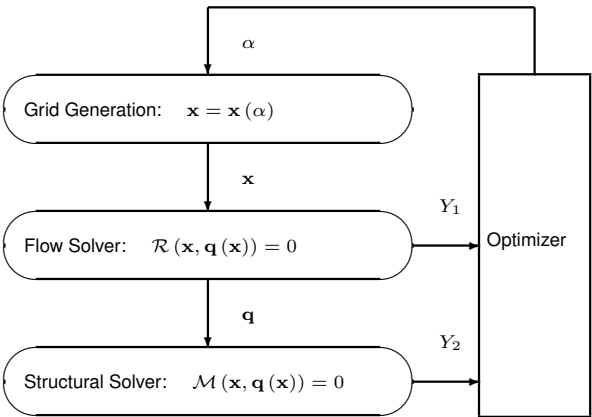


Figure 1.1: Schematic of some algorithm.

# Chapter 2

## Results

Insert your chapter material here, much like in 1

### 2.1 Figures

Insert your section material and possibly a few figures...



Figure 2.1: Caption for figure.

Make reference to Figure 2.1.



(a) Airbus A320



(b) Bombardier CRJ200

Figure 2.2: Aircrafts.

By default, the supported file types are *.png,.pdf,.jpg,.mps,.jpeg,.PNG,.PDF,.JPG,.JPEG*.

See [http://mactex-wiki.tug.org/wiki/index.php/Graphics\\_inclusion](http://mactex-wiki.tug.org/wiki/index.php/Graphics_inclusion) for adding support to other extensions.

## 2.2 Equations

Equations can be inserted in different ways.

The simplest way is in a separate line like this

$$\frac{dq_{ijk}}{dt} + \mathcal{R}_{ijk}(\mathbf{q}) = 0. \quad (2.1)$$

If the equation is to be embedded in the text. One can do it like this  $\partial\mathcal{R}/\partial\mathbf{q} = 0$ .

It may also be split in different lines like this

$$\begin{array}{ll} \text{Minimize} & Y(\alpha, \mathbf{q}(\alpha)) \\ \text{w.r.t.} & \alpha, \\ \text{subject to} & \mathcal{R}(\alpha, \mathbf{q}(\alpha)) = 0 \\ & C(\alpha, \mathbf{q}(\alpha)) = 0. \end{array} \quad (2.2)$$

It is also possible to use subequations. Equations 2.3a, 2.3b and 2.3c form the Navier–Stokes equations 2.3.

$$\frac{\partial \rho}{\partial t} + \frac{\partial}{\partial x_j} (\rho u_j) = 0, \quad (2.3a)$$

$$\frac{\partial}{\partial t} (\rho u_i) + \frac{\partial}{\partial x_j} (\rho u_i u_j + p \delta_{ij} - \tau_{ji}) = 0, \quad i = 1, 2, 3, \quad (2.3b)$$

$$\frac{\partial}{\partial t} (\rho E) + \frac{\partial}{\partial x_j} (\rho E u_j + p u_j - u_i \tau_{ij} + q_j) = 0. \quad (2.3c)$$

## **Chapter 3**

# **Conclusions**

Insert your chapter material here...

### **3.1 Achievements**

The major achievements of the present work...

### **3.2 Future Work**

A few ideas for future work...



# Appendix A

## Vector calculus

In case an appendix is deemed necessary, the document cannot exceed a total of 100 pages...

Some definitions and vector identities are listed in the section below.

### A.1 Vector identities

$$\nabla \times (\nabla \phi) = 0 \tag{A.1}$$

$$\nabla \cdot (\nabla \times \mathbf{u}) = 0 \tag{A.2}$$

