The unreasonable effectiveness of mathematics in graduate school

by

Richard Feynman

A dissertation submitted in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

Department of Physics

New York University

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Dr. Galileo Galilei

Dr. Isaac Newton (if co-advisor $\exists$)

Dedication

To Albert Einstein...

Acknowledgements

I am grateful to the many people who helped me during the doctoral program at ABC University which culminated in this dissertation.

My advisor John Doe who has always been an inspiring, patient and encouraging mentor.

My dissertation committee ...

My collaborators,

My friends,

Our graduate program administrator Alice who...

Abstract

Summary of the thesis. Can also cite, for example this book [5]

Chapter 2 studies... Finally, Chapter 3 summarizes the findings and discusses further studies.

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1 Introduction

1.1 Section title

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Citing some works [3, 4].

Showing some maths

$$\boldsymbol{u}^* = \boldsymbol{u}/U, \boldsymbol{x}^* = \boldsymbol{x}/L, \text{and } p^* = p/(\mu U/L) \text{ or } p/\rho U^2, \tag{1.1}$$

where U, L are characteristic velocity and length scales, respectively.

1.2 Another section

1.2.1 Subsection

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1.2.2 Another subsection

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Here is a table 1.1.

Equations	Initial-boundary value problem	Applicability	Under $(\boldsymbol{u}, p) \mapsto (-\boldsymbol{u}, -p + c(t))$
Stokes	$\nabla p - \mu \nabla^2 \boldsymbol{u} = 0$ $\nabla \cdot \boldsymbol{u} = 0,$ with boundary conditions	$\mathrm{Re} \ll 1$. The solution is exact near rigid boundaries [2].	Reversible
Navier-Stokes	$\rho \left[\partial \boldsymbol{u}/\partial t + (\boldsymbol{u} \cdot \nabla)\boldsymbol{u}\right] = -\nabla p + \mu \nabla^2 \boldsymbol{u}$ $\nabla \cdot \boldsymbol{u} = 0,$ with initial and boundary conditions	$\mathrm{Re} > 1$	Irreversible
Euler's	$\partial \boldsymbol{u}/\partial t + (\boldsymbol{u} \cdot \nabla)\boldsymbol{u} = -\nabla p$ $\nabla \cdot \boldsymbol{u} = 0,$ with initial and boundary conditions	$\mathrm{Re} \gg 1$, in free flow regions [1].	Irreversible

Table 1.1: The governing equations of fluid flow at different dynamical regimes and kinematic (ir)reversibility

2 The unreasonable effectiveness of mathematics

This chapter is adapted from the preprint version of ..., submitted to Some Journal. In this chapter, we...

ABSTRACT

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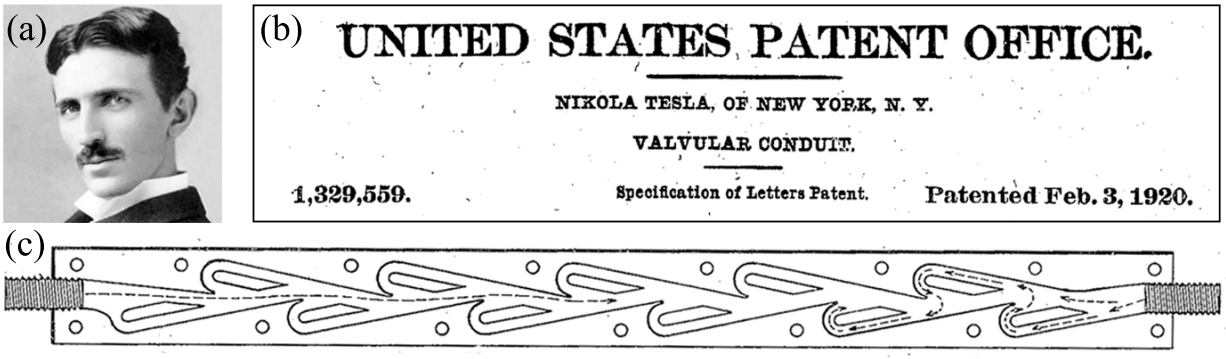

Figure 2.1: (a) The genius Nikola Tesla (b) His patent (c) Tesla's channel

2.1 Introduction

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Example of a Figure reference Fig. 2.1.

3 Conclusion

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