Translation Operators for Translation-Variant Modal Green's Functions

by

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Professor Michael O'Neil

To Mary.

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Abstract

Translation operators for various flavors of the Fast Multipole Method (FMM) are a minimal pre-computation for translation-invariant Green's functions and modal Green's functions. This is due to the fact that for these functions many translation operators on various levels the computational domain are the same, and so need not be repeatedly computed. However, for a translation-variant Green's function or modal Green's function this is not immediately clear. Until now one may have needed to compute all possible translation operators between all boxes in the computational domain. This thesis shows that lightening the pre-computational load of the translation operators for the FMM is possible for translation-variant modal Green's functions. Specifically we examine the application to the translation operators of the three-dimensional kernel-independent FMM for Laplace's equation.

Contents

Dedication iii

Acknowledgements iv

Abstract v

List of Figures vii

List of Tables viii

Introduction 1

1 Statement of problem **2**

1.1 The Riemann Hypothesis 2

1.2 Another section 3

A One more comment **4**

Bibliography **5**

List of Figures

1.1 This alternate caption appears in the list of figures. 2

List of Tables

1.1 Strange rules. 2

Introduction

This thesis is about the Riemann Hypothesis. We provide an affirmative answer to the question "If z is a zero of the zeta function and $0 \leqslant \Re(z) \leqslant 1$, then is $\Re(z)$ necessarily equal to $1/2$?"

In chapter 1 we do this and that.

In the latter chapters we...

Chapter 1

Statement of problem

In this chapter, ...

1.1 The Riemann Hypothesis

Blah, blah, blah. There is nothing interesting in figure 1.1.

This statement is false.

Figure 1.1: This is the caption that appears under the figure. It may be quite long—you wouldn't want such a long caption to appear in the "list of figures".

More blah, blah. There is nothing interesting about table 1.1 either.

Table 1.1: For some reason unfamiliar to me, typesetting rules require one to place captions above tables, but below figures. Go figure.

You could put a table here. I won't.

1.2 Another section

Notice that the fist paragraph is indented. There's a package to do that automatically. Blah, blah. Blah, blah, blah, blah.

Appendix A

One more comment

This is an appendix.

Bibliography

[1] J. B. Conway, *Functions of One Complex Variable I*. Second edition. Springer-Verlag, Graduate Texts in Mathematics **11**, 1991.