

Table of Contents

Before the Beginning

Foreword 1

This Book and its Technology 5

Part One: Getting Used to *Mathematica*

Chapter 1: An Introduction 13

Chapter 2: Consistency, and Why You Want It 31

Part Two: NestList, NestList, NestList

Chapter 3: Many `sin` Functions Make a Square Function 39

Chapter 4: Finding Gold in Continued Fractions 51

Chapter 5: $I^I I^I I$ 59

Chapter 6: If I Have Seen Far It Is Because I Climbed a Tree 67

Chapter 7: Bifurcations Forever 89

Chapter 8: Fractals When Least Expected 139

Part Three: Sound and Graphics

Chapter 9: Plotting and Graphics 165

Chapter 10: Two-Dimensional Graphics, Differently 185

Chapter 11: Three-Dimensional Graphics, Differently 203

Chapter 12: Density Plots 217

Chapter 13: Making Posters 237

Chapter 14: Fourier for Sound 239

Chapter 15: The Amazing Constantly Rising Tone 263

Chapter 16: What Sound Is That Function in the Window? 275

Part Four: Adventures in Mathematics

- Chapter 17: Factoring $x^n - 1$: So You Think 100 Cases Is Enough? 299
Chapter 18: The Square Root Of Beethoven, and Other Really *Big* Numbers 325
Chapter 19: Complex Maps, or How to Make a Tangled Mess 371
Chapter 20: The Gasket Chapter 397
Chapter 21: *Mathematica* For Young People Ages 7, Yes 7, and Up 415

Part Five: For Teachers and Students

- Chapter 22: High School Math 431
Chapter 23: College Math 469

Appendices

- Appendix A: `NicerFourier.m` 489
Appendix B: `ComplexMapPlot.m` 493
Appendix C: `IteratedMappings.m` 505
Appendix D: `InequalityPlot.m` 511
Appendix P: Making Posters 519
Appendix V: Visiting Professors and Authors Biographies 529

Index

- Index 531