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## A Student's Guide to Waves

Waves are an important topic in the fields of mechanics, electromagnetism, and quantum theory, but many students struggle with the mathematical aspects. Written to complement course textbooks, this book focuses on the topics that students find most difficult.

Retaining the highly popular approach used in Fleisch's other Student's Guides, the book uses plain language to explain fundamental ideas in a simple and clear way. Exercises and fully worked examples help readers test their understanding of the concepts, making this an ideal book for undergraduates in physics and engineering trying to get to grips with this challenging subject.

The book is supported by a suite of online resources available at [www.cambridge.org/wavesguide](http://www.cambridge.org/wavesguide). These include interactive solutions for every exercise and problem in the text and a series of podcasts in which the authors explain the important concepts of every section of the book.

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## Preface

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This book has one purpose: to help you understand the foundational concepts of waves and the mathematics of the wave equation. The authors have attempted to fill the book with clear, plain-language explanations, using just enough mathematical rigor to help you understand the important principles without obscuring the underlying physics. Armed with that understanding, you'll be ready to tackle the many excellent texts that deal with mechanical, electromagnetic, and quantum waves.

You should understand that this book is meant to be used as a supplemental text and is not intended to be a comprehensive treatment of wave phenomena. That means that we haven't attempted to cover every aspect of waves; instead, we've included the topics that our students have found most troubling.

As you'll see, the design of the book supports its use as a supplemental text. Whenever possible, we've made the chapters modular, allowing you to skip material you've already mastered so you can proceed directly to the topics with which you need help. As a Student's Guide, this book is accompanied by a website that provides a variety of freely available material that we think you'll find very helpful. That includes complete, interactive solutions to every problem in the book, as well as a series of podcasts in which we explain the most important concepts, equations, and graphs in every section of every chapter. By "interactive" we mean that you can see the full solution immediately, or you can request one or more hints that will guide you to

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Preface

Is this book right for you? It is if you're looking for help in understanding waves, whether you need that help to supplement your work in a physics or engineering class, in preparing for the physical science portion of a standard exam, or as a part of a program of self-study. Whatever your reason, we commend your initiative.

## Acknowledgements

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Primary responsibility for the good bits in this book belongs to the students in our classes, whose curiosity, intelligence, and persistence have inspired us to pursue (and occasionally find) deeper understanding and better explanations of the physics of waves. We thank those students.

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