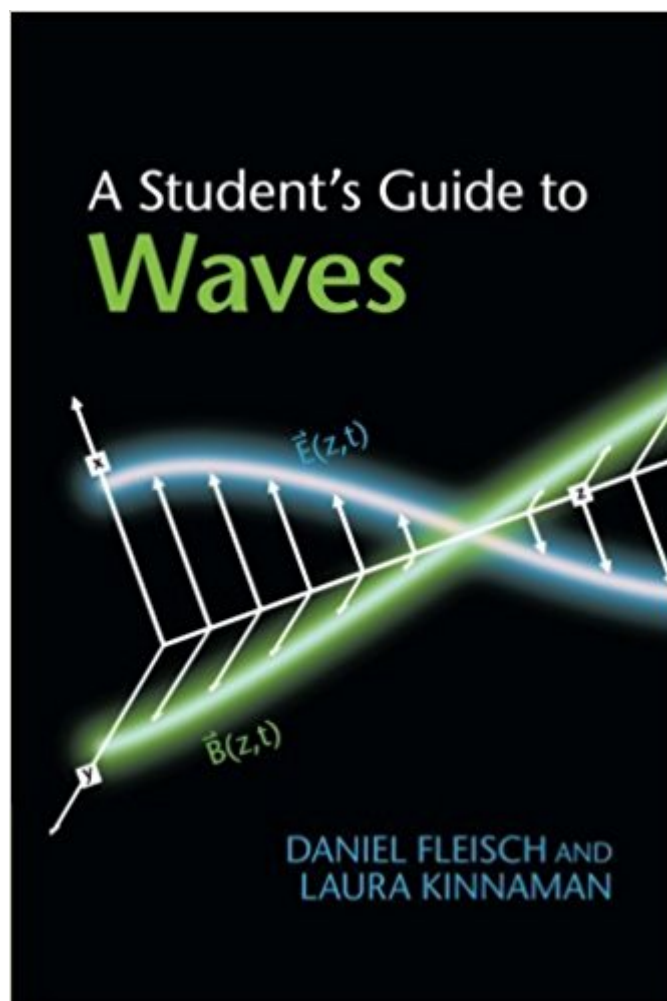


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A Student's Guide To Waves



Synopsis

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/9781107643260. These include interactive solutions for every exercise and problem in the text and a series of video podcasts in which the authors explain the important concepts of every section of the book.

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Customer Reviews

"I recommend this supplementary textbook as clear tutorial for the understanding of the basic concepts of waves and the wave equation with its applications to mechanics, electromagnetic waves and the Schrödinger equation. ... It is written for undergraduates in physics and engineering, but it also has exceptional value to a wider readership. ... Physical insights that are helpful for a deep understanding of waves are uniquely presented. The text is supplemented with clear and useful graphs. The book's website contains additional resources: worked solutions to all problems, animated graphics, a few errata, and author podcasts to augment all the chapters." Barry R. Masters, Optics and Photonics News

Written to complement course textbooks, this book focuses on the topics that students find most difficult. It uses plain language to explain fundamental ideas, and features exercises and fully-worked examples. Ideal for undergraduates in physics and engineering, the book is supported by a suite of online resources.

I am a retired chemical engineer (Delft, Holland) revamping his knowledge of maths, in order to rediscover physics. Like the other "Student's guides" written by Daniel Fleisch, this one caused a sentiment of "why didn't they tell me this before" ? Why are there so many textbooks full of unnecessary, non relevant detail, clobbering the main issues and just impeding true understanding ? Where the authors seem to concentrate on impressing their audience by their own knowledge, rather than fostering real understanding with their readers. Great book, highly recommended ! (needless to say: I bought all Students's guides written by Fleisch)

Once again Professor Fleisch has delivered a great guide. I own his famous "A Students Guide to Maxwell Equations" and instantly fell in love with it, and now I bought this new book and it didn't disappoint me at all. I must say there are some differences, this book is borderline between being a guide and a textbook, It's not comprehensive enough to be an actual textbook but it's not as concise as the Maxwell guide. The book felt a lot more verbose than the Maxwell guide, this one about waves is actually twice the size of the Maxwell guide. One could argue that it's a more general topic, and it is, it will attract many different readers since it covers many different topics from mechanical motion, EM and even the Schrödinger wave equation. The author will provide good introductions to such topics, which is nice to have, however I kind of miss the beauty and the simplicity of the Maxwell guide, in which whenever you want to check something out, you can quickly find what you are looking for, in this Waves guide you need to go through a lot more paragraphs (even pages) of explanations to get the info that you need. Overall I would say it was a great buy!

The book is far more comprehensive than I could have imagined. It covers the bare basics, first and foremost, and then it gets into the deeper aspects of wave theory, such as, Fourier analysis and even aspects of quantum mechanics which is a real treat to be exposed to seeing how important wave theory is to the subject. Also, for you Electrical Engineering students out there, the Smith Chart is also covered.

'A Student's Guide to Waves' by Daniel Fleisch (he has different student's guides, all very good, check it out), it is such a pleasant reading that I wish I have read it when I first studied waves. I recommend anyone wants to learn waves, or have already learned to go through this book (you will find it you go through it very fast). It is truly a student's guide and if in the future I will teach this subject, I am sure, this will be my class text ^)^The very nice part of this book is that it explains everything in plain English. All the concepts and equations are explained like reading a story that you just want to follow with the author to understand deeper. Besides, the book is only ~200 pages, and each section is short, makes it a book that you can read anywhere (I actually read this book mostly on the flight or on Bart). The author has very deep understanding of the subject that he gives a lot of the nice explanation that I never read from other books (I am a student in Seismology, I read many books talking about the mechanical waves, but most of the time, I finish the book with more confused view about waves, it took me long time to understand it). This book starts with the fundamentals of waves, concepts like the wavenumber, complex numbers, Euler relations, wavefunctions, etc. are introduced here. These are basics for learning more of the waves. The author did very nice job showing how did these concepts come up, and accompany with the figures, these concepts become very clear. Afterwards, the book talks about the wave equation. How the wave equation derived in a simple way, and why it is the 2nd partial derivative are all nicely explained it here. Also, there are many details in the equations that we often ignore but pointed out by the author which help us to understand better of the subject. Later, the book gives the general solutions to the wave equation and the importance of the boundary conditions. After all these, the Fourier synthesis and Fourier analysis are discussed with the aids of many figures that you will find that the important Fourier synthesis and analysis are really simple and will store into your mind forever. It even talks about the 'uncertainty principle' between the time/frequency domain and the distance/wavenumber domain that dominant many analysis in practice. The last part of the book deals with specific types of waves, i.e. mechanical wave equation, electromagnetic wave equation and the quantum wave equation. Armed with the concepts and equations you learned before, you will find how to apply them to specific types of waves in the real world to address some of the interesting problems. Even though I am a seismologist, and mostly interested in the mechanical waves, but I found the electromagnetic and quantum wave equations are also very interesting. I was so impressed by the way all the nature phenomenon links to wave equation in various forms. Overall, it is a great short book that suitable for beginners or more advanced researchers.

This short book is an excellent course supplement for undergraduate students of engineering and physics. This guide includes some of the elementary material that is often left out of textbooks. The first part of the book covers basic mathematical concepts up through partial differential equations. The remainder of the book provides examples of the wave equation in different fields such as electromagnetics and quantum physics. This is not a detailed treatment of waves and the wave equation but it is a good summary of the subject. I particularly liked the general approach to the subject that illustrates how mathematics can be applied to different topics in physics and engineering.

Daniel Fleisch should be awarded with a prize for writing such wonderful books. He goes to the point, with simple and very nice explanations. We often work out equations and get results, but there are many "tiny" details in equations that Fleisch points out and reveal deep facts about the subject. It is a pleasure to read book like this because they're small but they enclose all the essence of the topic. I highly recommend Fleisch books. You can have a deeper and clearer outlook of topics covered. By the way, it has some typos, so we should be careful when reading.

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