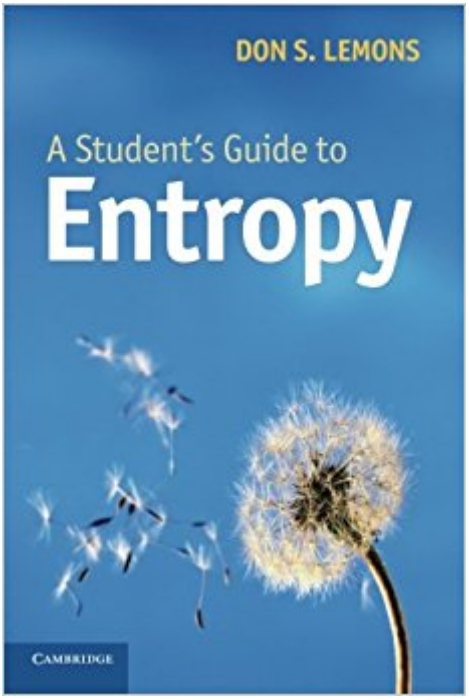
A Student's Guide To Entropy



Synopsis

Striving to explore the subject in as simple a manner as possible, this book helps readers understand the elusive concept of entropy. Innovative aspects of the book include the construction of statistical entropy, the derivation of the entropy of classical systems from purely classical assumptions, and a statistical thermodynamics approach to the ideal Fermi and ideal Bose gases. Derivations are worked through step-by-step and important applications are highlighted in over 20 worked examples. Nearly 50 end-of-chapter exercises test readers' understanding. The book also features a glossary giving definitions for all essential terms, a time line showing important developments, and list of books for further study. It is an ideal supplement to undergraduate courses in physics, engineering, chemistry and mathematics.

Book Information

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Customer Reviews

"In A Student's Guide to Entropy, Don Lemons conveys both mathematical and physical intuition of entropy ... [he] is very thorough, clear, and succinct in his explanations, making sure that no subtlety is left unnoticed or unaccounted for. The reader feels that he/she is being taught and guided by an experienced teacher of thermodynamics and entropy ... This book will be essential not only to students but also to faculty who are charged with the difficult task of teaching a subject that involves entropy ... a thorough, self-contained guide to entropy for students and teachers." Effrosyni Seitaridou, American Journal of Physics"The book is well written ... Highly recommended." Choice"... a truly first-rate book on the subject, and I would happily recommend it as the main (and inexpensive) text for a course of statistical mechanics." The Observatory"A Student's Guide to

Entropy is an excellent textbook for undergraduate students and early stage graduate students in physics and engineering. ... Each concept is well defined - mathematical derivation of theories is rigorous and proceeds from fundamental notions to their final form in a methodical, step-by-step manner. The physical meaning of these equations is then explained in simple words, which is perhaps the most impressive feature of this book." Prashant Khare, Contemporary Physics

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I studied physics almost 30 years ago. Since then I have drifted into software engineering, with an interest in the more mathematical side of things. So I bought this book to check out the similarities between thermodynamic and infortmatic (if that is a word) entropy.I was very pleasantly surprised. The book arrived a few days ago and I have now read five out of the eight chapters - much more than I originally intended - for the simple pleasure of seeing so much, so clearly explained. I wish this book had been available when I was a student!I can identify two reasons why this book is so good:First, it starts with the simplest approach and then builds on those foundations. This makes it easier to understand, because things become only gradually more complex, and also more entertaining - you are constantly questioning what you are shown, and then find that your questions are answered in the next section.Second, it takes pains to explain how things are constructed to have certain properties. This removes much of the "magic" I remembered from the thermodynamics courses I took.But following those two guidelines alone could still produce an awful book. So credit must also go to the general style, and clear writing.[Also, I am amazed another review can claim that the formula do not come with derivations. My only guess is that there's a kind of student who is not happy unless faced with pages and faces of incomprehensible algebra. There is certainly algebra here, but only when necessary. Sometimes you can frame a problem so clearly that the maths is simple to write down.]

This was an absolute delight to read. I am an ex-physicist, so I had some of the required mathematical background, which I'm sure helped. But the author's overview and journey through the topic was great. Clearly the author knew the history of the subject as well as the various shifts in how Entropy was considered from classical through quantum treatments. And he has synthesized

all of this into a clear overview that gave me a great understanding and appreciation for entropy worked, to the point where I think most readers who follow the book can apply entropy concepts to almost any system. (And bonus points for also having a brief but surprisingly helpful overview of Gibbs free energy.) I'd read of both Boltzmann's and Planck's contributions before, but the real meaning of what they'd done came through best in this text.I really wish there were other books like this on other deep topics in physics. This is one I'll keep on my (virtual) shelf.

I love this book. My undergraduate Thermodynamics and Statistical Mechanics course uses Reif for the required text, which I honestly can't stand. I got this book and I'm also using 'Concepts in Thermal Physics' http://www..com/Concepts-Thermal-Physics-Stephen-Blundell/dp/0199562105/ref=sr_1_1?ie=UTF8&qid=1427051543&sr=8-1&keywords=concepts+in+thermal+physics, together I'm learning a lot more than I had been from Reif.This book is concise, which is something missing from many textbooks these days, and very clear. I just wish there was a solutions manual available.

Generally useful, but I find some of the ideas are not presented clearly within the context provided. I have to supply additional context from other writings on entropy.

A well organized examination of thermodynamics from an entropic point of view. Develops a clear conceptual appreciation for entropy and its significance.

Do not be misled by the description that appears on the book's back cover: "striving to explore the subject in as simple a manner as possible". The statement is accurate (as far as it goes) but requires an important caveat: entropy and thermodynamics are mathematically driven subjects and require math for an in depth discussion. Any discussion of entropy without mathematics can offer only a narrow conceptual overview which will inevitably be inadequate. However, there are two fine books published by Dover (at low Dover prices) that are quite helpful in offering a solid introduction. They contain some math but quantitatively less than A Student's Guide to Entropy. The books areÃ Â Understanding Thermodynamics (Dover Books on Physics)Ã Â by H. C. Van Ness andÃ Â Thermodynamics (Dover Books on Physics)Ã Â by the great Italian Physicist Enrico Fermi. An entirely conceptual discussion which leaves out any material that requires mathematics for understanding or for conceptual derivation isÃ Â The Second Law (Scientific American Library)Ã Â by P. W. Atkins, originally published in the Scientific American Library. It is a bit dated

and leaves out a lot of important material, but there is no mathematics and it is a nice, clearly written introduction to the single most important concept in all of science. Comparing this book to the others is instructive as to how limiting the lack of mathematics can be.A Student's Guide to Entropy offers an excellent overview arranged roughly chronologically into Classical statistical thermodynamics and modern quantized thermodynamics. The level of physics required for a full understanding of the material is upper undergraduate with an appropriate level of mathematics that includes algebra, partial differential equations, probability theory, statistical analysis and topics from discrete mathematics. If you meet these requirements you should find the book clearly written and intelligently outlined. But if you are unable to manipulate mathematics at this level or cannot follow a mathematically structured argument you will find this book somewhat opaque. A Student's Guide to Entropy is an intelligent introduction but, like all science and mathematics, it is challenging material requiring prior exposure to antecedent subjects as a foundation for true understanding.

Excellant book

This book delves deeper into a subject that is usually not covered in enough detail in an undergraduate thermodynamics course. The examples are clear and the mathematics not made overcomplicated. I found it to be a wonderful supplement to the curriculum!

Entropy - God's Dice Game: The book describes the historical evolution of the understanding of entropy, alongside biographies of the scientists who ... communication theory, economy, and sociology A Student's Guide to Entropy Statistical Mechanics: Entropy, Order Parameters and Complexity (Oxford Master Series in Physics) Entropy Theory in Hydrologic Science and Engineering Entropy, Large Deviations, and Statistical Mechanics (Classics in Mathematics) Entropy: The Truth, the Whole Truth, and Nothing But the Truth Correlations and Entropy in Classical Statistical Mechanics (International series of monographs in natural philosophy) (English and French Edition) Entropy: A New World View Entropy and the Second Law: Interpretation and Misss-Interpretations Entropy Demystified: The Second Law Reduced to Plain Common Sense Complexity, Entropy and the Physics of Information Thermal Physics: Energy and Entropy The Briefest History of Time: The History of Histories of Time and the Misconstrued Association between Entropy and Time Exploiting Continuity: Maximum Entropy Estimation of Continuous Distribution (Series on Econometrics and Management Sciences) Discover Entropy and the Second Law of Thermodynamics: A Playful Way of Discovering a Law of Nature Entropy Optimization Principles

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