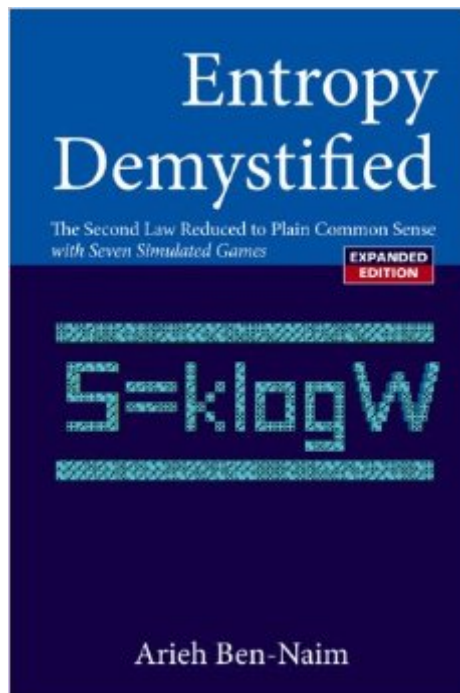


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Entropy Demystified: The Second Law Reduced To Plain Common Sense



Synopsis

In this unique book, the reader is invited to experience the joy of appreciating something which has eluded understanding for many years – entropy and the Second Law of Thermodynamics. The book has a two-pronged message: first, that the second law is not infinitely incomprehensible as commonly stated in most textbooks on thermodynamics, but can, in fact, be comprehended through sheer common sense; and second, that entropy is not a mysterious quantity that has resisted understanding but a simple, familiar and easily comprehensible concept. Written in an accessible style, the book guides the reader through an abundance of dice games and examples from everyday life. The author paves the way for readers to discover for themselves what entropy is, how it changes, and, most importantly, why it always changes in one direction in a spontaneous process. In this new edition, seven simulated games are included so that the reader can actually experiment with the games described in the book. These simulated games are meant to enhance the reader's understanding and sense of joy upon discovering the Second Law of Thermodynamics.

Contents: Programs for Simulating Some of the Games in the Book
Introduction, and a Short History of the Second Law of Thermodynamics
A Brief Introduction to Probability Theory, Information Theory, and All the Rest
First Let Us Play with Real Dice
Let's Play with Simplified Dice and Have a Preliminary Grasp of the Second Law
Experience the Second Law with All Your Five Senses
Finally, Grasp It with Your Common Sense
Translating from the Dice-World to the Real World
Reflections on the Status of the Second Law of Thermodynamics as a Law of Physics

Readership: General readers interested in science; a useful companion for a course in thermodynamics.

Book Information

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Customer Reviews

Arieh Ben-Naim, professor at the Hebrew University of Jerusalem, taught thermodynamics and statistical mechanics for many years and is well aware that students learn the second law but do not understand it, simply because it can not be explained in the framework of classical thermodynamics, in which it was first formulated by Lord Kelvin (i.e. William Thomson, 1824-1907) and Rudolf Julius Emanuel Clausius (1822-1888). Hence, this law and the connected concept of entropy are usually surrounded by some mysterious halo: there is something (the entropy), defined as the ratio between heat and temperature, that is always increasing. The students not only do not understand why it is always increasing (it is left as a principle in classical thermodynamics), but also ask themselves what is the source of such ever increasing quantity. We feel comfortable with the first law, that is the principle of energy conservation, because our experience always suggests that if we use some resource (the energy) to perform any work, then we are left with less available energy for further tasks. The first law simply tells us that the heat is another form of energy so that nothing is actually lost, something which we can accept without pain. In addition, the second law says that, though the total energy is constant, we can not always recycle 100% of it because there is a limit on the efficiency of conversion of heat into work (the highest efficiency being given by the Carnot cycle, named after Nicolas Léonard Sadi Carnot, 1796-1832). Again, we can accept it quite easily, because it sounds natural, i.e. in accordance with our common sense: we do not know any perpetual engine.

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