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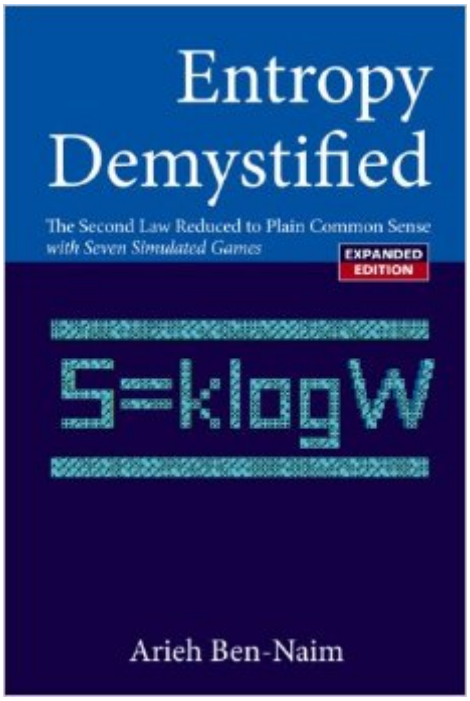
Entropy Demystified:The Second Law Reduced To Plain Common Sense



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Synopsis

In this unique book, the reader is invited to experience the joy of appreciating something which has eluded understanding for many years â " 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 readers' understanding and sense of joy upon discovering the Second Law of Thermodynamics.Contents:Programs for Simulating Some of the Games in the BookIntroduction, and a Short History of the Second Law of ThermodynamicsA Brief Introduction to Probability Theory, Information Theory, and All the RestFirst Let Us Play with Real DiceLet's Play with Simplified Dice and Have a Preliminary Grasp of the Second LawExperience the Second Law with All Your Five SensesFinally, Grasp It with Your Common SenseTranslating from the Dice-World to the Real WorldReflections on the Status of the Second Law of Thermodynamics as a Law of PhysicsReadership: 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, taughtthermodynamics and statistical mechanics for many years and is wellaware that students learn the second law but do not understand it,simply because it can not be explained in the framework of classicalthermodynamics, 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 areusually surrounded by some mysterious halo: there is something (theentropy), defined as the ratio between heat and temperature, that isalways increasing. The students not only do not understand _why_ it isalways increasing (it is left as a principle in classicalthermodynamics), but also ask themselves what is the _source_ of suchever increasing quantity.We feel comfortable with the first law, that is the principle of energy conservation, because our experience alwayssuggests that if we use some resource (the energy) to perform any work,then we are left with less available energy for further tasks. Thefirst law simply tells us that the heat isanother form of energy so that nothing is actually lost, something whichwe can accept without pain. In addition, the second law says that,though the total energy is constant, we can not always recycle 100% ofit because there is a limit on the efficiency of conversion of heat intowork (the highest efficiency being given by the Carnot cycle, namedafter Nicolas LÃ©onard Sadi Carnot, 1796-1832). Again, we can accept itquite easily, because it sounds natural, i.e. in accordance with ourcommon sense: we do not know any perpetual engine.

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