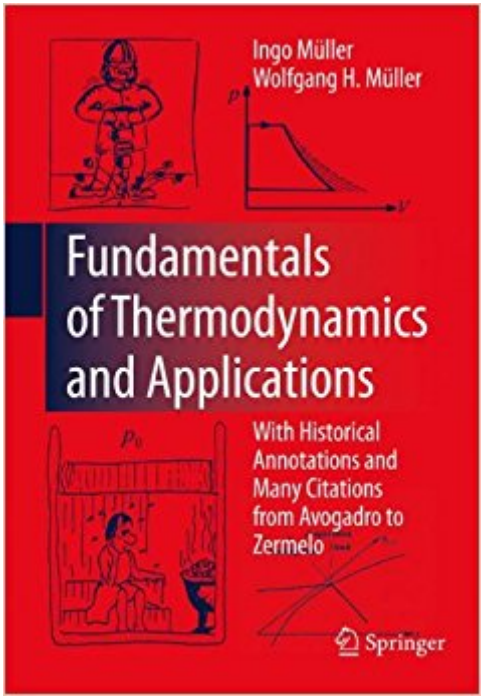
Fundamentals Of Thermodynamics And Applications: With Historical Annotations And Many Citations From Avogadro To Zermelo



Synopsis

Thermodynamics is the much abused slave of many masters â ¢ physicists who love the totally impractical Carnot process, â ¢ mechanical engineers who design power stations and refrigerators, â ¢ chemists who are successfully synthesizing ammonia and are puzzled by photosynthesis, â ¢ meteorologists who calculate cloud bases and predict fÃ¶hn, boraccia and scirocco, â ¢ physico-chemists who vulcanize rubber and build fuel cells, â ¢ chemical engineers who rectify natural gas and distil f- mented potato juice, â ¢ metallurgists who improve steels and harden surfaces, â ¢ - trition counselors who recommend a proper intake of calories, â ¢ mechanics who adjust heat exchangers, â ¢ architects who construe â " and often misconstrue â " ch- neys, â ¢ biologists who marvel at the height of trees, â ¢ air conditioning engineers who design saunas and the ventilation of air plane cabins, â ¢ rocket engineers who create supersonic flows, et cetera. Not all of these professional groups need the full depth and breadth of ther- dynamics. For some it is enough to consider a well-stirred tank, for others a s- tionary nozzle flow is essential, and yet others are well-served with the partial d- ferential equation of heat conduction. It is therefore natural that thermodynamics is prone to mutilation; different group-specific meta-thermodynamicsâ ™ have emerged which serve the interest of the groups under most circumstances and leave out aspects that are not often needed in their fields.

Book Information

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Customer Reviews

From the reviews:â œThe book is divided in twelve chapters which describe the fundamentals of thermodynamics and many applications, mainly in machines or chemical reactions. â | The whole

book is also illustrated with many figures and many historical notes concerning the pioneers of the thermodynamics. Engineers will find here an historical complete introduction of thermodynamics going to modern developments. Mathematicians involved in partial differential equations (pde) will find the physical and historical context which leads to the famous heat or wave equations, among other pdes.â • (Alain Brillard, Zentralblatt MATH, Vol. 1168, 2009)â œThis is a remarkable book, which presents in a systematic way the fundamental aspects of classical thermodynamics. â | The interesting feature of the book is that all applications are described using the rigorous concepts of thermodynamics. The book contains also many historical annotations and many mini-biographies of the pioneers. â | The authors formulate and exploit the second law of thermodynamics, together with the concept of entropy. â | The book ends with some studies about flames, linear viscoelasticity and shape memory alloys.â • (Elvira Barbera, Mathematical Reviews, Issue 2012 b)

The book provides a systematic introduction into the fundamental ideas of thermodynamics at a somewhat advanced level. And it exhibits many applications of the theory in the fields of engineering, physics, chemistry, physical chemistry, and materials science. The universal equations of balance are strictly separated from the constitutive equations which characterize the behavior of material bodies, mostly gases, vapors, and liquids. Some selected solids like rubber, gels and shape memory alloys are considered as well. Both authors have taught students of the subject for many years at the Technical University of Berlin, and they have actively participated in modern research in thermodynamics. Historical annotations offer some relaxing moments for the reader.

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