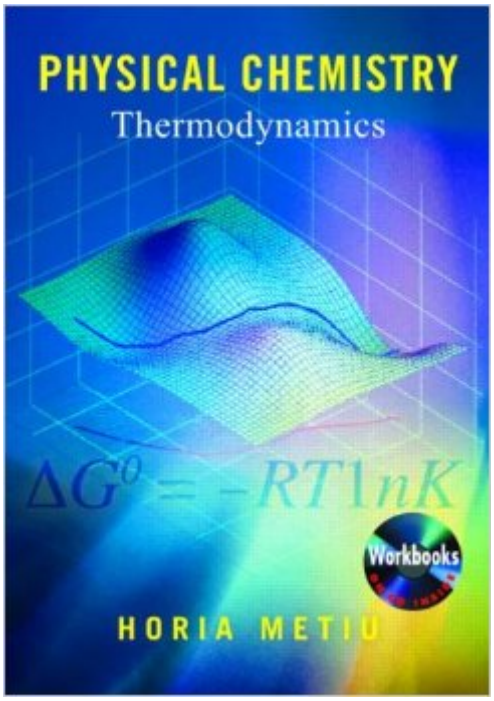
Physical Chemistry: Thermodynamics



Synopsis

This is a new undergraduate textbook on physical chemistry by Horia Metiu published as four separate paperback volumes. These four volumes on physical chemistry combine a clear and thorough presentation of the theoretical and mathematical aspects of the subject with examples and applications drawn from current industrial and academic research. By using the computer to solve problems that include actual experimental data, the author is able to cover the subject matter at a practical level. The books closely integrate the theoretical chemistry being taught with industrial and laboratory practice. This approach enables the student to compare theoretical projections with experimental results, thereby providing a realistic grounding for future practicing chemists and engineers. Each volume of Physical Chemistry includes MathematicaÂ® and MathcadÂ® Workbooks on CD-ROM.Metiu's four separate volumes-Thermodynamics, Statistical Mechanics, Kinetics, and Quantum Mechanics-offer built-in flexibility by allowing the subject to be covered in any order.These textbooks can be used to teach physical chemistry without a computer, but the experience is enriched substantially for those students who do learn how to read and write MathematicaÂ® or MathcadÂ® programs. A TI-89 scientific calculator can be used to solve most of the exercises and problems.Â® Mathematica is a registered trademark of Wolfram Research, Inc.Â® Mathcad is a registered trademark of Mathsoft Engineering & Education, Inc.

Book Information

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Customer Reviews

I was a TA for an undergraduate quantum mechanics class that used this book. It provides a more

modern approach to solving problems using Mathematica. Its use of Mathematica to solve problems had major advantages and disadvantages. It allowed for students to solve problems that they otherwise would not have been able to do, and required them to develop some computational skills that will be useful to them in the future (I have had to learn several different programming languages in my graduate work). However, learning both Mathematica and Quantum Mechanics simultaneously proved to be quite a task, and I fear that some of the meaning in both was lost. Metiu provides great examples of how to solve problems for each chapter in the Workbook CD that accompanys the text. I doubt if everybody would have been able to make much progress on HW problems without these examples. In many instances the code Metiu provided was used to solve similar HW problems without much knowledge of how the programs worked, and in others, his examples were followed without knowing what was being solved. This book seems very distinct from others as Metiu describes QM much differently than other introductory works, and provides important details that other books completely omit. I enjoyed his approach which helped me to understand better. This book would be great for an advanced (honors) undergraduate class, one that already has some experience with solving problems with computers, or one that is able to schedule a weekly tutorial time to go over problems using Mathematica, otherwise another text may be best. It is newly released so there are some errors but nothing major.

This book is good for beginners in Mathematica and statistical physics. It succeeded in giving fundamental concepts such as partition function, entropy, enthalpy, free energy, and so on by showing functions coded by Mathematica. However, the application or examples are limited to gasses and Very simple systems. Those who have learned statistical physics by other books may feel short on fun. However, the book that deals the application of Mathematica to statistical physics is quite rare. I appreciate this point.

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